THE

POPULAR RECREATOR.

A KEY

to

IN-DOOR AND OUT-DOOR AMUSEMENTS.

"THAT BOW, IF KEPT ALWAYS STRAINED, WOULD LOSE ITS SPRING, AND PROBABLY SNAP. LET IT GO FREE SOMETIMES."—RIP.

Vol. I.

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## CONTENTS

**ANGLING**
- Fishing—Tackle in General—The Choice of Rod—Bamboo v. Hickory—Fixed Point—River Fish... **44**
- Rods (continued)—Fishing Lines—Gut—Silk—Single & Double loop of Shot—Best Ways of Applying. **97**
- Heavy Lines—Gut—Human Hair—Nottingham Lines—How to Stain—Floats for all Waters. **165**
- Floats—The Traveller—Caps—Shot—The Improved Traveller—Chasing Ring—Swivels—Fluorocarbons. **206**
- Clearing—Ring—Drag Hook—Disguisers—The Rouch. **349**

**AQUARIUM, THE.**
- My Experiences—The Struggled Life—Natural History—Zoological Garde... **57**
- Animals and Plants—Oxygen—A Failure. **187**
- My next Attempts—The Two Globes—Vegetation in Water. **245**
- Water Breathing—Evaporation—Vegetation—Pollution of Water. **309**
- Decomposition—Purification—To make an Aquarium. **373**

**BICYCLING.**
- The Machine and its History—First Practice—Mounting—Steering—The Ariel—The Surbiton. **6**
- A Mistake—Four-Wheeled Machines—Tricycle—Low-Wheeled Machines—India-Rubber Tires—Putting on the Break—Luggage. **76**
- A Rough Ride—Preparing for a Trip—Use of the Break—Position of the Saddle—“Riding Jealous.” **129**
- Picking your Pace—Our Start. **129**
- Fresh Start—Early Breakfast—A Stop—Oiling the Horses—To Winchester—Homeward. **203**
- Maps—Speed—Prices—To make a Bicyec. **271**

**BILLIARDS.**
- Antiquity—India-Rubber Cushions—Tricks of Players—The Table—The Game. **107**

**Angler Anecdote of Roberts—Terms used in the Game.**
- The Bridge—The Stroke—Screw—Drag. **65**
- The Best Striking—Where will your ball go?—The Cushions—Influence and Reflection. **137**
- Side—Under the Cushion—Losing Hazards—The Spot Stroke—Playing for Position. **235**
- Practice of the Losing Hazard—Top Pocket—Middle Pocket—Losing Hazards—Side—The Rules. **341**

**BOATS AND BOAT SAILING.**
- The Best Rig—Loggers—Sails and Masts—Technical Terms—Centre Boards—Our Teaching. **30**
- The First Cruise—Sea Sickness—The Boat—Getting Aboard—Hoisting Sail—Tacking—Making a Board—Tacking—Landing—Squalls—Jibing—Bringing to our End of the Cruise. **193**
- Trimming of Ballast. **267**
- Third Cruise—Varieties of Low—Sail Rig. **321**

**BUTTERFLY COLLECTING.**
- Time for Seeking—Variations—Apparatus. **177**
- Apparatus (continued)—Nets—The Ring—The Cap-Net—Open-side Bottle—Stupifying—Killing Boxes. **279**
- Butterflies—The Large and Small Whites—The Peacock—Camberwell Beauty—Tortoiseshell—Admiral—Comon. **344**

**CASTING.**
- Casts from Coins, Medals, and Seals. **318**

**CHESS.**
- Nature of the Game—Acquiring Skill—Situation of the Pieces—Their Movements. **15**
- Queen's Pawn—Capturing—Taking on Pawn—Problems—The King—Check and Checkmate. **78**
- Mystery of Automation—Checkmate—Notation—A Problem. **145**
- Checkmates—Suicided Mate—Castling—Problems. **165**
- The Value and Properties of the Pieces—Maxims—Difficult Situations. **316**
- Pawn—Moral Qualities required in Chess—Time. **380**

**CRICKET AND CRICKETERS.**
- Historical—Old Players—Cat and Dog—Single Wicket—Pitch—Myn—Pele—Wickets. **33**
- Bats and Balls—Old Style—Little Joey—Gloves—Shoes—Leg guards. **99**
- Width of Bats—Old Players—The First Balls—Present Made—Attributes of Cricket. **161**
- Batting—Position—W. G. Grace—Essenriettles. **209**
- To show its full face to the Bowler—Forward and Backward Play—A Good Plan—Confidence of Bowlers—Defence—Composure—Seeing the Ball—the Wicket—Playing Forward. **290**
- Bowling—More Words on Batting—The Cut—How to learn the Art of Cutting—Tom Humphrey, Caffyn, and Carpenter—Timing—Half-Volley. **333**

**CROQUET.**
- Definitions—Terms Used—Particular Positions—Balls and Mallets—Practise—The Fall—Mallet. **96**
- Mallets—Eccentricities of Players—Strong Tools—Handles—To Hold the Mallet—To Strike. **131**
- The Laws of the Game. **278**
- The Balls—Wood—Hoops—Braces—Clips—Pegs—Settings. **312**
- Single and Partner Matches—Tournaments—Trials—Shots—Mallet Marks. **324**

**DRAUGHTS.**
- The Board—The Men—More—Notation—Openings—A Match in a Dream. **190**
- The Laws—Openings—General Instructions—Three Kings to One—Two Kings to Two—Three Kings to Three—Four Kings to Four. **239**
- Openings—Endings of Games—Storge's Positions—Variations. **291**
- Theory of the More—The Second Position. **356**

**DRIVING.**
- Old Whips—The Classics—War Chariots—Macadam's Roads—The Seat. **19**
- Concluding Aphorisms. **129**
- The Reins—Turning—A Light Hand—Rule of the Road—Avoiding Danger—Lady Drivers. **161**
- Slips—Skulls. **218**
- Meagrim Low Seats—Tripping—Reins—Turning Corners. **112**
- Wheelers—Advice. **318**

**Egg-collecting.**
- Collecting—Old Collectors—Rare Birds—Where to Go—Campaign Boxes—Blowing—Implement—Incubation. **331**

**EGGS, ORNAMENTAL.**
- Dyeing—Various Tints—Easter Eggs—Ornamental Vases—Mosaic Work—Bird Screens. **46**
- Olden Egg-work—Presentations—The Mosaic Food—Blending of Colours. **102**

**ELECTROPLATING.**
- Electricity—Simple, Cheap Apparatus—Moulds—Solutions—To make a Medallion. **140**
- Electricity—Zinc—Copper—Circuits—Our Experiment—Positive—Negative. **301**
- Action of the Acids—Batteries—Weights. **263**

**FEATHER WORK.**
- Ancient Decorations—Flumination—Feathers of Foreign Birds—To make Screens—Imitation of the Hummingbird. **9**
- Bird-making—Bamnet Screens—Materials—The Star-spangled Banner—Hand Screens. **67**
- Hand Screens—Baskets—Pen-wipers—Muffs—Another Kind of Basket—Feather Flowers. **135**
- Fans—Muffs—Mat—Pen-wipers—Covers—Tufts and Cockades—Trimmings. **234**

**FENCING.**
- Weapon to Weapon—Greek Swords—Scipio and the Buckler—Amphitheatres—French Fencers. **41**
OIL rules the nation with iron hand whose finger points continuously in one direction, and says, "Work, that you may be wealthy." Education stands, with a Minerva-like smile, calm and wise, and whispers, "Learn, that you may be wise." To complete the trio, let us bring forward Recreation, bright of eye, glowing of cheek, with ruddy lip pouted to display her glistening teeth. She pants as one out of breath with eager ness, and there is a pure silver ring in her mirthful voice as she bids you pause and remember her, and cries, "Play, that you may be healthy!"

In the name then of wholesome pastime, of recreation, sport, play, we appeal to all—to young and old, to gentle and simple, to the busy workers of our towns, to those whose lot is placed in afluence; for our object is this—as far as is practicable to produce the best and most exhaustive work upon amusements that has been placed before the public. To do this the most eminent and pleasant writers upon each game and sport have been enlisted, with busy pen ready to pour forth in happily chosen word the secrets of the game of skill, the wonders of science in sport, and the many pastimes for home and open-air that can give gladness and elevation of mind to all. Our range is very wide, extending from the making and usage of the simplest toy to the recreation that contains within it the germs of some noble science.

And now to enlarge upon our intentions. We mean to give on each subject no mere dry text-book detail, but a broad, light treatment, decidedly practical, but so written that the very reading of the paper shall be a recreation in itself, and amusing to those who, while giving the preference to one or two or three of our pleasant pastimes, may still enjoy the knowledge to be gained of others. Genuine, innocent, pure recreation is to be afforded; and while many sports will be childlike, the ladder will be long, and reach by steps to those which are of a high-class and elevating nature—whose very pursuit must needs give great results. We said that we appealed to youth and mirth; for we shall treat in turn of every playground game; of toy homemade and bought; round games and forfeits; puzzles of every device; and the drawing-room amusements popular with those young ladies who will not romp. But for those and their more matured sisters will be endless amusements: out-door, they shall learn to draw the bow, to use the croquet mallet, seek wild flower, fern, moss, and grass, seaweed, shell, and other wondrous objects of the shore; indoor, be initiated into the mysteries of recreative art, paint glass, colour transparencies, or practise decalcomanie, potichomanie, or spray work. Paper flowers will be made, and those of wax, with many a design in fruit. Everything that scissors can cut will here be shown, with the art of making endless ornaments of twigs, acorns, and fir-cones; baskets of moss or aluin; screens of feathers or paper; Nature-printing and shell-work; illumination, embroidery, lace, and patchwork; coral and fret cutting, and bouquets of skeleton leaves, with, most charming of all, the arranging and treatment of the living flower in nosegay and ornament, or in those pleasant home additions, the window-garden and conservatory. In short, all that is pleasant and feminine of pursuit will be here.

Youth shall grow lusty with his lessons in swimming, and learn in recreation that which may be the means of saving his own or a brother's life; his skates be made to ring upon the hard metallic ice as he sways in graceful curves from side to side, and imitates the swallow in his skin. With pleasant teachers he will seek the egg of woodland bird for his collection, preserve and stuff choice specimens for his little museum; know safely how to make the brightest coloured fireworks; manufacture balloon and kite; while elder brothers, those who verge on manhood, shall have a goodly museum from which to choose—they and those in manhood and manhood's prime. For what have we? A perfect catalogue of recreations from which all may choose, and in which practically the cost has been explained, and the pursuit shown in every phase.

As amateurs they may use the workman's hammer, and construct in wood, rig a boat, contrive a steam-engine, window-garden and summer-house, or turn a bare London yard into a pleasant view. Or study the secrets of optics—magic lantern and microscope—glass-blowing and electrotyping, photography, turning and organ-building, chemistry and hydraulics.

In natural history pursuits they shall construct and collect for aquaria, fresh water and salt; make a collection of moths and butterflies; collect shell and sea-weed, stone and fossil; study the habits of, and catch, bird or quadruped, fish in sea or river, and learn to handle a rifle or gun.

What more? Scores of subjects. What of athletic pursuits? They shall build their own canoe, and paddle it of course; row under a great master; know how to rig
and sail a boat; drive as if reins were familiar to them from birth; ride with ease, confidence, and grace; train for running or leaping; handle dumb-bell and club; climb, and leap bar, or swing from rope, to the development of every muscle—in short, study every manly athletic sport or pastime.

And then for skill, those great in the knowledge shall unfold mysteries, and explain the bias of bows, or those wondrous shooting balls and hits at cricket; tell how the ball can be made to follow the orders of that magic wand, the cue, and cannon from cushion, and seek each pocket by the green cloth in billiards. Chess shall be treated by a champion, and royal battles done; draughts, backgammon, bagatelle, with their many relatives, will have their place; and cards with their many games, from whist through bêquie and zetka, be treated, even unto simple patience.

And here we seem to hear some one say, with shaking head, “Cards—gambling—No!”

A word with this imaginary speaker, to whom we say, every game of skill is pure and innocent! If these pleasant pastimes are made the vehicles of gambling, the fault lies not with the game, but with the covetous and grasping disciples of folly who seize upon it for their purposes. And besides, these things are mere matters of custom and prejudice. Centuries ago the ladies of Edward the Fourth’s reign played at skittles! A few years since bagatelle was only the ordinary game of an inn parlour; fashion has changed that, and a bagatelle board is a pleasant means of passing an hour introduced in many a drawing-room.

Here then we end? Oh no! Nothing has been said of keeping silkworms, of home pets—of the canary, or talking bird, rabbits, fosils, and guinea-pigs; the pigeon, squirrel, or sleepy mouse, the cat, or its mortal enemy our old friend the dog. They shall have their place, and be discoursed upon by those who know their little weaknesses, and who will point out their failings as well as excellences, and the means of keeping them in health. Neither have we mentioned yet amateur theatricals or charades, or the games connected with many seasons of the year, for even now we have been almost degenerating into a catalogue.

But we appealed to the aged. What have we for them? Surely there has been enough quoted, for, after all, the healthy mind is never old; and for ever let the idea be exploded that those of mature years render themselves childish by entering into the sports of the young. The sternest desk-master we ever had was one who joined us in the playground, and could shoot a tow and spin a top to the admiration of every boy in the school.

To the mature and old, then, we offer that which we shall place before the young, telling those whose years are many and whose limbs are feeble that they still may read and ponder upon our papers, and think with a smile, not sad, of those days when they were young and lusty, and could leap and wrestle with the best. To them the young can still flock for advice—advice they will accord, while they will sigh, and perhaps say, “Ah, when we were young we had no such works as this!”

We have taken no slight task in hand, but one that it will be a great recreation to fulfil. In conclusion, we would repeat in other words that which has been already announced, namely, the text upon which we work—breadth and lightness, while dulness shall be banished from the pages of that which is intended to be truly a Popular Recreator.
playground without a loving sigh, or without a desire to emulate
Pastr, and once again recover the joys of youth, that pitiless
Time has removed far and still farther away from us. Was it
not the Iron Duke—the brave old soldier who checked the wild
ungovernable ambition of that insatiable conqueror the First
Napoleon, and in all probability saved England for us British
boys, with all its histories and its glories, its ancient rights
and unsullied name—who said that it was on the playgrounds
of England that the battle of Waterloo was won?

I know there is another version of the story, that it was the
playing-fields of Eton that gained that memorable day of the 18th
of June for Englishmen and Britons; but I prefer the more general
application, and I am satisfied to read the passage in the more
universal sense, as the victory of British playgrounds, and
British boys all over the world, under the rule of that good
Queen over whose dominions the sun is said never to set. So
let puny and misanthropical dullards say what they will in dis-
paraging of these juvenile sports; it matters not, as long as
the spirit remains that has always pervaded the minds of us
English boys—I claim to be a harmless old boy myself, so
pardon the identification between you and I—of healthy exer-
cise and cheering pleasures, that have prevented Jack from
becoming the dull boy that he surely otherwise would have
been. So come with me, now that the bell has marshalled us
out of school, and the lessons of the day are over, and help to
make the playground ring again, as it has rung many a thousand
times before, and will, I hope, many a thousand times again,
with jollity and no thought of care,

"Turning to mirth all things of earth,
As only boyhood can."

ROUNDERS.

Command me first of all to the game of rounders, if you want
a pastime that you can enjoy at any time of the year, in any
weather, and without any of the trouble that is incidental to so
many of the other kindred sports. I fancy there are few, very
few, of us who cannot recall the luxury of an occasional relaxa-
tion in the way of rounders, after the fatigue and exult of a
long and tedious outing at cricket. I can picture, as if it were
but yesterday, the jollity that reigned supreme in the cricket-
field under that sacred old hill out Harrow way, when rounders
was proclaimed by a pliobiscete as the sport next on the pro-
gramme; and it seemed like a wail from the great ocean of the
past, when, last summer, I had a chance of renewing my old
intimacy with the game, at the invitation of a posse of mirth-
loving Cheltenham schoolboys, as I passed across the vast field
which they are wont to call, as a term of endurance, "our
playground."

I do not know any sport that can hold a candle to rounders
on the score of simplicity or economy of materials. It can be
learned by the veriest dunce with ease; and it requires nothing
but a ball, a few sticks, stumps, or even stenes, and a common
stick or bat for the purpose of striking the ball. You may
consider it merely a modified form of cricket if you like, but
it can be pursued and enjoyed when cricket is impossible, and
when other sports are equally impracticable. It resembles,
rather, one of those occasional scenes that you see at a theatre
when time is required for the preparation of the set or trans-
formation scene, and is always ready to serve its purpose when
a few minutes are required before we can be introduced into all
the mysteries of Dreamland or the mythical realms in which
the Queen of the Fairies is theatrically represented to hold her
court. So, on the ground of general utility, I would advise the
study of rounders, and you will have a pastime always on hand
when you are dettred from cricket or football; one, too, that
you can enter into with spirit without a formal preparation,
fieldsmen has a "shy" at any of the runners. I say they will all have to be watchful, for otherwise "rounders" will be plentiful, and the chance of an innings extremely small.

You have now so far distributed your field, and the feeder has the ball in his hand to toss to the first of the strikers who comes up to represent the inside. This striker places himself in front of the stump or stone that serves to represent the home, with bat or stick, as the case may be, in hand, to strike the ball far and low, and of course, if possible, beyond the reach of the outermost circle of fieldsmen. The feeder must throw the ball so as to give the striker a good chance of hitting, or time will be wasted, for he need not strike at any ball unless it appear to suit his requirements. So it is best not to cause tedious delays; as it is only when the striker has struck at two balls, and either missed or declined to run, that he is compelled to strike at the third ball, on pain of being put out; and here, too, he has the chance of being put out, if he strike the ball on this third attempt so that it passes behind him, or so that it be caught by any of the fieldsmen before it touch the ground.

On the other hand, on the supposition that he has hit the ball at the third attempt—and, to make sure of a hit, it is usual to strike the ball with the hand in this extremity—he makes hot haste, as fast as his legs can carry him, to the base at No. 2, and so on, if he can succeed on his circuit by way of 3, 4, and 5, without being hit by the ball from any of the fieldsmen while running between any of the bases, or before the ball has been thrown up to the feeder, and by him grounded home. If he be just started from one base on his way to another when the ball reach the feeder, and the latter decline a shy at him, he will have to return to the base whence he came; but if the feeder or any of the fieldsmen shy at him, and he escape untouched, he can continue his course. If then he succeed in getting home before the ball again returns to the feeder, he is entitled to the honour of a rounder, which is important, as that side wins which scores the most rounders; but if, on the other hand, he be hit by one of these shyies, he is out, and stands on one side, being practically removed from all participation in the game until either the rest of his party are discomfited in a similar manner, or the turn of his side arrives to field; of which more anon.

BILLIARDS.

BY A. G. PUTNE, B.A.

ANTIOCY - INDIA-RUBBER CUSHIONS — TRICKS OF PLAYERS — THE TABLE — THE GAME — POSITION.

THAT a game called billiards is of ancient origin there is no doubt; Shakespeare even mentions it as being played B.C. 30, but that any game resembling the modern one of the name existed at that period is very doubtful. It has been known in this country for about 300 years; recent improvements have however so changed its character that, practically speaking, it may be considered almost a game of modern date; and as our papers are intended to be of a practical character, we will not enter into a discussion as to what country or to what individual we are originally indebted for its invention.

The invention of leathern tops, together with the substitution of slate for wooden beds, and of India-rubber for list cushions, have so altered the game, that it can hardly have been said before these changes were introduced to have been billiards except in name, and it must have borne about the same resemblance to modern billiards as bat, trap, and ball bears to modern cricket.

It will no doubt seem strange to any one who has ever played a few strokes with a cue without a stop, to be told that before the year 1507 leathern tops had no existence; such however is the case, and we are indebted to a foreigner of the name of Mingaud for an invention that has been to billiards what Galileo's discovery was to...
astronomy. Mingaud was perhaps the first real master of the game. On one occasion he entered a billiard room where he found a man boasting, and stating that Mingaud could not give him more than three points in twenty-one. The result of a series of games was that Mingaud defeated the boaster, giving him fifteen points out of twenty-one. Upon which the latter said, "No human being could possess so entire a mastery over the balls. I shall play you no more."

"No," replied Mingaud, "there is no need of any further exhibition on your part. But before we part, I would impress upon you the great disadvantage of not speaking the truth."

"Monsieur, I do not comprehend; I —"

"Quiet! There is no reason for a noise. My explanation is very brief. I am called Mingaud, and I think you will admit my skill is somewhat above yours. Had you not boasted so outrageously, I should have contented myself with remaining a spectator."

Before Mingaud's discovery of the leathern top, the ball had to be struck exactly in the centre; side and screw were alike impossible and unknown.

It will however be best perhaps at once, for the benefit of real beginners — and by real beginners we mean those who have never played — to give a description of a billiard-table, with the names of the pockets, cushions, and spots, and also to give some short explanation of a few of the technical terms used in billiards, as it is obviously useless to speak of "side" and "screw" to those who have no idea of what either means.

To begin with the table:

The slate bed of a full-sized table measures 12 ft. by 6 ft. 2 in., and as an allowance of 2 in. in width must be made for the projection of the cushions, the playable bed of a table is 11 ft. 8 in. in length by 5 ft. 10 in. in width, and consequently is double as long as it is wide; and it may be as well to bear in mind that it consists of two squares, exactly equal, joined together, each side of the squares being 5 ft. 10 in. in length. This is occasionally a guide in judging of the angles.

The first diagram (Fig. 1) represents the bed of an ordinary full-sized billiard-table. A is the right-hand top pocket; B is the left-hand top pocket; C is the right-hand side pocket; D is the left-hand side pocket; E is the right-hand bottom pocket; and F is the left-hand bottom pocket. The average size of a pocket — i.e., its width at the fall — is from $2\frac{1}{2}$ to $3\frac{1}{2}$ inches. Some pockets are easier than others, not only on account of their greater width, but also on account of the varying shape of the cushions at the edge.

The cushion between the two top pockets is called the top cushion.

The cushions between the right-hand top pocket and the right-hand bottom pocket are called the right-hand cushions.

The cushions between the left-hand top pocket and the left-hand bottom pocket are called the left-hand cushions.

The cushion between the right-hand and left-hand bottom pockets is called the bottom cushion.

The line $b' b''$, called the baulk line, is drawn (between two marks let into the woodwork) on the cloth of the table, parallel with the bottom cushion, and at a distance from the face of it, varying on different tables from 28 to 30 inches.

The space between this line $b' b''$ and the bottom cushion is called baulk.

The centre (d) of the baulk line $b' b''$ is the centre spot in baulk.

With the centre $d$, and at the distance $d c$, along the baulk line $b' b''$, describe a semicircle on the baulk side of the line, cutting the line $b' b''$ in the point $c$. This semicircle is called the baulk circle. The distance $c' c''$ varies on different tables from 20 to 23 inches.

The spots $c'$ and $c''$ are called respectively the right-hand spot in baulk and the left-hand spot in baulk. All other spots are in the centre line of the table, parallel with its length.

The spot $a$ is 13 in. from the top cushion, and is generally called "the spot."

The spot $m$, exactly in the centre of the table between the two middle pockets, is called the "centre spot."

The spot $p$, midway between the centre spot and the top cushion, is called the "pyramid spot," owing to its being principally used in a game called pyramids.

So much for the table.

We now proceed to a few words upon the game:

The game of billiards is played with three balls, one red and two white. The balls are $2\frac{1}{2}$ inches in diameter, and weigh about $4\frac{1}{2}$ ounces. It is of great importance, however, that in the same set of balls all should be of exactly equal weight.

The red ball at the commencement of the game is placed on the spot $a$; and each of the two players takes one white ball, which are distinguished from each other by one of them being marked with a small black spot, and called consequently the "spot ball."
THE POPULAR RECREATOR.

Each player at starting should particularly notice which is his own ball, as there is a penalty for playing with the wrong one. It is also well for beginners to avoid the habit, which is not uncommon, of preferring one ball to another. We have often heard it said by players, “Oh, I always play with the spot,” or “I always play with the plain ball.” Should two players meet who both prefer the same ball, it is very probable that during the course of the game the unsuccessful selector will play with the wrong one.

Each player starts from the baulk circle, and strikes his ball with a long ash stick called a cue.

The length of a cue varies—4 feet 9 inches is a fair medium length. A tall man, with what is called a long reach, would require a cue rather longer than a very short man with a small reach.

The diameter of the cue in the butt is about 2½ inches, and gradually tapers down to a point. The diameter of the cue at the point is generally about half an inch, or rather less. Beginners should avoid playing with a cue with too small a point; three-eighths of an inch is quite small enough.

To the point of the cue is fixed the leather top. The tops now used are almost universally the French tops, and are sold in boxes containing many of different sizes. In topping cues, great care should be taken to select a top the exact size of the point of the cue; and in fixing them the same principles apply as in veneering—both the top and the top of the cue should be made hot; the top of the cue should be made perfectly flat, but not too smooth (just as in veneering a toothing plane is used); the cement or glue—we prefer the latter—should be applied very hot, and the top pressed well down. The reason why the cue and top should be made hot is that, as heat expands the cue on cooling, the cement or glue is to a slight extent drawn into the minute air-holes on the surface of the cue and top, causing them to adhere more closely.

The first thing a beginner has to learn is to strike his own ball properly, and in order to do this great care must be taken to acquire an easy position.

The position in which a player stands is a matter of very great importance, especially to novices; as, if they once get into a habit of standing badly they will find it a very hard matter to correct it. Suppose a player to be about to make an ordinary stroke—for instance, about to play from the centre of baize, where he can reach his own ball with ease—the proper position which he should occupy is as follows:—The player should stand with his left foot advanced, the toe of which should be about a line with the edge of the table. He should stand firmly on his right leg, which should be quite straight, while the left leg should be slightly bent. The body should be inclined forward so that the left hand can rest with ease on the table. The ball must be exactly in front of the player, in a line with the direction in which he intends to strike it. (See Illustration on page 5, “The Position.”)

BICYCLING.

By CHAR. F. INNES.

THE MACHINE AND ITS HISTORY—FIRST PRACTICE—MOUNTING—STEERING—THE ARMS—THE SADDLE.

VERB a patent was taken out in France on behalf of a certain Baron von Drais, for his invention of a hobby-horse, but more especially during the last seven years, the attention of many practical and scientific men has been directed towards improving and perfecting a machine that would enable travelling to journey from place to place on the high roads without the fatigue of walking, at the same time dispensing with the use of steam; and the result is that we have in the bicycle of the present day perhaps the best yet simplest form of machine that is likely to be produced. We say perhaps, however, for in this age of progress one improvement succeeds another with a rapidity little dreamt of by our ancestors, and under these circumstances it would be rash to say that the beautiful vehicles now in use may not, in ten or twenty years’ time, be voted old-fashioned and utterly out of date.

Though the modern bicycle certainly owes its original parentage to the dandy-horse of fifty years ago, the child would hardly know its own father, owing to its great superiority in workmanship and to its being constructed on a totally different principle. On looking through the records of the Patent Office it will be found that as far back as December 22nd, 1818, a patent was granted to one Dennis Johnson, a coachmaker, for “a machine for the purpose of diminishing the labour and fatigue of persons in walking, and enabling them at the same time to use greater speed, and which he intends to denominate the Pedestrian Currie.”

The illustration of this “Pedestrian Currie” (Fig. 1, page 8) will at once enable the reader to see the difference between its method of progression as compared with the present bicycle. According to the specification, this machine consists of a beam, A, B, of wood or metal, of sufficient strength to bear the weight of the person who is to ride it. This beam is supported upon two light wheels, C, D, by means of the ironwork E and the pivot F, the hinder wheel being fixed so as only to revolve in the direction of the beam, whilst the front wheel is pivoted to the beam at G, where a screw makes it fast; H is a saddle, supported by two long screws underneath it, passing through but fixed to the beam by two nuts, one immediately above and the other below it, enabling the rider to raise or lower his saddle at will; I is a cushion for the support of the elbows; and L is the handle by which the machine is steered. The patentee was no doubt a thorough believer in this description of implement, for it appears that “His most excellent Majesty King George the Third did, by his Letters Patent, not only grant him this special licence to make and vend them, but also to use and to exercise them within England, Wales, and the town of Berwick-on-the-Tweed,” and he was by no means singular in this belief, for they soon created a perfect furor, and on many a high-way our ancestors might have been seen with flying cost-tails striding through the mud. The original name of “Pedestrian Currie” appears soon to have been dropped for that of “dandy-horse;” but the dandy-riders soon had their enjoyment stopped by the Legislature, as the exercise proved to be most injurious.

In an interesting little work published as recently as 1869, the writer gives it seriously as his opinion that “in all probability the three-wheeled velocipede will have a more enduring
Another great mistake with beginners is that they grasp the handles too tightly, and thus cram their hands and tire their arms out before they have gone a mile.

We will now suppose that the rudiments have been mastered, and that you are able to travel two or three hundred yards without coming off; during this period, however, you have probably been mounting from a raised path, or by the aid of a friend, and dismounting by letting the bicycle fall over gradually till one of your feet touched the ground; but there are many roads, especially across large commons, where it is impossible to find a convenient place for mounting in this way, and to overcome this difficulty the “step” was invented, so the sooner the use of it is learnt the better. It will probably be found easier to mount from the left side of the machine, in which case you must stand just behind the step, stretch over and hold both the handles in your hands, then placing the toes of the left foot on the step, hop a few paces on your right foot, pushing the machine at the same time; and as soon as it has got a little way on, raise yourself on the step, and throwing the right leg over the backbone, drop a little forward into the saddle. Once there, get your right foot on the treadle as soon as possible, and immediately afterwards find the other treadle with your left foot, thus preventing the machine coming to a standstill before you are fairly in a state for progression.

When you wish to dismount, hold the handles firmly, with the hands uppermost; take the left foot off the treadle and move it back till you are able to place your toe on the step, not forgetting during this time to keep on working the other treadle with your right foot; as soon as you have got your toe firmly on the step, raise yourself out of the saddle and bring the right leg backwards over the backbone, and jump off, letting the right foot touch the ground a little earlier than the left; but this will be almost imperceptible, as both feet will touch the ground almost simultaneously. As you jump off, you will probably have to let the handle go with your right hand, but the left can still hold on, and the right hand can at once help in keeping the machine up by holding on to the saddle or spring.

When both mounting and dismounting by means of the step has been mastered, there is nothing to prevent your trying a larger machine. We will proceed to describe some of the beautiful machines now in use, which we may divide into two classes —viz., those with a very large front and small hind wheel, and others where the front wheel is very little larger than the one after.

There is still a great deal of controversy going on as to which machine is the best for general purposes, and we believe the partisans of the large driving-wheels look down with considerable scorn upon those of the smaller ones, whilst the latter still keep to their own views of the subject. It is not our purpose to write up the one at the expense of the other, as there is room for all, and when the use of the machine is once learnt, the rider will after a few trials soon be able to form his own judgment on the subject. To the makers of the “Arild,” bicyclists are indebted for many of the improvements that have gradually been made for their comfort, so that a description of it will fairly exemplify this class of machine (Fig. 2), which for better explanation we will divide under the following heads:—1. The backbone. 2. The spring. 3. The wheels. 4. The steering apparatus.

1. The backbone, A, is made of hydraulic tube bent to the required shape, finishing in front with a pivoted staff to fit into the steering apparatus, and at the other end with a fork, between the prongs of which the hind wheel is fitted. At the upper end and on the outside of this fork a small step is attached, for the purpose of mounting and dismounting; whilst inside, just clear of the circumference of the hind wheel, there is a roller.
break connected with the steering apparatus, which has the merit of checking the speed without damaging the india-rubber tire.

3. The spring, B, of this machine is the makers' registered clip-tail sliding one, fixed at the front end only, where it begins with a collar fitted to the upright staff which connects the backbone to the rudder, and is then brought forward in a horizontal line a few inches to the front, when it is bent sharply round and brought back parallel to (but below) the attached end, between the side pieces of the steering apparatus, and then, taking a graceful curve, finishes with a clip-tail, C, consisting of ears lapping downwards over the backbone, at the same time allowing play enough to admit of its sliding up and down with the rider's weight as he passes over the inequalities of the road; by this arrangement a great deal of the usual jar inevitable on a rough road is reduced to a minimum.

3. The patent lever tension wheels, D D, of the Ariel are of a very ingenious construction; the spokes are made of round charcoal iron wire, and the felloe of V-shaped steel, which from its shape forms a bed for the circular india-rubber tire. Staples, a a a, are fixed at regular distances round the inner face of the felloe, and through each of these one of the wire spokes, which have been previously fitted into a collar round the hub of the wheel, is looped and then carried back again to the centre and hooked to the collar; thus each length of the wire is equal to about twice the radius of the wheel, and forms as it were two spokes. A lever, c, equal in length to about two-thirds of the radius of the wheel, is fixed to the hub, having a hole at its outer end, through which a rod, b, is passed at right angles to it, and made fast to the felloe. At the other end of this tension-rod, which projects slightly beyond the lever, a thumb-screw is attached, by which it can be screwed up, thus turning the hub of the wheel round slightly and simultaneously tightening all the spokes. The usual number of these latter is in large driving wheels, from sixteen to twenty pairs, and when the wheel exceeds forty inches in diameter, a second lever and tension-rod is applied.

The trellises are square wood blocks clothed with india-rubber, and can be used either by the toe or ball of the foot.

4. The steering apparatus, B, differs entirely from the old arrangement of fork and spindle working in a socket of the backbone, inasmuch as it is formed of two side pieces of flat iron having steel bearings forged on at the lower ends for the front wheel, whilst just above the wheel are two cross-heads, which not only act as stiffeners to the side bars, but form a loose attachment to the backbone, the front staff of which is pivoted to fit recesses in them; through the upper ends of the side bars a steel rod is passed, terminating at each end with the handles by which the machine is guided.

The break to the hind wheel is connected with this rod midway between the handles by means of a narrow leather strap or cutgut, so that the rider, by turning the handles round, tightens the connection with the break, and thus skids the wheel. The advantage of this mode of steering over the old spindle and socket is that it is not liable to get set, as the latter occasionally did, from overheating, and sometimes, in excessively cold weather, from the oil freezing in the socket. When this happened the machine became perfectly unmanageable, as the front wheel could only be turned by fits and starts, and true driving was out of the question.

Another beautiful machine of this class is the "Sunbiton" bicycle, which, however, differs from the one previously described in several of its details. The backbone differs slightly from the Ariel in its mode of attachment to the steering apparatus by an ingenious method which allows of the staff of the backbone being tightened up as required by nut and screw. The pivot, though fixed to the staff, can be taken out and replaced when it is worn out. The felloes of the wheels are made of V-shaped steel, and the spokes, which are of iron wire, screw separately into the hub, thus possessing an independent tension, so that if one of them becomes loose—an event of rare occurrence—it can be screwed up quite rigid, while the patent anti-friction bearings are so constructed that, owing to a succession of rollers, they scarcely ever require oiling, and the friction greatly reduced.
FEATHER WORK.

ANCIENT DECORATIONS—PLUMARIANS—FEATHERS OF FOREIGN BIRDS—TO MAKE SCREENS—IMITATION OF THE REAL BIRD.

From time immemorial, feathers have been prized as articles of personal adornment, and have been fashioned into ornamental devices of various kinds. The earliest embroidered work was formed of the real feathers of birds, and in the present day there come to us, from many lands across the sea, choice and exquisite specimens of feather work. From South America, Mexico, India, Madeira, we have a variety of articles—screens, fans, flowers, and many other ornamental devices, too numerous to particularise—all so deftly manipulated by the nappy fingers of the natives, and so uniquely beautiful in themselves, as to command at once our wondering admiration, and to stimulate a desire to master the accomplishment.

Fig. 1.

Fig. 2.

Fig. 3.

worked in various ways into linen. It is said that the ladies of Babylon originated this idea, and that their garments were elaborately embroidered in this beautiful style. Leaves, flowers, and even birds themselves, were designed and executed by "plumarians," as the embroiderers were termed.
"A thing of beauty is a joy for ever; its loveliness increases;" and, tell me, is there any object more beautiful, any more lovely, than a bird’s feather? No matter what its size, or what its hue—whether it come from the wing of the plain brown sparrow, or from the coverts of the justly-prized peacock; from the biggest of geese or from the tiniest of humming-birds—a feather, in itself, has something about it so indescribably dainty, a something which so far exceeds in beauty of colors, and in delicacy and peculiarity of fibre, anything that human heads, however gifted, could devise, or human hands, however clever, could execute, that so it is, the more we examine the more we admire, and our admiration passes irresistibly from the object created to the Creator.

And how do feathers grow?

Look at this wee bird, which has just broken through its prison-house, and has come out but ill-prepared, one would imagine, for the cold world into which it has precipitated itself. Look more closely, and you will perceive that its bare-looking little body is covered with a downy kind of hair—little bundles of fibres—softer and more minute than these were—these had already been developed, and require no more food, then the pulps which have performed its work, and it shrivels up and becomes the dry substance of the quill which no doubt you have observed when cutting a pen with your knife.

The summer dress of many species of birds varies from that of their winter costume; and, most surprising to relate—but, then, some facts are stranger than fiction—as a rule the attire of male birds at all seasons is much more brilliant and smart than that of the fair sex among the feathered tribe.

Of all the birds “with painted plumage gay,” the macaw is one of the handsomest, therefore, if you are fond of recreation, be feather work, and you do not possess a macaw, but have friends who do, my advice to you is to be very friendly with these friends, for Mr. Macabees treasures bright and beautiful—the daintiest, prettiest feathers imaginable, as well as the strongest and noblest; of etheeral blue, of rosy red, of shaded hues.

Parrots and parakeets offer a great variety; indeed, the majority of foreign, and more especially tropical birds, surpass ours in the gaiety of their colours; but the plumage of our own feathered friends is by no means to be despised, it offers us much that is exceedingly pretty although not so strikingly ornamental. The peacock, Guinea-fowl, pheasant, hawk, owl, haron, sea-gull, kingfisher, goldfinch, from these, and even from some of our barn-door owls, we can gather materials for our work. And if it so happen that brighter-colored feathers are indispensable to carry out our design, and that we cannot obtain those of foreign birds—though brilliant skins can now be bought from a shilling upwards—why then we must go to the goose, and she will help us out of our difficulty, for her pure white feathers are to be had any day, and they can be easily dyed any colour we require.

Feather screens are exceedingly beautiful, ornamental, and useful. There are several ways in which they may be made. We will speak first of the easiest, which is that of covering the whole surface of the screen with feathers, as it were indiscriminately, and in no set pattern.

First of all, decide what size and shape you would like your screens, and then trace the outline on paper—round, heart-shaped (as in Figs. 4, 5, 6, 7, 8), whatever your particular fancy may be. Lay the pattern on a piece of millboard, such as may be bought for sixpence or eightpence per sheet; draw your pencil circle round its edge very carefully, and then take a sharp strong penknife and cut clean round the mark. This is an operation that should take place on a board, or woe to your table and its cloth!

There are two ways of fixing the feathers—either by stitching them with needle and thread on to stiff buckram, or by fastening them with gum on to paper. In the first instance, you paste the buckram on the millboard, after the feathers are stitched on; in the second place, the millboard is covered first with paper, on to which you gum the feathers. We will speak as if the latter method was adopted; of course the description generally will apply to both.

I hope you have got at hand a pair of pliers, such as are used for paper flowers; two pairs of scissors, one strong, for cutting the shafts of the quills, and the other pair small, with fine points, for trimming the feathers; also a bottle of thick gum—home-made solution is best, made by dissolving one ounce gum arabic with warm water—and a camel-hair brush. Take the feathers you intend to use—peacock’s, Guinea-fowl’s, pheasant’s, jay’s, and the poultry-yard cock’s make a good assortment—keep each sort separate in old envelopes, cut off the downy portion, and part of the shaft if you deem it necessary, after which gently brush their backs one by one with gum, and then leave them to dry. This little attention will keep their delicate fibres from being soon ruffled.

The feathers chosen for these screens should not any of them be very large or strong, as they would then look stiff and awkward, and the work would lose that soft and feathery appearance which it should wear if it is to look well.

The plumage of the back of the bird is the most suitable. The wing-feathers of some of the smaller species may be used, as it often happens that they are the brightest; the jay, for instance, has several bright blue barred with black in its wing.

Now take your screen, and begin your fascinating occupation. There is no particular design, as I have before remarked, but the arrangement of the feathers should be such as to form completeness of harmony. The colours should be made to pass one into another, to blend together, so that no sudden suspension of effect may startle the eye. “The boldness of contrast consists not in sudden transitions from harmony, but with it.” To gain this effect there is no better study than the birds themselves; in them we may observe all the sharp outlines, no startling divisions between their various colours, however many and brilliant they may be. But we must live back to our screen, for you are holding the millboard all this time.

Always work from the outer edge to the centre. There can be no prettier finish for the edge than a fringe of two or three of peacocks’ eye-feathers (Fig. 2); therefore, secure and prepare enough to go round both the screens. Moisten with gum the part where the shaft of the feather is to be (allowing for this first row to project about half an inch or so beyond the edge of the millboard), then, with the pliers, place them one by one close together round the screen, leaving a small space for the handle. When these are dry, moisten with gum as before, and put on the next. This row must not be placed immediately in front of its predecessors; and in like manner with the feathers that come after; one should appear to be playing bo-peep between two other feathers; and the faces of all should be seen distinctly, as in Figs. 2 and 3—the latter of pheasant’s feathers.

As the centre is more nearly approached, the feathers should decrease in size, and then the work becomes more difficult and requires more delicate handling. In order to finish the actual
FEATHER WORK.

centre neatly, it is advisable to reverse the order, that is, to place the shafts of the last row of feathers under the fibres of the preceding row. This work should not be done hastily; for if too much gum is put on, or if sufficient time is not allowed for it to dry, the gum used for one set of feathers will most certainly ooze through the next, and completely spoil their personal appearance.

When the screens are quite covered, place them face downwards on a piece of clean paper; but, before you do this, inspect your regiment of feathers, and if any member of the corps appears to be discontented with its position, carefully smooth it down. Then place weights on them, and let them remain in durance vale till the following day. But little now remains to be done. Cut out in glazed or watered paper (some warm colour, such as scarlet or crimson, looks the best) coverings for the backs of the screens; paste them on, and again place them under pressure for a night.

Lastly, attach the handles, which, if some ingenious brother cannot turn for you, can be bought at a Berlin-wool shop, at prices according to style and wood. The work is finally completed, and your screens ought to be perfect. They will look most in place in a dining or morning room.

I am afraid that you will be growing weary of my descriptions of feather screens; but "variety is pleasing," you know, and so I will venture to speak of yet another way, although perhaps it is one which is not so often undertaken by the amateur as by those whose avowed employment is to cure and stuff birds.

These screens are composed of the head, breast, and wings of a bird. The dozens of our own woods and forests show to great advantage, and are most effective. The owl looks better than any other bird in this position; the hawk ranks next, then come pheasants, woodcocks, sea-gulls, &c.

The different parts required should be severed immediately after the bird is killed; and cut them off in a dexterous and scientific manner, if you please, otherwise the plumage will be sadly ruffled and damaged. Take off the wings as near to the body as possible. Hold the feathers of the breast out of harm's way, and cut the skin round to the back. Draw back the skin till the skull passes through the neck, and the skin is stopped by the beak. Take the eyes out of the head, scoop out the brains, and fill the cavity with cotton-wool, either steeped in arseneal soap or well sprinkled with alum. Sever the head at the base of the neck. For the process of curing crasical soap is extensively used by naturalists, and can be bought in pots: it is a deadly poison, and requires keeping under lock and key. But the following simple means have been proved to be effectual:—After putting the feathers straight, and smoothing the skin, sprinkle it with a little lime; then cover all the skin and the parts of the feathers which require curing with powdered alum. Let it remain in this state (the side on which the alum lies should be uppermost) for several days, after which shake off the alum, when they should appear as in Fig. 1.

Now brush over the backs of the wing-feathers with some gum, and, placing the two wings side by side, sew their inner edges firmly together until near the extremity of the feathers; then press the sewing with a hot iron, but have some brown paper between the feathers and the iron, or the former will get scorched; after which put weights on them, so as to flatten them. Take a thin piece of board, well seasoned, and fix the wings on to it by glueing the shafts of the feathers. They are radiated round in the same fashion as the Turkey-cock sets his tail. The breast and head are then fixed on with glue. If the stiff feathers are not inclined to keep back, they must be pinned down for a while. The back of the board must be covered with coloured paper, and a gilt handle affixed, to complete the work.

For the drawing-room we know of a daintier device, and that is of forming flowers and birds on silk cloth or net, the effect of which is charming, and the work has the further recommendation of being highly uncommon.

The first step to take is to get the material stretched on the frames you intend to have—those frames which require no other finish but the black rim they already possess are the most suitable for this style of work. As the whole effect is spoilt if the groundwork is not tightly and smoothly stretched, the amateur will, if wise, order this to be done where the frames are bought. Then there is the design to be considered. Of course the occupation is twice as interesting if you are following out your own devices; but all people are not born with that valuable and pleasant gift, invention, and where that is the case they must have the outlines of the group traced for them when they have the frames prepared. The effect is very good if garden flowers are grouped on one screen and field flowers on the other. In either case, specimens of Flora's simplest handicap look the best—perhaps because they are the easiest to imitate, and therefore the most quickly made, and consequently do not get so much handled as more pretentious flowers. Geraniums, coneflowers, asters, myosotis, yellow jasmine, and the pheasant-tail, and its big brother the coxcomb, "the shining pansy, trimmed with golden lace," the daffodil, anemone, and celandine—indeed, any species of flower which is not of cupped form, but which naturally spreads open and lays back its petals, will look well.

All preliminary matters being settled, take the feathers and prepare them for their future position by depriving them of all down, then lightly touching their backs with gum, and finally, after they are dry, shaping them according to the form of the flower-petal you are going to represent, and basting them into shape, if required, with your finger and thumb. A natural flower placed before you will prove a helpful guide. The petals are now laid severally on the material, and one by one placed in their places with a needle and fine silk the exact colour of the flower. This requires some skill. The needle must make its way very carefully between the fibres, and the silk must just span the shaft and no more, it must not disturb the plumage of the feather or attempt to capture any of the down. When all the petals are thus fixed, there remain the stamens. These are worked with coarser silk, as are also the stalks, leaves, and buds belonging to the group.

I mentioned the forming of birds on scenes of this kind. One may either be introduced amongst the flowers, or itself form the central figure. As the bird must be small, and look light and elegant, the work is minute, and necessarily difficult to accomplish; but "laugh at impossibilities, and cry, It shall be done!" I have in my possession a bird formed in the manner I am about to describe, which is smaller than you need undertake, although the tinier they are the prettier they will look. My dainty little specimen measures one inch and a quarter in length, and its plumage looks as if single fibres had been placed on, so minute are the feathers. See that the shape of your bird be very exactly drawn on the groundwork; then paint its bill and legs, and if there are to be no flowers, paint the background of some description—a tree, or anything that will give a finished and picturesque appearance to your work; or if you cannot handle the artist's pencil, a pretty scene may be cut from some tinted print. On the part of the bird reserved for the feathers, lay thick gum with a camel-hair brush; then let it dry, and repeat this process three times, or until the gum lies sufficiently thick to give a substantial appearance to the body.
You begin at the tail, and then work upward to the head, moistening gradually with gum and a fine camel-hair pencil the part where the shafts of the feathers are to lie—taking the greatest care that the gum does not smear the succeeding feathers. The eye must not, however, be forgotten. If a glass one can be obtained, so much the better; black ones are very cheap, being about twopence per dozen. A round piece of paper coloured like an eye may be made really quite deceptive; but if the bird is very wee, a bead will answer the purpose.

The work should be pressed when finished, to perform which operation it is best to lay the ornament between two pieces of stout millboard, used for bookbinding, and then weighting with any flat heavy objects that may be convenient. Books make capital weights for the purpose, though, of course, nothing is better than a press used with discretion, such a one, for instance, as is used for table-cloth or napkins.

If novices in this art are fearful of spoiling the screen by an attempt of this kind, it will answer the same purpose if they make the body of the bird in like manner on thin card, and then cut it out, and gum it in the place assigned for it on the screen.

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**SWIMMING.**

BY THE SECRETARY OF THE ROYAL HUMANE SOCIETY.

**ANNUAL LOSS OF LIFE — A DARING SWIMMER — A MAN’S WEIGHT IN THE WATER — VARIOUS MODES — CONFIDENCE—POSIIONS.**

"AN you swim?" is a question asked of every lad when he is telling his friends what his progress in learning various accomplishments has been during the past year; and it is a most serious and necessary inquiry, as on the answer may depend the life of the lad himself, and of others who might require his aid on some important occasion. Swimming is not only the most enjoyable, but the most really useful of all the many accomplishments which constitute the education of every lady or gentleman, or, indeed, of every person of whatever grade of life they may chance to be. So great was its importance considered, that Sir W. Fraser induced the committee of the Royal Humane Society to send up a deputation to the Right Hon. Mr. Forster, the president of the Council on Education, to impress upon him the necessity of making swimming one of the subjects of compulsory education for the scholars that would come under the jurisdiction of the new School Boards; when, after a long and exhaustive discussion, in which Mr. Forster fully recognised the importance of the object sought to be attained by the Committee of the Royal Humane Society, he said he felt that the teaching of this important accomplishment must be left to the discretion of the various School Boards. Alas! that such a golden opportunity should have been lost, when boys and girls, of all ages and conditions, could have been brought under a compulsory system, and made to swim in spite of themselves; and it is to be hoped that the powers that may yet manage the Committee of Council on Education will see how necessary it is to make swimming a subject to which some portion of every week should be devoted. When the writer of this was in a man-of-war at Gibraltar a few years since, the crew of the ship was piped to bathe, and out of a total number of 800, not one half could swim, and this in a nation whose sons are pre-eminently aquatic. Appended is given the number of deaths by accidental drowning in England and Wales in the years from 1860 to 1870, as furnished by the Registrar-General to the writer:

<table>
<thead>
<tr>
<th>Years</th>
<th>Persons Drowned</th>
<th>Males Drowned</th>
<th>Females Drowned</th>
</tr>
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<tbody>
<tr>
<td>1860</td>
<td>2,594</td>
<td>1,908</td>
<td>386</td>
</tr>
<tr>
<td>1861</td>
<td>2,501</td>
<td>1,924</td>
<td>377</td>
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<tr>
<td>1862</td>
<td>2,433</td>
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<td>382</td>
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<tr>
<td>1863</td>
<td>2,488</td>
<td>2,089</td>
<td>390</td>
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<tr>
<td>1864</td>
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<td>2,220</td>
<td>444</td>
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<td>394</td>
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<tr>
<td>1870</td>
<td>2,594</td>
<td>2,113</td>
<td>391</td>
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<td>28,699</td>
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It will thus be seen that the average loss each year from drowning by accident amounts to the terrible total of 2,008.
SWIMMING.

When we consider these figures, it is appalling that such a number should thus be annually consigned to a watery grave, the greater portion of whom was doubtless in the prime of life, and enjoying excellent health, and who, had they been able to swim, or all, I have no doubt. On the 25th we made a boating party to visit one of our detachments about fifteen miles from here, at Grand River, south-east; we left this about eleven A.M., and, after reaching our destination all safe, left it about three o'clock

if some swimmer had been at hand at the right moment, might have been living now.

The Royal Humane Society find that in the majority of cases that come before it for reward, the persons saved could not swim; and it is only reasonable to believe, that if swimming was as compulsory a part of education as reading, writing, and arithmetic, fewer deaths from drowning would occur than heretofore.

To show the use of this noble art, the following narrative of an escape from peril, and the rescue of five lives, by the individual gallantry of a swimmer, has been rarely equalled and never excelled in the records of high and noble daring. It is extracted from the report of the Royal Humane Society, which awarded its Gold Medal for the act, and is from the pen of Captain Milman of the 5th Fusiliers, in a letter to his father Major-General Milman, late Coldstream Guards:—

"Mahebourg, Island of Mauritius, June 30, 1848.

"The following account of an almost miraculous escape that I and five other officers have had from drowning will interest you could take my clothes off in a moment. As it turned out, I think I was lucky in this, for they perhaps, though wet, kept me a little warmer than my companions.

"Nothing seemed to give us a chance of being saved, except holding on till daylight; and as it was terribly cold, this seemed next to impossible. At last it struck me I might be able to

positions in the water.

P.M. for home, the weather then looking anything but promising. When about four miles from home and from the shore we were over set by a squall. It came upon us so suddenly that we had no chance to do anything; torrents of rain fell at the time; and there we were, drifting along on the side of the boat (which luckily did not sink), without a chance of assistance, and the night setting in. This happened about half past five o'clock, and at this season it is dark at six. We drifted in this way for about two hours, and at last grounded in about seven feet of water. It was very nearly dark; and all that we could see were the tops of the mountains in the horizon—we supposed we were about two miles from the shore. All of us but myself had stripped on being upset, as I knew if we came to a swim I

Attitudes for practice.
swim ashore to procure assistance, and I got permission from the others to do so. Our boatman, a crook, who also said he would be glad to start with me to make the attempt. I left them with a hearty ‘God bless you!’ from all. After swimming some time I lost sight of the boatman, and was left to myself. I swam back a little, shouting as loud as I could; but, getting no answer, and feeling for my own sake that I must push on, I turned my head towards the mountain tops (my only guide) and struck out my best.

"I must most certainly have been swimming for more than an hour when I landed. I found myself a little tired, and very much benumbed, barefooted, ‘en chemises,’ and not able to see two yards before me, it was so dark. My first impulse was to fall on my knees and thank Providence; after which, curious to see, my military schooling came to my aid in the ‘extension motions,’ which brought some little feeling into my limbs, and enabled me to continue my work. After feeling my way for about half an hour along the shore, shouting all the time, I came to a cottage, where I was hospitably received. They told me that they had heard my cries some time, but fancied I was some drunken man returning home, or else they would have come to my assistance. The poor black gave me some dry clothes, and made me a cup of tea, and then conducted me to the proprietor of the estate, who lived close by, and had the nearest pierque (a small boat like a canoe, dug out of a solid trunk of a large tree) in the neighborhood. M. Chirian (the name of the proprietor), a man of colour, as soon as I explained my situation and my want of a boat to go and assist the others, immediately offered to go himself, and his son also insisted on going with him; I jumped at the offer, of course, and we immediately walked down to where his pierque was moored, and started myself at the bottom to serve as guide.

"By the blessing of Providence, after about an hour’s search we heard the cries from the wreck. I think I never felt so happy or so light-hearted in my life as I did at this moment; for there were so many chances against our finding it.

"We could not see many yards from our own boat. It was then about eleven o’clock, so that my companions had been exposed on the boat for upwards of five hours. Luckily, with great care, we got them safely into the pierque without capsizing her; and by twelve o’clock we were safely housed under M. Chirian’s hospitable roof, who fed, clothed, and lodged us for the night.

"In the morning the unfortunate crook boatman was found dead, cold and cramp about half a mile from the place he was supposed to have landed at. The kindness, hospitality, and truly courageous assistance afforded us by M. Chirian, at the risk of his own life and that of his son, are deserving of all praise. It was a service of danger to go out even at all in a pierque on such a rough night, much more to go and seek for five drowning men three miles out at sea. He wished his son not to go, but the latter would not allow his father to go without him. Constantly, during our long search, when the son was getting tired of pulling the boat, the father would cry out and encourage him, saying, ‘Courage, mon fils!’"

One of the principal things to bear in mind is that the human frame is so awesome in its composition that one of the weight of 160 pounds, if thoroughly desnicated, would not weigh more than fifteen pounds. To enable a man to swim without exertion or to float safely in the water with his head out of it, he must have some additional means of flotation or buoyancy, i.e., he must be able to displace more than his own weight of water. Those men who have a large development of chest and lungs are sure to float lightly in the water. Again, a very fat man, such as the "Claimant," can swim very easily, for fat, whilst it adds to the bulk, does not increase the bone and muscle. Ducks, swans, and other water-fowl, are so buoyant from the peculiar construction of their feathers and their power of oiling them.

If the human body was of the same specific gravity as water, and it was required to raise the head above the surface, it would be only necessary to displace as much water as would be equal to the bulk of the head; but as a rule only about onehalf of the head requires this support, and a force of flotation equal to about six pounds is generally found to be sufficient; therefore, any object that will in floating support six pounds is enough to ensure a man against being drowned.

Experiment proves that a healthy person can expel about seven pints of air, and then there still remains in the lungs a considerable quantity. Each pint of air is equal to the support of a pound in weight of any substance, and we may safely estimate the capacity of the lungs at one gallon, or about nine or ten pounds floating power. Therefore, man carries with him his own life-buoy, and should be educated so as to fully comprehend how to apply this store of safety to the greatest advantage, when called upon in any emergency, to save either his own or the lives of others in danger of drowning.

There are various modes of swimming. To begin with, there is the usual method; the upright or Italian; the dog-like; the hand over hand; on the back; on the side; with various limbs only; also under water or diving; and varied fancy and ornamental methods of displaying one’s power in the water; these exhibitions are, in general, peculiar to those professional swimmers who give from time to time a public display of their powers in the water, and what can be done by any one who will only persevere in conquering the few simple rules necessary to enable them to become powerful swimmers.

The first rule in learning to swim, is to gain confidence; and until a man has that he cannot swim. As a rule one should never employ artificial means, such as cords, life preservers, or any such contrivance, as can be gained by frequenting a tepid swimming bath, when within reach, as there are usually greater facilities there for learning from qualified attendants, who are always at hand.

Having selected the most suitable place for the purpose, enter the water gradually, and when you have waded as far out as to let the water reach to your chest, turn towards the shore, draw your hands up to your chest, keeping the fingers close together, the thumbs pressing against the forefingers so as to form a sort of hollow scoop, which gives you a greater power of propulsion: the palms of the hands must be downwards. The lower part of the arm and elbow should be close to the body, as shown in Fig. 2; next stretch out the arms to the full extent just under the surface of the water, as in Fig. 3; turn the palms of the hands out and take a circular stroke until the arms are square with the shoulder, as in Fig. 4; then draw the hands back to the first position. These three movements in our new extension motions for learners of swimming should be repeated several times by numbers—and, at the word one, draw your hands up to your chest, keeping the fingers close together, etc.; at the word two, stretch your arms out to the full extent keeping them just under the surface of the water; at the word three, turn the palms of the hands out, and take a circular stroke until the arms are square with the shoulder. When the learner has gone through these motions several times by word from the instructor, he should do it, judging his own time, the speed of the movement being gradually increased until the three separate actions merge into one motion, easily performed by the pupil.
CHESS.

By John Beiley, the English Champion.

NATURE OF THE GAME—THE BEST MODE OF ACQUISING SKILL—SITUATION OF THE PIECES—THEIR MOVEMENTS.

HESS, the origin of which is said to be "lost in the mists of antiquity," is certainly the most difficult, and has the reputation of being the most fascinating, of all games. The student who may learn to admire its beauties may readily despair of ever arriving at a thorough knowledge of its complexities; but for him there is one striking consolation, arising out of the nature of the game: it is not needful to play well to appreciate the interest of this pastime. The moderate player or the ignorant probably enjoys his recreation more keenly than the first-rate artist. Moreover, skill in chess is only a matter of comparison; no perfect master has ever yet been produced. So endless are the resources of the science that no game was ever contested in which the very best moves were played throughout on both sides.

The best actual play is only very good—an approximation to the best possible play. Every week the elaborate calculations of a first-rate player are upset by somebody, very likely inferior in skill, who has looked a little farther. Of an analysis of the openings published some years ago, occupying 325 pages, not half a dozen pages now hold good. It is related in Staunton's "Chess Tournament" that a first-rate player once took the enormous space of two hours and a half to calculate a single move, and made a blunder one after all. A match by correspondence is now proceeding between the City of London and Vienna Clubs. Six players consult on each side; and it frequently happens that a week's deliberation is required to finally decide upon the best line of play in a difficult situation. These examples will show the beginner that he need not be discouraged because he cannot play very well, though he may reasonably play as well as he can.

There is another set-off of no small importance against the difficulty of chess: it is possible to learn the game almost entirely from books-teaching. Practice, indeed, may be made quite a subsidiary element in the success of the chess player. In this respect the game resembles neither cricket nor billiards, but rather whist. The best schools are undoubtedly the London clubs or the historical divan in the Strand, but not every aspirant is within reach of either. I, who learned chess in a country town, where there was little practice and that not good, may instance my own experience. I was in the habit of choosing some fine published game, and of selecting the winning side as my own. Say that Morphy won of Anderssen—I selected Morphy's side, covered up his moves with a piece of paper, and endeavoured to anticipate the great master's line of play. After due deliberation, I compared my ideas with the course actually adopted, made Morphy's move, with the reply of Anderssen, and then proceeded to consider what might be the American's next adventure.

The experience was generally humiliating at first; better results followed afterwards; and eventually I was able at times to do better than the teacher. This is the mode by which chess can be understood as a science; nor can quieter or more reasonable mode of enjoyment be imagined. You play as long as you please, you consume as much time as you please over each move, and you go on in happy indifference to the eccentricities of an opponent who may be looking at his watch, lighting another cigar, or taking up the newspaper, to remind you that you are deliberating for four minutes, whilst he himself consumed the insignificant total of twenty.

If you can combine the oral lessons of a friend with an examination of these printed directions, your progress will be most rapid and sure.

Fig. 1, then, is the aspect of the board, with the pieces arranged for the beginning of a game.

The board, it will be seen, resembles an ordinary draught-board, with sixty-four squares. The chessmen, however, range over all the squares, and are not confined to half of them, as in draughts. The board is so placed that each player has a white square at his right hand. This is not a condition arising from the essentials of the game; it is a convenience arranged for the sake of uniformity. The sixteen pieces at each player's disposal include six different kinds:

Eight pawns (abbreviated P), and represented thus . . . Two Rooks, which are sometimes improperly called Castles (B), thus . . .

Two Knights (K.), thus . . . A Queen (Q), thus . . .

Two Bishops (B), thus . . . A King (K), thus . . .

The rooks occupy the corner squares; next to them on each side is placed a knight; then a bishop; the king and queen occupy the two centre squares of the first row; and the eight pawns are placed in front on the second row. Thus the arrangement of the pieces for battle is very simple. The only point to be noticed is the proper respective places of the king and queen on the two centre squares. The queen stands always on a square of her own colour. Thus the black queen stands on a black square, and the white queen on a white square. This, likewise, is not an essential of the game, but a convenience to ensure the indispensable condition that the opposing kings and queens face each other. It may be as well to understand here that in all diagrams the white men are supposed to occupy the bottom of the board, and the black the top.

Having given the positions and names of the pieces, it is time to describe their powers and peculiarities. The attributes of three—the rook, bishop, and queen—are simple; those of the other three are more complex. To begin with the three former: the rook moves in a straight, horizontal, or perpendicular line, to the right or left, backwards or forwards indiscriminately. Fig. 2 is a diagram showing his mode of action.

It will be seen that his range is bounded only by the sides of the board, or by the interposition of a friendly or a hostile piece. In the diagram his march downwards is absolutely barred by the white pawn. He cannot take his companion in arms, neither can he leap over his head; only the knight of the chess pieces is allowed to perform the latter feat. With regard to the black bishop on the left, he is open to the range of the rook, who can capture him. The move of capture in all cases, excepting only that of the pawn, is simply the removal of the obnoxious man, the capturing piece occupying the victim's square. Thus the rook may take off the bishop, and instal itself in the prelate's place. He can go no further.

The bishop moves diagonally, backwards and forwards, over
the whole length of the board, subject only to the interposition of another piece, as in the case of the rook. In the diagram (Fig. 3) the range of the bishop on the white square is barred by the white pawn and by the black pawn, which he may remove, placing himself on the vacant square. The bishop on the black square is not barred by any obstacle whatever. It will easily be perceived that a bishop having got upon one colour, cannot by any possibility remove to another. Each side has one bishop on a black square and one on a white square, and there they remain.

The queen combines all the powers of the rook, with all the powers of the bishop. She can move diagonally, horizontally, or perpendicularly, at will. Her range is immense, extending over nearly half a clear board. She is by far the most powerful piece on the board. Fig. 4 will obviate further description.

In the diagram (Fig. 5) the white knight, if he would move at all, must proceed to one of the eight squares occupied by the black pawns, and he can remove them as in the preceding instances. If the learner carefully examine the principle of one square forward and one sideways, he will perceive that there is no other square open to the knight. He cannot interfere with the intervening squares except by leaping over pieces that may occupy them.

The pawn is the least valuable of the chessmen, but possesses the most eccentric qualities. In the first place the pawn cannot move backwards; he can only advance. He may be played one square or two at his first move, at the option of the player; but afterwards he can advance only one square at a time. Under these conditions, if he always go forwards and never backwards, he must ultimately reach the eighth square. But the peculiarities of the pawn and its further movements must be deferred to our next paper.
ACCUROCITY of form and truthfulness of light and shadow characterise the perfect photograph; but colour, which has been described as the sunshine of art, chemistry and optics fail, and probably always will fail, to supply. Here the artist must step in, with his pigments and brushes, to complete the resemblance to Nature, and supply colour, that element which "clothes poverty in smiles, and renders the prospect of barrenness itself agreeable; while it heightens the interest and doubles the charm of beauty."

A clever artistic colourist will give a photograph its final claim to fidelity with curious success; but in a general way those who live, as thousands of people do, by colouring photographs are not in any just sense of the term artists, and the effects they produce, although generally tolerably pleasing, are the result of simple mechanical processes quickly conducted and easily learned. Cleanliness and neatness in manipulation, with some knowledge of pigments and a correct eye for colour, are the main elements of success in practising this branch of art.

Seeing, then, that so many thousands find recreation in the practice of photography—in which we are giving lessons—who would be glad to add the charm of colour to their productions; that many thousands more find delight in practising painting as amateurs; and that even larger numbers who love colour, but are unable to paint, from their ignorance of drawing, would be glad to devote some of their leisure to a branch of painting in which no knowledge of drawing is required, we give some articles on photographic colouring.

The easiest mode of colouring photographs is that in which dry colours are used in a state of powder. These are generally applied to photographs on glass, technically known as glass positives, although they have been very successfully used, and with effects analogous to those of crayon or pastel painting, on paper photographs, technically known as positive prints. To this process we shall first direct attention.

The colours are sold at most photographic warehouses in small bottles. They should be brilliant, powerful, pure, and so prepared as to adhere readily to the varnished film of colodion or albumen, and retain their brightness and intensity after varnishing. They should be very finely ground, or they will obscure the photograph and produce a smudgy, coarse effect. If they are selected without due consideration for their chemical nature, as the cheaper kinds often are, they rapidly fade; if they do not bite well, one touch of the brush removes the pigment previously deposited by it, and it is then impossible to get rich and forcible effects of colour. The cheaper kinds are often inferior in other respects, being made of the less expensive and more impure materials. These colours are obtained at prices ranging from sixpence per bottle upwards—the most expensive being the pure scarlet, the carmine, and cadmium—at the shops of dealers in photographic or artists' materials. The colourist should obtain all the flesh tints, the pale, the florid, the fair, and the dark, carmine, pure scarlet, the pinks, and crimson; also a colour specially prepared for the cheeks and lips; the tints of blue, including French ultramarine; yellows, including cadmium; grays and browns, including madder brown; greens and purples, including purple lake; and a bottle of white.
Good brushes are of primary importance. Some prefer those which are especially prepared for this work, although many prefer, as we do, ordinary water-colour brushes. They should be elastic, with the hair not too long, and when pointed, with the aid of a little moisture, their points should be fine, well-supported, without struggling hairs, and not apt to divide or fork under a fair degree of pressure when dry. Those of the smallest sized sable brushes, and three of the larger and cheaper camel-hair brushes will be sufficient. Two of the sable brushes should be round, and one flat. The cost of the smaller two, the round and the flat, will be about fourpence or fivepence each; the price of the other, being larger, will be sixpence or sevenpence. The camel-hair brushes will cost you from a halfpenny to a penny each, and one more, to be used for removing dust or superfluous colour, will cost you from twopence to fourpence. The latter brush should be chosen with the hair much longer and spreading more than those of the smaller brushes. If in addition to these brushes the colourist should prefer others to save repeated cleansing and avoid soiling the purity of one colour by mixing it with another, he can buy a dozen or two of the camel-hair crowquill brushes at about eightpence per dozen.

The brushes are prepared for use by first rinsing them thoroughly in a little clean cold water, bringing them to a point between the lips, and then putting them aside out of the dust to dry. The diagrams on page 17 will help the reader to understand the kind of brushes he will require. Figs. 1, 2, and 3 show the forms of the sable brushes, one of which (Fig. 3) is flat, which we prefer, mounted in the tin, to the quill, and Fig. 4 is the camel-hair "duster." The other brushes will resemble the round sables, only the camel-hair will be softer, and their points less firm and elastic.

In addition to the duster, the colourist will require an india-rubber bottle or ball, with a tube of bone or ivory attached to it, to blow off loose colour where it is not advisable to remove it with the dusting-brush. You must be particular not to purchase the varnished india-rubber balls, as the sulphur they acquire in varnishing, and the fact that our picture is formed with a salt of silver, render them unfit for this purpose.

In addition to the above, the colourist will also require a bottle of Chinese white, price one shilling; the following water-colours, in half cakes, price sixpence each—yellow ochre, Naples yellow, the French (or warm) colour, and burnt sienna, and a bottle of varnish suitable for covering and for receiving the powder colours. This varnish must be perfectly colourless, must dry with a smooth and not too brilliant surface to the eye, and yet be sufficiently rough to hold the impalpable powder colour securely in its interstices. If the varnish is too hard and smooth, the colours will not adhere properly; if it is too soft, the colours will adhere unequally and in patches. If you visit any respectable dealer in photographic materials, and explain the purpose for which the varnish is required, he is tolerably sure to give you the right article; its cost will be one shilling. A small piece of dark purple to place beneath the glass positive, and a piece of white velvet to serve as a palette, will complete your set of implements and materials.

Supposing the colourist to be also the photographer, he will of course provide his own picture. This may be either a positive on glass, a positive on one of the thin even plates now so much used—selecting one of those more recently introduced which give a rich purple-brown colour to the picture—or a print on the ordinary alumined paper used by photographers. We take it for granted that it is a portrait you are about to colour, as these only are suitable for colouring by the process now receiving attention. It should not be too dark—what is technically called under-exposed—not too white, or over-exposed; the half tints and shadows should be of a rich warm black, and the white portions of the face, &c., should be as pure as possible, and free from any tinge of horn yellow, brown, or grey. Positives in which the whites have a metallic gloss are not suitable for colouring. The picture should be entirely free from such defects, or black and white spots and stains.

For the first colouring take the collodion positive unvarnished, and place it over the piece of dark purple velvet on your desk. See that your brushes are clean, free from dust, and pointed. Take a little of the pale yellow on the point of your smallest sable brush, and apply it to the high light on the forehead.

The term "high light" is used by an artist to indicate the more prominent parts of an object, those on which the light falls most direct. To make this simple but important matter perfectly clear, we give two diagrams Figs. 5 and 6. Fig. 5 is a profile placed facing the light, which falls upon it in the direction indicated by the arrows, and a single glance will show you the parts of the face on which rays of light coming down at that angle will fall most directly. They are marked in the diagram with the figures 1 to 6, and they are—the top of the forehead, the projection above the brow, the bridge and tip of the nose, the projection of the upper lip, the projecting lower lip, the cheek-bone, and the projection of the chin. According to the prominence of these parts the high lights they will receive must indicate a stronger or a fainter degree of light, so that if you make your high lights stronger than the form or degree of projection in the photograph indicates they should be, you alter that form, and to that extent weaken the likeness.

Bearing the above hint carefully in mind, we return to our photograph. Suppose it to be from a face lighted in the way indicated by Fig. 5—which is the way in which photographers usually do light the faces of their models—the high light will fall on the forehead at 1. Having applied the pale yellow to this point with a light circular motion of the brush, you next take the flesh tint No. 1, and in the same way strengthen the high lights on the other parts of the face, namely, 2, 3, 5, and 6; after which, with the same tint, you work round the edge of the high light on the forehead, softening it into the yellow. This slightly yellow tint is given to indicate the presence of the bone.

Take a little of the darker flesh tint in the second round sable, and work it with the light circular motion referred to before from the high lights up to the edges of the half tints.

Half Tints.—As we suppose our reader to be a perfect novice in art, we shall here pause to explain another very simple matter, namely, what we mean by using the term "half tints." As surfaces retire from the light they of course fall gradually into shadow, just as parts advancing to the light grow gradually lighter. The high light is nearest neighbour to the light, and the deepest shade is to shadow what this high light is to the lighted surface—it is farthest from, as that is nearest to, the light. (Of cast shadow as distinct from the shadow we refer to now we shall speak directly.) The intermediate space between the lighted surface and the deepest shadow consequently falls by degrees into darkness, and it is these degrees of faint light and growing shadow which we technically call half tints. In our diagram, Fig. 7, x, l is the high light; l and t, the light; n, the deepest shadow; and the intermediate spaces are the half tints, some belonging to the light, others to the shadow.

If the eye is blue, tone that portion of the iris which is farthest from the light with that colour at a point opposite the mark of light in the pupil of the eye; that is to say, at 3, as shown in Fig. 8. With the shadow colour tone the darkest parts of the ear, the nostrils, and the cast shadow under the nose, which is shown in Fig. 6 at s.
DRIVING.

By Whistling.

OLD WHIPS—THE CLASSICS—WAR CHARIOTS—MACADAM'S ROADS—THE SEAT IN DRIVING.

There have been "whips" from days immemorial. Godheads drove their coaches earlier even than men paddled their own canoes. Apollo, god of the sun, drove daily his chariot "Enothen" from the east to the gardens of the Hesperides (the "place to spend a happy day"), at a time when Poseidon owned the only other rival team. Among humanity Pelops ran a chariot race against Oenomas for the hand of the fair Hippodameia (daughter of the latter), and won fortuitously, through the treachery of Myrtilus (the groom of Oenomas), who drew the line-pins of his master's coach, and so upset him and broke his neck in the heat of the struggle—a dirty trick to play one's intended father-in-law. But be it as it may, Pelops prospered, married Hippodameia, and the gods came down to the banquet.

What may have been the manners and customs of mankind with regard to horse-flesh before the Deluge we know not; but very soon after that date chariots and pairs were common commodities to all the grandees of the cities of the plains, of Egypt and Mesopotamia. Harness seems to have taken precedence of the saddle for many generations; and in many countries that could boast of war-chariots the art of riding seems to have been at a discount. War-chariots were used in Israel in the days of Jehu, and earlier, yet Babelsimbele taunts Hezekiah that he will give him a thousand horses, if he be able for his part "to set riders upon them." Not only lack of horsemanship, but the interests of personal safety had much to do with the precedence of the chariot over the saddle. The former was the safer means for prosecuting warfare. The chieftain was less exposed in his car, and could make use of a shield and armour-bearer in addition. As classical ages progressed, chariot-racing became a standard institution of Greece. Not exactly our idea of a satisfactory test of speed and endurance. The course was essentially a fluking one. A terrible statue, Taraxippus, or the horsefrightener, stood in the first quarter of the course; the horses were no blinkers, so no wonder if they shied. At the end of the ground was the "meta," or turning pillar, which was the scene of many a spill, and fatal accident to boot. That accidents were more frequent than was necessary, even under such circumstances, may be assumed when we consider the style of driving of the period; instead of holding their horses well in hand, and feeling their mouths with body well upright.

War-chariots disappeared from the ranks of the Roman armies, but were in vogue among ancient Britons. As civilisation progressed in our own country, horsemanship made rapid strides, but locomotion on wheels was at a discount; the state of the roads forbade it, and apart from the slowness of such a means of transit, the non-invention of springs made coaches no great luxury in swampy, boulder-strewn tracks. Ladies of distinction were wont to make their journeys on horseback, unless the distance was within the range of litter carriage. Coaches made their appearance only on state occasions, in the few better-paved thoroughfares.

When stage conveyances first began to make their appearance, they were piloted by postillions in the saddle, and not by a driver from a box seat. The journey from London to Edinburgh was advertised to be accomplished, "D. V.,” in a fortnight. Such a conveyance as that of any magnate travelling with his family would not say a journey without the attendance of a wheelwright to repair springs, axles, and wheels as fast as they gave way in the rut-grooved highways of the day. Ordinary merchandise was still carried on pack-horses; and pack roads, straight from point to point, still exist in the rough, though modern engineering has taught roads to wind round hills to facilitate draught.

But with Macadam a new era was inaugurated; roads were rendered firm and light of draught, and from that date conveyances on wheels made rapid strides, and became in time within the reach of every man who was sufficiently well-to-do to keep his beast of burden.

There is now no branch of an Englishman's outdoor education of greater importance, not only to himself, but also to others, than that of an ability to "handle the ribbons." There is not such a thing as a good Continental team or whip, and only one or two Anglicised foreigners can even drive decently.

Not a bagman, petty tradesman, or man of business, but would be ashamed to say that he was incompetent, if in fair health and strength, to pilot his own "trap;" and the majority of ladies of ordinary physique, who have had opportunities of learning the art, would not like to confess themselves unequal to the task of driving a quiet pony. And yet, though so large a proportion of society, aristocratic and bourgeois alike, can boast a smattering of the science, there is no pursuit in which perfection is proportionately so rarely attained.

Any one can make "eat" rhyme to "rat," but "poeta nascitur, non fit." It does not need deep culinary art to grill a shop or fry a rasher; but a really good chef is a rare aves. So in driving: it does not require any deep skill to pilot a steady nag, "warranted quiet to ride and drive," along a highway; the brute, if left to itself, would probably jog safely on his way, avoid all obstacles, turn securely all corners, and even take his right side of the road at a rencontre. But between such handling as this, or even the driving of an ordinary broken pair of horses, and the first-class professional handling of scratch teams, "to time," from stage to stage, there is as wide a margin as in either of the previous analogies.

The first requisite for a tyro is to learn to sit well, and so to acquire the proper scope for his own power over his horse. And yet this all-important item is too commonly the first to be overlooked, both by those who build and those who use carriages. "Elegance" is the primary aim in such architecture, and to this not only lightness of draught is sacrificed, but also control over the horse.

"Such a love of a phantom!" papa or Charles has given to his daughter or wife; and as far as elegance goes, the long sweep from the high splash-board to the low lounging driver's seat looks pretty enough. Power for the fair driver is sacrificed wholesale by this arrangement. She herself would be the first to explain if she was asked to mount a second step before she reached her seat, perhaps soiling her dress against the wheel and risking the accusation of being "masculine." Yet if it is not unladylike to mount a box-seat alongside of a gentleman driving, why should it be deemed unfeminine to have a lady's driving-seat similarly raised for the sake of mechanical advantage and safety to herself? The seat should be above, or at least on a level with the horses' heads, not below them; and it should moreover be so placed that the driver can use his legs and feet to restrain the pull of the horses if necessary, and that cannot be done if the reins pull down over the splash-board into the driver's lap.
CROQUET.

BY CHARLES BLACK, Champion.

HISTORY OF THE GAME—ITS FOLLOWERS—FILLING A BLANK—GREEN LAWNS—HOOPS AND THEIR SETTING—VETERANS.

Great deal of ingenuity has been expended in connecting croquet with the games of bat and ball played in former days. Dr Prior has lately given the public an interesting work on the historical and etymological points connected with croquet, and he seems to imply by the title that he regards the different games mentioned as the ancestors of croquet. It is always delightful to find that an apparent stranger is only an old friend in new guise, and one is prompted by such a feeling to accept Dr. Prior's genealogy. It is, however, truer to say that croquet belongs to the same genus of games as those arrayed by him, but to a very different species. For instance, crook and ball is probably the modern hockey; chicane is the new game of polo; jen do mail or pull-mail the common parent of both cricket and golf.

Croquet has a common element with all these in its having a ball driven by a wooden implement wielded by both hands; but beyond this general feature, there is no indication of their direct parentage. Croquet is in very many respects a game per se, and any of the modern historians who delight in demonstrating the uncertainty of early records, will find a congenial study in discovering the date of the birth of croquet. It would be a very wholesome study too, for they would have to search not merely in the folds of many MSS., but also in the region of cloud.

The facts known are these:—Croquet came to England from Ireland, where it had been known in many private circles for a long time; there is also testimony that the peasantry in the south of Europe have been seen playing it in a very primitive fashion. The game was introduced into England some twenty years ago; but the tradesman to whom it was given thought he could make nothing out of it, and sold it to Mr. Jaques, to whose enterprise its earliest development in England is due.

It may be a matter of astonishment to some that croquet has a great merit in affording a common ground for ladies and gentlemen to join in a real pastime. In these days, when ladies are claiming equal education and equal right of competition in the struggle for dear life, surely it may be a matter of discretion for men to utilise the hours of recreation by seeing how they get on at croquet, where ladies meet them on an equality. Ought not ladies also to eagerly support a game where they may be getting in the thin end of the wedge? Is it too much for them to hope that croquet is inaugurating an era in which there are no longer to be separate games for men and women?

Seriously, though, croquet offers an admirable field for the energy of ladies, who, eager to avail themselves of some open-air recreation, feel a distaste for the mechanical practice necessary for archery. Croquet tournaments possess all the social advantages and excitement of archery meetings, while the practice necessary to attain distinction in them is by no means monotonous. How a rising croquet player can utilise such solitary moments will be shown in future papers.

There is a greater opening in croquet for lady-recruits than
for gentlemen; for though there are several dashing and brilliant lady-players, they would all stand a chance of being beaten by a new-comer who had learnt how to make continuous breaks. If any lady would learn how to effect this coup de main, a patient study of the tactics; and more especially of the break, which will be given in our ensuing papers, is recommended.

So much for the prospect offered in croquet to those who wish to be actual players; but there are points in the history of the game which entitle its supporters to claim attention to it from the general public. They claim that as a game it has supplied an immense social want, and also exercised a powerful influence on the development of lawns as a feature of landscape-garden-gardens, can deny the great increase of plain lawns in the last few years. Where the eye was before dazzled with the glare of red geraniums, it is now refreshed by a delicious expanse of green sward. Where a small garden was dwarfed by being over-crowded with ill-assorted flower-beds and shabby shrubberies, justice is now done to its area by a neat lawn, which is at once a source of pleasure to the eye and recreation to the body.

Whence came these numerous lawns? To what new demand was their appearance due? Is it too much to say that the universal reception accorded to croquet has had a good deal to do with this universal taste for lawns? Did not the importunities of the rising generation prevail on Paterfamilias to seal the fate of the flower-beds, and give them room for a game which ensured certain amusement and prospective parties? Yet this widespread popularity has not made croquet lawns vulgar; and they stand in the same relation to well-appointed gardens as billiard-rooms to luxurious houses.

If, but a tithe of these advantages be conceded to croquet, the public ought to be grateful to the game, and give substantial evidence of their gratitude by supporting the clubs which promote its development, or by forming clubs in their own neighbourhood. Surely this is the least to be expected from people who either acknowledge that croquet has done good in its time, or pay tribute to its excellences as a game. These excellences must be now fully dealt with, in order to sustain the claims which have been advanced. To recapitulate these, and add some others to them——it is hoped that the game will be shown to have a manly element; to be well worthy the attention of ladies and gentlemen alike; to require some of the finer qualities of our nature, viz., patience, skill.
nerve, and judgment; to present some elegant combinations for
solution; to possess many social advantages; and to have a
kind of aesthetic influence on modern gardens.
Croquet has emerged from private into public life at least
five years, and has now a definite code of rules, a definite set
of technical terms, and a definite class of instruments.

What are these instruments? First, there are the
hoops, which are only pieces of malleable iron varying from
close to four feet in length, and bent in the form of an arc;
they are painted to preserve them from rust. The balls are
round pieces of wood about three and a half inches in
diameter, and painted to distinguish them from each other,
and preserve them from cracking. The mallets are used to
strike the balls, and are made of two pieces of wood, one of
a hard wood, for the striking part, the other of a more elastic
wood, for the handle. The striking part is called the head of
the mallet, and is a round block of wood flattened at the end,
the handle being left into the side of the block.
The mallets are grasped by any part of the handle, and either end of
the head is used for striking.

Well, supposing that all these implements are
in the house and a croquet lawn at hand, how
is the game to be played? First, there
must be an amicable wrangle as to who is to
carry out the "things," and then a race to de-
cide who is to get there first, the inevitable re-
sult being that the whole lot are indiscrimi-
nately tumbled on the lawn, thereby denting
the smooth turf and chipping the balls and
mallets.

Now comes the tug of war. How are these hoops to be placed? The scene is invariable: some youthful squire, eager to win his spurs,
rushes forward, seizes the hoops, strides about the lawn like a
railway surveyor, lies at full length peering through avenues of
hoops, and after getting very hot, and keeping everybody waiting,
returns to the company with an exultant "There!" The result is given in Fig. 1.

[The dotted line indicates the course in which the balls are to
be driven through the hoops. The numbers also show the
order. Between 7 and 8 the peg is has to be hit. The game is
ended when the balls of one side have hit 10.]

The triumph of the hoop arranger is short-lived. The first
grumble comes from a veteran. "Hoops!" cries he, "I've
always called them bridges, as Captain Mayne Reid does." Of
course this heresy is promptly suppressed by general indignation;
but in truth does not many a baffled player find a hoop to be a
very "bridge of sighs."

The veteran, however, is not to be daunted. Baffled at
the name of the hoops, he attacks their arrangement. "That may
be your idea," he says, "but it is too old-fashioned; that's only
the first setting of all, as they call it; I know a later im-
provement." He promptly sets to work, and pulls up hoops
Nos. 4 and 11, and places them crosswise in the centre of the
lawn. The result is seen in Fig. 2.

[The two hoops removed from the sides are placed crosswise,
as in diagram, and instead of going through the fourth hoop,
the player has to go through the middle of them, the opening
being obviously narrower than the ordinary hoop. In returning
from the turning peg, the player, instead of passing through
the eleventh hoop, has to go through the middle of the crossed
hoops, the opposite way to that he went before. The crossed
hoops are often called the "trap" or "call." The way of ap-
proaching and leaving the trap is shown by the dotted lines.]

After the veteran has expounded the way of going through
his device of hoops, the owner of the
lawn chimes in. "I do
believe," he says, "that
there's a machine in the
box to provide for that
arrangement. Let us
see." On examining the
croquet box, two hoops
are found fastened to-
gether, so as to admit of
being easily driven
into the ground, as the
terminus wished.

But here a difficulty arises. An iron hook is fastened underneath
the piece of iron which fastens the hoops. To what inten?
"Bah!" says the veteran; "you're not going to hang that
antiquated bell to the hook, and allow us when
we come to the trap to
...
PAPER- FLOWER MAKING.

NATURE'S BEAUTIES FADE—BOTANY—A FLOWER'S

PARTS—REQUISITES—TOOLS—TO MAKE A PRIMULA.

WITH feelings of pure delight we gaze on the tempting array of choice heaths, gay geraniums, and sweet-smelling roses, "laden with the breath of June." What prolonged happiness if we could always have these exquisite flowers around us! And why should we not? They can become our very own in return for a few silver coins. Then, upon a bargain is soon struck, and we gloat over our treasures, as we proceed to adorn our rooms with these lovely productions of Nature.

But our pleasure is short-lived. All too soon they begin to pine for the fresh pure air which town life denies them. In spite of our utmost care and attention, they droop, they wither, they quickly die, and we are left lamenting. No, it may not be. The rose, which shows its sweet face in almost every clime, which blooms alike in Sweden, in Africa, in Kamchatka, and in Mexico, shrinks from the smoky, dusty, gas-polluted atmosphere of a great English city, and gradually dwindles away. Even the daisy, that prime favourite with old and young in all ages, of which Chaucer declares that—

"Of all the flowers in the meadow
Than love I most those flowers of white and gold;
Such that men call daisies in our town—"

even that hardy sturdy little flower cannot be induced to give us the pleasure of its cheerful society.

You steady refuse, then, Dame Nature, to let us enjoy your beauties! We cannot command you to do so, it is true, so we must o'en submit. But, thanks to more kindly Art, we can imitate your productions; and that so perfectly as often to deceive the cleverest of your admirers. Nay, according to the ideas of some people, we surpass you, for we heard a woman say, as she peregrinated round a tent filled with choice specimens, "Well, I declare, they're almost as beautiful as artificial!"

Ah, ah, Dame Nature! by the help of wax and cambric, feathers and paper, we can deck our rooms with flowers of every form and hue. In wet and cheerless November, in bare December, in cold and frosty January, in bleak February, it matters not, our rooms may be bright with flowers. And what a refining influence—unconscious it may be, but nevertheless real—is shed by the very presence of flowers. A room may be decorated in a costly and elaborate manner; it may have lovely pictures on its walls, and elegant articles of vertu scattered about its tables; but if flowers are absent, then its chief grace is wanting. And on the other hand, a room shall be barely and inexpensively furnished; no gold or ormolu shall glitter there, but, decked with flowers, its whole aspect changes, as with the touch of some fairy wand, from dulness and gloom to cheerful brightness.

Dame Nature has many secrets both curious and wonderful in her storehouse of knowledge; but if we have a little patience and a moderate amount of skill, led by the guiding hand of Art, we shall succeed in making ourselves mistresses of many seeming mysteries, and learn to imitate fairly well her masterly work. The mind that directs should be inquiring and observant; the hand that obeys it must be careful, exact, and delicate; and then our success is certain.

The first key to be sought for is the one which unlocks and unfolds to us the different parts of flowers. For this information we must take one of Nature's own productions, and carefully dissect it, at the same time fixing in our minds the name assigned to each particular organ; this will greatly help us to understand the instructions given us by art hereafter. To begin (Fig. 1) with the stem, A, which we hold in our hand—this is termed the peduncle, a name which is given only to those stems which bear flowers. On coming to the flower itself we first find the calyx or flower-cup, B, that little outer cover of leaves which encloses and protects the flower while it is in bud, and supports beneath the crown of bright petals when it expands into bloom; it is an extension of the peduncle, as it were, in the form of leaves, termed sepals, n, which differ usually but little either in colour or texture from the ordinary leaves of the plant. Having stripped off the calyx, we come to the corolla, that portion which is placed above and resting upon the calyx, which is of a finer texture than the latter, and often displays the most beautiful colours; the corolla is made up of distinct parts, called petals, m, the "flower-leaves," as they are commonly but wrongly called. In some flowers, as in the tulip for instance, these are separate; in others, as the convolulus, they are joined together. A flower is termed single or double, according to whether it has one or more rows of these petals.
Having denuded our specimen of its corolla or petals, we now come to some thread-like substances, which generally bear little knobs on their points; these are the stamens, and the knob-like extremities we term the anthers.

In the centre of all, from the base of the flower—the pericarp or seed-vessel, where the fruit and seed are formed—rises the pistil, a slender tube standing in the midst of the surrounding stamens; this again rests upon the receptacle, the solid base by which all the other parts are held together; and the last thing to be mentioned is the seed itself. It is a curious fact that directly this organ attains perfection all the other parts of the flower dies.

Having mastered our botanical lesson, we must next decide of what to make our flowers before we can begin this extremely beguiling and attractive recreation. Wax and paper are the materials most used by those who engage their leisure hours in pursuing this art. More skill is required to model flowers in the former than to make them in the latter. The followers of each branch have their own particular reasons for preferring the one to the other.

Those who model in wax say that they can more faithfully show the exact characteristics of each individual flower, while when paper is used the flowers are all made after one model. This assertion is not denied by the champions of paper; but, say they, "Look at the results; when your flowers are finished they are so frail, so delicate, so perishable, that they have to be placed under a glass shade, and then good-bye at once to all appearance of reality; while we fearlessly place our buds and blossoms here and there, mix the counterfeit with the real, twine the wire stalks around the living stem of some flowerless plant, and have no reason to dread any disastrous consequences."

Before we go into more definite details, we had better see what is necessary in the way of tools and materials. The tools will not bewilder, for they are both few and simple, and have the further recommendation of being very inexpensive. First of all there are the two ball tools, differing in size and slightly in shape. These are thick pins about four inches long, made of box-wood; the one has a large and a small round ball on either end of its pin (Fig. 2), and the other has wooden acorns, as it were, of different sizes on each of its ends (Fig. 3). These tools are used for moulding the petals of the variously-shaped flowers; the round balls for roses, azaleas, etc.; the acorn-shaped too for the petals of bell-like flowers, such as the campanula. A steel pin, like a fine knitting-needle broken in two, with a small round head on its shoulders, is another requisite. The duty that this tool has to perform is with its point to make a way through corolla and calyx for the stamens and peduncle, and with its head to mould the petals of minute flowers.

Next on the list comes a pair of pincers (Fig. 4) with which to hold the different parts of the flowers during the process of mounting. The pin end of the pincers is used for curling petals, for entrapping their edges, and for making the lines down the centre of petals of China asters, etc. Lastly a pair of finely-pointed scissors, and we shall have got all our tools together.

As to the materials to be provided, that depends greatly upon what the flower-maker undertakes to do. Every part of the flower can be bought ready for mounting—calyx, petals, stamens, leaves, etc., all are sold prepared. This simple method will not satisfy an ambitious mind, which will naturally desire more scope for talent and taste than is afforded by merely putting together the ready-made portions.

Then, if the flowers are to be our own hardwork entirely, the following materials will be found to be necessary:—French paper, of various colours and shades, according to the nature and hue of the flowers; we propose to copy; tissue paper, both green and brown, for the covering of the peduncles; wire of three different sizes, the thickest similar to that used for bell-hanging; for the stems of the larger flowers, the next size for smaller flowers and buds, and the finest, the thickness of pack thread, for the fastening on of stamens and smaller peduncles; some cotton-wool for the thickening of peduncles; bristles for the making of stamens; powder paints of different colours for the tinting of the petals in shaded flowers; a bottle of liquid cement (it is not advisable to use gum as it stains the paper); these, together with a camel-hair brush, will complete our requirements, and we may at once begin our delicate task.

We will choose for our subject the cheerful Primula. It will be well to bear in mind that many of the following remarks and instructions will be of service in a general way in the construction of other flowers.

Take two natural flowers for guides, keep one before you as a pattern, and pull the other very carefully to pieces, lay its several parts flat on thin cardboard, trace the outlines correctly.
and then cut them out in paper with scissors. Make the stamen by covering a piece of the finest wire with paper, and dipping one end in melted white wax sufficient to form an anther like a little globule, then fasten it with wire on to the peduncle, which must now be covered in the manner before described, after this prepare the corolla by placing the cardboard pattern on paper the colour you wish your primula to be; if your model is only tipped with colour, then use white paper, and afterwards tinge the edges of the petals with powder paint. Having traced the outline, cut it out (Fig. 5), make a hole in the centre for the passing through of the stamen, then gimp the edges with the scissors, and crimp them slightly by pressing them gently with the pin end of the pincers. The next process is that of moulding. Place the corolla in the ball of your hand, and with a ball tool of suitable size mould each petal, the effect of which is that they lose all stiffness of appearance, and look to be of a softer and more natural texture. In the natural flower the corolla would extend a little way down the stem, but as this cannot be managed in paper, its support has to be made a separate part: cut a piece of paper half an inch square and gimp one edge, roll it round the pin end of the pincers, to form it into a tube, gum it to keep it firm, turn back the little points, put on cement, and place the corolla on them. The calyx now remains to be spoken of (Fig. 6).

THE GOLD-FISH TRICK (page 26).

LEGERDEMAIN.

By A Professional.

MODERN MAGIC—PRKEL'S GOLD FISH—CONFEDERATES—HOUDIN AT PARIS—THE WONDROUS HANKIECHIFF.

As strange to say, no dictionary that we know of, either ancient or modern, has ever defined the word "conjuror," or "conjuring," apart from the idea of magic or dealing with evil spirits, we will at once disclaim the use of the word in any but its toy-shop sense, if we may be allowed the expression, and will give our own definition of the word "conjuring" as follows—the art of amusing people by apparently performing impossibilities by means of hidden mechanical contrivances, or by sleight of hand. That a man like Dr. Johnson, who was a firm believer in the Cock Lane ghost, should have declared a conjuror to be one who either dealt or pretended to deal in charms or enchantments, is not to be wondered at; but it is
somewhat strange that Webster, Walker, and others, should have fallen into the same error, or rather have made the oversight of omitting the common meaning of the word as understood by 999 people out of 1,000.

We will illustrate our definition by describing and explaining one of the most effective feats ever performed, and one perhaps that on its first introduction into this country caused more astonishment than any ever before produced.

The trick we refer to is that performed so admirably some years ago by Pimick, and might be entitled, "How to bring bowls of water, in which gold fish are swimming, out of an empty cloth."

The performer advances on the stage, and stands quite apart from any surrounding objects; there is nothing in his dress in any way unusual, and in his hands he holds an ordinary cloth, say about four feet square, which he throws to the audience to examine. While the cloth is being examined he walks to and fro, occasionally turning his back to the audience.

On the cloth being returned to him he throws it up in the air, and lets it fall on the ground, stamps on it, takes it up, and shakes it to show that it is empty. He now throws the cloth over his left arm and hand, and after a few seconds produces from under it a glass bowl full of water in which gold fish are seen swimming; he pours a little water on the floor, and hands the bowl to any one to examine. From the shape of the bowl it can at once be seen that it would be impossible to carry it concealed about one's dress without spilling some of the water, and at the same time causing such a projection that it would be at once detected.

The cloth is again thrown into the air, examined, and shaken, and the trick repeated until four large bowls have been produced, the performer, as we have said, standing so that it is impossible for these bowls to be obtained from the floor or from any article of furniture near.

It may now be asked, what hidden mechanical contrivance or what sleight of hand can render this performance possible.

Fig. 2 represents an india-rubber cover, the diameter a b being the same diameter or nearly so as the top of the bowl; the whole cover turns over at the edge flat about two or three inches, so that the opening c d is considerably smaller than the diameter a b. After the bowl (Fig. 1) has been about three parts filled with water, and two or three fish placed in it, the cover (Fig. 2) is stretched over the bowl (Fig. 3); the part of the cover a b (Fig. 2) is, of course, in contact with the rim of the bowl a b (Fig. 3), and the part c d (Fig. 2) is in contact with the outside lower part of the bowl c' d' (Fig. 3).

The bowl as now covered can be turned upside down and carried sideways without any fear whatever of the water being split. The next point is how to conceal it about one's person.

Fig. 4 represents a small black bag capable of holding two bowls side by side (i.e., the glass bottom of one in contact with the india-rubber cover of the other), which is tied round the waist, the tail of a dress-coat being amply sufficient to hide it. The slight of hand required in performing this trick is to manage the cloth so that it hides the movement of the right arm in bringing the bowl out of the pocket into position. When the bowl is brought under the cloth, rest the bowl on the right hand, and bring away the left from under the cloth. In taking off the cloth incline the bowl very slightly towards one end, peel off the india-rubber cover by means of the left-hand finger and thumb outside the cloth. The cover remains in the cloth, and must be conveyed away into any pocket during the examination of the bowl. The direction of the eyes, so important in conjuring, and on which we shall have a good deal to say another time, must be with the bowl, as should the eyes rest on the cloth after the bowl has been taken out, people will at once suspect that there is something there, and possibly put awkward questions or ask to examine the cloth too soon. There is, however, no harm in purposely pulling the cloth about in a nervous manner after the cover has been removed into the pocket, in order to excite suspicion, as some sharp person is sure to want to see it, and by instantly throwing it to them the trick is made to appear more simple and more wonderful. To bring out four bowls, either the conjurer, on pretext of fetching a cloth, leaves the room or stage for an instant after bringing out two, when a friend quickly puts two fresh ones in the bag, or two more bowls can be concealed one on each side of him inside his waistcoat in a pocket made in it on purpose. Two bowls are, however, amply sufficient to enable amateurs to perform a really wonderful trick.

There is some art required in putting on the india-rubber covers; at first they will be found occasionally to slip. We cannot conceive a more horrible catastrophe to a sensitive young gentleman of seventeen or eighteen than for him to feel one of the covers give way in the middle of the performance before a mixed audience, as of course the water would instantly escape.

If proper care be taken, there need be no fear of any such accident taking place. If the covers slip, it is owing to there being too much air under them, and in putting them on sufficient air must be expelled to render the surface of the india-rubber concave and not flat: if this precaution be taken, there need not be the slightest apprehension of any disaster happening. It is perhaps needless to add that for the fishes' sake the bowls should not be covered till just before they are wanted.

It must be borne in mind that there is a great distinction between a confederate and an assistant. It will perhaps be best to explain what we mean by a 'a confederate'; we mean one who pretends to be one of the audience, when in reality he is a friend of the conjurer, and helping him all the time.

Suppose, for instance, a conjurer borrowed a coloured silk hand-
kerchief of a confederate, there would be nothing wonderful in the same handkerchief appearing anywhere afterwards.

We believe that as a rule good conjurers never have confederates, but all must necessarily have assistants. Trap-doors will not open themselves; many things may require preparation behind the scenes which it would be impossible for the conjurer himself to do. When, therefore, the same man can be employed night after night, such as a man to clear away apparatus, etc., he may or may not assist in the performance, but he cannot fairly be called a confederate, but simply an assistant.

The most "apparently impossible" feat that we ever heard of was performed many years back in Paris, we believe by M. Houdin, but are not absolutely certain. We will describe the trick, and explain how it was done.

The conjuror advanced down the centre of the theatre, having in his hand a lemon, which he gave people to smell. He advanced to a box, the occupants of which on the night in question were of such high rank, and so well known to all present, as to preclude the possibility of their being confederates, and asked a gentleman in it to hold the lemon so that it could be seen by all present, at the same time placing a small knife on the edge of the box.

After the professor had done this, he said politely to one of the ladies in the box, "Madame, would you oblige me by lending me your handkerchief?"

The request was of course complied with; the conjuror retreated, placed the handkerchief in the flame of a candle till it was reduced to ashes, then placing the ashes in a small pistol, he fired, and said, "Pass."

Turning to the gentleman, who was still holding the lemon as he had been before even the handkerchief was borrowed, he said, "Will you have the kindness carefully to cut off the end of the lemon you hold?"

He did so, and, to the astonishment of the crowded audience, inside was the very same handkerchief which he had just borrowed of the lady.

Of course, every one will say that such a feat must be absolutely impossible, but they must bear in mind that conjuring tricks are intended simply to astonish and amuse, and that almost any means to attain these ends are lawful.

The following anecdote explains the trick. The same conjuror one day, during his walk on the Boulevards, observed a man pick a pocket with such consummate address that none but a conjurer's eye would have detected him. Laying his hand on the man's shoulder, he said, "My friend, come along with me; should you refuse, I give you in charge." The man, of course, having no choice, complied. He was asked if he would like to earn an honest living, "or at least," said the conjuror, "pick pockets only when I tell you, and when I am responsible for the result." The offer was accepted, and the late thief became box-keeper at the theatre where the tricks were performed, and among other duties, had, in handing a lady a programme, occasionally to pick her pocket of her handkerchief, and to substitute for it a similar one out of the almost infinite variety the conjuror had by him. Like Columbus breaking the egg, when once known the trick is nothing; but, then, who would have thought of it? At any rate, this trick for some months appalled all Paris.

Some months ago an account appeared in the Times of a man getting into a cored box by himself, and being found there, the box being still cored outside, the writer saying, "I do not know how the feat was done, but it beats spiritualism into fits." A Mr. Clarke observed, "Now it appears to me that this confession of being unable to fathom the mystery of that surprising and baffling trick is a weakness on the part of the preceived exposer of spiritualism; for a man without sufficient invention to account for any feat of legerdemain is not qualified to detect supposed secrets of the 'mediums.'" "Without entering into details which would require a diagram, I would suggest to anybody's common sense what is the explanation of the wonderful box trick. A little reflection will show that if the conjuror had first to loosen the portion of the cord, next to open the canvas cover, and then to open the box, in order to get inside, he must of necessity have re-fastened those parts in reverse order of succession when shutting himself up. Thus, when once inside the box he first tied the cord, next secured the strings of the canvas wrapper, and then closed the box. Of course the box lid was shut, or neither the cord nor the wrapper could have tightly fitted in their proper form; but a portion of the box made to open inwards was that finally shut. Any one who knows how conjuror's boxes are constructed to deceive inspection by means of veneers which look like real dovetail joints, by screw-heads without screws, and nail-heads without nails belonging to them, will perceive how an end or side, or part of an end or side, could be movable."

In our ensuing series we will give a list of conjuring tricks that, with a little ingenuity, can be made at home; also describe how to make a proper conjuring table, as well as explain some of the more wonderful tricks which have during the last century been performed in public theatres.

We will conclude this introductory paper, for the benefit of our younger readers, by describing a trick, easily made, easily performed, and yet very effective. Purchase two small toy wedding-rings, which can be obtained at any toy-shop for a penny each. Get a piece of black elastic, such as is used by ladies for bow bracelets; fasten one end of it inside the coat-sleeve, high up under the arm, and attach one of the rings to the other end, so that when the ring is held between the fingers and thumb the elastic is fully stretched. On leaving go of the ring it will, of course, instantly fly up the sleeve. When pretending to drop the ring into a jug or vase, it is very easy to cause the ring, on its way up the sleeve, to strike the edge, making a sound exactly similar to that which it would make if it had fallen inside. By previously placing the other ring anywhere, you can apparently cause the ring to pass from the vase. It is an improvement to have one in each sleeve. Care must, of course, be taken to hide with the hand the piece of elastic.

PHOTOGRAPHY.

By J. C. Leake.

APPARATUS AND MATERIALS—PREPARATIONS—BACKGROUND—READY FOR WORK.

We are about to invite your attention to a very plain and practical series of articles on the beautiful art of Photography; but before entering on the details of the subject, we think it as well to offer a few general suggestions, which will perhaps help you to a better understanding of that which is to follow. In order to become a successful photographer, three things are absolutely essential—namely, cleanliness, order, and perseverance. If not cleanly, nothing more than dirty plates will result from your operations; if not orderly, your chemicals will become mixed one with the other without
hopes of remedy, causing much expense and many vexations failures; if not persevering, you cannot hope to succeed in making pictures by photography, any more than you could by means of the pencil. In both cases you must try, and diligently seek and find the cause of your failure. Having done this in a few cases, your task will become easy, and you will rapidly become a successful photographer.

At the outset, however, we must warn you that at first you must allow us to think for you. We shall lay down a simple and definite course of proceeding, which we shall ask you to take without question or hesitation, for the present at any rate. Presently, when you have succeeded in making good photographs by the means which we shall here describe, we shall let go our leading-strings, and leave you to traverse the vast field of photographic experiment at your own sweet will. At present, however, this would not be safe: the road is to you unknown, and you must trust to our guidance until you have travelled over, and at least obtained some knowledge of it. After this branch off where you will, and you will at least be sure of readily finding your way back to the old paths in safety.

But by this time you will be beginning to inquire, "How, then, are we to make photographic pictures? Tell us, that we may once begin." Well, then, there are well-nigh as many ways of producing photographs as there are roads to Charing Cross. In the early days of the art, pictures were mostly taken upon silvered plates, by a process called, after its inventor (Daguerre), the Daguerreotype. Those were the days in which photography was not at all recreative; for the plates required much polishing, which on a hot day was very hard work indeed, while the results were, as a rule, not at all of a satisfactory character.

We all remember the polished, looking-glass kind of things produced by this process, which required placing in a particular light before the faint impression could be seen at all. Wonderful, indeed, did these pictures seem at the time, and a vast improvement upon those distorted misrepresentations of the "human face divine" perpetrated by the artists of the Miss La Crevy school. But better things were in store. Certain chemical facts having been determined, many wise heads were at work trying to discover a better method of producing pictures, and many busy hands engaged in experimenting. And right well were they rewarded when Mr. Scott Archer discovered what is known as the collodion process, which still is, and seems likely to remain, the best and most practically useful of all. At once easy to learn and to work, certain in its action, and exceedingly beautiful in its results, this process is of all the most useful, both to the professional and amateur artist, and it is to this in its various forms to which we shall at first direct your attention.

We shall suppose, with your permission, that you are desirous of taking portraits of some of your friends, and shall now proceed to show you how to do it.

In the first place, you must understand that photography is chiefly a chemical process, and that the various reactions necessary to produce a picture are of exceeding delicacy; hence the necessity of the greatest care in all the manipulations.

In order to prepare a plate which shall be sensitive to the action of light, and capable of receiving an impression in the camera, a properly arranged room will be necessary. This is what is technically termed the "dark-room." Those who have given sitting to a photographer will remember that when the pose has been settled upon, the operator goes into a mysterious-locking chamber, from which he returns bringing a thin box, mostly wrapped in a cloth. After the ordeal of sitting still and looking at a spot upon a screen has been gone through, the artist returns to this room; and as he enters you perceive that this chamber is lighted by one window only, and that a small one of orange glass. This is his dark-room or laboratory, and is in this that the plate has been prepared. Our first work will therefore be the preparation of a similar dark chamber, in which we may work. It is advisable to select a room for this purpose which is not required for general use, both on account of the injury caused to the plates by dust, and the trouble and inconvenience of removing all the apparatus upon the termination of the day’s experiments. A small room will answer; and should it have more than one window, all but one must be completely blocked up.

A ready mode of effecting this last necessity is to make a light frame of wood just large enough to fit over the entire window. To this frame may be tacked a sheet of the stout brown paper known as carpet paper, which will exclude the light and form a handy and portable shutter, which may be secured in its place by buttons, or, if more convenient, a couple of strings. When these shutters are set up they should be carefully examined to ascertain if any light finds its way into the room, and if, as is frequently the case, there are any small holes in the paper, these must be covered by pasting paper over them. This part of the work must be most carefully done, as the smallest gleam of white light falling upon the plate will inevitably spoil it.

When the whole of the light has thus been excluded, an aperture should be made near the bottom of one of the screens by cutting with a penknife three sides of a square about a foot across, making one cut along the bottom and one on each side so as to form a kind of flap of brown paper. This may now be folded back, and across and over the opening thus formed, should be secured, by pasting at the edges, at least four thicknesses of yellow paper. When the screen is replaced at the window it will be found that sufficient yellow light is admitted to allow of comfortable working, and this yellow light, curiously enough, does not affect the plate.

Immediately beneath this window we must place a strong table upon which to operate, and if a couple of shelves are within convenient reaching distance it will be a great improvement. It is better, though, to have such an arrangement as is shown in Fig. 1, with barrel of water, b, on the shelf, and pipe, c, passing through the aperture a to supply the tray or sink 

As we have determined upon taking portraits, we must next provide a suitable background. We have no well-appointed studio, so we must be content with the open air; but as it will not do to have our background left out of doors, as it would soon become spoiled, we must make it of such a size as to be easily removed in-doors when done with. A rather strong frame of wood should be made about five feet wide and seven feet high, which should be covered with stout calico very tightly stretched and tacked to the edges of the frame. This calico should be well painted over with either double size or strong flour paste, and allowed to dry. A sheet of brown carpet paper of the requisite size having been provided, it should be laid the best side upward upon a clean flat surface and well wetted. When just surface-dry it should be turned over and well pasted for about six inches all round the edges, taking care not to paste the centre portion at all. The sheet must then be carefully lifted on to the calico screen, and having been turned over, the edges must be well rubbed down to ensure adhesion. When dry this sheet of paper will be found to be perfectly flat, and will form an excellent and cheap background, but of course it must not be left out in the wet.

Our next care must be to find a suitable place in which to take our pictures. We may if we please work in-doors if we have a room with a large window, such, for instance, as the large bay, now so common; but, as a rule, we shall find it better to operate out of doors, if for no other reason than a desire to be merciful
PHOTOGRAPHY.

To our first models by saving them the torture of a prolonged sitting. A north light is the best, since it is the least variable, and as our house faces south we have a good and steady light at the back. As we find, moreover, that there is an out-building about twenty feet long extending from the back of the main building, we at once avail ourselves of the excellent shelter thus formed, and determine that our background shall be placed against the back of the house, the sitter facing north; while we at the same time observe that by turning the head slightly towards the wall of the out-building we obtain an excellent arrangement of light and shade, one side of the face being rather darker than the other, producing a fine round effect with good detail.

As, however, the strong light from the sky falls directly upon the top of the head, and gives, by contrast, a shade of rather too marked a character under the eyes, nose, and chin, we suspend a sheet by means of strings over the background, which at once remedies these defects and gives us the effect we wish for—namely, a bold system of light and shade without any violent and harsh contrasts. Having thus satisfactorily arranged these preliminaries, we may at once go out shopping and procure the necessary apparatus and chemicals.

Anybody can spend money, but few know how to spend it well. Bearing this in mind, we have carefully considered the size and class of apparatus which we think will be most useful to us. A very inviting stock indeed is that of the photographic dealer in whose shop we stand. Brilliantly polished cameras, and still more brightly burnished brass settings for the lenses, are set temptingly before us; but though “on pleasure bent, we have a frugal mind,” and select a small unpolished camera of what is technically known as quarter-plate size, made square, so as to allow of the plate being used either upright or flat, as we shall hereafter want to take some landscapes (Fig. 2).

The cost of this is about eighteen shillings. It will be observed that the body of this camera consists of two parts, marked A and B; the one sliding into the other to allow of a proper adjustment of focus. Into the back part of this camera is fitted a frame containing a square of finely ground glass, upon which the image is to be projected by the lens. It will also be observed that a second slide, marked C in the figure, is provided, and that in this there is in the front a sliding shutter, and at the back a hinged door. These arrangements are made in order that the prepared plate may be carried in perfect dark-ness from the dark-room to the camera. In the front of the camera, and quite in the centre, the lens is to be placed, as shown in the diagram.

We find that this camera is suitable for pictures of four and a quarter inches by three and a quarter, a size easily and cheaply worked, and suitable, moreover, for subsequent enlargement, if we wish it. The “next article” required is a lens (Fig. 3), and here we hesitate a moment. If we want a good lens we must pay a good price. But we know that it is utterly impossible to succeed with a bad one, so we invest in one of a superior character, the quality of which is guaranteed by the vendor, and which costs us from thirty shillings to two pounds, inwardly resolving to make up for the extra cost of this by making for ourselves certain minor pieces of apparatus. Only four things more in the way of apparatus do we purchase—namely, a dipping-bath or trough of porcelain (Figs. 4 and 5), which is to contain the nitrate of silver solution used for sensitising the plates; a pair of scales and weights; and a small glass funnel and graduated measure, costing altogether about eight shillings.

Our attention is next directed to the chemicals required. These, as we intend to commence operations on a very small scale, will not cost us a large amount. The first and most important item is nitrate of silver, of which we require two ounces. This we ask our dealer to put into a clean stoppered bottle, and also to provide us with a quart bottle of distilled water. We shall also require an ounce of potassium chlorate of iron, the same quantity of nitrate of potash, two ounces each of glacial acetic acid and alcohol, one ounce of pure nitric acid, and one ounce of cyanide of potassium. Of course, we are not likely to taste these on our way home, but our chemist warns us that this cyanide of potassium is a poison of the most deadly kind, and, moreover, will not sell it to us except in presence of a witness, and without the signing of his poisons’ book. With one more purchase our chemical department will be complete. We now only want some collodium, which we ask for as “positive” collodium. The meaning of this term we shall understand presently. As our pictures are to be taken upon glass, we of course require some plates, which we inquire for as “quarter-plate flatted crown.” Thus stocked, we may return to our dark-room to prepare our chemicals and apparatus.

On examining the invoice we find that the cost of our chemicals is as follows:—Nitrate of silver, eight shillings; iron,
threopence; distilled water and bottle, sixpence; acetic acid, alcohol, and cyanide of potassium, sixpence each; nitric acid and nitrate of potash, twopenny each; and colloidion, one shilling, besides the cost of the bottles. The glass plates cost us one shilling per dozen.

Having unpacked our treasures, we find that the chemist has placed our chemicals in very neat bottles, duly labelled, and we carefully arrange them upon the shelf over or near to our operating table. Our next care is to provide ourselves with some six or eight stopped bottles of various sizes and perfectly clean, in which we may mix our solutions; as well as with a clean coarse towel, a piece of soap, a good supply of water, and a large basin or dish. Our first proceeding will be to prepare the nitrate of silver bath. In order to do this, we set up the porcelain trough (with which, we find, has been supplied a dipper, A, Fig. 4, for holding the plates) upon the table, and by means of the glass measure ascertain how much fluid is required to fill it within half an inch of the top. This may, of course, be done by measuring common water into the vessel.

We now measure into a perfectly clean bottle as much distilled water as will fill the trough, and most carefully weigh out sufficient nitrate of silver to add to it, in the proportion of thirty-five grains to each ounce of water. When the crystals are dissolved, wash out and dry the glass funnel, and fold, so as to fit into it, a sheet of white blotting paper into the shape of a cone. Place the funnel in a second clean bottle, and pour the silver solution gently into it. The solution will gradually filter through the paper, and be perfectly cleaned from all floating particles of dust. Label this bottle nitrate of silver bath, and set it carefully aside, closely stopped.

We now proceed to mix a solution of potassium nitrate, which we do by measuring into a clean bottle ten ounces of clean common water, to which we add one hundred grains of the iron salt and fifty grains of nitrate of potash. As soon as these have been dissolved, we add to the solution half an ounce of glacial acetic acid and the same quantity of alcohol, afterwards dropping in five drops of nitric acid. This bottle we label developing solution.

Our third and last solution is one of cyanide of potassium, which we mix with common water in the proportion of ten grains to each ounce of fluid, and label, in large letters, fixing solution, and in still larger ones, poison, in order to prevent accidents.

In all our weighing we have, of course, been careful not to place the chemicals upon the scale-pan, but have cut clean white paper to the requisite size, and placed one small piece in each pan, using separate papers for each weighing, so as not to mix our chemicals.

But now it is quite time that we should definitely understand what sort of pictures we intend to produce. We have used the term "positive" as applied to the collodion, and as a positive implies a "negative," we must explain. The pictures called positive are those which are taken direct by one operation in the camera, while those called negative, although taken in a similar manner, are not used as finished pictures, but only as a means of producing pictures by a subsequent process, termed printing. The matter will be easily understood if we take a piece of white paper, cut it into a circle, and paste it on a glass plate; if we place this upon a piece of black velvet, we shall see the white circle upon a black ground: that is a positive. But if we hold the glass up and look toward a light, we observe that the circle is dark while the margin is light: that is a negative.

Our glass plates must be carefully cleaned, and so we prepare them by rubbing them on both sides with a little whitening mixed with clean water, afterwards cleaning them with a piece of soft linen and a chamois leather, and setting them up against the wall after carefully wiping the edges. A soft, broad brush will be required for dusting them before use. Our camera and lens is next dusted out and cleaned, and we are now ready for work.

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BOATS AND BOAT SAILING.

By J. C. Wilcox.

THE BEST RIG—LUGGERS—SAILS AND MASTS—TECHNICAL TERMS—CENTREBOARDS—OUR TEACHING.

The most useful size for a small boat in which a beginner can learn the practice of sailing is about fourteen feet long, and five feet wide, for in one of this size, if anything gets out of order in the shape of running rigging, the boat can be immediately held under command with the oars. It is not wise to build and rig any very small boat exclusively for sailing, for they are then so hampered with fittings that there is very little room to move about on board them, and when it becomes necessary to use the oars, they are not as efficient as in a boat entirely open, owing to the additional weight of decks and extra rigging. We have a variety of rigs in use in pleasure-boats at the present day, namely, the lug, sprit, cutter, schooner, yawl or dandy, Bermudian, shoulder of mutton, lateen, sliding-gunter, santee lateen, etc.; these modifications of them have been fitted to boats of all sizes, but the majority are not calculated for small boats, in which the greatest simplicity of arrangement, provided it ensures efficiency, should ever be kept in view. Of these rigs, the two first named, the lug and the sprit, are the most general, because on the whole they are the most useful for small boats, and as regards the others, we can defer the consideration of them for the present.

There are three varieties of the lug-sail—the dipping lug, the working lug, and the Chinese lug. The first is so named because it requires to be either partially or entirely lowered when the course of the boat is changed; the second because it works from side to side, not requiring to be lowered on a change of course; and the third because it has been partly copied from the sails of the junks in China. The dipping lug is a sail to be avoided by amateurs, for its use is fraught with danger, owing to the following peculiarity. A considerable portion of the canvas is in front of the mast when the sail is set, and as the lower fore corner of the sail, termed the tack, is also manti in front of the mast when hooked on in its place, should the wind by a sudden shift or any inadvertence of the helmsman get on the wrong side of the sail, the canvas is pressed against the mast, and the boat is subjected to the backward force of this part of the sail, and the forward force of that portion of the canvas behind the mast. This is termed being "taken aback," and it has frequently
happened under these circumstances that the boat has upset, as it is rarely possible to haul down the sail soon enough to avoid the mischief, from the fact of the canvas being firmly pressed against the mast, by the force of the wind.

Neither the working nor Chinese lugs are open to this danger, for they are so arranged that they can be trimmed at any required angle to the wind, instantly, and the boat be relieved of undue pressure by allowing the sail to slide.

The illustration on page 32 represents a boat fourteen feet in length and five feet beam or width; a simple and at the same time a very effective rig is recommended for her in the two working lug-sails. The management of these two sails is quite sufficient for a beginner, but a third can be added if desired after experience has been attained. The larger lug is termed the foresail, the smaller the mizen.

The larger sail is in fact both foresail and mainsail in one, but as it is hoisted in the fore part of the boat, it is always known as the foresail or fore lug. A metal ring is provided for each mast, a hook and eye forming part of the same; these rings are termed travellers, and should be of galvanized iron covered with leather.

The spars which extend the sails are termed yards, and bear the names of the sails to which they belong: thus they are known as the fore-yard, the mizen-yard, etc. Each yard is encircled by either a single or double piece of small rope called a string, which is hung over the hook of the traveller to enable the sail to be hoisted. In the eye of this string, a ring of brass or galvanized iron having a groove round its circumference is placed, which prevents the eye of the string being cut by the hook of the traveller. This hollow-edged ring is known as a thimble.

The foreyard is eight feet six inches long, and the string placed two feet four inches from the heel or lower end. The length of the mizen-yard is five feet eight inches, and the string is placed on it at two feet three inches from its heel. A rope for hoisting the sails is spliced into each of the travellers, led through a mortise cut through the mast, and brought down to the level of the seats or thwarts, where it is secured under a pin passing through the thwart. Each mortise should be supplied with a grooved wheel or sheave of either brass, galvanized iron, or lignum vitae, to facilitate the hoisting of the sail by diminishing the friction. It will be found a very good plan to get a three-inch block spliced into the end of the fore-halliards, or rope by which the fore-lug is hoisted, for this combining with the sheave in the mast will give a great accession of power in setting the sail.

A smaller rope is put through this block having an eye or loop on one end of it, which eye being passed over a pin projecting downwards through the seat or thwart which supports the mast, the other end of the rope is hauled on, and easily raises the sail. When the halliards thus consist of two parts, that passing through the mast is termed the tie, and the smaller, running through the block, the fall. Each part of every sail has also its particular designation, as well as the rope to which it is sewn. The top of the sail is naturally termed the head, the bottom the foot, the front edge close to the mast the luff, the after edge the leech, and the rope to which the sail is sewn the bolt-ropes. The highest angular portion of the sail is the peak, and its apex the peak-earring; the upper portion of the sail close to the mast has received the name of the throat, and the angle of it the throat-earring. The lower corner close to the mast is the tack, and the after corner the clew.

Both on the fore and after edges of the two sails, or, to speak correctly, on their luffs and leeches, the reader will observe certain eyes or holes. These are the reef cringles, each contain-
always in place. When the sail is not in use, the peg or toggle can be drawn out and the sheet coiled up and stowed in the sail.

The boom for the mizen is usually termed an outrigger, and passing through the transom or sternboard, is received into a socket on the inside. In front of the boat the reader will observe the mast and its running rigging, which has been delineated apart from the sails, that the details may be the more readily perceived.

Although the methods for obtaining and reducing the additional draught of a boat at pleasure are by no means of modern date, they have not been commonly met with except in certain localities, where a shallow kind of boat or vessel was absolutely necessary.

As all shallow boats and vessels offer but little sideways resistance to the action of the water, they will not gain any given point to which they are directed by the helmsman unless the wind is very favourable, but move in a sideways direction as well as ahead at the same time, so that the actual line of progress forms an angle with that it is desired to maintain. This difference is known to seamen as the lee-way, and to overcome it as far as possible, heavy wings of wood, called lee-boards, were adopted, and lowered by the side of the vessel to a certain depth below the level of the bottom, in order to obtain additional hold of the water.

The very familiar flat sailing barges of the Thames and Medway, numbers of Dutch vessels and fishing boats, and a great proportion of coasting craft belonging to the Humber and the Wash, still retain these lee-boards; but as they have a very unsightly appearance, they do not find favour with the owners of pleasure-boats, and as one board in the centre of the boat or vessel is just as effective as two on the sides, it is now frequently in use. The keel requires to be somewhat stouter than ordinary; in the present fourteen-feet boat it should be three instead of two inches thick; and on the keel, and reaching to the level of the thwarts, a water-tight well or case is fixed, reaching as high as the level of the two latter seats or thwarts, and the same length as the space between them.

Simple as sailing seems when a man in charge of a boat is seen to shift his tiller here or there, and haul in or slacken the sheet or rope that governs his mainsail, yet there is much to be learned, and it will be our object so to teach this that no lad need fear to take up the management of a small boat, and steer her clear, not only of shoal and rock, but of dangerous shallows; taking advantage of cross current and sweeping tide; and above all learning that amount of prudence that is so necessary for all those who would enjoy with safety this most pleasurable of all pastimes within reach of those who dwell near river, estuary, lake, or upon any part of our storm-beaten coast.
CRICKET AND CRICKETERS.

By C. W. Alcock.

HISTORICAL—OLD PLAYERS—CAT AND DOG—SINGLE WICKET—PILCH—MYNN—FELIX—WICKETS.

What is cricket? This is not what Artemus Ward was wont to call a "kermudrum." Nor is it what Lord Dundreary would term a "widdle." I fancy though that I can hear the chorus of indignation from young and old at the idea of such a frivolous question. "What bosh," says young Chillworthy in the Eton Eleven, who was born as surely with a cane-handled bat in his hands as with the luxury of a silver spoon in his mouth. "He's a muff," chimes in young Grenville, who is now pursuing the curriculum of classical education with the rival congregation on the hill at Harrow, for both are agreed on the point that "it's the jolliest game under the sun."

Never mind, my young friends, spare your ire, for I belong to the order of mammalia and am pachydermous as the rhinoceros. Even the indignation of old Stubbles, once so slim and graceful, but now, alas! so podgy and fat—the Stubbles, who was in his time the most graceful and agile of cover-points, now sobered down into the most cunning old wicket-keeper, bent on enjoying the game with as little possible trouble to himself. You remember Stubbles well enough, for you see him every day. You know how persistently he tells that story of his "of the brave old days of Kent, sir; of Wenman, of Mynn, of Felix, and Pilch; how Kent used to meet England and lick their heads off, sir,"—the expression emanates from Stubbles, not from me—and how the bowling genius of Stubbles used to overcome all the masterly batting of the greatest batsman—even the ponderous assertion of Stubbles that "cricket is a sport that connects every class, sir, and puts on one level the peasant and the peer, the sport of Britons all over the globe, and none of your foreign kickshaws," moves me not. I am determined, youth and old age notwithstanding, to repeat my original question in a spirit of historical inquiry. What is cricket?

It would be idle to attempt anything like a proper treatise on cricket without a few words on the early stages of the game. I am not going, believe me, to recapitulate what has been written on the same subject by countless other writers, who have made the study of cricket in all truth a labour of love. Nor am I going to offer theories of my own, for theory after all is a poor substitute for fact. I am going merely to give my own ideas, gained from the practical experience of others, as well as from a personal connection with the game, and an intimacy with its most distinguished exponents extending now over many years. Crede experto is my best recommendation. You will trust one that has tried.

At present I shall confine myself to a few reasonable suggestions relative to cricket. Here there are witnesses whose own testimony I have myself received, and whose veracity or authenticity it would be high treason to impeach. My old friend Mr. Pycroft has gone headlong into the study of cricket lore, and collected a mass of evidence to prove the antiquity of the game, as well as to determine the precise source from which the nursing sprung. I could quote numberless other
THE POPULAR RECREATOR.

authorities, but the task of siting would prove too long, and require too much elaboration for my present purpose. For all reasonable minds, Mr. Pyecroft and another equally accurate historian will be sufficient to decide the most point of the age and origin of cricket. How old is cricket? that is the question. I propose for a reply.

Mr. Pyecroft claims the old pastime of "cat and dog" as the fountain-head of the cricket, and his case is made out with all the skill of the best legal practitioner. The evidence is rather too strong on his side, but there is still another counsel to undertake a brief on the same behalf. I allude to Mr. Bolland, the distinguished founder of the wandering tribe known as the "I Zingari," the most influential as well as the most aristocratic of all the various sects that adopt the religious teachings of cricket. Both Mr. Pyecroft and Mr. Bolland are agreed on the origin of cricket in the abstract, though the former goes more abstractly into the historical question, and executes the process of unearthing with even greater success.

Under which king? To which day shall we pin our faith? There is much to support Mr. Bolland's view, who affiliates cricket on the humble sport of tip cat, the favourite amusement of ragged urchins in populous alleys and squalid courts. It may be that the parentage is not very select, but I vote hesitatingly for Mr. Bolland, and his less illustrious progeny. "Tip cat" and "cat and dog" are very much in the position of Caesar and Pompey—"berrry much alike, especially Pompey."

First, the materials were very similar in both sports, and this is of itself high as well as direct evidence. It is true that the implements were more than scanty, and that there could have been little distrust in amusements that were so closely connected in point of time, but the link of evidence is none the less very firm and well sustained. The instruments were more similar too, for they were precisely identical. There was in each case a stick for a bat, and the ball was a piece of wood notched at each end, instead of the leather article now in use.

There was, too, at each end of the playing ground a circle of about eighteen inches in diameter, and these were in all likelihood the parallels of the present "creases." What more do you need in the way of conclusive testimony? Mr. Bolland, however, thirsts for corroborative evidence of a stronger character, and he drinks deeply of success. He instances the record of a match at double wicket tip cat, which was played at the commencement of the present century between the cat players of Lincoln's Inn Fields and the rival players from the district of Westminster. Here there were eleven players, and a notcher on each side, so that the resemblance between the parent sport and the game now in vogue becomes still more striking.

It was, I have no doubt, from a genuine mixture of these kindred amusements, with possibly a suggestion or more from the popular pastime of "rounders," that cricket was first embodied into a practical shape. And whence the name of cricket? is the next question. It was in all probability either a corruption of some phrases that were applied to the sport in practice, or it was merely a corruption of the Saxon word "creces," which signifies a crooked stick; but as this borders rather closely on the region of theory, I shall refrain from further comment.

Let it be conceded that as far as we can probe, cricket can lay claim to an existence of about 150 years. Theory may bestow on it a higher antiquity, but the same prebends will be difficult, and facts will be wanting.

You would like to know, too, how they played cricket in the brave days of old. Perhaps you have not had an opportunity of seeing the old pictures that serve as the only illustrations of the game in its infancy. Perhaps you have not cared to trouble yourself at all about the matter, and possibly you would not even now trouble yourself at all, but rather let somebody else explore, as long as the result of the exploration is published for your own benefit and that of others. But still you are in your own small way ardent supporters of the game, and you do your own small share in its behalf. Therefore, listen while I give you briefly a description of the old game of cricket as it flourished in the eighteenth century, when George II. was king, when the Young Chevalier was just preparing for the ill-fated campaign that ended at Culloden, and Pitt was just about to enter on that brilliant career which gained him at last a resting-place among England's noblest sons in Westminster Abbey.

At first cricket was merely confined to what is now known as "double wicket," for obviously the game of "single wicket" was merely an offshoot of the original tree grafted to produce a less complicated form of the original pastime, to suit the convenience of a lesser number of players, though governed by laws of a similar character.

According to the definition of a well-known ponderous old writer, cricket was "performed by a person who, with a clumsy wooden bat, defends a wicket raised of two slender sticks with one across, which is attacked by another person, who endeavours to beat it down with a hard leather ball from a certain stand. The further the distance to which the ball is driven, the oftener is the defender able to run between the wickets and the stand. This is called gaining so many notches, and he who gets the most is the victor." The difference even now is not so great as you would believe. Only alter the number and arrangement of the sticks ("stumps"), and designate "notches," in the present vocabulary of terms, as "runs," and you will have a positive definition of the ruling purpose of cricket as it now exists. There is a crudity of description, possibly, but one can trace the lineaments plainly enough for all practical purposes. At present the game universally adopted is that of "double wicket," and it is only indeed on the very rarest occasions that "single wicket" is ever practised or witnessed.

What is generally known as "cricket," then, must be understood to be "double wicket," for so little is single wicket known by the present generation of cricketers, so rarely is the spectacle of a single wicket match now furnished, that I really wonder whether hundreds of those who have reached eminence in the profession could pass a satisfactory examination in the rules specially made for single wicket. Still the game recalls to many of us sunny memories of the past that one can ill forget.

To me it revives many a long pleasant chat with the oldest living cricketer of the day, honest old John Bowyer, of Mitcham, esq., eighty-three, the last link between the two great eras of cricket history, as well as many a cheery gossip in the snug parlour at Canterbury with old Fuller Pilch—as indubitably the marvel of his day in sitting at is Mr. William Gilbert Grace of ours—only a few years ago numbered with the "famous nations of the dead." It brings back forcibly to my mind the tales of many a great single wicket match in the days when there were giants; of the descriptions given by "Old Fuller" of his two great contests at Norwich and Sheffield, when he defeated Marsden, of Sheffield, the greatest player of the day, first by an innings and 70 runs, and next by 128 runs; of Alfred Myynn, the Lion of Kent, and his victories over the trusty Humpate, who became famous under the sobriquet of "Felix;" of Dearman and Redgate, and many other heroes who are now gone to their last long rest. Fuller Pilch was a
CRICKET AND CRICKETERS.

as before stated, the specialities of single wicket may be left to a later period. Originally the wickets did not consist of three upright stumps as now, for I have in my possession the original engraving, dated 1742, showing what is, I believe, the earliest illustration of cricket, of which we give a reduced copy. You can see the original at the Surrey Cricket Ground, Kennington Oval, and welcome. Here are the principal features of the game as it is there represented, when cricket was, undoubtedly, in a sort of chrysalis condition merging from club-ball into cricket. The wicket was then more after the fashion of a skeleton hurdle, consisting of two small sticks, instead of three stumps as now, and in the place of the two nails that now surmount the top and connect the three stumps, there was then merely a thin piece of stick placed across, without groove or other support. You can see the player in the act of striking with an instrument not unlike the hockey stick now usually used, and the bowler on the alert to receive the ball that he has just delivered, while with outstretched hand and head, devoid of wig, the wicket-keeper remains behind the wicket in anticipation of a chance of stumping. Look at them well, for they will bear inspection.

Cricket must have been an enjoyable sport in those days. Manslaughter must have been easy enough, it is true, from the positions of the figures, but the homicide was perhaps justifiable. It is evident from the illustration that the bat, as I have just said, was not the shapely instrument that it is now, but rather a rough piece of wood, fashioned as best it could be for offensive purposes; that the ball was a very inferior sample of the article as it is now manufactured, and that the sport must have been of a somewhat more passive description than it is now, else the young gentleman in the three-cornered hat, who sits so quiescently within a few yards of the batsman (where point usually stands), cutting the notches on a piece of wood, as was then the primitive method of scoring, would hardly have been able to pursue his avocation without serious danger to wind and limb.

There was, too, another arrangement that wanted alteration, for midway between the sticks at the base there was a hole cut, in which the batsman was to ground his bat after running, before the fieldsman at the wicket could ground the ball.

But misunderstandings would and did arise from this ordination. It may be surprising, but the knuckles of the latter and the bat of the former did so often meet—intentionally or unintentionally, of course, depends on the construction placed by those that weigh the chances of the two eventualities, but always to the discomfort of the knuckles—that a popping crease was substituted, and the distance fixed as it still remains, within a limit of two inches. Cricket, it is true, is now played on more rational principles, but in the main features the game remains the same now as it was of old, subject to the same penalties, and moved by laws much the same in the abstract. If the knuckles are safe, the back sometimes forms a good target for a fieldsman.

I have spoken already separately of "wickets" and "stumps," and it may be so imagined that there is a difference in the precise significance of the two words. Wickets there are, of course, and stumps. There is a distinction, though the difference may not be very marked, for the word "wickets" is used in
the singular to denote the entire arrangement of the stumps collectively, at each end (e.g. each "wicket"), while in the plural it often serves to signify the ground on which the match is played, or the entire area from one set of stumps to the other, as instanced by the injunction to the umpires to pitch "fair wicket." The wickets are now formed of three upright stumps, made usually of ash of the best growth (see engraving, Fig. 1). Across these are two "bails," or pieces of wood neatly carved and turned, and also made of similar material, each one of which connects two of the three stumps, the grooves on the top of each of the stumps serving to secure the ends of each bail. These are what is termed collectively a "wicket," and at each end of the ground, at a distance of twenty-two yards, three stumps are placed, the two wickets serving to illustrate the distinction of "double wicket."

The various stages through which the wickets passed before they reached their present perfection have been fully detailed by old Nyren, one of the earliest historians, but here they are not material. At present I think that I have written enough on the historical in relation to the game and its principal accessories. In my next I hope to treat on other points of equal utility and describe the weapons in use, both bat and ball.

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**ROUND GAMES.**

**By James Mason.**

**CONSEQUENCES—WORD-MAKING—TRADES.**

...
"'Now,' said Emily, tired of all this talk, 'when are you going to begin Consequences?'

'Immediately,' said David, and the company rose and took seats round the table.

Every one was provided with a long slip of paper, and those who had pens sharpened them, and those who had none borrowed from those who had to spare. David was chosen leader of the game, and as soon as there was silence he gave instructions.

'Write,' he said, 'at the top of your papers the description of a gentleman, then fold the papers down, so that the writing cannot be seen, and pass them on to your neighbours on the right.'

That was done.

'Now,' said David, 'let every one write on the paper he has now the name of a gentleman; fold the paper down, and pass it on to the right, then an adjective or two descriptive of a lady; then a lady's name; then the place where the lady and gentleman met; then the time of the meeting; then what the gentleman said; then what the lady said; then the consequences; and, last of all, what the world said. After writing out each of these items of information, every one must fold down his paper and pass it on to the right, so that no one may write twice running on the same paper.'

The papers were at last all filled up; they were then handed to David, who unfolded them, and read them aloud for the amusement of the company. The first one was as follows (the words in italics were filled in by the leader to complete the sense).

'The wassail and spitful—Mr. Jones—met the lovely—Miss Smith—at the opera—on the 1st of April.' He said to her, 'Time is money.' She said to him, 'I never had a good opinion of you in all my life.' The consequence was that the Iron Age succeeded the Age of Brass—and the world said that 'Nothing wastes so much precious time as disputers.'

Several more were read, and at last came one in which it was recorded that the gentleman said to the lady, 'What is the difference between a honeycomb and a honeymoon?' and she said to him, 'Because the one is made up of many cells, whilst the other is one great sell.'

'What a shame it is to cheat!' cried Emily, when we had ceased laughing at the conundrum; and it was quite clear that some misguided individual had secretly turned up his paper so as to make the lady's reply harmonise with the remark of the gentleman.

'Cheating,' said David, in his severest tone, 'is not in the least allowable, and will be visited with the severest penalty it is in the power of the company to inflict.'

'Not much of a threat,' said Tom.

All the rest of the papers were then read, and after that came a second round of consequences, but the only thing worth noticing about it is that Notes-and-Queries—it was evidently Notes-and-Queries—took it into his head to make all that he wrote relate to one particular subject: his two characters were Mary Queen of Scots and Darnley, and he made these two appear in every paper that came under his hand. Some thought this was rather a good idea, others were of quite the contrary opinion.

'Come,' said Alice, 'We won't settle the point to-night—let us play at something else.'

'Word-making let it be,' said David; so word-making it was.

'This is a capital game,' remarked the Reporter, 'for increasing or practising one's vocabulary.'

'How is it played?' said Emily.

'Don't you know?' said he; 'it is a common enough game. But David is going to be leader, and he will explain.'
THE MAGIC LANTERN.

By Samuel Horsley, F.G.S., etc.

THE GALANT SHOW—MAGIC CIRCLE—MY FIRST LANTERN—THE BULL’S-EYE—HISTORICAL.

Looking back to “the days when I was young” (I am afraid to think how many years ago, but an infantry corps of which I am commander reminds me that it cannot be a few), I call up in my memory the then common cry at Christmas tide of “Galanty Show! Galanty Show!”, and the mind-photographs of two particular proprietors of this mystic exhibition who annually displayed their wondrous pictures within the magic circle” in a darkened room, for the delectation of a chosen band of friends. These two men formed a joint-stock or very-limited liability company, and as they moved in respectable society, of course they had regard to appearances—that is to say, both wore chimney-pot hats, muff-brown great-coats, gaiters, and stick-up collars embraced by bird’s-eye neckerchiefs.

Nevertheless, our old housemaid, who, I may incidentally remark, was responsible for the plate, made a strong point of seeing them up and seeing them down with a sharpness of aspect that gave me the idea she was a woman of a suspicious turn of mind. The man that carried the magic lantern and who focused the lenses wore a patch over one eye. Whether this was to cover the result of accident or to give greater precision while fulfilling his optical duties, I could never ascertain, for he was uncommunicative on all matters relating to the mysteries of his calling; but as I had noticed that all persons when looking through telescopes, spy-glasses, microscopes, and other optical instruments, always placed their fingers over the unemployed eye, I favoured the latter hypothesis.

His companion, who carried the box of “sliders” and a gig umbrella, did the talking, was endowed with a gruff voice, which, by a stretch of the imagination, might be regarded as sepulchral when the ghost put in an appearance on the screen—which, by the way, was a sheet always furnished from the household store, for probably the exhibitors, from past experience, had discovered the futility of attempting to provide clean sheets for their evening’s entertainments, when the cold season tempted them to employ them for domestic use.

I was given clearly to understand that “it wasn’t the lantern as was the galanty show, nor it wasn’t the sliders neither,” but the combined action of lantern, sliders, and united efforts of the exhibitors, that produced that so-called delightful entertainment for inquiring youth. Nor can I forget that part of their honorarium was “summat hot,” for, as one remarked, it was “dry work,” and the other that talking necessitated the operation known as “wetting one’s whistle;” and great ingenuity did both display in securing a maximum of supply, with a genteel deference as to asking for more.

This was effected as follows:—After a deep “pull” at the steaming tumblers, both simultaneously pronounced the mixture “really too stiff,” and filled up with hot water. Then came another milder “pull,” and the discovery that in the exercise of their temperate natures they had “overdone it,” and “would the gurner oblige with a little more spirit;” and this little dodge was repeated between the acts—and every year—as if this give-and-take system was perfectly undiscoverable by human perception.

What an extraordinary combination of tea-casca and sugar-camiset that magic lantern appeared, how redundant of melted tallow, and with what a smoky atmosphere it was surrounded, suggestive of “the emancipation of the blacks.” Then, as to the sliders. Well, they did not “go in for beauty” in those days, or for “educational aims,” but broad, mirth-moving or terror-inspiring figures—the broad grinning clown, with rolling eyes; the kicking donkey; the sanguinary ghost; the dancing skeleton, that fell to pieces in a heap, and then became reanimated.

Who can forget the history of the “House that Jack Built” and the “Cow that tossed the Dog” or the party-spirit elicited amongst the youngsters by that stirring scene when all the parish espoused the cause of the rival cues, and hung tenaciously on to their respective tails?

Ah! tempora mutant more, my masters, for hobo-goblins have gone out of fashion. What a remarkable collection of animals that was which went into the Ark! The hippopotamus was nearly as life-like as that specimen in the British Museum which Ernest Griesel so faithfully represented in the pages of Puck that it could not be said he caricatured its aspect. How my youthful brain was troubled as to how the whale (so “very like a whale”) could ever have been lodged within the walls of that barn-on-a-barge-like structure which overlooked a sugar-loaf mountain, unless he was a creature of accommodating disposition, and took in all the other animals—elephant included—as steerage passengers; but even then I fancied the long necks of the pair of giraffes must have hung out of his mouth—he must have been so like an omnibus on a wet day—“full inside.”

Human nature will be human nature, and I must confess that after three seasons of this same delectable entertainment, it paled upon our taste, and we went in for a conjurer of
THE MAGIC LANTERN.

vast skill. A year or so after, a friend presented me with a lantern and a box of slides. This, of course, I took to pieces, and found (what I now know to be) the type of construction of the magic lantern, and which I will here describe. The outward aspect of the apparatus is shown in Fig. 2, and the section of same in Fig. 3. B represents the japanned tin "body," with its chimney so arranged as to exclude all light from the room in which the pictures are shown on the screen; C the condensing lens that collects and converges the rays from the source of light X, which pass through the transparent picture placed in the stage S, and P the power or lens that magnifies the picture and projects, in diverging rays, its enlarged image on the screen, placed at a suitable distance, proportionate to the size of image desired—the nearer the screen is to the lantern the smaller and brighter is the picture produced, the farther the screen is from the lantern the larger but fainter is the picture produced, according to the law of inverse squares, to be hereafter described.

But this lantern was a small one, bought at a toy-shop, with pictures only about 3/4 in. diameter, and I yearned for grander effects; so I annexed the bulb of a lantern pertaining to the ware house, and, being of a mechanical turn, I rigged a stage with a double-convex power on in front of the bulb’s-eye lens, as shown in Fig. 4, and, without knowing it at the time, produced an arrangement of superior type—that is to say, the type now universally adopted—where the condensing lens is placed between the light and the stage. This lantern showed pictures 2 inches in diameter, and proved a decided improvement on my first; but this in turn gave place to another of still better construction, wherein the bulb’s-eye was replaced by a double-convex condenser of 3½ in. diameter, with a plano-convex lens of 1½ in. diameter and 3½ in. focus for the power, which showed pictures, single and double slipping slides, vevers, and chromatopes, 3½ in. diameter, by aid of an argand-solar lamp, M, as shown in Fig. 5.

This satisfied my youthful desires, for my aim was mere amusement of friends during the winter season. But a time came when I saw that the magic lantern was destined to take position as an instrument of the highest educational aims—that was, when the method of producing transparent photographs on glass became known to the world, for by such means we were enabled to produce faithful transcripts of nature and art upon a small surface, and, by aid of the lantern, enlarge these up to ten, twenty, or thirty feet in diameter, so as to reproduce every detail, even of microscopic subjects, clear and distinct, and so artistically rendered as to light and shade as to cause the magnified images to appear stereoscopic in aspect, consequently in a manner to address themselves impressively to the eye and mind of the spectator or student.

As this alliance of photography with the magic lantern promised to prove a happy one, since 1856 (when I gave a course of lectures on natural history thus illustrated) I have devoted time, thought, and money to the development of this method of "imparting instruction and perfecting the apparatus required by the demonstrator," and the result of my experience I purpose giving in these pages.

Having described the simplest type of lantern, it will not be uninteresting if we look into the early history of this instrument; for though most persons are only accustomed to regard it as a toy, it has probably been used as an implement of priestly power in days gone by, as it will prove an educational power in days to come. As both metal specula and glass lenses have been discovered among the ruined buildings of Egypt, it is not improbable that the priests of the ancient Egyptian temples—men learned in many branches of science—availed themselves of the means such optical aids afford for producing illusions of supernatural aspect for the purpose of acquiring influence over the minds of the people, and even the mighty of the land. The intense illuminating power of an eastern sun supplied their deficiency in regard to their knowledge of producing a bright light by artificial means; and we can imagine their adopting some such contrivance as that suggested by Schottius, but shown in more elaborate manner in Fig. 6. In this we find a polished metallic speculum, across which a wook suited to the desired manifestation, such as cave, is written, and placed in reversed position on the dwarf wall of a courtyard at 0, on which the brilliant rays of the sun so would fall at a given hour. Opposite to and in line with the inscribed mirror, a double-convex lens, L, is inserted in a wall standing opposite to a drapery, D, suspended in the conjugate focus of this lens, consequently in the position where an upright image, I, of the object 0 would be projected above the altar of the temple, in view of an awe-inspired crowd or a king who had to be brought to the priest’s way of thinking.

The next glimpse we get of optical contrivances being employed for the wonderment of the people is in the Oxford legend, which relates that Friar Bacon had been seen walking in the air between two steeples, "which was thought to be done by glasses when he walked upon the ground." Some authors ascribe the discovery of the principles of the magic lantern to the learned friar, which would carry it back to about the year 1200. It was not, however, till the seventeenth century that any definite description of the construction of the magic lantern was given to the world. In the first edition of Athanasius Kircher’s "Ars Magna Lucis et Umbra," or "The Great Art of Light and Shadow," published at Rome in 1646, a rude engraving, of which a fac-simile is given in Fig. 1, represents a barrel-shaped lantern, with one end closed by a concave mirror, A, B, for the purpose of collecting the rays from a wax taper, F, and projecting them through a double convex lens, D, fixed before the open end of the "body," a space being left for the insertion of a smoked glass, on which the subject to be represented was scratched; the object of this arrangement, we are told, being to throw an inscription on a wall at some feet distance. The smoke from the adjustable taper, F, was carried off by a double concentric chimney, C. This lantern was portable, and could be carried about by handles, H, projecting from the sides.

There is every probability that this was the crude kind of optical arrangement employed by the Sicilian priest whose incantations in the Colosseum at Rome are so graphically described by the celebrated Florentine engraver, Bonvento Cellini. This necromantic ceremony, he states, lasted above an hour and a half, whereat legions of fiends seemed to fill that vast amphitheatre. Cellini seems to have had some knowledge of how these demons were "raised," as he says that he tried to quell the intense fear and horror of his companions by telling them that "all these demons are under us, and what ye see is but smoke and shadow," thus indicating an optical origin for such frightful visions. A declaration made by a youth who accompanied Cellini on this occasion further confirms the conviction that some kind of magic lantern was employed, for the boy states: "As we were going home to our houses, in the Quarter Banchi, two of the demons whom we had seen at the Amphitheatre went on before us leaping and skipping, sometimes running upon the roofs of the houses, and sometimes upon the ground."

Cellini died in 1570, and his description, here curtly rendered, has caused some authors to refer the discovery of the magic lantern to the early part of the sixteenth century.

In the second edition of Kircher’s great work, published at Amsterdam in 1671, the author professes to give the result of
Rome. Kircher, born in 1601, was educated for a Jesuit, and it appears he for a long period gave exhibitions in his rooms at the Jesuit College, which were nightly thronged by the noble and learned inhabitants of Rome.

In his "Ars Magna Lucis et Umbrae," edition of 1671, Kircher gives a large and beautifully engraved representation of the arrangement adopted at these exhibitions, a reduced fac-simile of which is given in Fig. 7. By this we find that his apparatus was shut off from his reception room by a partition, through a hole in which the image-yielding beam of light passed on to a wall opposite. The lantern itself seems to have been a chamber some six feet square, fitted with a large open lamp, s, suspended beneath a chimney, and a tube, c, that carried the condensing lens and sliders, probably also the power or magnifying lens; but it is remarkable that neither in this nor in another representation he gives of his lantern, does he in any way indicate the existence of this essential part of the apparatus.

A mere concentrated beam of light passing through a painting on glass would give but a misty, shadowy image, such as a stained glass window would cast upon a wall when the sun shines brightly through it. If he formed a sharp image, such as he represents in his figure of the skeleton on the wall, by a small hole in front of the picture—such an arrangement as is known to opticians in "the pin-hole camera"—there would be a deficiency of light, and this is not indicated in the disc surrounding the skeleton. It is more probable his "power" was fixed in a sliding tube fitted into the partition, so as to effectually prevent any person peeping into his operating room.

The author's reticence on this point is very striking, when in all other instances, in a work teeming with optical information, his illustrations are elaborated to every detail; but in our own days lecturers on optical illusions have been very communicative, as to details that have been cut out and become common property, but have proved very reticent on "things not generally known," and a withholding of the truth has been considered sound policy.

Kircher's slides consisted of rude figures of spectres, skeletons, etc., painted on glass, within circles, three or four subjects being depicted on one slider. He also indicates an arrangement wherein the subjects were painted round a large disc of glass, that rotated on the axis of a circular stage, so that subject after subject could be brought opposite a circular aperture corresponding to the tube shown in Fig. 7.

Most authors seem to credit Kircher as being the inventor of the magic lantern; but, according to his own statements, he is indebted for all his knowledge...
of the subject to Walgenstienius the Dane, to whom he dedicates his "Ars Magna."

It is probable this instrument took form by gradual steps, such as first admitting artificial light through a stencilled plate, and focusing the image on a wall by aid of a lens, next covering the apertures in the stencilled plate with coloured paper, mica, etc., then the tinted stencilled figures would give place to crude figures scratched on smoked glass, etc.; then to rough paintings on glass; the reflecting concave mirror would be supplemented with a condensing lens, till we find the arrangement much as Kircher described it in the seventeenth century.

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**FENCING.**

**By Major Hodie.**

**WEAPON TO WEAPON—GREEK SWORDS—SCIPIO AND THE BUCKLER—THE AMPHITHEATRE—FRENCH FENCERS—DELLING—THE POSITION.**

Ever since men invented weapons with which to pierce each other in earnest, they have probably sought to acquire skill in the use of them by practising in sport. When the Spaniards first invaded Mexico, they found the Indians armed with wooden swords, which they used with surprising address; and even in the case of more barbarous peoples, when a waddy meets a waddy, there is a great deal of feinting, and springing from side to side in search of an opening for a blow, which proves a certain amount of study and exercise.

But so far as we can judge, it was a long step from the practice of individual ingenuity to the laying down of certain fixed rules for general use. The Athenians were the first of whom it is recorded that they taught the use of the sword as a science, and amongst whom fencing was a necessary branch of education. Following their example, all the other nations of Greece, and particularly the Macedonians, adopted the thrusting sword. The Spartan blades were only fourteen inches long, which shows that they must have trusted to the point rather than the edge; and this is further exemplified by the reply of Agis, the Spartan, to an Athenian who bantered him
about the short swords of his people; “And yet we manage to
spit our enemies upon them,” he said; and when an officer of
King Agrippas complained to him of the shortness of his
blade, the king replied, “Take another step forward, and it
will be long enough.”

The Romans also paid great attention to the management
of their weapons. Both Trajan and Adrian taught recruits
themselves, and offered rewards for the most expert. And not only
did the Romans practice with their own weapons, but with the
long sword invented by the Gauls, who were very skilful with it.
Scipio the younger, when appealed to by the owner to
admit a very beautiful buckler, said, “Very handsome indeed,
my lad; but a Roman soldier ought to put more confidence in
his right hand than in his left.” And the long career of
Roman victories is generally attributed to the deadly skill
with which that people attained in the thrusts of their short
swords. When the sports of the arena became the most ab-
sorbing of popular interests, great was the attention paid to
the fencing-schools kept by classical masters d’armes, termed
lansdriers, where the gladiators practiced with wooden swords.

But, after all, the skill attained even by these professional
fighters in the use of the sword must have been of a very infer-
describable that acquired by modern adepts in the art of
fencing, for the left arm bore a target, which was employed to
ward off the thrusts and strokes of the adversary. You re-
member how Rodolfo Dhu faced when he somewhat quixot-
ically threw down his target in his combat with Fitzjames, who
did not possess, and did not want one.

“For trained abroad his arms to wield,
Fitzjames’s blade was sword and shield.
He practised every pass and word,
To thrust, to strike, to feint, to guard;
While less expert, though stronger far,
The Gaol maintained unequal war.”

and was killed.

As a rule, though, it must be evident that the more power-
ful of two men armed with sword and buckler would be able to
press down upon his weaker adversary, force his shield
aside, and cut him through the helm, even if he were more
cunning of fence than himself; and it was probably owing to
this that the connoisseurs of the amphitheatres did not much
care to see two men who were similarly armed encounter one
another. Thus the murmillo, whose arms were those of the
Gauls, was matched with a gladiator, who bore the small round
shield and the sick or falchion of Thrace; or with the Samnite,
whose shield was broad at the top and narrow at the bottom; or
with the retiarus, who had a net in which to entangle his ad-
versary, and a three-pronged spear, with which to prod him.

Let us then take a considerable leap, and in the commemo-
ration of the sixteenth century we shall find that the science of
arms, as understood by the moderns, was cultivated in Italy
under the names of espada, estocade, extramazon; and there is a
trace of this still extant in the fencing-schools of the present
day, if we may trust Mr. Knight, who affirms in one of his
Shakespearean annotations that the “Hah!” which fences
habitually utter when they large, is derived from the Italian
half! (You have it!), which in its turn probably came from the
habet of gladiatorial Rome.

It is singular that at the period alluded to fencing was
entirely neglected in France, a point of honour, begotten of
chivalry, causing it to be banished from the court of Francis I.
Montaigne tells us that in his youth the nobility avoided the
reputation of being good fencers. They considered that a
combat should be a test of courage, and not a trial of skill.
And this feeling, which was not a very consistent one, con-
sidering how carefully horsemanship, and that skill with the
lance which should ensure success in tilting was cultivated, had
not vanished entirely until about the middle of the seventeenth
century.

In the reign of Charles IX some fencing schools were es-
tablised in France, and in Henry II’s time the practice of the
sword, in sport and earnest, was carried to a very great height.
The king himself excited the duelling mania by an imprudent
speech, which he bitterly repented afterwards. Posterity one
day with some case in which he had been appealed to as an arbi-
trator, and the rights of which were hard to get at, he said in a
moment of impatience, “It is very strange that gentlemen who
wear swords by their sides should come to me for justice.”

Henry III. (we are still speaking of France) was one of the
best fencers of his time, and the gentlemen of that period
carefully studied the art, and, as was always the case, were too
apt to test their proficiency with the unsheathed weapon. This
monarch raised such magnificent tombs to such of his favourites
as fell in duels, that “I will cause you to be carved in marble,”
became a cant phrase among the courtiers when they reached
the threatening stage of a quarrel. One of the duels of this
reign is so famous, and so characteristic of the manners of the
time, that it cannot be passed over in a treatise like the present.

One April day in 1578, Magiron, Queïns, and Livoret on
the one side fought with d’Entremague, Ribéran, and Schomberg on
the other, at Paris, in the Rue des Tournelles, opposite the
Bastille, with the following result:—Magiron and Schomberg
were killed on the spot; Ribéran died next day; Livoret and
d’Entremague were more lightly wounded, and survived; and the
sixth, Queïns, pierced in nineteen places, lingered for thirty-
three days, and then died in the arms of the king, May 29th.

Quélus bitterly complained that d’Entremague, to whom he
was opposed, made use of a dagger to assist him in parrying
the thrusts, while he himself, understanding that by the terms
of the combat no second weapon was allowed, had not brought
one; and as d’Entremague, when appealed to, declined to forgo
his advantage, he had to use his unarmed left hand, which was
soon out to pieces. Opinions were divided at the time as to the
conduct of d’Entremague, which does not appear to us very chival-
rous, inclined though we are to pay all due homage to success.

The next great impetus given to fencing was by Louis XIV.,
who, by patronising and encouraging the best maîtres d’armes,
and raising them in social position, did more than any one to
exalt fencing into a science.

It may be well here to point out the difference between
the rapier and the small sword, weapons which are sometimes
equippedly considered identical. The rapier has a flat blade
with a sharp edge, so that it could be used for cutting as well
as thrusting; while the small sword is triangular, with the
sword flinted or hollowed out to lighten it without detracting
from its strength.

In the reign of Louis XV. was invented the duel au premier
sang, in which the first blood drawn decided the affair; and
this arrangement, which, while it encouraged the practice of
“going out” on slight provocation, also enabled sensitive
gentlemen to do so at little risk to their valuable lives, has
remained customary in France to the present day.

In 1735 a duelist of the name of Dorsant had three en-
counters in one week: the first with a man who had dared to
look at him askance; the second with an officer who had stared
at him; and the third with an Englishman who, having been
introduced to this susceptible gentleman, failed to recognize
him, and passed without looking at him at all! It must have
been difficult for a peaceable contemporary to avoid giving
offence to M. Dorsant.

Perhaps the last-named gentleman’s honour would have been
less sensitive if many men had been as irreclaimable and earnest
as a little gentleman living in Paris at the same time, who, quarrel-
ling with some one in a restaurant on an upper story, and
being a bad swordsman, challenged his adversary to jump out
of window; but withdrew the challenge when the other, after
considering, replied, "I will, on condition that you jump first."

Happily the days of duelling belong to the bad old times,
and in our land no such follies are perpetrated. We have grown
too wise to consider that an affront necessarily calls for an
appeal to arms. Fencing, however, still holds its place as a
graceful, manly art, one which calls forth agility and skill as
well as quickness of eye in its votaries.

The principles of fencing laid down by Grisior are these:

To form a correct and rapid judgment of the mental and
physical resources of your adversary, and how far he has
learned to avail himself of them.

To divine his intentions and frustrate them.

To profit by any irregularity in his guard.

To learn whether his strength lies in defence or attack.

Lastly, to find whether he acts at hazard, or according to a
preconceived plan.

The object of him who desires to become a good swordsman
must be to combine with perfect coolness the greatest possible
rapidity of movement, with firmness on the legs, and suppleness
of body; to parry without effort, and yet effectively; to feint
with safety.

Five qualities are necessary for the attainment of this ideal:
knowledge, precision, rapidity, a quick eye, and a strong wrist.
The first three are only to be acquired by careful practice of the
rudiments before loose practice is indulged in. Let us there-
fore begin with

THE POSITION.

If attitude is not "everything" in fencing, it is at least a
very great deal, for without securing a correct position, into
which the learner shall fall instinctively, without thinking about
it, further progress is impossible. The more pains he
takes to come on guard and long enough correctly, the quicker he will
get on afterwards.

Place yourself with your right breast opposite the adversary,
your eyes fixed on his, your right foot pointing to the front, the
left to the left, at right angles; the right heel in front of the
left ankle; the body upright; the hips rather drawn back, but
without constraint; the head erect, but not thrown back; the
hands hanging easily at the sides, the left holding the foil as
if it were a sword in its scabbard, convex side of the handle
upwards (Fig. 1).

Raise the right hand in front of the body as high as the face,
palm upwards, and bring it across to the hilt of the foil, which
grasp lightly. Raise both hands above the head, separating
them, so that the left hand shall hold the point of the foil
(Fig. 2).

Bring down the right arm with the foil, until the elbow is
about on a level with the waist, and some eight inches in front of it.
Thumb along the surface of the hilt; forefinger under
the thumb; the point of the foil as high as the chin; the fore-
arm and foil in a straight line. The left arm must remain in
the position in which it held the point above the head, except
that the palm of the hand is to be turned to the front. Then,
without moving the body, head, or neck, bend both knees,
sinking down as low as you can, and advance the right foot
some twelve or fourteen inches, so that the leg from the knee
to the ground is perpendicular (Fig. 3). Now you are on guard,
which is the position from which all attacks are made, and in
which all attacks are parried. Short men should have their
guard as high as their necks, men of middle height a little
above the middle of the chest; tall men should take the middle
exactly. As a rule, you must always regulate the height of your
guard by that of your adversary.

Pay great attention to the hold you have of the hilt, for
upon it depends that freedom and suppleness of the wrist
without which the various movements to be described hereafter
cannot be performed. However the arm and hand may be
turned and twisted, no finger should ever stir from the position
in which it is first placed on the handle (Fig. 4).

The foil then must be held firmly, but not grasped hard; the
thumb advanced along the upper side of the hilt, and nearly
touching the shell; the forefinger exactly underneath it; the
other fingers close up to the forefinger, not separated.

Remember also with regard to the feet, that in all positions,
whether you advance, retire, or change, they must remain as they
are placed when on guard, i.e., at right angles, the right foot
pointing to the front, the left to the left; for if the toes are
turned outwards or inwards, the body will at once lose its
balance, while in the case of longeering, your point will be turned
aside from the adversary's breast.

The Advance.—Take a short quick pace to the front with the
right foot, which must not be raised high, but just skim the
ground. As the right foot touches, bring up the left the
same distance, taking care to keep the feet in their relative
positions, i.e., at right angles, and the right heel on a line with
the left ankle.

The Retreat.—Take a short quick pace to the rear with the
left foot, and as it touches the ground bring back the right
foot, planting it firmly on the ground.

The Loigne.—Straighten the right arm, raising the hand, and
depressing the point of the foil, until arm and foil form one
horizontal line; and as you do this turn the nails upwards.
Then step forward from fifteen to eighteen inches with the
right foot, and straighten the left leg by pressing back the
knee, taking care not to move the left foot, which must be
kept flat and firmly planted; at the same time let the left hand
fall to within a few inches of the thigh (Fig. 5).

After a little practice, these actions are performed simultane-
ously, but it is of such vital importance that the nails should be
turned upwards (Fig. 6), a slight movement which gives strength
and suppleness to the wrist, while it communicates rigidity and
accuracy of direction to the sword; and also that the arm
should be perfectly straight when the right foot darts forward,
that you must begin by making two distinct movements: first
straighten the arm, then longe. It is well to have a mark on the
adversary's plastron to aim your point at; or for private practice,
make a mark on a wall at the height of the centre of a man's
breast, and longe at that. You cannot take too much pains to
acquire the habit of performing this movement properly; for if
you once get in the way of plunging forwards with a bent arm,
and making a poke, you will find it very difficult to break
yourself of it. You would never have the opportunity of
doing so if you were opposed a weapon with a point to it;
on the first occasion of the experiment, your adversary would
merely hold his sword straight, and you would plunge upon it.

Pay great attention also to the position of the body when
extended; that the feet remain at right angles; that the right
leg is perpendicular from the knee to the ankle; if the foot is
beyond the perpendicular line, you have a "longed" too far; that
the head and shoulders are not bent forward, but retain the
same position as when on guard.

The lowering of the left arm is of use in preserving the
balance.

To recover from the extended position, press the ground
with the right foot, withdrawing back to the position of the
guard, re-bending the left knee, and tossing up the left hand
again. These are the movements which may be considered as
having reference to the position in fencing; in the next paper
we propose to treat of the defence.
ANGLING.

BY GREVILLE FENNELL.

WE have but little fault to find with the countless treatises on angling which have appeared in the English language, beyond the fact that they bewilder the tyro with what we consider an undue importance attached to different tackle for different kinds of angling, and perhaps that singular omission of explanations of the "why" and the "wherefore" of the various tenets the writers are desirous of impressing upon the reader. We take up some of the best works, and what do we find? That if we are to subscribe to the doctrine of our teachers, and implicitly follow their instructions, we should, before we started as a faithful pupil, require, particularly if we were a youngster, a far more liberal allowance of pocket-money than generally falls to a youngster's lot. Here we take at random the list of an angler's outfit—a rod for general fishing, a stiff cane rod, eighteen feet long, for roach-fishing, a four-joint stout bamboo for perch, a different one for spinning, another for trolling, a double-handed fly-rod for salmon fishing, and a single-handed fly-rod for trout angling; and who has not become more and more perplexed as he has read on of the costly, if not of the altogether unattainable, equipment indispensable to qualify for an angler's career? Not to say anything of reels, "plain," "click," and "multipliers," landing-nets, gaff-hook, rod-spike, clearing-ring, bait-kettle, pannier, fly-books well furnished, plummet, swivels, traces, floats, and a hundred other items deemed by the tackle-manufacturers, but not by us, essentially necessary to be at hand before the tyro dare think of looking with profit upon the waters.

Upon this the first part of our text, a dear friend once wrote us: "How often have not I retired, full of much murmuring and disquietude of heart, to my favourite promontory of turf projecting a little way into the stream, under shelter of some friendly pollard willow, throwing its shadow over rippling shallows, there to pursue in solitude a ruthless campaign against the minnows. But who shall picture the delight with which the first huge gudgeon, fully two ounces in weight, was hooked and fairly landed? Who shall describe how the scales fell from my youthful eyes when a trout—yea, a little trout—having unwarily seized the worm, was jerked right overhead and lay kicking and gasping among the tender grass? What was this book that should teach us? Who was the author, that he should endeavour to make small boys unhappy for the term of their summer holidays, and lead bigger ones into self-denying outlays of pocket-money on expensive gut-lines and bamboo rods? Had we not caught trout with horse-hair and a two-joint hazel? Let him be of small account henceforth. So said we in our boyish days, and so say we now. Unquestionably, you cannot throw a fly with a cane roach rod, nor can you troll comfortably with a fly-rod; but your selection of this article of tackle, as of every other, must be governed to a certain extent by convenience and to some extent by the nature of the water you are going to fish. A rod of four joints, with a stiff top and a longer plant one, and one that will fit into the second joint (and be nearly as stout as the ordinary third joint), for trolling, will answer every purpose of bottom fishing that can be imagined. Whether this rod should be of bamboo or hickory, you shall presently determine for yourself. The bamboo is lightest, stiffest, and tires the arm less; the hickory is less likely to break than the bamboo, and is easier to mend."

As it will be our object in these papers to deal as much as possible with the "why" and the "wherefore"—in a word, to render "philosophy in sport science in earnest"—we shall endeavour to explain in the most simple and practical way the reasons for the adoption of certain rules, which rules we shall select alone for that popularity earned for them by their success.

Here, then, we have to explain why the bamboo rod is superior to the hickory; beyond that already advanced in its favour—its lightness and stiffness. It is that in float-fishing, for roach more particularly, in which the action of the hand ought rapidly to follow the detection by the eye of the slightest indication of a bite, there should exist no undulation along the rod from the strike of the wrist to the extreme tip of the top joint; but this is the case generally with the best hickory rods, and sometimes, it must be confessed, with a badly-made rod of bamboo.

It is extremely easy to tell whether a fishing rod has this great and serious defect, or is altogether free from the disadvantage, and as this test can be applied before the purchase is made, it has this additional recommendation, that you are not saddled with a piece of tackle you daily wish would meet with some accident to justify your getting rid of it. Put the rod together in the shop, and holding it as in the attitude of angling with its top joint over the counter, evenly and horizontal, within
a couple of inches of it, strike with the customary turn of the wrist, and if the top bends towards the counter first before it rises, have nothing to do with it, for in that period it will lose by its action in giving the necessary tautness to the line, and consequently, in hooking your fish, your prey will detect that the bait is held by a lure and will reject it.

Again, you may be told by the manufacturer invariably to observe certain marks upon the ferrules, which are always to come opposite to each other to secure the equality and straightness of the whole. Our opinion upon this point is, that well-finished joints should permit of their being put together without any such conditions—conditions which in the hurry of fishing, more particularly when the sport is fast and furious, are sure not to be observed.

In the purchase of a rod, the chief thing, next to sound material and workmanship, is the balance. A good rod should rest fairly in the hand when grasped, neither dipping at the butt nor above it, and such a rod may be held all day with scarcely any fatigue, provided there is little or no wind. During windy or boisterous weather, a bamboo rod certainly possesses objections which do not fall with the same force to those of a heavier description, and the longer the rod the more unmanageable it becomes under these circumstances; but as the bamboo rod is almost wholly confined to roach fishing, and roach fishing is almost always pursued in calm, unruffled weather, these objections to the use of bamboo do not apply but in exceptional cases.

Still, there are those who altogether eschew the bamboo rod, and affect the hickory or lannee-wood, and as they have an equal right to be heard, we will quote a passage from our commonplace book on this head. "My favourite mode of enjoying my darling sport is not to sit in one place all day, or for hours together, at an accurately plumbed swim, dropping in and drawing out, and ground-baiting with the regularity of a pendulum, but, in fine autumn weather, to start up such a river as the upper Thames, with a good stock of red worms, and walk over three or four miles of water in the course of the day, making a cast wherever I see a likely spot, in happy indifference whether perch, chub, roach, rudd, dace, gudgeon, or other of the fish delineated below (Fig. 2) accept the proffered dainty. And as, to avoid any squabbles with landowners, I prefer keeping to the towing or public footpath, it is very often necessary to make a far cast, for fish of any size will usually shun the frequented side, and keep either in the middle or on the further side of the stream. Now it is by no means easy to pitch float and bait lightly and accurately into any tempting locality—as, for example, between two patches of weed in the middle or at the other side of a river—particularly if the tackle is fine (which it always should be), and such as the wind might take. If you have a bamboo rod, and there is anything of a breeze, you will find it pretty fatiguing work, for the impetus has all to be given by your arm; but with a hickory rod you avoid this labour. Being much heavier than bamboo, it resists the wind better; and if, holding it in one hand, you take the bait or float in the other (according to the length of line required for the cast), and make a spring of the rod, you will find, with a very little practice, that you can pitch the bait into any space big enough to hold it. And let me add, too, that in a weedy river it is no small advantage to have a pliant, limber rod, that will take the strain off your fine gut or single hair, as a bamboo never will. Giving line to a heavy fish under such circumstances would be fatal to your hopes of landing him, and to your tackle too; and this is why I consider a hickory rod preferable for this kind of
fishing. I confess, however, that its greater weight is a serious primary objection, and that, like many other instructors, I do not always practise what I preach.

The above presupposes that the rod is fitted with rings and reel for running tackle, and in this respect the Nottingham style of angling leaves the Thames and other modes of angling very far behind, for not only does the line run off the Trent winches or reels with extraordinary facility in comparison to the ordinary description, but the weight of the float and consequent number of shot (the float generally is a simple pinion-quill from the swan or goose, of which we shall have presently more to say in praise) permits of and facilitates a far greater range of cast.

We have seen, however, a compromise between these two kinds of rod, part bamboo and part hickory, or lance-wood, which has all the stiffness and suppleness combined for both styles of fishing; but where the angler is seated to his work, and he fishes with a tight line, keeping the end of the top of his rod immediately over the float as it slowly moves down stream, there is no rod to excel the bamboo for rapidity of strike (most important in reach fishing) and the facility of killing or securing the fish.

A worthy old Waltonian, to whom we owe some of our first lessons beside the stream, used to say, "Don't buy a rod with screw, or bayonet, or any other fancy joints; they are always getting out of order, nor do I like metal round the bottoms of the joints—it gives additional weight without compensating advantages. Let the sockets be of metal, if you please, but let wood fit into them. As for the difficulty of separating the pieces should water get to the joints, I always consider that an advantage rather than otherwise. Following the example of a friend of mine, the best anglers by many degrees that I ever knew, I always wet my joints thoroughly before putting them together, for there are few things more disgusting than when making a vehement cast to hear the piteous splash which tells you that one-half of your rod is sweeping helplessly down the stream, attached to the remainder in your hand by a slender link of running line, and carrying float and bait into inextricable difficulties. I acknowledge that they stick fast occasionally, but a little dexterity will generally separate them, and very often sooner than is expected; but if they do not readily yield, by no means use too great force. Holding the troublesome joints about a foot above the flame of a candle for a few minutes, or, what is better, letting them stand near the kitchen fire for an hour or two, will soon part them."

Our Mentor here, however, overlooks the annoyance of having to carry the stubborn joints, perhaps for a long distance, to candle or fire, and thus subjecting them, perhaps, to damage upon the road; and we have learned since to well grease the joints occasionally with tallow or mutton suet, which has invariably prevented their obstinate adhesion.

In our illustrations we have given (Fig. 1) the best ordinary form of general bag rod, the convenient "walking-stick," and the butts of trolling and fly rods. In Fig. 2, the ordinary river fish, from the tiny minnow to the powerful barbel—friends that we hope a careful perusal of our articles will enable you to capture with the greatest ease.

**ORNAMENTAL EGGS.**

**DYING—VARIOUS TINTS—EASTER EGGS—ORNAMENTAL VASES— MOSAIC WORK.**

I has often puzzled me, when seeing a number of egg-shells lying upon the kitchen table, why the ingenious fancy-worker has not often tried her skill upon an article so beautifully and symmetrically modelled by Nature, and which it would be a waste of material to persevere upon to make up into articles both useful and ornamental. We always admire in the egg its fitness to its purposes, and the arrangement by which the greatest possible strength with the least expenditure of material is acquired.

One description of ornamentation is that acquired by the tolerably well-known process of colouring for presentation as Easter offerings. But this process is attended with great uncertainty, inasmuch as the results are scarcely to be measured by the means of which use is made; still, in its uncertainty, there are great advantages at times which occur from the accidental markings of colour, which are sometimes exceedingly effective. I will now give a few ways which have been tried by my friends.

One tells me to take a clean egg, rub a little arnatto (a cheap buff dye, to be obtained at any chemist's) on one or two places, drop a little finely-powdered cochineal on one or two other spots, and, if I choose, rose pink and cinnabar in different patches, these all on one egg. Then tie the egg in a piece of rag, and place it in a pan of cold water. Take care not to let it boil too fast, but just to simmer for half an hour.

To dye plain mauve, put a very little finely-powdered cochineal in water. When dissolved, boil the egg in it half an hour. To dye plain yellow, use arnatto or saffron. Logwood dyes black; rose pink and cinnabar both give pretty colours, and can be obtained for a few pence.

You can boil as many eggs at once as your pan will hold, taking care they do not boil too fast to knock against and break each other.

In Cumberland they are dyed all colours—red, purple, yellow, and black. They are then called "pace eggs," and are much prized by the "baireys."

Another friend tells me she always found her plan successful for Easter eggs—namely, tying up and boiling the eggs in pieces of silk or print, which should be of cheap, common material, bright red, mauve, or blue, such as will not wash. Whole cochineal makes a beautiful crimson, or logwood chips a rich dark purple or black. Dry onion peelings dye in rich shades of orange, brown, and yellow. Variety may easily be obtained by mixing the colours on the same egg, as one half logwood and the other half red. The egg should be covered with the dyes, and then wrapped up well with old linen to keep the dye in, and boiled at least half an hour. The cochineal should be crushed before putting on the egg.

The third practiser of the art says, "Use liquid dyes, of which you can procure any colour at the chemist's for sixpence."

As the fashion of presenting eggs in spring is being revived, it may not be amiss to give my readers a little account of some of the customs in France with regard to Easter eggs. In an
old work, published at the beginning of the century, I find the following:—"In the week preceding Easter, in France, baskets full of eggs boiled hard, of a red or violet colour, are seen in the streets, and the children amuse themselves in playing with and afterwards eating them. The egg entered into all the mysterious ceremonies called apocalyptic; and the Persians, who present eggs at the commencement of the new year, know that the egg is the symbol of the world; and whether the Christians, whose year commenced at Easter till 1568, have borrowed the custom of presenting eggs to children from the Persians, or from the paschal ceremonies of the Jews, there is little doubt that the red colour given to them is derived from the Jews and the Egyptians. Throughout the country of Bonneval, on the day preceding Easter Sunday, and during the first days of that week, the clerks of the different parishes, the beadle, and certain artisans—as those who were constantly employed in constructing the implements of agriculture, or in making harness for the horses—went about from house to house to ask for their Easter Day with red or yellow eggs. The following custom on Easter Day is general throughout France:—The different mechanics, such as the smith, the wheelwright, the shepherd, the ferryman, the miller, etc., go to their customers and ask for eggs, which are never refused; the children of the village also proceed on the same errand, and have red eggs given them. This kind of begging is called les roulées, or going the rounds."

Many very pretty and useful articles can be made with the shells of eggs, provided they be of sufficient strength to admit of manipulation. Of course the eggs of swans, emus, ostriches, and even geese, would come under this category; while sometimes those of the common fowl and domestic duck, from their occasional thickness, would serve.

For this purpose eggs which are newly laid should be chosen, as any decomposition of the contents will cause a discoloration of the shell. Make a hole at the smaller end with an awl or some other pointed instrument, and another at the larger end, which should be as small as possible; merely a pin-hole will do. To this latter the mouth must be applied to blow out the contents. If the yolk does not come out readily, get a cup full of water, and, immersing the sharp end, put your mouth to the blunt end, and draw some of the water up into the shell; then shake it about well, and blow it out again; but as it may sometimes happen that the eggs may not be fresh, it would be better to procure a little glass or tin tube, tapering to a fine point, and having a hollow bulb in it about two-thirds of its length, like the accompanying cut (Fig. 1). By the aid of this (which can be procured at any bird-stuffers'), the yolk is sucked up, the bulb preventing it coming into the mouth.

Of course you have a basin of water beside you during the operation, and by alternately sucking and blowing water into the shell you soon get it clean. In blowing with the mouth, be careful to remove the lips before you draw your breath again, or you may chance to find this, instead of blowing downwards, you draw up, and may get a taste of something that will turn you for ever from egg-blowing unless you are an enthusiast.

The egg being emptied of its contents, the operator decides whether he will employ the whole of the egg to make a vase and cover, as in Figs. 2 or 3, or one without a cover, as in Fig. 4. To do this the egg-shell is cut by drawing a fine line around it (see diagram, Fig. 5) with an ivory point or sharp piece of wood dipped in strong acid (sulphuric is the easiest obtainable, and must be kept in a stoppered bottle), which will eat into the egg, and render its division facile with the assistance of a knife or any sharp-edged tool. To get this line exact, the egg should be put into a circular vessel, a little larger in circumference than itself, containing sand or flour; the egg should be sunk in this until that portion to be separated reaches the rim of the vessel, which will afford a rest for the acid pencil to traverse with correctness around it.

If the shell is soiled in any way, wash it well in strong lather made with card soap, using a nail-brush if the stains do not come off readily, but great care must be taken in the handling of so brittle and fragile an article.

The stand of Fig. 3 is made with one of those common imitation bronze candlesticks, a pair of which may be bought at any German warehouse for less than a shilling. Into the nozzle some prepared plaster of Paris should be inserted to overflowing, and while in a liquid state the base of the egg-shell pressed down upon it, taking care that it is truly and exactly poised. It should now be allowed to rest without disturbance for twelve hours to set, when it will be found that the bronze stem will afford an excellent handle for the remaining operations. These will consist, according to fancy, of decorations, which are very readily applied with any description of colour if the shell itself is first washed with a little ox-gall and water to render all greasy, and then covered with glycerine, which will dry rapidly. A narrow binding of thin gold paper may now be gummed round and turned in over the edge of the shell, taking care to nip the paper here and there, in order that it may be evenly attached and free from creases. When the bordering is finished, and the gum is dry, should the rim under the border be gold, as in Fig. 3, the pattern may be drawn with a little gum, slightly coloured to show the design, and, while wet, bronze powder shaken over it, or the more expensive gold leaf may be applied. The stand of No. 2 is a small slab of marble or stained wood.

I have been trying decalcomanie lately for decorating eggs, and have had marvellous success with it. Purchase from the stationer's some small bunches of flowers, such as are sold for 1d. a dozen, for use on small eggs, and larger sizes in proportion to the egg to be decorated. Have ready a sauce of clean water and a thick pad made of linen rag; dip the bunch of flowers in the water, and place it while wet just where you want it to remain on the egg. Apply the pad so as to fix your subject well, taking care not to shift it; then slip the paper, which will be loose, gently off. Be very careful not to lift the paper until you see your design well developed on the egg. Let it dry, when proceed the same with another, letting one dry before trying a second. The rim at the top in gold and the bunches of flowers round, with an arabesque in gold under, have a very happy effect. Over the whole a good coat of varnish or copal varnish will secure the art application, and give additional strength and beauty to the effect.

The hinges of the vase may be formed of a small piece of narrow China ribbon, gummed inside. Of course the covers should be made to correspond with the vase.

Should you desire to have figures in relief on your egg, the following is the plan:—

Design on the shell any figure or ornament you please with melted tallow, or any other fat, oily substance; then immerse the egg in very strong vinegar, and let it remain till the acid has corroded that part of the shell which is not covered with the greasy matter; those parts will then appear in relief exactly as you have drawn them.

In Vienna the natural egg has been almost entirely superseded by the artificial one amongst the aristocracy, as it gives more scope for the introduction of valuable presents of whatever size needed. Gold, silver, bronze, and other metals are used in the manufacture of the shells, as well as other materials, such as paper mâché, mother of pearl, ivory, glass, and choice woods, handsomely finished on the outside with floral and other
designs, engraved, perforated, coloured, etc. Some are covered with silk and satin, and bedecked with embroidery. Scarcely any material is to be named that is not made into Easter eggs. At the Imperial glass-cutting manufactory at Moscow two halls were seen filled with workmen employed on nothing else but cutting flowers and figures on eggs of crystal.

Very beautiful mosaic work may be executed in endless variety of pattern, and even pictures composed of human and other figures, with small portions of the eggs of wild birds, quite equal in effect to many works which form the attractions of some of the finest and choicest collections of foreign exhibitions. It may be reasonably supposed that as every portion of the egg-shell forms an integral segment of a concave and convex form, the absence of perfect flatness of the coloured surface presented to the eye would form an objection to this mode of decoration. I am far from thinking this to be the case, as the individual irregularities of surface, catching each its own light, enhance the effect, and get rid of that monotony which by injudicious arrangement might fall to the share of some of the more early operations of the tyro.

Another very great objection might be advanced by the humanitarian — namely, the encouragement which this practice might, if generally obtained, give to the purloining of the nests of our feathered companions. This may have its weight; but if we should have to resort to the homes of living birds, we might confine our spoliation to the early parts of the season, when, by only the removal of one or two of the eggs, the birds will make up the deficiency, and the general community of our favourites will scarcely suffer in number.

But we do not anticipate any such attacks upon the denizens of our woods and glades, for we have ample store in the debris of foreign imports and the casualties of our cabinets. Even setting aside these resources, we need not go beyond our own farmsteads for the coloured material to commence our pleasing work, without a charge upon our conscience of wanton robbery, whether fair or foul. For instance, the greyish blue is found in the eggs of the domestic duck; our Guinea fowl gives us a reddish white, freckled with a darker hue; the Cochin China varies in colour from our common barnyard fowl. But should we not get sufficient variety of colour by this means, we can easily fall back upon the artificial ones already given for Easter eggs, from which pieces of the more exact may be selected; and while upon the topic of selection, I would suggest that the various hues, or as far as they may be approximated, should be kept separately in divisional partitions, running from white through a regular chromatic scale.

A plain shallow cardboard box, such as is used by shirt-makers, with separate compartments, will answer the purpose, as our intention is to make our work as simple and inexpensive as possible, ever a pleasurable element in objects of recreative usefulness.

Suppose we take for our first essay one of the well-known common plaster fonts, like the illustration (Fig. 6), procurable for a small sum at the Italian figure-makers, and commence upon its plinth or base, giving first to the surface a good coating of boiled oil.
ROWING.

By Lambert Young.

LOVE OF THE WATER—RACING—REGATTA—DIVISION OF SUBJECT: ROWING, TRAINING, LAWS—BOATS AND THEIR FITTINGS.

If all English athletic sports there is very little doubt that the essentially English exercise of rowing has now for many years stood on an equality with the fine sport of cricket. This arises in a great measure from the exertion required for its thorough enjoyment, and from the insular position of Old England, with its numerous streams, lakes, canals, and pieces of water suitable for rowing on, as well as the opportunity it offers of displaying the muscle of our rising young men.

It seems as if all boys in England are born with a turn for the water, as immediately they can get into a boat the choicest

less in number, and whose interest in the successes of the various champions of their acquaintance tends to their making greater exertions to win the coveted prize.

But all these inducements would not be strong enough if the magnificent contests between Oxford and Cambridge, the many boat-clubs in all parts of the United Kingdom, and the Henley-on-Thames Regatta, as well as the little less exciting but smaller meetings of towns on the Thames and the provinces, with their numerous prizes for the victors, did not keep their ambition in full force, and make them train carefully to arrive

present that can be made to them is a small paddle with which to join in propelling the skiff with their elder and more accomplished companions; and the faster they go, the more delight is derived by the child. The lessons learned at such a tender age are of great benefit ultimately, as the good-natured chaff given to the child who does not fever rightly, keep time with the others, or who catches crabs, delaying the occupants of the boat, makes such an impression, that great care is taken that such awkwardness is corrected on future occasions.

Boat-racing is now the most popular sport amongst all classes of the community, from the many pleasant associations connected with it—the picnics and enjoyments afforded by the presence of our friends and relations, who can join in parties more or as near perfection on the day of contest as constant practice can make them. And we must not forget that Eton, Westminster, Radley, Trinity College, Dublin, etc., are constant feeders of our array of finished oarsmen, both at Oxford and Cambridge and in the many clubs so abundantly spread about the country.

One good sign of the times is that the officers of the Royal Engineers and Royal Artillery at Chatham, known as the "sappers" and the "gunners," have now an annual contest for the "honour of the thing." The younger officers coming up from the public schools are of course good oarsmen, and very soon show a "good form" in the rival boats. It is much to be hoped that they will put in an appearance at Henley regatta this year, and if possible add to the popularity of the sister
corps by coming to the point to contest for the honourable distinction of "Champions of the Thames."

In treating this subject at length, it will be necessary to divide it into three parts—Rowing, Training, and the Laws of Boat-racing; and these three heads must be again subdivided into many and various matters embraced in the three before-named headings.

Firstly, boats and their fittings will be treated of as copiously as this work will permit, and all the most recent inventions and additions that may tend to make those boats approach perfection will be explained as clearly as needs be.

As a rule all boats used in racing at the present day (propelled by oars and sculls) are built and fitted as outriggers—from the twelve-oars, eight-oars, four-oars, pair-oars, to the sculling boats—and the old-fashioned in-rigged boats, in which the rowlock was fixed on the gunwale or upper plank called the wale, being hardly ever used in races in the present day unless under special circumstances, such as the annual race for Doggett's coat, badge, and freedom of the Thames, rowed from the Old Swan at London Bridge to the Old Swan atChelsea, on the young flood-tide, and in some waterman's races, where, by previous agreement, these old-fashioned boats are used.

The term "outrigger" is of comparatively modern date, and means something rigged out or fitted outside the gunwale of a boat, and is now understood to mean the iron frame-work fixed to the boat's side to support the rowlocks; the term "outrigger" is also generally applied to any boat fitted with this contrivance. Another name for them, which is but seldom used now, is that of the "Clasper boat," from the builder "Henry Clasper" of Newcastle-on-Tyne, who is generally supposed to have invented this simple but most useful addition to our old-fashioned boats. But to put the facts of this addition to our powers of propelling our racing boats through the water with the utmost velocity clearly before our readers, we cannot follow a better course than to give from some letters that appeared in a newspaper in 1863, the real history of the case, which may safely be considered to set this much-contested question at rest once for all.

The first outriggers used in racing were fixed on a boat called the "Diamond" of Ouseburn, Tyneside, where she rowed against the "Fly," of Scotstoun-on-Tyne, in the year 1833; but they were only rude pieces of wood fastened on the sides, and were invented by Anthony Brown, of Ouseburn, and fixed by Ridley, a boat-builder of that period. In the same year Frank Emmett claimed the invention, and fixed something similar on a boat belonging to Dent's Hole, Tyneside; and there can be no dispute that the "Eagle," of Dent's Hole, by Emmet, in the year 1836, was the first boat with iron outriggers; outrigged craft then came to be the usual form of racing boats on the Northern rivers, Tynes and Wear.

When regular regattas were established by the Durham University about 1834 or 1835, London-built six-oared racing boats were procured from Searle, but they were found to be so inferior in speed to the native outriggers that the latter were not allowed to compete in the same races, and consequently the boats were divided for separate races into two classes, i.e., cutters, and gigs (as outriggers were then termed). The force of Southern fashion, however, appears so far to have prevailed over common sense and experience—just as fast-sailing vessels for many years were used in preference to faster going steamships—that many boats of the London pattern were built in the North after that time, until the Clasper victory on the Thames established the reputation of the Northern type of boat. The principle of Clasper's boat was the same as the traditional form, only he was the first builder who reduced the substance of the boat to the limit of lightness and fine workmanship, or nearly so; as it cannot be denied that the racing outrigger has undergone a very marked improvement since he achieved his well-deserved reputation. In 1842, then, Clasper commenced to build the four-oared boat which was to produce such a revolution in the art of boat-building down south; but he was dissuaded from completing one for the £200 match with Coomber's crew, which took place on the Tyne on the 16th July, 1842.

It now takes a good long time to acquire the proper knack of sitting one of these racing-boats, and many upsets must be expected before that perfect command of them is acquired which these delicate craft require.

The sculling boat is composed of two portions, the body, or boat proper, and the projecting irons or outriggers to support the rowlocks, which necessarily are placed one on each side exactly opposite one another. The body is generally built of cedar wood, in lengths, with ribs or "timbers" of ash, edble chestnut, sometimes beech, fixed to the inwale, at the upper part (the inwale is a long strip of deal running lengthwise down the inside of the upper edge of the boat), and below, into the inner keel or keelson. Upon the inner keel is fastened a long piece of wood, generally fir, which rises in the centre, under the thwart or seats, which are fastened to it, to their level, and tapers off fore and aft; the object of this false kelson or backbone being to impart strength to the floor of the boat, and to assist in carrying the thwart. The inner keel, kelson, and inwale are first laid down, bottom upwards, on the frame upon which these boats are usually built, and, when built on moulds, the moulds next; the skin is then bent on to the inner keel, inwale, and moulds by the application of hot water, and fastened to the inner keel and inwale; this having been done, the boat in her then condition is turned over, right way uppermost, and firmly fixed on the stocks or frame; the timbers are then put in, and the mould removed as their places are thus supplied. Some builders, however—Biffin for instance—cut out the timbers by rule, and, using no moulds, fasten the skin at once on to them, before turning the boat over. The stem and stern are made of solid pieces of wood, which is sometimes mahogany, cedar, fir, or beech, at the option of the builder, and the skin worked up to them; the stem is usually protected by a brass clamp; and the nails used are all made of copper. In addition to the ordinary kind of timbers, larger, or "outrigged timbers," are inserted where the iron outriggers will be fixed, and to them the latter are fastened. The interior of the boat is divided into three portions by bulkheads, upon which are fastened the wooden decks, at whose upper corners are small holes for allowing the water to run out, when leaky, by turning the boat topsy-turvy. The washboard rests upon the forward deck, and prevents rough and broken water from coming in. The breakwater runs round the sides of the boat to the coxswain's thwart, and crossing the boat abaft his thwart, so ends. The remainder of the boat is covered over with what is technically known as the "canvas," but the covering is made of linen, well varnished, stretched, and nailed to the inwale. It is supported by a long strip of wood running longitudinally down the centre, and called the rising piece, and by cross-beams, which run transversely from the rising piece to the inwale. The canvas is nailed on the outside through the skin to the inwale, and its edge is hidden by a thin beading which runs fore and aft. The skin meets in the centre of the boat at the joints, and is fastened into the inner keel; and there being no cuter or visible keel, the bottom is round. The lengths of which the skin is composed are joined by "scarves" put in opposite one another. There are usually four scarves, two on each side; and the boat is thus divided into three lengths of skin, one long and two.
short; but this rule is not universal. The centre portion of
a sculling-boat is called the “box,” and of oar-boats the
“body.”

It is almost needless to observe that all these boats are
well varnished outside and in. The stretcher against which
the rower’s feet are placed is a strong piece of fir fitted into
a rack with brass thumb-screws, and this shifts according to
the length of the rower’s leg; a leather strap for the toes
is fastened to it by a small staple. In some boats there are
bottom boards or burdens, and in others there are not. If
you go to twenty different boat-builders, each will have a
different way of putting the work together, and of fitting
out his boat; it is therefore of no benefit to enter into a
very lengthy description of all the small technicalities of
their business, as it will not answer our present purpose.
The iron outriggers now in use are made of four round stays;
not so long ago they were of square iron, and the two lower or
middle stays were then crossed. The two upper stays are the
shortest, and, with the rowlock plate, are in one piece; the
thowls, which are generally made of beech-wood cased with iron,
are separate, and, being fitted with shoulders through holes in
the rowlock-plate, receive the lower stays, fastened underneath
by means of nuts screwed tight and firm. All four stays are
fastened (at their lower extremities) through the out-
rigged timbers by means of nuts and bolts. When required,
cross-stays are also placed inside the boat. The thowls are
known by the names of “thowl” for the fore one, and the
“stopper” for the after one; across their tops there is
generally fixed a piece of twisted string, to keep the oar or
scull from unshipping or jumping out of the rowlock.

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JOINERY AS A RECREATION.

By ELLIS A. DAVIDSON, Author of “Drawing for Carpenters and
Joiners,” “Linear Drawing,” “Drawing for Cabinet Makers,” etc.

OTHER PEOPLE’S SHELVES—FAULTS OF TOOL BOXES— HOW TO BUY WOOD—COST OF NECESSARY TOOLS.

Do not know any amusements
which afford so much real
pleasure as those which leave
permanent records of ingenuity
and skill. Every time we look
at some useful or pretty object,
the construction of which has
employed our leisure hours,
the pleasure revives. We re-
member the difficulties we en-
countered, and the energy
with which we vanquished them: the gratification is thus
rendered ever green.

Our friend Jones calls to
see us, and remarks, admiringly, “Why, what beautiful book-
shelves you have! I wish I had some! I say, Alfred, where
did you get them?” Fancy the modesty with which we are
suffused, as we reply, “I made them myself.”

This satisfaction is not however a merely selfish feeling, for
by the art that is treated of in these papers, much additional
pleasure and comfort may be given to those around us, and
numerous things may be made at the mere cost of the materials;
while on the good old principle that “a stitch in time saves
nine,” the power of executing little repairs in a house not
only saves much money, but often prevents further damage
and expense.

We intend therefore giving a series of patterns for numerous
useful and ornamental articles, together with hints for their
construction, which, whilst being thoroughly practical, will be
found sufficiently simple to be followed by the amateur.

Now the very fact of our friend Jones admiring our book-
shelves and yearning to possess a similar set, evidences his
appreciation of them. And we must remember that Jones is
but the “type of a class.” If Jones wishes for such a set of
shelves, depend on it there are many others who have their
books lying scattered about, and who would only be glad of a
similar receptacle for them, so we will help them to “rig up”
a book-case of the simplest character.

We do not in the first place give a long list of tools which
our readers are supposed to require before setting to work. We
shall in commencing give subjects which require but few tools,
suggesting others which may be purchased singly, as the neces-
sity for them arises.

We do not wish to ignore a well-fitted tool-box, but to in-
timate that an amateur need not wait to begin work until
he has one. We would however throw out a hint to those
who are about making such an investment, viz., purchase at
a regular tool-shop at which you can depend on the quality
of the tools.

Do not buy a tool-box which is merely a toy; this is absolutely
a waste of money. Further, the tools fitted in the boxes are as
a rule of a smaller size than those used by regular joiners, and
as certain tools are supposed to be required to make up a set,
it follows that in many cases, the boxes being sold at stated
prices, some are introduced to make up the number which are
of inferior quality.

There is an old adage that “a good workman can work with
bad tools.” Of course he can, because he is a good workman,
and knows how to get over every difficulty, so as to make his
tool “do its best,” but he could do much better, and work more
quickly too, if he had good tools.

We are not, however, writing for “good workmen” but for
amateurs; and as neatness, accuracy, and careful fitting (or
“joining”!) of one part with another are main features in joinery,
the necessity for good tools, by which alone he can attain these
results, cannot be too strongly insisted upon.

One of the greatest luxuries the amateur joiner can enjoy is
a room all to himself—a kitchen or other place on the ground
floor; but in lieu of this an attic will do.

The former is, however, preferable, since wood is more easily
brought in, and chips, shavings, etc. removed without being taken
through the house. Of course, if this desideratum cannot be
obtained, the embryo joiner must be content to work in the
kitchen, or wherever folks will let him, but this involves much
waste of time, as all the parts of the work have to be got
out, and put away again. The inconvenience of this will be
manifest.

And now let us proceed with our work; and we will assume
that it is required to build a nest of shelves, 3’ 6” wide (when
one dash is placed over a figure it means feet, and two dashes
stands for inches, thus 3’ 6” means three feet six inches); such
a set of shelves may either be placed in a recess, or may stand at any other part of a room.

As all the boards employed must be very nicely planed, we do not advise the beginner to attempt this, but to content himself in the first instance with the absolute construction of the piece of furniture, and such operations connected with the work as his "plant" or tools may enable him to carry out.

Now let us come to sizes. As has already been said, the case is to be 3' 6" wide inside measurement, and this will therefore be the length of all the shelves.

It is not usual in cases of this kind to bring the shelves down to the bottom, a space is generally left for portfolios, drawing boards, etc.; and, of course, an extra shelf in this space can be added at any time it may be found needful.

Do you remember the story of an old lady who, when asked how to jug a hare, gave as a starting-point of the receipt, "catch a hare?" Well, we must follow this excellent plan. You know we have said we mean to be thoroughly practical, so you must in the first place, get the wood.

At most large timber-yards there are planing machines, and you can buy the boards ready planed; but if the yard is at a distance from your house, there may be some difficulty in getting your purchase home, and therefore the better plan is to buy your material from some carpenter in your own neighborhood, who will charge you perhaps a little more than they would at the yard, but still the little extra money paid on the wood will bring profit to your amount of knowledge, for whilst in the carpenter's shop, if you make a rule to "walk through the world with your eyes open," you will see many things which will be of service to you; and if you "cultivate" the carpenter, you will get from him numerous practical lessons in manipulation which can only be understood by seeing the work actually done. To see a regular workman handle his tools; to watch how he uses force to his saw only in the downward stroke; how he presses on the plane only as he pushes it forward, but lifts it as he draws it back, instead of rubbing it about on the wood as if he were using a duster—all this is important and instructive; you can in fact tell by the very sound produced whether the saw is cutting or the plane biting; then, again, look how he uses his screwdriver—he doesn't keep up a series of hurried little jerks, working himself into a perspiration not at all commensurate with the progress made by the screw, but placing the end of the tool in the "nack" on the head, and keeping it in a line with the screw, he turns the screwdriver deliberately round as far as his hand will turn, then again and again, until the screw is driven home and the head nestles down into the comical home which has been countersunk for it; and so regularly does a practised artisan work, that if he has to put in twenty screws he will use nearly the same number of turns for each.

And then watch how he hammers. Did you ever hear the housemaid nailing down a carpet or knocking in a nail? Listen—tap, tap, tap! about a hundred of them in a couple of seconds, a sudden stop, for, instead of striking the right nail on the head, she has struck the nail on her finger, or you hear hollow blows whilst she is straightening up the nail, "which would go in sideways."

Now look at our friend the carpenter; he holds his hammer at the most distant from the head, and thus obtains the greatest possible force, and he strikes the nail straight on the head with firm and decided blows. Watch all this, and you will be much the better for it.

Let us advise the amateur joiner, before he goes for the wood, to calculate what and how much he wants, and to put the quantities down on a piece of paper for the person who is to supply him. Now in this case the following is a copy of the order.—Two pine boards, 9 inches wide, 1 inch thick, planed both sides and edges—they are called inch boards, but are rather less than that when planed on both sides—12 feet (the usual length) long. You will get this at 2½ to 3½ per foot. One 11-inch wide pine board, 1 inch thick, planed both sides and edges, and 12 feet long. The price of this will be 3½ or 4½ per foot. Six-feet of moulding, 3 inches wide, and somewhat of the pattern shown in Fig. 1. The price of this will be about 9d. the six foot.

The following measurements will show you the length you are to cut the sides:—1st or lower space for portfolios, etc., 3 feet; first shelf 1 inch; second shelf 1 inch; third shelf 1 inch; fourth shelf 1 inch; 5th or upper space 11 inches (of which 3 inches will subsequently be covered by the cornice, leaving the space for books 8 inches). These added together give the total height of the sides 6' 9".

Place your board on a long table, and, with your square placed as in the illustration (Fig. 2), draw a line across near the end, so as to make sure of getting the end quite square, which, in the rough way in which the planks are sawn, cannot be depended upon. From this line mark off along the board the divisions for the spaces and shelves already given, and moving your square along, rule lines across, carefully observing that the wooden part of the square is held tightly against the edge of the
board. The square (Fig. 2), consists of a piece of wood about seven inches long, with a steel blade at right angles to it. The price is 1s. or 1s. 6d. If you happen to have a T-square, such as is used for drawing, of eighteen inches long or more, you might place the two boards close to each other, side by side, and then draw the lines across both in one operation. This ensures absolute accuracy, and saves the trouble of “setting out” the divisions on each board separately. The boards are then to be sawn off at the end of the measured parts.

It is advisable for beginners to mark the line in which they are going to saw on both sides, and on the edges, and to observe that the saw should pass through both lines. Carpenters’ pencils are flat, both as regards the wood and the lead. The wood should be cut away, leaving the lead exposed, and this should be merely scraped down or filed, so as to bring it to a chisel-shaped edge—not a point—and in ruling the broad side of this should be placed against the rule. By this means a more accurate line is obtained, and the lead keeps sharp much longer than in the usual round point.

When you are going to saw, place the board on two kitchen chairs, and, standing on your right foot, place your left knee on the board, holding it also with your left hand. Let your saw move perpendicularly, starting it very gently, or you will chip away the edge of the board. Press on your saw during its downward motion, but not as you draw it up; and let us again remind you not to attempt the cut by a quantity of short jerks, but by regular “pushes” down and “pulls” up, extending almost the whole length of the saw.

The saw (Fig. 3) we advise you to purchase is called the “hand saw,” the price of which is about 5s. 6d. new. You can, however, buy this, and most of the other tools, second-hand at many shops for half the money, but be careful to see that the tools are second-hand, that is, that they have been used by working-men; do not buy a new tool at a second-hand shop, for common goods are manufactured and sold as second-hand; but if a tool shows that it has really been used, it is to a certain extent a proof of its quality.

Your boards were twelve feet long, and you have cut from them 6’ 9”, leaving pieces 5’ 3” long. Cut out of the two pieces thus left two of the shelves, which are to be 3’ 6’’ long, and you will then have two pieces 1’ 9” left, which you may lay aside for future small purposes. Thus far for the mere structure, which we shall proceed to finish in the next paper.

The other tools you will require are the gaugoe (Fig. 4), gimlet (Fig. 5), plane (Fig. 6), screwdriver (Fig. 7), and hammer (Fig. 8); the descriptions and cost of which will also be given.

TOY-MAKING AND TOY-GAMES.

THE SUCKER—THE CUT-WATER—CUP AND BALL—THE WATCH—SPRING GUN—JERK-STRAWS—SPILLIKINS—PAPER BOXES.

OST people have a hobby of some sort; as for me, I have all my life had a mania for toys, and am just as fond now of making kites, and Zelian harps, and paper boxes, and darts, and watch-spring guns, as I was twenty and never mind how many years ago. There is now less time, certainly, for such work, but the relish for it is not gone. My object in the present series of papers is to tell everything I know about the subject. I shall do my best to describe all those toys which can be made easily and at small cost, and shall also give an account of every toy-game worth speaking about.

It does not seem worth while to enlarge on the importance of toys. Does anyone doubt it? Did not the famous Faraday once say that toys were “the most philosophical things in the world”? Looked upon in the right light, they are by no means frivolous, and the making and playing with them are really profitable recreations. I might point out how inventive genius is quickened by them, I might say that, even supposing one has not much inventive genius to be stirred up, the making of toys will encourage neat-handiness, and the playing with them will greatly improve one’s quickness of eye, and often one’s readiness and grace of motion. But I leave these remarks to be enlarged upon at another time, and proceed at once to the matter in hand; and the first toy I shall speak of is the Sucker.

A sucker is made by cutting—a circular piece out of a scrap of stout leather, boring a hole through its centre, and passing a string through the hole, with a knot at the end large enough to prevent its slipping, or instead of a knot one may put a small button of leather. To the other end of the string tie a piece of wood a few inches long, for the handle. Before using the sucker, soak it well in water; then place the leather on a stone and press it down with the foot till all the air is excluded. By taking hold of the string after that is done, the stone may be raised to a considerable height. This is in consequence of the existence of a vacuum beneath the sucker, and the pressure upon it on all sides of the external air. If the sucker could act with full effect, a weight of fourteen pounds would be supported by every square inch of its surface.

The next toy to be mentioned is the Cut-water, which is constructed in the following way:—Take a circular piece of tin or sheet lead, three inches or so in diameter, and cut it all round, so as to look like a circular saw (see Fig. 1). Now bore two holes in it, marked A A, making them about an inch apart; through these holes pass the two ends of a string, tie the ends of the string together, and the cut-water is complete. The way to use it is this: The string is held as in Fig. 2, and the tin saw is thrown round and round till the string is twisted as tight as possible. The hands are then drawn outwards, and by the untwisting of the string, the saw of course revolves rapidly. When the string is all untwisted, the hands should be allowed to go slightly nearer each other, when it will be found that the cut-water will begin to revolve in the opposite direction from that in which it went previously. When the string has become twisted again, the hands are to be drawn outwards, then brought a little nearer each other, then drawn outwards, and so on, as long as you please. The name “cut-water” applied to the toy is derived from a common way of playing with it. It is dipped a little below the surface of a basin of water whilst being spun, and it is highly entertaining to see how it sends showers of spray over the player whilst it spins in one direction, and splashes the spectators when it goes in another.

An imitation of the cut-water may be made by passing a piece of thin string through the holes of a common large button. This was its ordinary form in the school in the north in which I received a considerable part of my toy education; and many a time, I confess, have I made it spin, instead of writing half-text in my
copy hook, or listening to the lessons of a master for whom I then felt indifference and now entertain the highest respect.

The Cup and Ball was a favourite toy at the court of Henry III of France, and is still often played with. It consists of a stem of ivory or hard wood, with a point at one end, and a cup, which should be small and shallow, at the other. To the stem a ball, also of ivory or hard wood, is attached by means of a string of soft silk. You will find it somewhat difficult to acquire dexterity in playing with it; but it is worth taking some trouble about, for few pastimes are better fitted for training the eye and hand. Hold the stem, but not too tightly, in the right hand. Now make the ball revolve by twirling it between the finger and thumb of the left hand. When its motion becomes steady, throw it up with a slight jerk of the wrist, and catch it either in the cup or on the spike at the end of the stem, to fit which spike there is a small hole made in the ball. The latter is by far the more difficult feat; but it is possible by practice to accomplish it thirty or forty times in succession. A variety of the game is to catch the ball in the cup, when holding the stem by the point between the forefinger and thumb, instead of by the middle. Another variety is to swing the ball into the cup instead of throwing it; and a third is to catch the ball in the cup with your eyes shut. When you can do this, I shall give you a certificate as being a really good player at cup and ball.

Let us now give our attention to that highly popular toy, the Watch-spring Gun. The reason of its popularity is no doubt that we are by nature rather a pugnacious people and fond in our early days of even the imitation of fire-arms. The tendencies of nations, it has been observed, are exhibited in their toys as well as and sometimes better than in their graver affairs. I shall give as plain directions as possible for its manufacture; and hope that you, the reader, will succeed in turning out quite a superior article. The first thing is to get a piece of wood about four inches long, and cut it into the form of the stock of a gun. In the upper part of the stock, where the barrel lies in an ordinary rifle, scoop out a groove; in this groove place a large quill, open at both ends, and fasten on the quill with waxed thread; one end of the quill should project beyond the muzzle-end of the stock, and the other should reach as far as the middle of it. Get a piece of old watch-spring, about as long as the quill, bend it backwards, and then tie one end of it firmly to the upper part of the butt-end of the stock. Thorough the middle of the stock, about half an inch from the mouth of the quill, bore a small hole, break a pin in two halves, take the half with the head, and round the head tie a piece of thread, fasten the other end of the thread to the string that binds on the spring. The gun is now ready for action. When you would fire it, place a shot between the

hole in the stock and the mouth of the quill, put the pin in the hole, bend back the spring, and let its loose end be caught by the pin. Now that you have made ready, "present"—"fire," that is to say, draw out the pin and let the watch-spring free. By the action of the spring the shot may be sent to a considerable distance. Sometimes the watch-spring is fixed in a different way; you will see it represented in Fig. 3. A B C is the barrel, which may be a brass tube; the upper half of it is cut away between A and B; C A is the trigger, passed through a hole cut in the stock, and moving on a pin, B; D E is the watch-spring, one end of which is inserted in a notch in the trigger; it is then passed through the piece of the tube A, and is caught by a pin, D, which has been driven through the barrel, the head being allowed to project so as to serve as a catch. When the gun is fired, the shot is placed in the groove before the watch-spring; the lower part of the trigger is then pulled, and that throws the spring forward and causes it to free itself from the pin-head, and propel the shot through the barrel B C.

We come now to speak of two toy games, Jerk-straws and Spillikins. However trifling they may seem, to play them well requires the exercises of considerable judgment and coolness and steadiness of hand. Jerk-straws, or jack-straws, or juggling sticks, is played with a number—forty or fifty will do—of small sticks, about twice as long and half as thick as a ha'penny match. These are thrown in a confused heap on the table, and the players have to remove them one by one by means of a longer stick. No one is allowed on any account to disturb the rest of the sticks in the heap. The first player removes as many as he is able, but whenever he shakes the heap, even in the slightest degree, he gives place to another, and consoles himself by reckoning the number he has taken off, which counts towards his game. The second player goes on as long as he can, and then gives place to the third, and so on, till all the heap is removed. He who in the end has removed the greatest number of sticks is the winner. The game of spillikins is much the same as that of jerk-straws. The spillikins are a number of thin pieces of ivory or bone, cut into odd shapes—some like saws, some like spears, some like hooks, &c. Each spillikin is inscribed with a number, the lowest being 5 and the highest 40. They are thrown upon the table in a heap, and separated one from the other, just as in jerk-straws. At the end of the game each player adds up the numbers marked on the spillikins he has captured, and he who can show the highest number wins.

Long ago we used to make several articles of paper, but our favourite manufacture was that of Paper Boxes. These we turned out in great numbers, and of all sizes: I have seen us make as many as twenty at a time, arranged so as to fit one inside the other. What we put inside them I really forget; no doubt it
was pieces of slate pencil, buttons, foreign coins, and such-like articles. To make them is very easy. Take a square piece of paper, the dimensions to be according to taste. Make folds in it where the dotted lines are in Fig. 2, but remember that the paper is not to remain folded, but is to be opened out after each fold. Now turn the corners A, B, C, D, into the centre; then open out, when the folds will be seen as in Fig. 5. Next fold A over to E, B to F, C to G, and D to H; open out after each fold, and when this is done the folds will be seen as in Fig. 6. Fold A over to N, B to M, C to L, D to K; then open out, and the folds will be seen as in Fig. 7. Take a penknife and make a cut wherever the dotted lines in Fig. 7 are superseded by black lines. Fold in the sides s and y of corners A and D—they will then look like Fig. 8—so that they may pass easily through the slits in the opposite corners, B and C. Last of all, pass the folded corner A through the slit in corner C, and open out the folds so as to make the fastening secure; and pass the folded corner D through the slit in corner B; and after opening out the folds, the box is finished.

WINDOW GARDENING.

By J. C. Leake.

HOME ORNAMENTATION—PRIZES—SIMPLEST FORMS—TO MAKE BOXES—DECORATION—RUSTIC WORK.

It is only of late that window gardening has received any considerable share of attention. It is true that for many years there might be seen in most windows a few rough, red garden pots, containing plants, ragged, badly cared-for and it should be, especially in the humbler walks of life, and this is doubtless due, in part at any rate, to the impression which still widely prevails that window gardening is a difficult and expensive amusement. It will be our endeavour to disabuse the

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plants, pot and all, in a decorated box or trough (Fig. 7). This system is equally applicable to in and out door window gardening, although some little modifications are necessary, which we shall presently describe. With our readers’ permission we shall suppose them to be something of amateur mechanics by the aid of our papers on joinery, and capable of using the most common of the workman’s tools, as we propose to explain how the most ordinary of the fittings of a window garden may be made by themselves, at but little cost of time and money.

In the first instance we will suppose that it is desired to construct a window-box for holding pots containing plants outside an ordinary window. This is a very simple matter indeed. The first thing will be to determine the size of the pots. An ordinary garden pot is about seven inches in height and about six in diameter. As, however, it is necessary to have a little space both above and below the pot, the box should not be less than ten inches deep internally and seven or eight wide, in order to allow of a little variation in the size of the pots. The first thing will be, then, to construct a box of this size, and of the requisite length to completely fill in the opening of the window. This box should be made of yellow deal, as being the most durable, and should be well painted as soon as made.

It is necessary to arrange the bottom of this as to allow of perfect drainage of the pots placed therein, and therefore holes should be bored through the bottom at frequent intervals, in order to allow of the free escape of water. This is best effected by means of a centre-bit of about half an inch diameter. Upon the bottom of the box should be secured two slips of wood about one inch square, upon which the pots may stand so as not to touch the bottom of the box, as shown in Fig. 1, in which A A A are the bottom and sides of the box, and B B the two slips of wood in question. Practically, this completes the box, which should stand upon blocks of wood about an inch deep, tapered as shown at C in the Figure, to allow of the level of the window-sill D. As, however, the front of the box will present a very bare and common appearance unless decorated, some provision must be made for this purpose.

There are several methods which are, perhaps, equally effective; or in door purposes, is that of constructing a pattern of rustic woodwork upon the front of the box, as shown in Fig. 3. For this purpose the round branches of trees should be employed, and they should be selected of about one inch in diameter. They may be employed either with or without the bark, but perhaps it is better to strip them, as they may then be varnished. Having selected a sufficient quantity of branches, they must be cut to the requisite length, and sawn down, as shown at A in Fig. 4. If the style of decoration selected be that shown at A in Fig. 3, the branches should be tolerably straight. The ends should be allowed to stand slightly above the top edge of the box, and may be cut to form a pattern. Each slip should be carefully bored with a bradawl, and secured with a copper brad top and bottom, as, if iron be used for this purpose, the oxidisation of the metal.
will stain the wood and quite spoil the effect when varnished. By far the prettiest plan is to form patterns upon the front of the box by means of curved branches or fir-cones, as shown at b in Fig. 3, and in Fig. 7.

Before attempting this, the proposed figure should be roughly sketched out upon a board, and the branches selected according to their suitability of form.

At first sight it may appear very difficult to form anything like a regular pattern from the irregular shapes of the branches, but it will be found practically quite easy.

Of course, each branch when cut will form two parts of the design, as shown at c and d in Fig. 4. It must, however, be left to the taste of the operator to make the designs for himself, those offered being only suggestions as to the kind of thing required. When this sort of ornamentation is employed it is better to leave the front of the box unpainted, and instead to varnish with several coats of the best oak varnish, both the front of the box and its decorations. It will be found to be a great improvement if ladders are used, as in Fig. 8, and the tops of the pots are lightly covered with loose green moss, especially where they are below the level of the eye.

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In Fig. 5 we give a diagram for the construction of boxes for bay windows, to which further reference will be made in our next article.

THE AQUARIUM.

BY W. A. LLOYD.


WHEN a very small child I was, for the improvement of my health (and to get rid of me), sent by my parents from London to North Wales, where I lived at a farmhouse named Llwyndafle, in Merionethshire, close to three villages called Betfaygwar-filgoch, Cerrig-y-drudion, and Llan-fihangel. I believe that the quickness with which I learnt these and all other outlandish Welsh words, and strung them together into sentences, and pronounced them volubly—though to strangers they must have sounded like what musicians call "passages of enormous difficulty"—largely aided my speedy acquisition of the German language in after life; and it may be mentioned in passing, that though I was, and sometimes still am, an inveterate stammerer in English, yet all my stammering vanishes in the guttural Welsh and German tongues.

In the year 1834 there was brought to Llwyndafle a large dead crab. Such an animal, at such a place, and at such a date, was rare to see, and I remember taking special notice of it. I was particularly curious in observing the complicated apparatus on its under side, or, as I should now term them, the "pedipalps," and other appendages of the "buccal orifice" of the creature. The crab was beginning to get "high," and as the weather was hot, it was decided not to cook and eat it, so I smuggled it to school to get the schoolmaster, Humphrey, the learned man of the place, to tell me all about it. He was a little thin old man, with a yellow shrunken face, yellow teeth, and yellow finger-nails, was dressed in a black velvet coat, waistcoat, and knee-breeches, with black stockings and huge shoes. He knew no English; and at intervals throughout the day smoked very coarse tobacco from a short black pipe in the school-room, which was the dissenting chapel of the place. There were no writing-desks or tables of any kind, but the scholars kneel on the rubble floor, and used as desks the deal forms on which the congregation sat on Sundays. Humphrey's scholar fees were all paid in kind: some of the lads brought corn, or oatmeal, or flour, or wool, or bacon; and I remember trying once to carry on my head my payment, a big square lump of coal; but it was too heavy, and another boy kindly let me carry his payment of a lump of butter, and he, being stronger, conveyed my coal. Cheese was a luxury known only to the rich: money was seldom seen in the form of coin, and few things never. I did not take my crab to school as a matter of payment, nor yet for play or idle curiosity, but really and truly to learn something about it from the only
person whom I thought could give me help, and his reply was, “Ah William, boy, only learned men in London can give information on such things!” and he smoked his pipe vigorously, and gave me permission to put the crab away during school-time in the chapel pulpit, to be out of reach of the other boys.

After school, Humphrey and I had it down again, and again examined it, but with much smoking, the other boys, in the usual village-school fashion, having rushed out at the moment of dismissal. How powerful are odours in bringing back memories! Thus, whenever I scent the particular character of tobacco smoke which issues from a stale pipe, this first and ineffable effort to gain natural history knowledge is brought before me—a big, high-smelling, limp-legged crab, a wise-looking spectacled old man in shabby black velvet, and a troop of ragged, barefooted, and uncombed urchins, standing wondering around or scampering away.

To me, then, a crab was a crab; but remembering its dimensions and its form, which I shall never forget, the species is what I should now call “the Edible Crab,” or “the Great Crab,” or in Latin, Cancer pagurus. The French naturalists, La Celle and Milne-Edwards, have proposed to name it Platy-carinus pagurus, and some German naturalists also wish the latter generic name to be introduced, and they do use it. But I hope it will never be employed in England, and so deprive us of our last “Cancer,” our British very “last rose of summer,” though this wish is based merely on a sentiment. Linnaeus on the Continent, and Pennant in England, and other naturalists of the last century and the commencement of this one, called nearly all crabs, lobsters, crawfish, and crayfish, and even many of the shrimp-like and least crab-like of the crustaceans, by the then universal generic name “Cancer,” the Latin for crab, and this crab, the crab of my childhood, has been known by its present scientific name, Cancer pagurus, ever since systematic zoology was invented; and it is peculiarly appropriate for the animal, as pagurus is Greek for crab; and so in calling it “crab-crab,” its typical position is happily fixed as the crab of all ages, the crab of crabs; the one best known to man as being the largest in Northern Europe; the most delicious to eat; the second only in abundance in England (the most common of all being Carcinus, the shore crab) it is also the historical crab represented in Roman-British tesselated pavements, and in medieval illuminated manuscripts.

After this digression I return to the crab of my childhood in Wales, in 1834. It was buried, and so were my remembrances of it, but they were destined to rise again in the fulness of time. Soon after, I met with a book on natural history, a duodecimo volume with rude woodcuts, bound in cloth, or rather in the coloured printed calico which Ticking had shortly before introduced as an improvement on the paper boards used before 1830. It was a lawyer’s book, and was a much-abridged epitome of Buffon, or rather, Buffon’s name was put on the title-page, and it was probably such a book as Charles Lamb would call one of the “books that are no books, but only things in books’ clothing.” I, however, desperately thirsted after its information, but it was in English, and I only knew Welsh, and so it was to me a sealed volume, in which I could not even find the crab—my crab. In 1835 I returned to London, and was soon after taken to the Zoological Gardens, Regent’s Park, and perfectly well remember that in passing through the tunnel (then the same as now) which divides the two parts of the garden, I thought how grand it would be if I could read English books (for none existed in Welsh) about the wonderful animals I saw. But I never expected to meet there with a crab, and I then should never have thought to call a crab an “animal,” any more than very many people do now. However, I determined to learn English and read books about animals. But the very first book I bought with my very own money was Craik’s “Pursuit of Knowledge under Difficulties,” and while saving up my pence for it, I once had to purchase a red horsehair. “Will you have one with a hard or a soft rose?” asked the shopkeeper, and I, thinking to hit the golden mean, replied “Middling, please sir.”

The man in the shop laughed very much, and brought forth his wife to enjoy the fun, but they never told me why they made so merry over me, nor was I told at home, where my story was also much enjoyed. It was well for me, however, that I was left to find out the reason, for the inquiry led me to much information, and to the taste for acquiring it, which otherwise I might never have obtained. I picked up Craik’s book, in the four parts (forming two volumes) in which it first appeared in 1830, in three second-hand book shops, and I had sevenpence over, with which I bought a copy of Todd’s “Students’ Manual” (an American book), and a Number (No. 204) of the Penny Magazine containing an account of the mode in which a poor student expended his weekly means in periodical literature.

This last Number I fastened in at the end of Todd, and it so remains till this day. At about the same period, I learnt from the Penny Magazine (my great source of miscellaneous knowledge in those days) the technical mode of correcting printers’ proofs, and this in a portion of my after-life (beginning in June, 1831) was of much service to me. But no written or spoken words can express the extreme avidity with which I read Craik’s book over and over again, or can tell the encouragement I gained from it. I carried it about with me constantly, and some part of every Sunday was spent in its company in a state of absolute enthrancement. The great glory of it was in its record of men who acquired, not money wealth, but knowledge, and that whoever money was also gained, that was but incidental to the learning which was within my reach, by my exercising the same amount of perseverance as that shown by the lives of men in this beloved book, my copy of which had a trick of opening at the portrait (by Sir Joshua Reynolds) and memoir of John Hunter the great comparative anatomist and founder of the Hunterian Museum of the Royal College of Surgeons in Lincoln’s Inn Fields, London.

Thus by my reading I was constantly, as it were, brought into mental contact with him, and learnt how he kept at Brompton many living animals, in a small menagerie, observing their habits and forms when alive, and dissecting them when dead, and doing so amidst many difficulties. Réaumur and Huber were two other naturalists in the book of whom I read with mentally hungering eyes. It was destined, however, that not then should I take up regularly with natural history matters.

But Thomas Simpson and James Ferguson, mathematicians, were the two men I most admired, and I soon got enamoured of the science of figures, and resorted to begin it at once (being even then impressed with Hannah More’s axiom about a person really in earnest never delaying to begin anything). I purchased the late Professor Augustus De Morgan’s “Elements of Arithmetic,” a most valuable book, and of extreme worth to me just then, as teaching me in all things—not merely in arithmetic—never to take anything for granted, but, to reason in a step-by-step deductive manner.

I remember purchasing this last-mentioned volume late one Saturday night in November, 1839, running from Holborn to Taylor and Walton’s in Gower Street in a very short time, lest the shop should be closed, and I be deprived of my next day’s chance of devouring the book, and when procured, I remarked how very different its philosophical plan was from that pur-
sued in that wooden-headed compendium of schools, "Walking-time's Tutor's Assistant." Soon afterwards I read Scoffern's "Chemistry No Mystery," and in it learnt that which was of much after use to me in my aquarium work, namely, that with but earnestness, costly apparatus is not essential in prosecuting experimental science. From Partington's "British Cyclopaedia," too, I gathered much mechanical and physical knowledge, which, years later, I turned to great service in aquarium mechanism. I pursued these mathematical and chemical studies with extreme ardour till the end of 1842, without getting much assistance or encouragement from any one. I made a resolve never to go to bed on Saturday night, when I was always alone, but spend the whole of it in study, drew up a contract with myself to that effect in regular legal form (imitating the manner of my indentures of apprenticeship to a bookbinder) and when I failed from weariness to keep my vows, I wrote out, addressed to myself, most abject confessions of wrong-doing, and promises of amendment.

At this time my only recreative reading was Craik's book, which I so constantly perused, that even now, almost every page of it, recording indomitable perseverance in the surmounting of stupendous difficulties in the acquisition of learning, is more or less familiar to me. In the spring of 1843, and in an evil hour for my figures, I read my first novel of Sir Walter Scott's—not "Ivanhoe," the general favourite of boys—but "The Talisman," and I went on then, from one production of Scott's to another, with my usual zeal, and was all the more eager to read them because novel-reading was strictly forbidden to me at home, but I contrived to read Scott, however, smuggling the books into the woods near the present site of the Crystal Palace. I then grew inquisitive about Scott himself, and got to know much of him, I think from his life by Lockhart, and found that one of the earliest books he read was Bishop Percy's "Reliques of Ancient English Poetry," which I got at Waller's in Fleet Street, and perhaps I was more impressed by it than by any other volume on similar matters I have ever possessed. But I did not stop with it. I laid myself out for a regular course of early English literature and old books, and devoured Ritson, and Warton, and Payne Collier, and Foss, and Dibdin.

As a change, I soon after, with equal ardour, took up with ecclesiastical antiquities and symbolism, and read Rickman, Buxton, the "Oxford Glossary of Gothic Architecture," Wolby Pugin, Billings, Didron, and Ayliffe Pusey. Then I had excursions into other branches of archaeology, Roman coins, Anglo-Saxon history and coins, Roman pottery, Anglo-Saxon glass, and ancient costume, arms and armour, with Sharon Turner, Roach Smith, Fairholt, Yonge Akerman, Beale Poole, Panché, and others. At other times I would have a fit at reading the Elizabethan dramatists, Shakespeare, Marlowe, Poel, Webster, and others, with their annotators, Steevens and Malone, Johnson, Collier, Halliwell, Knight, and many more.

Somewhat after this fashion I went on for eight years, from the spring of 1843 to the spring of 1851, digging as deeply as I could into those out-of-the-way mines of learning with the utmost zeal, and without the remotest intention or hope that I should be by them benefited in my means of earning a livelihood, and with no apparent chance of ever emerging from the poverty which seemed so natural to me, that I made up my mind to eternal familiarity with it. All my studies showed the maddest possible contrariety in aiming at anything useful—or what the world thinks useful. Thus, by the aid of Elstob, Vernon, and Bosworth, I worked at getting a knowledge of the Anglo-Saxon language so as to be able to plod through the Saxon Chronicle without the aid of Ingram's translation, while by taking as much less pains I might have learnt a modern language of service in trade.

During all these eight years, however, natural history matters could intrude themselves, in spite of my feverishly striving against them, and somehow, when I got a holiday I always turned my face Regent's Park-wards, to the Zoological Gardens. I was troubled by the occurrence of animals in archaeology—troubled lest they might tempt me to care too much for them scientifically. Thus, I was worried by the "Venas piscis," an early Christian emblem in the form of a fish. Once I read in a sort of guilty manner, a treatise on medieval zoology, written from a purely antiquarian point of view, lest it should seduce me to regard the subject from a natural history point of view. Moule's "Heraldry of Fish" (read with other heraldic books) was a real terror to me, as bringing me, from end to end of the volume, in contact with creatures I felt to be gradually taking an immense interest in. For instance, I felt to want to know why crocs were put among fish, in this volume, and the inquiry led to asking about classification.

Then from Moule I learnt with great interest what I deemed I ought not to care to know, namely, that the pike was a fish borne in the punning arms of Sir Thomas Lucy, referred to by Shakespeare in the "Merry Wives of Windsor," because "Lucy" or "Lucas" was the old English name for Pike, and was thus a play on the word Lucy. Worst of all, I learnt that Lucias (from this word) was one of the Latin names of the fish, and I caught myself making pilgrimages to look at stuffed pike in the shops of fishing-tackle makers in Crooked Lane, City, and I was alarmed at the interest I took in the fact that these shops are about the only relics of times when fishermen went to fish near London Bridge, and bought tackle and bait on the road.

I will remember again visiting the Zoological Gardens in 1847, the worst pecuniary year of their existence, and examined all with new eyes, and with a greatly troubled mind lest I should go over to animals altogether, and then I made out another legal agreement with myself, binding myself by all sorts of penalties in case of non-fulfilment, that the only animals I would ever know should be the impossible animals of heraldry, and that I would always spell "lion" with a y, as suggested by Mark Antony Lower.

Thus I struggled manfully, but vainly, against my coming tastes, and in spite of qualms of conscience I found myself eagerly visiting the Gardens in 1849 to see the new Reptile House, and in 1850 to behold the then great wonder, the Hippopotamus, the father of the infant that was born in November, 1872. Yet I could not make up my mind to go over entirely to natural history studies, though my interest in other reading weakened daily, and at last I found myself in the summer of 1851 hobbyless and miserable, and I took to desultory reading during an interregnum, and the heterogeneous food gave me mental dyspepsia, and I was wretched. I was, however, quite ripe for any worthy subject which might present itself as a hobby. I was like a very dry wooden house, full of inflammable material after a long and hot summer, and I felt that I was ready to be fired at any moment, and to blaze up fiercely with the smallest application of flame. On the morning of Wednesday the 15th of September, 1852, London learnt that the Duke of Wellington had died the previous day. The instant I heard of it I told myself that I should have a whole holiday when he was buried. The remarkable f easness of my holidays is shown by that fact, and indeed my hours of work were from 8 a.m. to 9 p.m.

The well-remembered day of the funeral at last came, Thursday, November 18th, 1852, and my entire holiday came with it, and in the morning it was discussed whether it should be spent in standing in the London streets to see the funeral procession, or to go to the Zoological Gardens to "see the wild beasts" if
they would be open, and an appeal to the Times showed that they would be.

The Gardens and not the crowded streets were decided upon, and that decision eventually turned the current of all my remaining life. There was nothing but walking there from St. John's Square (No. 56, second floor) and back, as not only was the Gardens' admission money all that I could spare, but no vehicles were on that day allowed in the streets.

On arriving there, I found near the side entrance a building I had never seen before, and which had risen since my last visit—a conservatory-looking glass erection of not large dimensions, standing on a low wall. The door was fastened, and I could see no one inside, and on my asking a passing attendant what the place was for, he said it was "a Fish House, though some people called it an aquarium," and that it was destined to contain fish and other such things, even sea-fishes and lobsters, and that it was intended to be opened in the following spring. He added his disbelief in the success of it, and an expression of his sense of the impropriety of its introduction in a zoological garden.

He regarded it evidently as an innovation on the customary inhabitants of such a place, which he defined as "beasts, birds, and reptiles." I was impressed by the novelty of the idea, however, and went away (after again trying to get in) to see Mr. Gould's collection of stuffed humming-birds, shown in the other (northern) side of the Garden, in what is now the Parrot House. They were exhibited in multangular glass cases (octagonal or hexagonal), and I was told that each side of each case represented a genus of the birds, and I was informed that a genus was a collective name for a group of species, or for one species, and that was a new bit of information gained in an interesting manner, and never forgotten.

So after lingering longingly at the Sixpenny Garden Guide Books on sale in the same room, and wishing I could afford to buy one, I went back to the Fish House, and passed round to its rear, and there to my great astonishment, I saw through the glass side of the building a glass tank containing perfectly clear water, with some aquatic plants growing in it (I have since learnt to call the plant Vallisneria), and, wonder of wonders, a living pike! I wish I could write what I then felt; I wish I could now feel as I then felt, but such freshness of wonder comes to one not more than perhaps half a dozen times in a life. I could not get away from the place (it was at the extreme north-east corner of the building, and the tank has been years ago converted into a marine one), but I went to it again, and remained there till it began to grow dusk, and it was time to get home.

In returning, I thought of all the odds and ends I had read of fish against my will, of the "Vesica piscis" of Monle, of Lucy, and of Crooked Lane, and on reaching St. John's Square I made a compound meal of dinner, tea, and supper in one, consisting of eggs and bacon and potatoes and tea. But it was not eggs and bacon and potatoes and tea—it was Pike and Vallisneria and water! I had seen an aquarium, and that was enough. I never felt unkindly towards the old archaeological pursuits, but here was something fresh, and green, and living, without any Dr. Dryasdust character about it; and I had seen amidst living vegetation a living pike, with his gorgeous livery of mottled green and gold. Ever since, I have picked up and treasured every morsel of pike lore I could meet, and I bought Mr. Cholmondeley-Pennell's "Book of the Pike" the moment it appeared. More than that, for the last eighteen years, in London, Paris, and Hamburg, I have never been without a pet jack in an aquarium. I have one now at this moment in a private tank in the work-room of the Crystal Palace Aquarium, and am never tired of setting forth how much more pleasure I get out of petting a pike than out of hooking a pike. With me pike-murder comes very near to man-murder. I am always telling some one about my pet pikes. But in this November of 1852 I was not quite fairly bitten through and through with the aquarium mania. The operation took more time than I can now imagine possible.

In the illustrations, Fig. 3 is a Pike of one of the Lucy family, copied from an old stained glass window, and it is, as such a representation should be, conventionally, and not naturally treated, and there is a careful avoidance of shading and of perspective, everything being expressed by hard black lines. Fig. 2 shows the interior of the Fish House of the Zoological Gardens, Regent's Park, from a photograph taken in 1856, representing the place very nearly as it was in 1853. And Fig. 1 is my earliest existing marine aquarium, now in the Crystal Palace, set up in 1856, and photographed in 1872, with the original animal in it—a sea-anemone taken from the coast of North Wales in 1855. As the carpenter's rule introduced in the picture shows, this aquarium measures 41 inches broad and 9 inches high. In later papers I shall have much to

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Fig. 2.—THE FISH-HOUSE AT THE ZOOLOGICAL GARDENS.
say about this jar, which remains now (January, 1873) as it was seventeen years ago, as in it were carried out many of the principles which have demonstrated the right application of experiments which Mr. Goss has given it the specific name [redacted] (widowed) because of the black and white vertical striping of the tentacles and body. In my next following articles I purpose treating of the Aquarium from the simplest and most inexpensive form up to the most costly, and giving the fullest and best instructions for keeping the occupants in health. The anemone just mentioned shows what can be done in this way—a success, though, not arrived at without many failures.

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**WHIST.**

*By R. B. Wormald.*

**INTRODUCTORY—OLDEN WHIST—AN EXPERIENCE—CHARLES DICKENS—HOYLE—DRESCHAPPELLES—ELEMENTARY HAND.**

The origin of whist, like that of playing cards, is involved in obscurity. It is quite certain, however, that a game of cards, played by two, three, or four persons, under the various titles of “Ruff” and “Honours,” “Slam,” “Wisk” and “Whist,” and “Swabber,” and bearing a certain amount of family resemblance to the whist of the present day, was commonly in vogue in England upwards of two centuries ago. Of the whist of the days of the Stuarts, as might be expected, little is known; but, judging from the technical phraseology of the game, there is every reason for believing that, unlike the majority of card games, for which we are indebted to France, it was of purely English origin. On this point, indeed, we have the explicit testimony of Richard Seymour, who in the fifth edition of the “Complete Gamester,” published in 1738, for the use of the Young Princesses,” expressly tells us that “Whist, vulgarly called whist, is a very ancient game amongst us, and is said to be the foundation of all the English games upon the cards.” The whist of our forefathers, however, appears to have been a very primitive pastime. In the first edition of the work above referred to, which was written by Charles Cotton in 1674, we are told that “Ruff and Honours (alias Slam) and Whist are games so commonly known in England, and all parts thereof, that every child of eight years old hath a competent knowledge of that recreation;” and the writer adds, “These games vary little from each other.”

In the comedy of the “Beaux Stratagem,” produced 1707, Mrs. Sullen disdainfully refers to whist as one of the rustic accomplishments of the beer-swilling, tobacco-smoking Corydons of the day. “Country pleasures—racks and torches! Dost think, child, that my limbs were made for leaping of ditches and clambering over stiles—or that my parents, wisely foreseeing my future happiness in country pleasures, had early instructed me in the rural accomplishments of drinking fat ale, playing at whist, and smoking tobacco with my husband?”

In a similar spirit Pope, in one of his epistles, speaks of whist as being the favourite pastime of the squires of the period. While Swift expressly tells us that “whist and swabbers” was a popular game in his time with the clergy. In the dramatic writers of the eighteenth century, allusions to whist are of frequent occurrence, and the fact that the modern vocabulary of the game still retains the old terms “honours,” “slam,” “ruff,” would seem to show that the short whist of the present day, with all its scientific accessories and elaboration, is a literal descendant of the old game with which our forefathers were wont to while away the monotony of a country life two centuries ago.

Of the original game, however, as we have remarked, we unfortunately know but little. If we read the “Complete Gamester” right, the game was “nine up;” three honours counted “eight by cards,” that is, two tricks; and four honours “sixteen by cards,” or four tricks, as in the modern game; and Cotton further informs us that “If either side are eight整数, he hath the benefit of calling ‘Can yo?’” If he hath two honours in his hand, or the other answers ‘One,’ the game is up—“a process, as our readers need scarcely be reminded, identical with the ‘call’ at the score of eight in long whist.

Of the other technical terms which still survive in the modern game, “Honours” and “Slam” require no explanation. “Trumps,” it is said, are an importation from the old game of “Triumph,” and “Swabbers” have been explained as particular cards, the possession of which, as in the fine old game of Quadrille—now, alas! well nigh obsolete—entitled the holder to a certain share in the stakes or pool. Would the giants of the “Portland” or “Arlington” be surprised to hear that in this enlightened nineteenth century, the “swasher” still holds its place in rural whist, and that we ourselves have personally come across the anachronism? The phenomenon occurred in this wise:

Some few years ago, in the course of a boating trip from Oxford to London, we were driven by stress of weather to take shelter one summer evening in a sequestered hostelry on the Berkshire bank of the Thames, and on entering the parlour we were agreeably surprised to find four local “Cavendishes” deeply immersed in the “game of silence,” to the accompaniment of long pipes. In the middle of the hand, one of the players with a grin that almost amounted to a chuckle, and a vast display of moistened thumb, spread out upon the table the ace of trumps, whereupon the other three deliberately laid down their hands, and forthwith severely handed over the sum of one penny to the fortunate holder of the card in question. On inquiry we were informed that the process was technically known as a “swap” (q.v. “swab” or “swabber”), and was de rigueur in all properly constituted whist circles.
THE POPULAR RECREATOR.

Our efforts to elucidate the etymology of the term proved unavailing; but this is scarcely surprising, seeing that the true etymology of "whist" itself—though popularly associated with "silence"—is a very moot point, while the derivation of the word "ruff" or "to ruff" is a mystery that, to the best of our knowledge, no lexicographer has ever succeeded in unravelling. In the never-to-be-forgotten description of the historical rubber played at Bath, wherein Mr. Pickwick, Miss Bolo, Mr. Buntam, M.C., and the Dowager Lady Snuffanuff figured, we find the word spelled "roughed," a barbarism that induced a whist-playing friend to apply to the author of the "Pickwick Papers" for his authority for the orthography. The reply was characteristic, and worthy of reproduction. It ran as follows—

Adelphi Hotel, Liverpool, October 15, 1838.

My Dear——To the best of my remembrance I used the orthography in question in "Pickwick." With the daring of youth, I rushed into the sanctuary of whist, and assumed that the word was derived from the "rough" nature of the process, and its exasperating effects on the feelings of the patient. Now that I have arrived at a more chastened period of life, and have become more cognizant of its many mysteries, I modestly perceive that I may have been wrong. If I have no means of referring to my notes; but if I were wrong herein, I rather think it was in good company. I am much mistaken if the word were not so spelt by Garrick, in "Prologues and Epilogues," and by the elder Colman in plays. I think I could find a number of such instances with ease in the great dramatic literature of the last century.

Very faithfully yours,

Charles Dickens.

Pursuing from the etymology to the history of the game, we have abundant testimony from contemporary writers that whist became a fashionable pastime in England about the latter half of the eighteenth century. Daines Barrington states, on the authority of a veteran whist player of the day, that about 1730 it "was much studied by a party that frequented the Crown Coffee House, in Bedford Row," and it is well known that about this time, Hoyle, who has been termed the "Father of Whist," made a very considerable income by giving lessons in the game, at the rate of a guinea each. In the Rambler of May 8, 1750, a fair correspondent is made to say: "Papa made me drudge at whist till I was tired of it; and Mr. Hoyle, when he had not given me above forty lessons, said I was one of his best scholars."

Hoyle's treatise, the original edition of which saw light in 1743, was the first attempt to reduce the game to a system, and the value of the work is best evidenced by the numerous editions through which it has passed. Even now, with all the advantage of the light which modern experience and investigation have thrown upon the science of whist, it is impossible to turn over the pages of Hoyle without being struck by the acuteness of perception and thorough mastery of the principles of the game displayed by the great master of the last century, and at the present day Hoyle is looked up to as the recognised authority by the few who still cling to long whist.

The introduction of the short game dates from the end of the last century. According to the popular tradition, which there is no reason to impugn, the "happy thought" was originally broached in the small hours of a protracted whist séance, at which, among others, Mr. Hoare—who is still remembered in Bath as a famous piquet player—and Lord Peterborough were present. The latter had been a heavy loser throughout the sitting, and in order to give him a chance of "getting back his money," it was proposed to cut the game in half, and play the remaining rubbers "five up," instead of ten. The innovation speedily found favour with the gamblers; and though strongly opposed by the conservative school of players, gradually worked its way into popularity, and ultimately, as we all know, drove "long whist" out of the field. The comparative claims of the long and short game have furnished a fertile theme for contro-

very. The great French player and whist author, Deschappelles, discussed the question, "Is short whist as difficult as long whist?" at considerable length; and finally summed up in favour of long whist as being the more difficult game of the two, "in the ratio of twenty to nineteen."

The carefully given opinion of Deschappelles is, it is well known, shared by some of the very best whist players of our own day; and even "J.C.," the father and founder of the modern school—to whom the very idea of long whist is an abomination—has more than once given a semi-reluctant assent to the proposition that long whist involves a greater degree than short whist the exercise of those peculiar mental qualities which enter into the composition of a fine whist player.

As usual, when there are two sides to a question, there is a good deal to be said on both. We will briefly place on record some of the arguments that may be advanced respectively in favour and against the claims of the long and short game. The most serious objections to short whist may be reduced to two; firstly, that the element of chance enters more largely into the game, in consequence of the undue preponderance of "honours" over tricks in the score; and that, secondly, short whist affords less scope for profound and brilliant play, each single point being of such vital importance when the game is only five up, that the fear of losing a trick will not unfrequently deter a player from venturing upon a brilliant but uncertain coup; whereas, when the game is ten up, the loss of a trick may be fairly risked for the chance of a great score. These are grave objections, far graver, we admit than any that can be urged against long whist. The more vulnerable point in the old game is the "call" at the score of eight—a quaint relic of barbarism willingly opposed to the first principles of whist, which we imagine the most inveterate laudator temporis acti would scarcely be prepared to defend. It might also be urged as an objection to long whist, that if the short game offers comparatively scant scope for brilliant and dashing coups, the long game, from the greater opportunities it affords of retrieving a false step early in the game, is calculated to foster habits of careless and risky play.

On social grounds, too, we think great exception may be very reasonably taken to long whist. In these days of high-pressure civilisation, when time is emphatically money, especially in the card-room, a rubber of three games of "ten up" is practically a monopoly of the "table," and an unfair trespass on the patience of the outsiders. Whist, or at any rate, modern whist, it should be remembered, is played, not by four players, but by six. When, however, we come to reckon up the sum total of the pros and cons, we think there can be no question to which side this balance will incline. Granted that long whist is open to fewer objections; granted that it may afford greater scope for deep and daring combinations than the modern game, there is, nevertheless, much to be said on the other side. Short whist demands keen observation, or, at any rate, more unceasing watchfulness of the minutia of the game, more patience, more self-control, and generally more judgment at every stage of the game, and, above all, a closer attention to the state of the score. This last is the distinctive feature of the modern game, and may, indeed, be termed the cardinal principle of short whist. We shall recur to these points on a future occasion.

On the next page is an example of an elementary hand which illustrates some of the simplest principles of whist play—viz., the lead, the return lead, attention to the turn-up card, and the importance of playing to the score. A C are partners against B D, and they sit round the table in the order indicated. The card led to each trick is denoted by a double rim.
C's Hand.
Diamond—Knave, 6, 4.
Spade—King, Knave, 2.
Heart—King, 8, 6, 5.
Club—Knave, 5, 4.

D's Hand.
Diamond—Queen, 8, 3, 2.
Spade—Queen, 9, 4, 2.
Heart—Knave, 7, 4.
Club—Ace, King, 10, 9.

Score, $\frac{1}{4}$ all.
D turns up the king of diamonds.

Trick 3.
A

Trick 3.—Won by B. Score, A, C, 2; B, D, 1.

B opens his strongest suit with the lowest. See remarks on Trick 1.

Inferences:—B knows that his partner cannot hold the king of hearts, otherwise he would not have finessed the knave, and it is obvious to all that the queen of hearts cannot be in A's hand, otherwise he would have won the knave with it.

A continues the suit of spades with the 10, which being the best, B trumps with his lowest trump.

Inference:—A knows that the 8 of spades must be in D's hand.

Trick 4.
A

Trick 4.—Won by A. Score, A, C, 3; B, D, 4.

A leads from his strongest suit. Having ace, 10, 9, and 3 of spades, he properly leads the lowest.

Inferences from the fall of the cards:—1. D has not the ace of spades. 2. The 2 of spades is in C's hand, because, if either B or D held it, they would have played it in preference to the 3 and 4; and if A held it, he would have led it instead of the 3.

Trick 5.
A

Trick 5.—Won by C. Score, A, C, 4; B, D, 1.

A leads the best spade, knowing that D has a spade left. B trumps with the 8 in preference to the 3, in the hope of drawing a high trump from C, who cannot have a spade.

Inference:—C cannot hold either the 9 or 10 of trumps, otherwise he would not have won the trick with the knave.

Trick 6.
A

Trick 6.—Won by D. Score, A, C, 4; B, D, 2.

C returns his partner's lead. Having originally only three of the suit, he returns the next of the two remaining. D covers the knave with queen in order to prevent A passing the knave, but the play is open to question.

Inference:—C has but one spade—viz., the 2, left in his hand.

See remarks on Trick 1.
This is what is termed a forced lead with C. Not being strong enough to lead trumps, and fearing to play the heart up to B, the original leader of the suit (see Trick 4), he has no alternative but to open the clubs. Having only three, headed by the knave, he properly leads the knave, in the hope of strengthening his partner.

Inference:—B knows that the ace of clubs must be in his partner’s hand, as C would not have led the knave from ace knave, while if A held it he would not have permitted the king to win the trick.

**Trick 7.**

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Trick 7.—Won by C. Score, A C, 5; B D, 2.

D, on getting in, returns his partner’s original lead.

**Trick 8.**

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Trick 8.—Won by D. Score, A C, 5; B D, 3.

C continues the club suit, and having only two, leads the higher card.

**Trick 9.**

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Trick 9.—Won by B. Score, A C, 5; B D, 4.

**Trick 10.**

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Trick 10.—Won by B. Score, 5 all.

This is a very instructive trick, and shows the importance of “playing to the score,” and bearing in mind the turn-up card. Each side has made five tricks, and the score being “four all,” the odd trick wins the game. B, the leader, is in a position to count the hands. All the spades and clubs are exhausted; eleven of the heart suit are out, and three trumps. He has himself the four of hearts, and the queen and three of trumps; C’s hand consists of the best heart, the 8 (see the fall of the cards in Trick 10), and two trumps, neither of which is the king, ten, or nine (see inference from Trick 5); D and A have consequently between them the six remaining trumps, of which the king (the turn-up card) is in his partner’s (D’s) hand. Under these circumstances, B takes the best chance of winning the odd trick, and with it the game, by leading the queen of trumps. He reasons thus: His partner has for certain the king and two other trumps, value unknown; but if either of them shall be the ace or 10, they must win the game, however the remaining cards may lie. In the event of D’s holding neither ace nor ten, he will pass his partner’s queen; and if A wins the trick with ace, supposing him to hold it, he will have to lead up to D’s king guarded, which will equally win the game for B and D. A, however, also “plays to the score.” To win the game he must make two of the three remaining tricks, and knowing the king of trumps to be on his right, he properly passes B’s queen, and waits for B to lead up to his tenace (the ace and ten of trumps) with the absolute certainty of winning the two remaining tricks. This is a very simple coup, of by no means unfrequent occurrence, but is apt to be overlooked by inexperienced players from want of a little attention to the turn-up, the fall of the cards, and the state of the score.

**Trick 12.**

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Trick 12.—Won by A. Score, A C, 6; B D, 6.

D would clearly gain nothing by finessing the nine of diamonds, as both the ace and ten are against him, and it is an even chance whether the former is held by C or A. If C has it, then putting on the king wins the game for B and D.

**Trick 13.**

A leads the ten of trumps, and wins the odd trick and game.
THE anecdote of Roberts and the farmers is well worth repeating, as a warning to players not to hold strangers too cheaply.

Some few years ago, during a visit to Yorkshire, Roberts had been to a small race meeting, and during the evening looked into the billiard-room attached to the hotel at which he was staying. Having just dined, his remarks on the play of two gentleman farmers present were anything but complimentary to them. At last the observation, "Why, you can't play at all," ended in his being challenged by the best of the two to play a game of 100 up, and we need not say who was the victor; in the second game Roberts gave ten points, with the same result, upon which the farmer asked, "Who are you?" "My name is John Roberts," was the prompt reply; but the dread of being possibly joked, or the feeling of not liking to confess that he had been overreached, was too strong for him, and Roberts was informed in the plainest possible language that he was a perverter of the truth.

"I answered," said Roberts, "And you are a gentleman," and we played on until I had beaten him with sixty in one hundred up." The farmers were convinced at last, especially on the production of Roberts's cue-case with "John Roberts, Manchester," engraved on it; who finishes his story by saying, "We supped together afterwards, for they were jolly good fellows."

And now to resume where we left off in our last paper.

A *losing hazard* is when the striker pockets his own ball after having it struck another ball. A losing hazard off the red ball scores 2; and off the white ball, 2.

A *winning hazard* is when the striker with his own ball pockets another ball. Should he pocket the red, he scores 3, and should he pocket the other white ball, he scores 2. Should he pocket both the red and his adversary's ball, the two winning hazards score 5.

The origin of the terms "winning" and "losing" hazards is that, in the game as played many years ago, only winning hazards scored; and whenever the player pocketed his own ball it was scored against him, he losing thereby; hence the expression "losing hazard."

A cannon is when the player causes his own ball to strike both the other balls; this scores 2.

The origin of the term cannon is evidently from the French game Carambole, in which winning hazards were called caramboles; and cannons, caroms. It was to this game that we referred when speaking of the terms winning and losing hazards.

*Side* is a rotary motion of the ball on an axis perpendicular to the table, causing it to rebound from the cushion at an angle different to that at which it would rebound had no rotary motion existed. Side can be put on to a ball at will, by striking it on either side of the centre of the ball in a horizontal line with that centre.

In speaking of striking a ball in certain points we suppose the face of the sphere presented to the eye to be flat; of course, mathematically speaking, the centre of the ball is inside, coincident with its centre of gravity.

*Screw* and *drag* is a rotary motion of the ball on a horizontal axis in a direction contrary to that in which the ball is travelling, and is caused by striking the ball on a point below its centre, in a line perpendicular to the table, that passes through that centre (See Fig. 1.)

The difference between screw and drag is that the screw is intended to affect the motion of the ball after impact with the object ball, and that drag is intended to affect the motion of the ball before impact.

On strokes compounded of screw or drag with side, caused by hitting the ball in points other than in the horizontal or perpendicular lines mentioned, we will speak another time; but as a screw always has a peculiar interest to beginners, who look upon
the stroke somewhat in the light of a conjuring trick, a few words of explanation may not be out of place.

First of all it must be borne in mind that a ball does not always roll, but rather slides along the surface of the table. Perhaps the best illustration, and at the same time explanation, of the phenomenon of a ball running up the table, striking another ball, and then running back again, would be the case of a railway engine at full speed when the driver, anticlimbing a collision, has reversed his engine. The action of the large wheel would be exactly similar to that of a billiard ball under the influence of screw, viz., it would be travelling very fast in one direction, and revolving very fast in a contrary direction. The collision takes place, and directly the momentum of the engine or ball is checked, the engine or ball instantly commences to run backwards. In cases of railway collisions where the engines have been reversed this is actually the case. Of course this rotary motion has the effect of retarding the ball in its progress; this is very evident in the case of drag put on to a ball by a good player; the ball will be observed to go suddenly slower; similarly the effect of reversing an engine is to stop the train.

The reason, of course, why the ball moves backwards in consequence of its rotating after the momentum in the contrary direction is lost, is owing to the friction between the ball and the cloth; but it must not be consequently imagined that it is easier to put on side or to screw on a rough cloth, owing to there being more friction, as such is not the case (we mention this as we have often heard it stated); but it must be borne in mind that friction between two bodies is independent of the extent of surface in contact, and proportional to the pressure. Were the table and balls perfectly smooth, no side or screw could exist; any more than a man could raise himself on perfectly smooth ice.

The bridge (Fig. 2) is another important part of position. It is evident that unless the bridge be steady the stroke cannot be depended upon, as any movement of the bridge after a player has taken his aim would cause him to strike his ball in some other than the point he intended.

In order to form a good bridge, place the left hand upon the table with the fingers touching each other, raise the knuckles so as to form a hollow under the palm, raise the thumb so as to form a groove between it and the adjoining knuckle, in which the cue may rest. The pressure on the table must be only on the tips of the fingers, especially the forefinger, and that part of the wrist that might be called the root of the thumb.

It will be found, after a week or two's practice, that a beginner will be able to raise his thumb higher than he did at first, thus forming a better groove.

We have now sufficiently explained the different terms employed in the game to commence to give beginners some practical directions, by following which they may ultimately become good players. It is of the first importance that the table, balls, etc., be in a perfect state, as no one can ever hope to become a good player by practising with elliptical balls and a crooked cue upon an uneven table, the cloth of which has been mended perhaps, as we once saw it, with a piece of green baize.

Of course in this case the word "perfect" must be taken in a limited sense. Sir John Herschel, in speaking of perhaps the most perfect of human productions, viz., astronomical instruments, says: *"Human hands or machines never formed a circle, drawn a straight line, or erected a perpendicular, nor ever placed an instrument in perfect adjustment, unless accidentally, and then only during an instant of time. This does not, however, prevent that a great approximation to all these desiderata should be attained." When speaking in our ensuing papers of a billiard-table, etc., we will take for granted that a sufficient approximation to the desiderata of a level table, tolerably fast, and round balls, has been attained. And we will presume each beginner to be possessed of the equally important desiderata of an ordinary amount of patience and temper, as without these it will be useless for him to attempt to learn the game.

It is a very common fault of beginners, and also often of fairly good players, to move too quickly after striking: the very instant they have delivered the cue they jerk their body, and the unconscious preparation for this jerk will often be the cause of their missing their stroke.

It would be a good thing for them to acquire the habit of standing perfectly still after having made a stroke, not only long enough to see if they have scored, but also long enough to see if they have obtained position for the following stroke—e.g., suppose an inexperienced player has, playing from baulk, made a losing hazard into one of the middle pockets, as a rule, the moment the ball drops into the pocket he runs round to get it out. A good player remains quiet, with his cue resting on the bridge, after the ball has been pocketed, and keeps his eye on the other ball, to see if he has obtained right strength to bring it down again over the middle pocket.

In fact, generally, it may be considered a good maxim never to move either body or cue after making a strike until the stroke is finished, bearing in mind that a stroke is never finished until not only the hazard or cannon has been made, but the balls left in that position intended by the striker.

In taking aim great care should be taken to ultimately strike the ball in the spot aimed at. The distance between the bridge and the ball should be about six inches. It will often be noticed in bad players of long standing that although they apparently take aim very well, yet when they bring back the cue for the last time in order to strike, they bring it back in quite a different manner to what they have done whilst aiming, generally not nearly so far back, and consequently the stroke degenerates into a sort of awkward push.

It much depends upon the way in which the ball is struck, that, at the risk of being wearisome, we must dwell for some time on the subject, and we would recommend any one desirous of becoming a good player, before he tries to play at all himself to go and see some first-rate hand, such as Cook, Roberts, Bennett, or Evans, and to observe carefully the way in which he hits his ball.

A good judge of billiards might be blindfolded, and yet could distinguish between a good and a bad player by simply listening to the sound made by the cue striking the ball.

The difference in striking between a good and a bad player is that the former brings back his cue from the ball quicker than the latter.

It will be observed that any one playing for the first time pushes rather than strikes his ball; after a time he learns to strike; but there is as much difference between the stroke of a man like Cook and that of an ordinarily good player, as there is between the stroke of that good player and the push of a beginner.

In these papers we can point out many of the mistakes often made by beginners, and also many of the little minute points wherein professionals differ from themselves, which, possibly, their own observation would not have detected.

For instance, in putting on drag, listen to the peculiar sharp sound made by Cook or Bennett in striking the ball. Let any beginner take the same cue and the same ball, and try and produce the same sound, and he will not succeed; there will be
as distinct a difference in the sound of his stroke and their shape in between the heavy thud of a navvy beating down the blocks of granite in the road and the sharp tap of a carpenter's hammer.

We were in conversation once with the proprietor of a room, which, owing to its proximity to University College, has been the resort of generation after generation of bad players. The proprietor, who is a first-rate player and judge of the game, informed us that when in the shop, by simply listening to the sound made by striking the balls overhead in the billiard room, he could tell as a rule the style of game played within ten points.

Another important point in striking and aiming is to keep the cue horizontal. We have sometimes heard a bad player remark, "How these balls jump!" most probably quite ignorant of the fact that any good player can hold the ball jump clean off the table every stroke he makes, if he likes, by raising the right hand and striking down pretty hard.

The direction of the eye in striking is another important consideration; and on this point we are much more inclined to agree with the veteran Kentfield than with the author of a book on billiards recently published. Mr. Kentfield says:

"Let the player first stand to his ball, and before he takes his position for striking, cast his eye to the object ball, that will enable him to accomplish it correctly; then he must place his cue to that part of his own ball which it is his intention to strike, in doing which his eye will necessarily rest upon it; after which the sight must be steadily directed to the object ball, and there must it rest until the stroke has been effected; for when the eye is suffered to wander from one ball to the other, this vision becomes distracted, and the power of correctly directing the hand lost."

This was written thirty-four years ago, and, we believe, holds as true now as it did then. In the act of striking, of course the eye should rest on the object ball, previous care having been taken whilst aiming to ensure hitting one's own ball in the point intended.

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FEATHER WORK.

BY ELIZA CHANDLE.

BIRD-MAKING—BANNERET SCREENS—MATERIALS—THE STAR-SPANGLED BANNER—BIRD SCREENS.

ELL, I have told you what to do and how to do it, but, nevertheless, I fear if you make your first attempt on the screen itself that you will in all probability spoil it, and ruin your feathers and your temper at the same time.

I do not mean to infer that your hands are naturally awkward, or your temper impatient; but in no case is this art of representing birds an easy one, and when the specimens require to be of very minute size, the difficulty of a neat performance is necessarily the greater. Therefore wise people will practise first on a larger scale, and so advance gradually to perfection.

Copy, then, some bird of middle size—say a thrush. Take either a piece of thin board and cover it with paper, or a sheet of cardboard, and, having made all the preliminary preparations as detailed before, place your model before you, and take the feathers off as you require them, for in this way only can you ensure their occupying the same position in your representation.

Nor will your labour be in anywise lost. A bird neatly and correctly formed in this manner is well worthy of a frame and place on the wall of your room; it is certain to be highly appreciated by the nursery pets, if by no other members of the household.

May be, even after this successful achievement, you will still lack the courage to attempt the formation of the oiseauxmouche on the screen; if so, form the "wee thing" on a thin card, afterwards cut it out and gum it on the place assigned for it on the screen.

There are still several more feather screens waiting to be introduced to you, and which I think are quite worthy of that honour, for they are as ornamental in their several ways as those whose acquaintance you have already made; and to-day I shall bring forward another variety, one which adds to its other recommendatory that of being particularly useful—the banner screen.

These screens are made in two sizes. The larger ones measure about twenty-one inches in depth and seventeen in width; they are suspended on poles of brass or wood, which are fixed either on to stands, or on to a jointed arm, and screwed on to the mantelpiece. They can thus be easily moved into any position, as a protection from the heat of the fire.

The bannerets are about ten inches deep and eight wide; they are mounted on to small rods and stands, and form a pleasant shade for the eyes, without the hands being troubled to hold them. The ordinary shapes of these screens will be seen by a glance at Figs. 3 and 4.

The groundwork for the particular banner screens which I am now about to describe is silk or satin, velvet or moire antique. No doubt you will find some of these materials amongst your possessions—some piece returned by a considerate dressmaker, or a remnant bought as a bargain, for which hitherto no use has been found.

Should the shade be too light, a dyer will soon turn it into a
rich crimson or blue, scarlet, green, or violet, which ever colour best agrees with that prevailing in your drawing-room.

Prepare some peacocks' feathers, more especially "eye" feathers; and get some gold spangles, such as are sold for Masonic aprons, and some black velvet: with these materials, and a little taste and ingenuity combined, very many various and lovely devices may be executed. We will mention two or three.

Take a piece of silk or satin, and form a Maltese cross in the centre of the screen, of the softest white feathers, then overlay (but not so as to hide them) with "eye" feathers, all stitched on separately.

For the centre of the cross, make a tuft of four white feathers, out of which should appear several of those glistening feathery barbs, such as you take from the shaft of an "eye" feather—these turn back so that they fall over the tuft. Make a fringe of the white feathers, and lay on an "eye" feather at intervals; border this with black velvet to cover the shafts of the feathers.

Then you can design a "star-spangled banner," by making a star in the centre of feathers of every hue, and studding the plain surface of the ground with spangles; put a border of black velvet, one side of which, that next the centre, vandyke, and from each point let an "eye" feather come forth. Also span the velvet at intervals with a single shining fibre.

Yet another pretty design might be that of some fairy rings of feathers, which show the groundwork within. Silk fringe the colour of the material gives a perfect finish to these screens; and they require to be lined with cashmere or soft silk.

In this manner there is ample room and scope for the imagination; splendid and exquisite screens may be thus fashioned, the gorgeous magnificence of which will be quite Eastern in its effect.

I hope that you have not grown weary of feather screens, for, as I have said, there are several ways of making them which have yet to be enumerated; so, on the acknowledged ground that "variety is pleasing," I shall venture to finish my somewhat lengthy catalogue before moving on to other feather recreations. Of course the size of the screen rules your choice of species to some degree; a fire-screen would require a much larger specimen for its ornamentation—a peacock, heron, or barn-owl, for instance—than would a screen destined for the mantelpiece. The making of this style of screen is one which perhaps is not so often undertaken by an amateur as by those whose arrowed occupation it is to cure and stuff birds; but there seems to be no reason why it should not be successfully attempted by any who are sufficiently docile to do as they are bid. Here are more hints.

Immediately after the bird is killed, sever from its body the different parts that are required, and proceed as before.

In order to cure the head make an incision immediately, under or just beyond the beak, and take out all matter that is come-at-able; leave the brains in; put in some alum, and let it remain for a few days, and then add spirits of wine, for a night, which will dry up the brains and eeceteras. If the under-feathers should be damaged by this process, it is easy to insert one or two, or a bit of down, in their place.

The back of the box it can have a piece of thin worsted material glued on to
GAMES OF THE PLAYGROUND.

By C. W. Alcock.

ROUNDERS (continued)—ACTIVE FIELDSMEN—“CORNING”—THE ROUNDER—INSPIRITING GAME—VICIOUSNESS.

PRISONERS’ BASE.—THE PLAYGROUND—THE PRELIMINARIES—“CHIVY.”

So far, I have shown how a rounder can be achieved; but with even a moderate field, rounders are not very easy, so that we shall have to consider the state of affairs under less favourable circumstances. Consider yourself for the time being, in the position of striker, that you have, at last, received a ball that suits you, and that you are speeding on your way to the first base, having sent the ball well into the farthest limits of the field. If the fieldsmen are not active, or they fumble the ball, it may be that you have a chance of reaching as far as the second, or even third, base; but do not be rash,
I implore, and be careful how you give any of the out-side a chance of a shy, for they will "cork" (you will soon be able to translate the word after the first lesson) you to a certainty, and the ball stings, you may rely on it. Should you be cautious, you will not imperil your safety, as well as endanger the welfare of your side, but remain, if there be the slightest risk, at the first base, and wait for the turn of the next striker. There is just a chance that while the feeder is toeing to the striker you may be able to improve your position to the extent of another base towards the goal of home; but here, too, you must look out for squalls, for it is one of the artifices of the feeder to feign a toss of the ball, in order to catch some of you unaware enough to hazard the danger of a throw by attempting to reach the next base under the shadow of this artifice.

Now that you have reached, as I have supposed, the first base on your road, you wait the movements of the striker next in order, and the same process is performed as in your case, each striking the ball or failing, as the ball suite or not.

Taking it for granted that the first four of you on the list have only been able to reach one base in your transit, all the four bases will be filled, and the next striker, if successful, will enable the first of you to get home, to take his turn again with the bat, when all the original number of strikers has been exhausted.

All this is on the assumption that none of you have failed in your allotted number of strokes with the bat, or that none of you have been hit on your road from base to base. If you have been unlucky enough to meet with either of these misfortunes, you will have to stand on one side, until you have been redeemed by the achievement of a rounder on the part of one of your side, or you have the variation of retiring into the field, to enjoy the luxury of a throw in. I shall ask you now to look at the reverse side of the shield, and consider how the game goes if the side to which you belong has been attended by ill-luck instead of success. You have, possibly, been exposing yourselves to unwarrantable risks, and you have found that the feeder has either been too artful for you, or that the aim of the field-screens generally has been too true, and most of you have been hit. At all events, nearly all of you have had to succumb, and only one of you still remains to win or fail. It is now that you will have to depend entirely on your last hope, and much depends upon whether this last reserve of yours is a skilful or unskilful player. He now calls for a rounder, and it is on his success or failure in this feat that the revival or overthrow of his side depends. He calls for "three fair hits for a rounder," which means that he has three fair chances of completing the circuit of the pentagon without being hit or caught, or if he reach home before the ball is grounded there. If he succeed once out of these three times in making the rounder, he has the privilege of liberating all his fellows who have been previously put out, and another innings is commenced on their account; but if he fail, his side is placed out, and the innings is transferred to those who have been fielding.

To accomplish this rounder, believe me, is no easy task, for the field is all on the alert, and you have not the protection of the bases, as in ordinary rounders. You must remember, too; that, in the ordinary rounders, you cannot leave a base and return to it, unless you leave it before the ball is out of the feeder’s hand; and do not forget, too, that on your return you are exposing yourself to the dangers of a shy.

I have told you what you have to do, and now I must caution you what you must avoid. When the ball has been grounded home by the feeder, and any of you are on your way from base to base, you will have to return to that which you left last, unless you have reached more than midway before the ball has been grounded; and even if you have passed this limit you are undergoing the risk of a shy. You should avoid, if possible, any loose article of clothing, such as a cricket-jacket; for if the ball hits any part of your person or any portion of your clothes, you are equally out, and the outer embellishment is an additional source of risk to your side. In the case of an ordinary rounder, each base affords you a protection, and you cannot be put out by a throw while so protected; nor is any fieldsman allowed to obstruct or interfere with you in any way during your passage from base to base.

I do not know a jollier game for an interval, nor do I know any that produces such exhilarating sport, or any amusement so easy of comprehension, by the absence of technicalities that only render confusion worse confounded, or so devoid of expensive adjuncts. I am not sure whether a cricket-stump does not form the best instrument for striking, as any species of bat renders it almost impossible to miss the ball, while a stump not only encourages skill by increasing the difficulty of striking, but it is surprising the distance that a ball will travel from propulsion by a stump. Nor can you have better materials for marking the bases or the home than these stumps, as they define clearly enough the boundaries, and are unmistakably superior to stones, or other such imperfect signs.

You may consider that any number can participate is rounders, and that the more there are the merrier is the game. So it is, in each case, but you can over-do here as well as in most other things. You want a game that will not be tedious nor prolonged to the distraction of any; and sooner than have an excess of numbers, I would, if practicable, separate the players into two games rather than overcrowd one, and displease or dissatisfy one or other. I would advocate not more than ten players on each side, as with this number in the field you will not realise many such feats as a rounder, and your chance of an innings will be sufficiently remote to render its contemplation a pleasing feature. You cannot have a better ball than those covered with white leather, and known as tennis-balls, for you want something heavy enough to fly far; and you will find that it will be quite heavy enough to render the effect of a shy gratifying rather to the thrower than to the recipient.

I wish you all good luck and a capital game, whenever you
venture on the pursuit of rounders. Only do not be vicious, I beg. If you throw, be sure of hitting, if you can; but do not aim solely to hurt. In this great world of ours I fear some of us who aim at rounders would fare ill if we were exposed to a shy from our friends.

PRISONERS' BASE.

I should like to see or have an opportunity of examining the length and the breadth of the playground that does not know nor has ever known the exercise of prisoners’ base, which I have placed second in the list of games that I am now endeavouring specially to treat.

Was there ever a playground that did not know it, one that has never rung with the merry shout of its fond disciples?

I pause for a reply, though there can be but one answer, and that one certainly not of a negative character. I know that my first recollections of the vast sparsely gravelled square known to us as the playground, with its tall overhanging trees older than the school itself, and its long sombre line of dismal black palings that looked as if they mourned without ceasing for past troops of boys after our own fashion, are identified with the game; and I am sure that my ideas on the subject are more precise than those of that irresponsible “claimant,” whether he be Thackeray or not, when he described his playground at Stonyhurst in the vaguest and most mysterious manner as “at the back of the side of the church.”

You may have many sports more popular that will not afford you half as much gratification or enjoyment as you can squeeze out of an hour of prisoners’ base, believe me. You want no materials, either, so that you can get to work at once; nor do wind and weather have any effect in spoiling your amusement, as in the case with so many other kindred sports, so that whether it be fine or whether it rain or snow, you can play and keep on playing as long as you fear not the moist, nor turn craven under the risk of a wet jacket or of boots that have never gone through the process of waterproofing.

Not that I am desirous of advocating the pursuit of any exercise under such discomforts, for if you want to enjoy yourself, you will evidently have a better chance if you have a bright sky overhead and ground that is dry under your feet. Only do not go away with the erroneous impression that there is no skill in an amusement apparently so simple, for there is here, as there is everywhere, a field for the display of talent; and here too you will find that the player gifted with the most ingenuity and most fertile in expedient and resource, will as surely triumph over his less expert fellow as in exercises where the accessories are more elaborate and the regulations more severe.

The first thing that you will have to do is to prepare your ground, and here fortunately you will not be opposed by any serious obstacles. Indeed, the selection will be more than easy, for any site will be suitable, whether it be the gravel of the playground or the green sward of the field. You can take the diagnosis given as a fair specimen of the kind of arrangement that will best suit your requirements.

A playground will after all make the best theatre for your play, for the four corners of themselves will form bases and prisons without the need of other definition. You will understand then, that the corners represent the four bases and prisons, and that the space in the centre forms the home for the most important performer in our little representation, who is technically known as “chivy.”

As in most games, two captains are selected; and according to usual custom each chooses a player until all are alike chosen and the sides are equal.

The next movement is to toss for the choice of positions, though generally there is little to be gained in this respect, except the dissatisfaction of finding that “heads” appear when “tails” are summoned.

Now that you have all the preliminaries settled, you will have to arrange your plan; and it is now that a captain gifted with strategic abilities will demonstrate his ability. First the captain of the reds, as we will call those who occupy the bases and prison so marked, sends out one of his own side into the centre of the play to act as chivy, and virtually serve as the signal for hostilities to commence.

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SWIMMING.

By the Secretary of the Royal Humane Society.


All the athletic exercises swimming is the most easily learned; but in learning to swim instead of to float, we begin at the wrong end, and with the wrong notion that swimming (instead of our own natural buoyancy) floats us in the water. Taken in the right order they come naturally. Any person who is accustomed to the water knows that the greatest difficulty he has to contend with is to dive or sink (i.e. to strive against the natural buoyancy of the body) and not to float. Let any of our readers try to pick up a bright object from the bottom in five or six feet of water, and the very strong resistance he meets with will convince him that it is far easier to remain at the top than to go to the bottom. When a horse, dog, pig, or bullock, gets out of its depth, it finds itself at once lifted up, and floating with its head above water, and, having no fear of sinking, its anxiety to reach the shore prompts it to make the natural motion with its four limbs.

Man has not, like the quadruped, the advantage of guiding himself in the water in his ordinary position; and his un instructed reason becomes a worse guide than the unerring instinct of the brute. Fear prompts him to raise his arms out of the water, and then they tend to sink him, whilst the necessary position of the beast’s four limbs keep them under water; thus, the efforts of the timorous to save themselves are the very cause of their drowning. Tossing with the arms above water, screaming with the mouth wide open, they get out of breath, water supplies the place of air, and they are choked or stifled—that is, drowned. But the time that it takes to frustrate their natural buoyancy proves the very thing they ignorantly doubted; for, if not lighter in themselves than water, they would have sunk like a stone. Nature has benevolently given us this
buoyant principle of safety in common with the lower order of animals, and we perversely mar it by our ignorant terror, and by absurdly fancying (according to the vulgar error) that the action of swimming, which is only moving through the water, keeps us on the surface, and not our own natural buoyancy.

The mouth must be kept carefully closed until the arms arrive again at the third position, shown in the Figures in the last lesson, in Part I.; then a full breath should be taken whilst the hands are returning to position number one.

This drawing of the breath is most essential, as all learners are very apt to draw their breath just at the moment they strike out, and to a certainty get a mouthful of water, the effect of which, especially in the sea, is to make the tyro very nervous.

These strokes in swimming should be taken slowly and steadily, not exceeding a speed of twenty per minute. Having got so far, now is the time when learners require some amount of assistance; and one learner can help another, by following a few simple rules.

Have a belt made at a saddler’s of the webbing generally used for horses’ girths, of such a size as will go round the body easily; eyelet-holes must be punched into the ends instead of buckles, and about two yards of strong line the size of an ordinary little finger should be spliced at one end into one of the eyelet-holes, the other end being run through the other eyelet-hole at the other end of the belt.

The teacher should then place the belt round the pupil’s waist with the rope in front of the chest (Fig. 5), and, holding the other end in his hand, must direct him to enter the water to his middle, and then strike out; the teacher walking backwards in his depth, or along the boards if in a bath, holding the end rather tight, so as to keep the learner in the most favourable position for swimming, and prevent his sinking.

The pupil must keep his head well back on the shoulders, and the back hollowed, which tends to the inflation of the chest, and gives more buoyancy, and he must at the same time kick out his legs well.

By repeating this exercise several times, he will get more confidence in the sustaining power of the water.

Sometimes the rope is passed over a pulley, at the end of a projecting beam, or crane, working on a centre, and giving way with the movements of the swimmer, or a strong wire is stretched across a large bath, and kept tight with screws; on this a pulley runs, and to it is attached the wire belonging to the belt, buckled round the learner’s waist, the cord in this case being attached at the back, as in Fig. 6.

This contrivance (than which nothing can be more simple) will not only facilitate the acquirement of the art of swimming, but enable any one who may be a tolerably good swimmer, to instruct any number of pupils in the art, by imitating the actions of the frog.

Now that swimming has become to be considered a necessary part of every boy’s education in those public schools that have any water within reach, this simple apparatus will prove the more useful, as it supersedes the necessity of being taught in a large space of water, which may not always be at hand.

Repeat this practice several times, and on each occasion you will get more confidence in the great sustaining power of the water, but if you cannot get any assistance in the manner above described, let one of your feet occasionally touch the bottom.

The manner of kicking out the legs should be precisely similar to that of the frog, i.e., as you draw your arms and hands into the first position you must at the same time draw up your feet and legs towards the body, and kick them out again, at the same time as you strike out with the arms and hands. There is not so much importance attached to the stroke of the legs as to that of the arms, and for this reason, that
as progress is made with the latter, the legs are sure to follow. A good swimmer very seldom swims on the breast since the side stroke in swimming has become so popular, although con-
mode of supporting the body; indeed, when not able to swim, you can always learn to float in salt water in a single lesson, simply by placing yourself on your back, throwing

Fig. 6.—Swimming with the cord.

...
keep their heads back; they generally lift their heads up,
principally on account of the water entering their ears, the
result being that the body is thrown into a position that
entirely prevents them from floating, because it brings the
mouth under water.

The arms can be placed in any position, but it is preferable
for them to be stretched right out, the palm of the hand just
under the water, by this position the learner has a better
mode of balancing himself, otherwise he is very liable to turn
over.

After he has obtained sufficient confidence to be able to
balance himself, he can place his arms in any position, either
by the side, across the chest, or folded under the head—the
latter position is best, as it throws the chest more forward,
and naturally inflates the lungs. The lives of many persons
have been saved by this simple plan; whilst thousands could
have been saved had they merely remained quiet, with their
heads thrown well back, instead of struggling and throwing
their arms out of the water, which naturally causes the head
to sink.

Of course it is much easier to accomplish this in the sea
than in fresh water. If in the latter, it would be better to
just paddle the hands at your side a little, which will prevent
your feet from sinking.

It is much easier for a woman to float than a man, from
the formation of the body.

One can swim some distance on the breast, by lifting the
arms over the head, and taking a circular stroke towards the
side. Many can swim more than a hundred yards in this way
as fast as some of our best swimmers on the side.

To acquire the power of floating well is to possess the key
to all kinds of swimming on scientific principles; it is also very
useful in cases of that terrible bane of the swimmer, the muscu-
lar contraction called the cramp, whatever part of the body
which is thus attacked being rendered temporarily powerless.
All are affected alike, and perhaps more good swimmers have
been drowned by cramp than by anything else. Strong men
and good swimmers, when seized with the cramp, have been
known to sink instantly, overcome with the sudden pain, and
nothing but the very greatest presence of mind can save the
victim.

The legs and arms are the parts of the body that are most
frequently assailed, by which means the difficulty of getting
ashore is much increased, but there is no real danger so long
as the swimmer preserves his presence of mind. When accom-
panied by presence of mind, cramp is comparatively harmless,
but when accompanied with fear, it is almost certain to be
followed by drowning.

If both legs are disabled, try to paddle ashore with the
arms; if, on the other hand, the arms are seized, the sufferer
should lie on his back, and get to land by the use of his legs,
if unable to do either, he should throw himself on his back,
and endeavour to float until succour reaches him. Under
such circumstances, some people recommend the following
method —

Turn on the back at once, kick out the leg in the air, without
minding the pain, and rub the part attacked with one hand
smartly, whilst the other is used in paddling towards the shore.
It is very easy to give these directions, but they are most diffi-
cult to follow. Cramp appears to deprive the person attacked
of all reason for the time, and to render him quite powerless
with mingled pain and terror.

The causes of cramp are usually believed to be two: the
first is from indigestion, for those in good health are seldom
attacked by it; the second is the over-exertion of muscles
that have been but little used, and when a very strong stroke
with the legs or arms is given, it usually comes on, therefore
easy swimming is to be preferred to that with sudden strokes
or jerks.

Balancing or perpendicular floating (Fig. 2) in the water is
done by allowing the legs to sink gradually, so that the body
may assume an upright position; the head must be thrown
back, so that the chin may be on a level with the surface. The
great requisite for the proper performance of perpendicular
floating, is confidence; caution is always necessary; and the
water should be quite still.

Treading water is a mode of supporting the body without
making any progress through the water, but of supporting the
head well above the surface. By it, if a man is drowning,
he may very possibly be saved, if two people take him by the
arms, and keep his head above water till assistance arrives;
but it must be borne in mind that it is a very dangerous
experiment, unless the two salvors seize the drowning person
with very great determination, so as to prevent his grappling
them.

The treading of the water can be done one leg at a time, or
both together, but the latter is the best way, as a greater
weight can be supported, when both legs raise the body at the
same time.

If one wishes to seize anything above the water level, such
as the gunwale of a boat, or a rope, the body is raised by this
plan of treading water with great vigour, also it is sometimes
done with the hands alone, or with both hands and feet to-
gether.

Upright swimming, or the Italian method, is given by
Bernardi, as follows: —

The pupil is supported in the upright posture in deep water,
by means of a hand under the arms, which are stretched out
horizontally under water. The head should never be allowed
to sink, but the body may be left unsupported for a short
time, if the pupil can be persuaded to remain quite quiet,
which he will do if he has full confidence in his master.

If the legs are inclined to come forward or backward, or
to rise on either side, a movement of the head in the same
direction corrects the tendency; and this is instilled into the
pupil and practised accordingly.

When he can manage to maintain the perpendicular position
by this mode of balancing, the most difficult part of the process
is accomplished. The next thing is to teach him to advance
one leg, keeping the other back, and, with the arms still hori-
zontal; this is easily done, and the legs may be taught to be
used as in walking. After this, the arms are practised in the
manner peculiar to the plan which is first attempted, while the
body is stationary, and is exactly the reverse of the use of
the arms in the old style, each hand being thrust out nearly
sideways, and then brought one after the other, round in front
of the chest, embracing, as it were, a body of water within its
grip.

When wishing to retreat, the body is inclined backwards,
the arms are reversed, and the water is pushed from the
body. The utmost rate of swimming in this way is about
three miles an hour in still water, which is not much more
than half the ordinary speed.

Dog-like swimming (Fig. 3) is simply following the same
motions as the limbs of the dog make when progressing through
the water. It is in all respects less useful than the usual
mode, being so much slower, but as it affords rest through a
different action of the muscles, it may be turned to very
good account when the swimmer is much exhausted by a long
swim.

The swimmer should lie on his chest, and move his hands and
legs alternately, the right hand with the left foot, and the left
hand with the right foot, one hand being thrust gently forward, with the palm flat and fingers close together; it is then brought back to the level of the breast, and the other used in the same way.

During the time that each hand is being so used, the foot and leg of the other side is drawn up, and then thrust backwards, forwards, and downwards with a good kick, but the learner must bear in mind the necessity of working the arms and legs in perfect unison.

The hand-over-hand mode of swimming is a very rapid one, and is frequently used when short distances have to be traversed, such as reaching a friend in the water who may be in danger, but it is too fatiguing to be used for any length of time, and is most adopted for the sake of the rest obtained by the change of muscular action.

It seems to be the dog-like method carried to an extreme; each hand is successively drawn out of the water and thrown forward, with the arm and shoulder to its full extent, with an action like a circular sweep, the last joints of the fingers should be a little bent, so as to make a small cavity, and enable the swimmer to hold the water as he draws his hands downwards towards the hips; the action of the legs is the same as in dog-like swimming; whilst these motions have been gone through, the shoulder has become so far advanced as to throw the body on its side, just as the hand on that side reaches the water, and the opposite, by having come into position, is strongly thrust backwards.

The arms, as it were, revolve in an oval, but each hand must pause a moment at the hip, whilst the other is being thrust forward, and the stroke of the opposite leg is to be made at the same moment.

Swimming on the back, much the same as floating (Fig. 1), is at once the easiest, pleasantest, and most useful method of swimming; indeed, some learners can make very good progress in this way, even before they can swim on the breast.

By acting in the following manner, the pupil will soon become a proficient in this style of advancing through the water.

Turn on the back, by forcing the leg and arm of one side against the water, next place the hand on the side of the body, just inside the hips, by the groin, take care to keep the head thrown well back and immersed, all except the actual face, hollow the back a little, and at the same time expand the chest as much as possible; the elbows and knees are to be turned out, so as to be kept under the surface of the water, and the head and whole body in a perfectly composed state.

The legs are next to be drawn up and thrust back as in ordinary swimming, but the knees must not come out of the water; if the legs are not to be used, possibly owing to cramp, they must be kept in a horizontal position, with the toes and heels together. This method permits a great rate of speed being attained.

If a bather will only keep his lips tightly closed, and the body still, he will find that when he inflates the lungs by a deep inspiration, his face will rise almost entirely out of the water, and at each expiration, his face will sink as far as the eyebrows and lower lip, but not any lower, his nostrils being always free for the passage of the air required by the lungs.

If any one will give this plan a fair trial he will learn more in an hour than in many days by other methods. Here he finds the immensely powerful buoyancy of the water, which would certainly prevent any one from drowning, whether he can swim or not, if he could only lie in the position of swimming on his back without moving his body or limbs, as he will be unable to sink, if he tries.

Every one should practise this simple plan of floating, until he has gained such confidence as to remain for a considerable time in this position, and even before being an accomplished swimmer, he need not fear being drowned.

Another way of obtaining a position of total rest, is to stretch out the arms as far as possible above the head, their weight acting as a counterpoise to that of the legs, the effect being that the toes are forced above the surface.

As before said, in the sea this plan of floating is very much easier than in fresh water, the face during expiration hardly ever sinking lower than the chin, whilst a good full inspiration will raise the whole face out of the water.

Swimming on the side (Fig. 4), which was not thought much of till within the last few years, is now considered the most powerful method known, and is almost universally adopted by competitors in races.

In our opinion there are few modern swimmers who can excel either in power or grace of movement in the water Mr. F. Cavill, the well-known teacher of swimming at Brighton, one who not only has taught an immense number of ladies and gentlemen this graceful and useful accomplishment, but who has also saved many lives when in danger of drowning, simply from having such power and confidence in the water under any circumstances; and as a result he now wears the silver and bronze medals and a clasp granted him by the Royal Humane Society for his courageous acts of rescue, and is the only celebrated teacher of swimming that we have ever seen so decorated; and we trust that the tepid baths he proposes to found in London, for the purpose of teaching in the same way as at Brighton, may prove such a success as he deserves.

As an example of the confidence given a man by being an accomplished swimmer, we cite the following act of rescue for which the Albert medal and the silver medal of the Royal Humane Society were very properly awarded.

On Sunday, January 6th, 1867, during a heavy gale of wind, the French lugger Courrier de Dieppe, drove ashore at Dymchurch, Kent, the crew consisting of four persons; attempts made to reach her with the mortar and rocket apparatus were unsuccessful, and the master, a cabin-boy, and a seaman, were washed overboard and drowned.

Soon the ship parted, and the portion upon which the mate, the only survivor of the crew, had taken refuge, was driven near the shore.

John Batist, a boatman of the Coast Guard Station at Dymchurch, clad in a cork jacket, and having a line attached to him, attempted to reach the vessel, but failed, and was dragged ashore.

At this moment the Rev. Charles Cobb, the Rector of Dymchurch, came up, on his way to perform divine service at the neighbouring church, when he hailed to perform a mission of mercy that was quite in keeping with his character as a clergyman. He immediately rushed into the water, and made for the vessel, and after one or two ineffectual efforts, by strong and determined swimming, at last reached the wreck, got on board, mounted the rigging, and rescued the only survivor.

Batist then succeeded in getting to the wreck, and, with a line he took with him, the poor French sailor was dragged ashore, supported on either side by Mr. Cobb and Batist.

Mr. Cobb made this brave attempt to save life in spite of the remonstrances of the people on the spot, and declined their assistance, by refusing to take any line with him, feeling so much confidence in his powers of swimming, learnt when young.
BICYCLING.

By Charles E. Inzer.

A MISFORTUNE—FOUR-WHEELED MACHINES—TRICYCLE—LOW-WHEELED MACHINES—INDIA-RUBBER TIRES—PUTTING ON THE BREAK—LUGGAGE.

There is a story told of three daring individuals, whilst the exercise was still a novelty, who, to their wives' astonishment and dismay, uttered their firm resolve to travel from London to Brighton by dandy-horse between sunrise and sunset. Great were the preparations, and fervent the marital blessings on their departure; but, alas for the vanity of human wishes! their horses were scarcely out of sight when the steering apparatus of one of their machines became slightly disarranged, and horse and rider went flying into a ditch, whilst the two remaining "dandies," turning suddenly to witness the catastrophe, ran violently into one another, to the great detriment of their limbs and garments. History is on this occasion silent as to whether there were any small boys present to enjoy the fun; let us hope, out of pity for the actors in the scene, that there were not. Some of these excursions ended, however, in more serious mishaps; and one rather curious accident occurred, which leads one to fear that the unlucky traveller had (perhaps owing to the heavy state of the road) endangered the lives of his Majesty's subjects, by taking to the footpath, for it is recorded that "whilst proceeding at a great speed down hill, he passed close to a certain house, the domestic whereof suddenly, from the interior, threw back the shutters, which, opening outwards, did him a violent blow to his most serious injury and detriment."

All the injuries sustained by the riders of these obsolete dandy-horses are entirely obviated by the present mode of propulsion, as will be seen at a glance. To go through the list of applications for patents and the various suggestions for the improvement of the velocipede since 1867 would be far too tedious; for in the year 1869 alone there were more than a hundred patents taken out bearing directly or indirectly on this subject; most of them were complicated and practically useless, and, like many inventions, looked very well on paper, but failed when put to the test. Some advocated four-wheeled machines to be worked by one sitter, and others by two; but it was more especially in designs for the tricycle and bicycle that inventors wished to shine, and it is interesting to see how each considered his machine superior to any other; there was always some want supplied that no other machine possessed; and as this was sometimes really the case, little by little perfection was arrived at. The advocates for the tricycle argued that on three wheels the rider was safer and more comfortable than on two—a very natural supposition, but one that is not borne out by actual experience; and it is not at all unlikely that in many instances the admirers of the three-wheeler had never mastered the bicycle.

A good specimen of the second class of machine, as improved from the original patterns, is that in which the driving-wheel is rarely more than forty inches in diameter, and the hind wheel some six inches less; while for the better description of it, we will divide it under the same four heads—viz., backbone, spring, wheels, and steering apparatus (Fig. 1).

1. The backbone is made of the best rivet iron, and is 1½ inches thick in its strongest part, lessening at either extremity to about ½ inch, and it extends from about a foot in front of the guiding-rod to the axle of the hind wheel, having at the same time a vertical socket in which the spindle of the fork of the driving-wheel works. The after end of it finishes in a fork, between which the hind wheel revolves, and its front end terminates in a scroll. The socket for the driving-wheel spindle is grooved, having a little hole near the upper end, into which the oil may be poured to ensure its complete lubrication. The scroll in front is useful to those bicyclists who rig up what has been called an accumulator (Fig. 2) which consists of a strong india-rubber ring, B (similar to those used for horses' legs) hooked into the scroll, with two straps or chains, A—-the former for choice—attached to it, one of which is fastened to each of the handles, or rather at the junction of the handles and the guiding-rod. By this method, if the india-rubber ring is strong and the accumulator made taut, the front wheel will not easily turn out of the straight line, whilst the elasticity of the ring allows sufficient play to admit of the machine being per-
flectly steered; and in this way to beginners it is a great help, though it will be well for them to practise also without it as soon as possible, so that they may not depend on it for their true driving. Its great use, however, when this class of machine is used, is to form a bed for luggage, which may be carried here with the least inconvenience to the rider.

2. The spring, which is slightly arched, is made of steel, and follows a generally horizontal line till it is above the centre of the hind wheel, where it is hinged to two other slightly curved springs falling nearly at right angles to it, the lower ends of which are fixed one on either side of the hind wheel. The saddle is placed a few inches behind the spindle of the driving-wheel fork, and may be shifted forwards or backwards according to the will of the rider; but as the spring rises very rapidly at this end, and falls much more gradually to the rear, the rider is placed on the strongest part of it.

3. The wheels of this machine are wooden ones, and consequently appear to the eye very often heavier than they really are. The front or driving-wheel is, as before stated, rarely made more than forty or forty-two inches in diameter, while the hind wheel is as much as thirty-four or thirty-five inches. The felloe is slightly hollowed all round, and then a curved iron tire fitting into the hollow is shrunk on, thus strengthening the wheel, and forming an almost semi-circular bed for the reception of the india-rubber, which is fitted on most ingeniously. When on the old machines the iron tires were first discarded, various methods were resorted to for substituting gutta-percha whilst still retaining the same wheels; but this was a matter of some difficulty, as, the surface of the felloe being flat, there was no bed for the gutta-percha to lie in. Some of them, however, answered fairly well; but they were at the best but make-shifts, as the gutta-percha was constantly coming off, and if it did not actually come off, the stones cut it up so much that it required incessant patching; this latter being due partly to the hardness of the material, and partly to the fact of its being in tension instead of compression, so that a cut once made was sure to open more and more.

These disadvantages have been overcome entirely by the compressed tire. The india-rubber is about an inch and a quarter in diameter, hollow in the centre, and the length of it considerably more than the circumference of the wheel; a twisted wire core, equal in length to the circumference of the wheel, is then pushed through the india-rubber till about the same quantity of the latter is overlapping each end of the wire core. The india-rubber is then forcibly drawn back, and thus compressed till there is sufficient wire visible to allow of its being spliced, which being done, the two ends of the india-rubber are released and allowed to fly together, thus making the circle complete. In this way a beautifully elastic tire is made, which, if damaged at all, has a tendency to close instead of to open, as it would do if in tension.

The bush of the hind wheel has a box of hard steel, slightly longer than the thickness of the hub, let through its centre, with a steel washer at either end just clear of the wheel, and then a bolt is driven through it as well as through the hind fork, and the whole is nipped together, so that however much the bolt may be tightened the wheel can never get jammed. The boxes of the front wheel are slightly cupped, thus reducing the friction, and furnishing a chamber for the oil.

4. The steering apparatus is similar to that used on the old machines, and consists of a vertical fork, supporting at its lower end the driving-wheel with the treads attached, and finishing at its upper end in a spindle, which, passing through the socket of the backbone, projects about two inches above, having a screw at its extremity. The handles (generally made of wood) are fixed to a steel rod resting on a bow of iron having a socket midway, which is dropped over the projecting piece of the aforesaid spindle, and then secured by a nut and washer. The leg rests come forward in front, in a somewhat similar manner to the old Coventry ones, but are stronger in construction; they are formed of two bars of iron on either side of the front wheel but parallel to it, fixed at right angles to the fork and joined in front, but quite clear of the wheel, with a steel stiffening rod. The steel rests for the feet are covered with india-rubber, and fitted on to the horizontal bars in such a manner that they will slide backwards and forwards, so that they can be shifted to suit the length of the rider's legs; when, however, the required position is found, they can be tightened with a nut to prevent their slipping.

Whichever class of bicycle may be finally decided upon, it will always be advisable to learn on a small machine, with plain iron tires to its wheels, as a beginner would be sure to damage india-rubber ones, and the latter are expensive; but as soon as ever you are able to drive tolerably straight, the iron tires may be discarded; and the difference of sensation between the two materials may be compared to that experienced in getting out of a jolting cart into an easy carriage.

In the light of present experience it would appear almost incredible, but it is none the less a fact, that when india-rubber tires were first introduced they had many opponents, who argued that although there might be a greater degree of comfort to the rider from using them, yet the extra labour involved, owing to the soft nature of the material, would more than counterbalance the slight advantage gained. It is needless to say that this theory soon melted away in the test of practical experience, as many other theories have before when tried by that ordeal.

The use of the break will be easily acquired, as it simply consists in turning the handles round till it is felt to be on; but it should be applied gently, as, if you are running fast down hill, and skid too suddenly, a spill may be the consequence.

When descending a long winding hill, it is more prudent not...
CHESS.

By John Wikker, the English Champion.

QUEENING A PAWN—CAPTURING—TAKING EN PASSANT—PROBLEMS—THE KING—CHECK AND CHECKMATE.

EARLY in the game, of course, it is difficult, if not impossible, for the pawn to penetrate through the serried ranks of his opponents. Rarely, and only in remarkable positions, does a pawn advance very far whilst the board is full of pieces; but at the end of the game he is frequently pushed forward to the extreme limit of the board, where he enters upon a new career of usefulness. He cannot retreat, he cannot remain a pawn, and he is therefore transformed. A player who advances a pawn to the eighth square must of necessity exchange it for some superior piece, excepting the king. He may claim a queen, rook, knight, or bishop for his promoted pawn. As a rule, the fortunate possessor of the pawn at its eighth square chooses a queen, she being the most powerful piece; but positions do occur, strange to say, wherein the selection of a rook, knight, or bishop, would save or win the game. I may give an example of these eccentricities at a future day; they are not needed now. Nevertheless, the choice of a queen is so frequent that the advance of a pawn to the eighth square goes by the technical term of “queening a pawn.”

The pawn’s method of capturing is peculiar. Unlike all the other pieces, he cannot capture on his line of march, but diagonally from it. He marches like a rook, but takes like a bishop.

In the diagram (Fig. 1) the hostile pawns on the left have each moved two squares, and confront each other. They cannot capture, because they are on the same file, and the pawn cannot take on its line of march. The case is one of dead lock; neither pawn can advance or recede. On the right of the diagram the two pawns are on different files, and they meet each other diagonally. Whichever has the move can capture the other—viz., by removing him and planting himself on the desolated square. It follows that whenever a pawn takes another pawn or a superior piece, the capturing pawn is transferred to another file. Thus you may have two or even three pawns upon one file—the original pawn that was on that file, and one or two others that may have passed on to it through the slaughter of their adversaries.

There is another mode of capture by the pawn which is exceedingly peculiar. It is called taking en passant. The
The object of this fine move is to bring the king's bishop to bear upon the adverse king.

**White.**
29. *B to Q Kt 3* (check).
30. *B to Q 6* (check).
31. *K to B sq.

**Black.**
29. *P takes R.*
30. *K to Kt 5.*
31. *Kt to K 5.

White sees his way to the end with admirable clearness, whilst Black seems unconscious of his danger.

32. *B to K 2.*
33. *P to K Kt 4.*

Black had at this point the opportunity of taking a bishop gratuitously; but by doing so he would have been mated at once by the check of the knight at K Kt 6. He accordingly plays the knight's pawn to avoid the mate,

32. *P to K B 6,*

the final stroke. Black has no resource left. If he take the bishop, White mates with the knight as before. He ob-

viously cannot take the pawn. Lastly, if he move away his king's rook, the bishop takes the bishop, check, and then the other bishop mates at K B 7. The young player may be told that the onward move of the K B P is far more effectual than the capture of the black Q B with the knight. Herr von Bilguer resigned at this point.

The problem Fig. 4 is equally old.

In this situation the Black seems to have decidedly the best of it, and undoubtedly he has overpowered his foe. His preponderance of force is enormous, and his position good. The game ended thus:—

**White.**
1. *Q to K Kt 5.*

**Black.**
1. *Q takes Q.*

The Black might here have won the game in several ways; but he could not resist the temptation of capturing the queen for nothing, threatening, as he now does, immediate mate. But the other side had also an eye to mate:—

**White.**
2. *Kt to K 6* (check).
3. *B to K 3* (check).
4. *K to Kt 5.*

**Black.**
2. *K to Kt 5* (he must).
3. *K to K 4.*
4. *B to Q B 6* (dis. check).
5. *B to Q B 5.* Checkmate.

Interposing the pawn or rook would evidently have been of no use.

The old German magazine from which it is taken remarks that it is useless to begin well unless your care and attention are kept up to the end.

I have said that the move of the king is the simplest of all. Subject to certain conditions, on which I am about to enlarge,
In the diagram (Fig. 5), it will be seen that the black king is within range of the white rook, which moves in a straight line parallel with the sides of the board. The rook could capture any other black piece, but being the king, the rook only gives “check.” As, however, the king cannot be taken, so he cannot remain in check. He must forthwith free himself from the assault of an adverse piece. This he can do in three ways; by moving out of the range of the piece, by interposing one of his own pieces, so that the king may be covered from the attack, or, thirdly, by capturing the man giving check. In the position given above, the king may simply step on to either of the adjoining files, and he is at once freed from check. Or the black bishop may be retreated to the black square immediately in front of the king, thus covering his majesty from the check of the rook. As the king must always be immediately relieved from check, it follows that he cannot move into check. He cannot be moved within the range of any hostile piece. Hence, also, as the range of the kings themselves extends one square in every direction, they cannot approach each other. At least a square must always separate them. Another observation respecting check is of importance. It is the peculiar feature of the knight that he can leap over the heads of his friends or foes, therefore, no piece can be interposed between him and the king. There are but two ways of escaping from the check of the knight; he must be taken, or the king be moved. So much for the obligation the king is under of escaping from check. But suppose he cannot fulfil this obligation; suppose that he can neither interpose a piece, nor capture the attacking man, nor remove to another square without exposing himself to the check of some other opponent. His majesty cannot remain in check, and if he cannot get out, he is technically “checkmated,” and the game is lost. Checkmate, therefore, is the fundamental principle of the game. The contest, strictly speaking, can be ended only by thus placing the chief piece in a situation from which he cannot escape. If either player sees that his position is hopeless, or that he is in great inferiority of force, he may terminate the game by simply resigning, and in the majority of cases this is the practical result. But carried to a complete issue, every game should end in checkmate. This element of the game is so important, that it may be desirable to give some illustrations respecting it.

Fig. 6 is the simplest form of checkmate. In this situation the black king is attacked on the lower file by the white rook. His majesty evidently cannot move to either of the squares to the right or left of him, for in that case he would still remain in the check of the rook; nor can he play to any of the squares in front of him, for in that case he would be violating the rule which forbids the two kings to approach each other. He therefore cannot escape, and is checkmated.

Fig. 7 is a more complicated specimen. Here the king is assailed by the knight. He cannot move to the square to the right, for it is commanded by the bishop; and he cannot move to the squares in front, for they are within range of the rook.

In Fig. 8 the white queen attacks the king. The queen cannot be taken, though on the square nearest to the king, for she is supported by the white pawn; and the only square to which the king could fly is already occupied by his own rook.
THERE are many people who look upon conjuring as a mere amusement, and who would be glad to see their children turn their attention to something useful rather than waste their time over that which cannot possibly, as they think, be of any service to them. We would, however, remind these people, who savour somewhat of the Gradgrind school, of that admirable book of Charles Dickens, "Hard Times," and that we cannot expect children to be always hard at work over some study. How often do we hear the remark made, "The boy has plenty of brains if he would only use them."

The great art of educating the young is to know how to make them use their brains; and we would remind these eminently practical people of the old picture of the two donkeys—the one being beaten and the other galloping after a bunch of carrots tied to the end of a stick—and that persuasion is better than force.

There is nothing that we know of more likely to make a boy think than a good conjuring trick; and we will describe one that many years ago caused us many hours of deep thought (would have given us many sleepless nights, had it not been for the custom we had at that time of going to sleep about half an hour after getting into bed), racked our brains at intervals for some years, and eventually gave us confidence for life, for, one
happy day our mind triumphed over matter, and we found it out.

The following is a description of the trick, which, though now sold in all conjuring shops, was at the time we speak of a novelty.

Well we recollect being the youngest child present, sitting on our nurse's lap, watching with eager eyes among many other young eyes a grey-haired old gentleman, sitting at the top of a long dining-room table, and placing on it a mysterious-looking little round blue box, made of pasteboard, about four inches long and the same width as an old-fashioned halfpenny, eight ordinary halfpence, and a small die.

We recollect too that he always had a dinner napkin on his lap when he performed the trick; and "after years" experience has taught us that he ought to have concealed this part of the performance more than he did.

He first sent round the box, halfpence, and the die, to be examined. The two latter had honesty stamped on their countenances, but not so the box, which every one scrutinised with the natural suspicion which conjurors' implements always excite. Of course it was nothing but what it appeared to be; and the very fact of its being sent round for inspection ought have been enough to have convinced people that there was nothing about it that might not be seen.

The halfpence were first piled up exactly the one over the other, so that the edges were smooth, and placed on the table, which, being an ordinary dining-room one, precluded the possibility of there being a trap-door in it.

The little round box, which was just large enough in diameter, was then placed over them; and the performer, placing his left hand under the table, after much scratching and rattling, produced the eight halfpence, and taking up the now empty box in his right hand, threw it to be examined by his young audience.

Again, the small die was placed on the table, and carefully covered by the little blue box (we say carefully, for we always noticed, long before we discovered how the trick was done, that it seemed to be necessary to place the die exactly in the middle), and the halfpence that were lying on the table were gathered up and placed under the table, when, lo and behold! the left hand emerged with the die, and on carefully and slowly lifting the blue box underneath it, where before was the die were now piled up the halfpence.

Again the halfpence were covered, and the die taken below; again the scratching and rattling was heard, and the halfpence produced from under the table, and on lifting the box the halfpence were found to have vanished, and in their stead appeared the die, the pasteboard box being again thrown to the audience to be examined.

This simple but very good trick—which caused us more real thought during the first nine years of our life than all our studies—is performed as follows:

Fig. 1 represents a pile of ordinary halfpence. Fig. 2, which is drawn "transparent," represents what Fig. 1 really is—viz., the halfpence stuck fast and securely together with a large round piece cut out of the middle of each one, except the top. Fig. 3 is the round pasteboard box, just large enough to cover them.

When the performer took up the pile of halfpence in his hands previous to putting them on the table, he, on pretence of getting them all exactly even, slips them into his lap, and takes from his lap the halfpence all stuck together (Fig. 1), which, when placed on the table, of course do not differ in appearance from ordinary halfpence piled up.

This block is covered by the box; the halfpence in the lap are first scraped against the table, then rattled, and then produced from underneath and thrown on to the table. By slightly pinching the box near the bottom with the finger and thumb of the right hand, of course the block is lifted with the box, and by instantly relinquishing the pressure, the block slips into the right hand, and the empty box can be thrown forward; all eyes follow the box, and the block can then be dropped quietly into the lap, where the dinner-napkin or cloth is laid.

The second part of the trick is done as follows:—

While the die is being examined, the box is slipped quietly into the box, and when the die is put on the table, it is covered over, care of course being taken to pinch the box sufficiently hard so as not to allow the block to slip out.

The performer has a second die, which he produces on the table, and by lifting the box carefully, without pinching it, the block, with the die underneath it, appears under the box instead of the die, or, in other words, the audience find the die changed into the halfpence.

Fig. 2 represents the apparent pile of halfpence with the die inside. On recovering the block and placing the die underneath the table, by taking up the real halfpence in the lap, and scraping and rattling them against the table before throwing them on to it, the trick is rendered more effective; and, of course, on again lifting up the box it must be pinched in order to retain the block, the die again appears under the box, which can be thrown for inspection as before, the block being retained in the hand.

We would, in explaining all tricks, warn our young readers against the feeling of disappointment they will naturally feel at the extreme simplicity of the methods by which they are accomplished. There are many people who, after puzzling themselves for months over a trick, on being told how it is done, instantly exclaim, "Why, anybody could guess that!" forgetful of the fact that they did not. As a rule, it is the very best tricks that have the simplest explanations.

Our woodcut (p. 81) represents a trick performed many years back by Professor Anderson, called the "portfolio trick," one of the most showy but at the same time simple that we have ever seen; but before describing it and explaining how it was done, we will revert to some of the exceptional uses to which conjuring may be occasionally put.

Perhaps the most remarkable case on record was that of M. Houdin, who was absolutely employed by the French Government to counterfeit the influence held over the Arabs by their native conjurors, who professed to be sorcerers. This he most effectually did, beating them with their own weapons.

It is reported in his memoirs that on one occasion, after performing the extinguisher trick—which consists in covering over a man on a table without a cloth on it, and beneath which it is possible to see, and making him disappear—having first extinguished one of his assistants, he asked his audience whether any one of them would consent to be covered.

A young Arab chief stepped forward on to the table; he was covered with the large cone-shaped extinguisher, a pistol was fired as usual, the cone fell off, and, to the consternation of the assembly, their chief was gone.

The Arabs, usually so mindful of their dignity, paused but for one moment, rose up wroth, and rushed to the door, where, so says the memoirs, they found their chief awaiting them outside. It has been reported, on the other hand, that the man was never seen again, and that perhaps some of the French secret state papers might solve the mystery.

We will on a future occasion again refer to the exploits of M. Houdin among the Arabs in reference to the pistol trick, one of Friell's best, wherein on one occasion he varied the usual method of performing in order to cause a large splash of blood.
to appear upon a white wall, which, previous to firing, was perfectly clean.

We mentioned in our first paper a letter that appeared in the Times, signed by Mr. Clark, upon the subject of spiritualism; and we fully agree with Mr. Clark in his opinion that any one unable to fathom the mystery of a conjuring trick is not a fit person to attempt to unravel the mysteries of spiritualism; but by no means follows that men of science would be the best pioneers of the investigation. We have the greatest respect for scientific men as a body, including the scientific gentleman mentioned in “Pickwick,” who was electrified by Sam Weller’s fist; but in any investigation where trickery was suspected, we would prefer for our ally a thimble-rigger from Epsom race-course to the president of the most learned society in the world.

We were called upon for an opinion on the subject, we would choose for our help three such men as M. Houdin, Professor Anderson, and Frikell, should the “mediums” consent to our scrutiny, which is probably rather doubtful, when we confessed that we could not do what they did, or if in our endeavours to imitate, we did not go beyond their best efforts, then and not till then is the subject worthy of really scientific investigation. Our own personal experience on the subject we give in a letter recently written to a friend. Conjuring has occasionally its uses, as will be seen.

About twelve years ago we attended a so-called seance, at the house or lodgings—I don’t know which—of a Mrs. —— and her two daughters, one of them being said to be what is called a medium. My companion and introducer was a boy of about fourteen or fifteen years of age, whom I had known for some years, and who, I believe, was some distant connection, and the account he gave me of a previous interview he had had with them excited my curiosity. I can add, too, that I had every confidence in the boy’s veracity, which nothing subsequent has ever shaken, and that, as far as I know, neither he nor the lady were aware that I had any knowledge of the art of legerdemain. On our first visit we were alone—i.e., the only people present were Mrs. ——, who wore a very large crinoline and did not move her seat the whole evening, her two daughters, the boy, and myself. We sat round a small table, which had a log in the centre terminating in a tripod.

We all placed our hands on the table, and on Mrs. —— asking, “Are there any spirits present?” I instantly heard several loud raps under the table. How these and all the subsequent raps were produced I did not at the time see, nor do I to this day know. That they might have been produced in a variety of ways was at the time evident; but as they might have been caused by the medium or her friends simply kicking the table with the foot, I attached no importance to this part of the phenomena.

I was requested then to throw my handkerchief under the table. I did so; and on taking it up after a few minutes, I found that a knot had been tied in it.

Again, I was requested to place a slate and pencil on the floor, having previously seen that there was no writing on the slate; on taking the slate up, I found some rather rough writing on it.

An alphabet was placed on the table, and on a pencil being moved along the letter, the table by rapping when the pencil rested on a certain letter spelt out different words.

We were then told to get up and take our hands off the table. We all stood up, Mrs. —— included—though she did not move away from her chair—and all placed our hands about two feet above the table, with the exception of one of Mrs. ——’s daughters, who kept her hands on the table, from which I presume she must have been the supposed medium on the night in question. The table rose in the air till it reached our hands, and fell again with a crash.

I honestly confess that at the time I was puzzled, and perhaps a little frightened, or rather a little nervous. I made them a present of a small sum of money, and left, to think it over.

On our second interview—the boy again accompanying us, and the same feats were repeated, with the addition that on a violin being held under the table, it was played, i.e., it sounded as if a bow was drawn across the strings, but there was no tone. On the alphabet being placed upon the table, the boy was asked to think of a word; and never shall I forget his look of astonishment on the table rapping the correct one! I also was asked to think of a word, but the table was in my case unsuccessful.

It was on this occasion that my skill in conjuring proved of service, for on placing the pencil and slate on the floor, by what Artemus Ward would call an “adroit movement,” I flipped the former up my sleeve, and awaited with some anxiety the result. Soon, however, I heard the pencil move across the slate, although with my left hand, which I moved from the table under the pretense of scratching my right arm, I felt it safely in my sleeve.

On taking up the slate, of course, I let the pencil fall into my hand and replaced it, and read what was written (some rubbish) with a grave face.

We were then asked if we should like the spirits to touch us; and before we had time to answer, the boy jumped up, and with horror depicted in his countenance, which no actor in the world could have put on, rushed with a scream to the end of the room.

Almost at the same instant I felt what imagination might easily have conceived to have been a bony finger and thumb clamp my ankle.

On our third and last interview, the only novelty was that I previously wrote down a word on a piece of paper which I placed in my pocket, and on being again asked to think of a word, I told them that I had one written down. I now tried to alter the expression of my face, as if I was highly excited at certain letters on which the pencil rested. It is a fact that the table rapped at those letters and spelt, not the word I had written down, but the word I tried to make it rap.

On being asked if I was convinced, I plainly answered, “No!”
and for the simple reason that nothing had taken place which any ordinary conjuror could not do. I do not say that it was done by trickery; but I maintain that it is our plain duty to believe in natural before supernatural causes, when we have the choice of the two. Any one, by placing the toe under the leg of a tripod table, can, by raising the foot, and at the same time pressing the edge with their hands, cause the table to rise in the air.

A small piece of slate-pencil fastened to the end of the foot, is to me a more reasonable explanation of the writing on the slate, than that spirits with slate-pencil in their pockets were present.

Two people, with their feet, can, with practice, tie a loose knot in a pocket-handkerchief (I have seen it done), or a little girl concealed under the medium's capacious crinoline would be a still easier explanation of most of the phenomena.

Such was our opinion of so-called spiritualism twenty years ago, and nothing we have since seen has induced us to alter it. That some hidden force independent of the medium, and at present unknown, may be in existence, is possible, as otherwise one is utterly at a loss to account for some of the stories given by those who are above suspicion. But that an immense amount of trickery and deception is mixed with it we are certain, and it is the conjuror's rather than the scientific man's business to sift the chaff from the wheat. The great portfolio trick, as performed many years ago by Professor Anderson exemplified, as we have said, how much conjuring depends upon simple means.

The so-called portfolio was about six feet long by rather more than three feet wide, as far as we can recollect and guess at its length from the front of the large theatre where it was exhibited. When closed it was not more than three or four inches in thickness, yet though placed on a small stand beneath which it was possible to look and impossible to hide anything, he brought out his son and daughter, aged eight and six years respectively, live ducks and geese, besides many other things, after which he shut his portfolio again quite close, reopened it, and brought out a sixteen-wire birdcage some two or three feet in thickness, and a large wooden box about three feet long by two feet wide and two feet deep.

The cage is represented in our woodcut in the performer's right hand and the box on the left. We will inform our readers of the way in which this trick was done in our next article, as well as explain the following very simple one, which we leave them to guess at in the meanwhile.

Take three shillings, and place them in a hat. Ask any one of the company to take one out and mark it so that he will know it again, and replace it in the hat, covering the hat over with a handkerchief. You are then to pick out the shilling that has been marked without looking into the hat.

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CROQUET.

By C. Black, Champion.

DEFINITIONS—TERMS USED—PARTICULAR POSITIONS—BALLS AND MALLETS—PRACTICE—THE FALL MALL MALLETS.

BROAD definition may perhaps sketch out the order of our treatment. Croquet, then, is generally understood as a game played with wooden balls and mallets, and iron hoops, the object of the game being to drive the balls by means of the mallets through the hoops, the rotation of the hoops being determined by the rules, which also control the movements of the balls when they are not being actually driven through hoops.

The first matter to discuss will be the instruments of use; but in describing their uses it will be necessary to use many of the technical terms which were spoken of in our last. An enumeration then of the terms and their meaning is a necessary preliminary:

Making a point, is passing through a hoop or hitting the sticks which are placed at either end of the lawn.

A turn, is playing a ball in its proper sequence, and it may consist of a single stroke or of a

Break, which is a number of points made in succession.

Roquet, is hitting another ball in your turn, or after making a point.

Croquet, is an advantage given to the player who hits another ball, he is allowed to place his own ball by the side of the ball which has been struck, hit his own ball to any place within the boundaries, and then take another turn, provided that he has shaken the other ball, when hitting his own. He is also allowed to make use of the other ball by certain strokes, which are hereafter explained. This is the great substitute in scientific croquet for the old license of banging away at an adversary's ball as far as you like. The act of hitting your own ball is called "taking croquet," and is one of the main features of the game.

Beginners must be careful to observe how the meaning of this term has changed. At the first introduction of croquet it had the signification which roquet had afterwards, then it meant the act of knocking away the ball after it had been struck, and now the process which has been substituted for this. A gentleman, who, many years ago played croquet in Ireland, whence the game
CROQUET.

was derived, has told me that one feature of the game as played there, was the calling out "croquet" as soon as your own ball hit another. If the striker forgot to make this claim at the moment of impact, he could take no advantage from the hit. This clearly shows the reader how the earlier meaning arose.

A ball is said to be in hand, after a croquet has been made and until croquet has been taken.

A ball is said to be a roiter, when it has made all the necessary points but one, i.e., after it has passed through all the hoops, and hit one stick; if it hits the other stick, it is dead, and can take no more part in the game.

Fineness, is strategic management of your ball, by which you apparently waste a turn or two in order to hamper your adversary's play, and secure some future advantage.

Position, is the best place for enabling you to pass through a hoop in the right direction.

The following terms refer solely to the use of the mallet, and are applied to strokes the elegant execution of which, it is acknowledged, constitutes one of the chief beauties of croquet:

The Rush, is hitting a ball very hard, so as to drive it forward to a place from which croquet may be most advantageously taken. For instance, in Fig. 1, if A had to pass through hoop 3 in the direction indicated by the arrow, it would be best to "rush" B, if so placed, to point 2, from which croquet might easily be taken into position. The term "drive" has been suggested as better and more expressive than "rush," and though there is some truth in this, the new term would have the disadvantages of being common to cricket and croquet in somewhat different senses.

The Cut, is really the rush made under very difficult conditions. It has exactly the same meaning as in billiards, viz., hitting a ball very fine in order to make it travel to the side instead of forwards. For instance, if A wished to pass through hoop 4 in the direction indicated by the arrow, it would be best to cut B to position. (See Fig. 2)

The Split, is a stroke used when you desire in taking croquet as in the diagram; if A be then struck with a mallet pointing towards C, the balls will divide and travel equal distances; but the more you move A towards B, the further B will go than A; the more you move it towards S, the further A will go than B. The truth of this will be best seen by a practical experiment.

The terms "thick" and "thin" are applied peculiarly to this stroke. If you move a towards B, you are said to be laying the ball very thick, if towards S, very thin. (See Fig. 3.)

These three strokes are those which occur most frequently in the game, and are the easiest of execution. Any one who desires to understand the beauties of the game must obtain a good mastery of these strokes.

The Roll is a stroke used to propel both balls about the same distance. It is not used for getting into position for a hoop, but for bringing up a ball into a place where it will be useful for your partner or for yourself in your next turn. I have heard this kind of stroke called by the extraordinary name of "bumble," the only explanation of which is that the two balls rolling and knocking together suggested the idea of a big bumble bee skimming over the lawn, and scattering the petticoats as a skilful roll does a nest of hostile balls.

The Pass, is a very difficult application of the roll. It is used to roll your own ball much further than that from which you are taking croquet. For instance, if A (Fig. 4) wishes to take croquet so as to arrive at a, and at the same time leave b resting at position b, the pass stroke would have to be used. The use of this stroke will be brought out in treating of the mallet and of tactics in general, and it will be seen to be at once a most useful and most malicious stroke, far surpassing the antiquated sledge-hammer stroke in its power of paying out an enemy.

It illustrates how wires may be used for other purposes than to pass through.

The Stop, is a stroke resembling as far as is possible in croquet the billiard screw. It is impossible to attain in croquet to that tremendous power of screw which is exemplified in the story of a celebrated billiard player going into a country billiard room in France and declaring that the balls were bewitched, because whenever he hit them they ran backwards instead of forwards. The head of the mallet is not pointed enough to get under the ball, and there is too much swing in the stroke of a mallet to

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Fig. 6.—PALL-MALL MALLET.
admit of any adequate drawback. Yet for all this, it is in the power of an experienced player to effect a stroke which savours of a screw. For instance, if A wished to send B a long distance down the lawn and yet not accompany him to his salubrious exile, A would have to be hit as low as possible and fall in the centre, with a kind of check of the mallet handle at the moment that it strikes the ball; A must also cover B before the stroke, to the extent of at least three-quarters of a ball, or there will be little stop effected. To illustrate the diagram (Fig. 5), A wants to stop at 1, and send B to 2.

It is to be hoped that the ground has now cleared of one of the main difficulties which prevents the game being understood by those who are not perfectly au fait at it. Its various actions cannot be Briefly recounted if it is necessary to append a paraphrase to a technical term every time it is used.

If readers who are desirous of appreciating croquet play will add to a perusal of the above explanations a study of the use of the mallet, it is perhaps too much to hope that they will feel more at home in the description of the intricacies of the game itself.

To return to the balls and mallets, the reason for treating them first is this: that it is well for any young player, and even for those who are climbing the ladder of success, to appreciate that a great deal is to be done towards attaining to good play with the mallet and balls alone, even if there be not a single hoop within a thousand miles. It must be remembered that though the main object of the game is to pass through hoops, position cannot be gained to pass through a number of these hoops consecutively, or even through one alone, without careful management of the ball. Now this is impossible without an accurate knowledge of the force you are applying with the mallet, the relative speed of the ball over the grass when it is dry or wet, short or long; and the various angles at which the balls divide.

It must be remembered that croquet is essentially a game of positions, and that no consecutive number of hoops can be passed without gaining these positions by careful management of the balls. Now, as in billiards, this manipulation is impossible without an accurate knowledge of three things—the force you are applying with the mallet, the relative speed of the ball over the grass when it is dry or wet long or short, and the different angles at which the balls divide. All this may be adequately learnt by the croquet player while knocking about two balls on any decent piece of level grass. Besides, this practice is such an excellent digestive for breakfast or lunch, that a weak-stomached poet like Horace would have immortalised it in his satire had it been known in his day. The words of Lauthier with regard to practising for ball-mall are singularly applicable here:—"The benefit we should derive from it would be, that we should breathe the open air in a moderate exercise, without much fatigue, and should gradually render ourselves certain in our aim in striking the ball neatly; an art that can only be acquired by accustoming ourselves to play it well with short strokes, from which we learn in the sequel to make long ones."

The mallet demands great attention in any discussion of croquet, for in its proper use lies one of the chief beauties of the game; and the other excellency, that of arranging combinations, is useless without a skilful handling of the mallet.

The connection of croquet with other games is chiefly illustrated by the mallet. In the present day the implements of golf and hookey are very like the croquet mallet; and the illustration we give of that used for pall-mall discloses an ancestor easily recognised.

It will be seen (Fig. 6) that this mallet is slightly curved upwards at either end, while the croquet mallet is quite straight. The handle, too, was longer for pall-mall, in order to admit of more swing; and the face of the mallet was sloped away from the ground, so as to let the lower part of the mallet-head get well underneath the ball, while in Croquet, the mallet’s face is flat, although one or two players have sliced away their mallet heads à la pall-mall.

To acquire the exactness necessary for the game, one should always use a mallet of the same weight and height, which should be proportioned according to the strength and stature of the player. If the mallet is too long or too heavy, it catches the ground, or drives the balls too hard in delicate strokes; if it is too short, or too light, it is apt to hit the ball on the top and make it hop, or it does not give sufficient force.

The truth of this axiom is abundantly illustrated by the variety of mallets which have been seen on croquet lawns since the game was first introduced into England. Private judgment never asserted itself more strongly than in respect of croquet mallets, for almost every player has "his own peculiar." It seems difficult now to realise how the game was ever interesting, as we know it was, when played with the top mallet and diminutive balls which the manufacturers sent out in the earlier sets. It was, however, providential, for we had to get over the days of mallets being hurled in frenzy across the lawn; and it is appalling to think of the consequences of a lady’s hitting her foot with a 3lb. mallet.

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BOATS AND BOAT-SAILING.

BY J. C. WILLCOcks.

FOR boats of a moderate size, a quarter-inch plate of iron will be found strong enough for the purpose named already, and as a slit of half an inch width will allow it to work freely, little strength will thus require to be taken out of the keel. The dotted lines in the engraving (p. 32) represent its position and dimensions, and that which runs forward to nearly under the mast is a fore-arm of iron also, an inch and a quarter wide by half an inch thick, which, being firmly fastened to the plate, is pivoted in the keel near the mast step, and allows the front end to come down more out of the case than if the plate were merely pivoted at the lower angle.

The plate is to be raised and lowered by a folding handle, placed just in front of the after seat, so as not to interfere with pulling when required. When raised, the plate is retained by an iron peg, and if a couple of holes be made at equal distances through the handle, it can be lowered to either depth at pleasure.
BOATS AND BOAT-SAILING.

Without a centre plate the boat delineated is a good and useful craft for general purposes, but the addition of the plate gives such an increase of sailing power, that I strongly recommend it to those who may be ordering new boats, and the following directions are given for those who may think right to add it to boats they have already purchased.

If the keel be two inches thick it will answer by putting two strengthening pieces of elm or oak, one on each side of the slit in the keel, so running a foot beyond it; if less than two inches thick a new keel and strakes on each side will be required. The expense, of course, is materially lessened by adhering to the old keel and strakes.

The planks on each side of the keel are known as garboards. The keel will be much strengthened and defended from abrasion at the same time, if a plate of iron, or keel band, be added to it running from end to end, with an opening in it corresponding with the slit in the keel. This should be fastened with galvanised screws, the keel band being also galvanised, and if the holes for the screws be made alternately in the main keel and side pieces, the keel, although consisting of three pieces of timber, will be almost as strong as if consisting of one—some persons would consider it stronger.

During a fresh breeze blowing over any considerable sheet of water, the surface is of course much disturbed, and it not unfrequently happens that small boats drawing but little water will not come about when desired, but will fall back again. This failure in turning is termed missing stays, and arises from the following causes. As the head of the boat is brought up by putting the helm down, into the direction of the wind, the sails shake and lose their power to propel the boat ahead, and offering, together with the mast, resistance to the wind in the line of the keel, a backward impulse is communicated to the boat. A second backward impulse is given by the wind meeting the boat on the bow, and a third by the waves striking the bow at and above the line of flotation.

The combined effect of the threefold impulse is to overcome the momentum which the boat has acquired by the power of the sails, the rudder loses its power to turn the boat’s head in the required direction, the boat at first staggers, as it were, then falls off from the wind and drives astern, until the sails again fill, and by moving the boat ahead, restore controlling power to the rudder.

Boats built entirely for sailing are constructed deep in form, so that quite as much, and in many cases more, of their bodies are below the line of flotation than above it; such boats therefore in the first place offer but little resistance to the action of the wind, and what little they do offer is overcome by their momentum, which, continues longer, because the ballast they carry is more in amount in proportion.

There is, however, in the second place, another reason for the longer continuance of the momentum than in the shallower type of boat. It is this, that the ballast, or a portion of it, is carried at a much lower level. If, therefore, a portion of the ballast of a shallow boat can be placed at a lower level than ordinary, a portion of the qualities of the deeper boat will be obtained.

This is accomplished by a weighted centre board or an iron plate, the advantages of which are constantly to be proved, by running the boat against the wind, with the plate first raised, and afterwards lowered. If the weight in the present instance in the shape of the plate be about eighty pounds, it will when lowered carry the boat several yards against the wind and wash the water with the sails shaking; when, however, the plate is raised, this eighty pounds is at a much higher level, and the result is that the boat stops almost immediately after the sails have begun to shake. The plate, when lowered, has also what may be termed a cleavage power, by which it obtains a hold upon the water in passing through it, and thus unites with the weight in maintaining the momentum which is first given by the power of the sails.

BALLAST.

All boats or vessels require a certain amount of weight to be placed on board, to enable them to withstand the pressure of the wind on the sails, or they would upset. This varies in quantity with the size and form of the boat, and requires much caution in its selection, and in placing and securing it in its proper position.

Several kinds of ballast are in use, namely, iron, lead, stone, or water in barrels or tanks. The most effective and useful is undoubtedly lead, as it occupies less space for the same weight than any other, but being very valuable, and therefore a great temptation to dishonesty, it is only occasionally met with as the ballast of an open boat. In the larger class of sailing boats, which are deep enough to allow of a platform being laid over it, and in yachts, it very often forms a portion, and in some cases of racing yachts, the whole of the ballast consists of lead.

Bags of shingle from the beach are often met with, but cannot be recommended, as they soon decay from exposure to the wet, although generally tarred or painted, and as soon as they become weak they burst, and are useless.

Water ballast in elliptic barrels, known as “breakers,” is in use in boats of the navy and coast-guard services, and is undoubtedly the safest kind which can be carried, but it is very rarely used, on account of the considerable space it inevitably occupies in a small pleasure boat, for the whole of the middle part of the boat must be given up to it if no other is used. This in a small boat is manifestly a great inconvenience, but in a man-of-war or coast-guard boat does not apply, owing to the greater length of the boats, and also to the fact that they are manned by a numerous crew, the weight of whom alone constitutes a large amount of ballast, instantly disposable in any required position in the boat.

Tanks of wood are sometimes used instead of breakers for water ballast, and are made of a form to fit the bottom of the boat, but there is one very great evil in them, namely, that they can scarcely be kept from leaking, as they cannot be drawn together in the manner of a barrel with hoops.

Iron weights of fifty six pounds each, are on the whole the cheapest and most effective ballast, as they are not too heavy to lift conveniently, and consequently can be readily moved as required to bring the boat into good trim. I have sometimes seen them galvanised, which both gives them a neat appearance and prevents rust. If not galvanised they should be painted lead colour, or with red lead. They do not readily move, even when the boat pitches; but as it is important they should have no opportunity of doing so, ledges of wood an inch and a half high should be screwed down to the bottom boards on each side of them, by which means they will be kept perfectly secure. The position of the ballast adapted to make the boat sail in its best form, must be ascertained by actual experiment, and to make trial of her, place the chief part of the weight a little behind the middle, and adjust it afterwards as may be required.

GETTING UNDER الث.WEIGHT.

The process of starting a sailing boat or vessel is termed “getting under weigh,” and has a singular doubtless, in the weighing of the anchor, although anchors are not always weighed when a boat or vessel moves from one position to another. They are often kept at fixed moorings consisting of very heavy chains attached to ponderous stones or anchors, which only
require to be raised for occasional examination and repair. A portion of this chain, somewhat longer than is required to reach the surface, is termed the bridle, which is carefully made fast on board the boat or vessel when not in use, and a rope sufficiently long to reach the bottom at high water being made fast to this portion of the chain, the chain is slipped when the boat or vessel leaves the moorings, and recovered on returning by aid of a boy attached to the upper end of the rope. Before giving directions for hoisting the sails and starting from a given position, it is necessary that a few terms which come into constant use in sailing should be explained.

The terms “windward” and “leeward,” “weather” and “lee,” “starboard” and “port,” are amongst those of most frequent occurrence, and should therefore be thoroughly understood. Thus we speak of an object to windward or leeward, and when opposite any particular part of the boat or vessel we are in, we say the object is on the weather or lee bow, the weather or lee beam, etc. Windward signifies towards the wind, and leeward the opposite direction, or away from it.

Starboard and port signify right and left, and apply when a person stands with the back towards the stern of the boat or vessel, that to the right being the starboard side, and that to the left the port side.

The terms were originally starboard and larboard, but as the ends of these words are the same, confusion and accidents were the result, and larboard was therefore changed to port.

On the beam, or abeam, signifies abreast the middle of the vessel, thus in passing a point of land we say, such-and-such a point is on our weather or lee beam, for instance, the Bill of Portland was right on our weather-beam or lee-beam at noon, as likely to push the tiller from him as to pull it towards him, in which case the boat, instead of coming up into the wind and relieving herself by shaking the sails, will be kept away and feel the whole strength of the wind. In this manner many boats have been upset.

When a boat or vessel has the wind on the right side to a person looking forwards, she is on the starboard tack, as it is called, and has the right of way over another vessel or boat, which has the wind blowing on her left side and is approaching her on the port tack. The vessel on the port tack is by law compelled to give place to the other by going to leeward, and if she does not bear up and avoid a collision, she is condemned for any damages that may result.

Having now drawn attention to and explained the chief terms which come into constant use in sailing, the reader and writer cannot do better than embark in the boat with two working lug sails, shown in the illustration, on their first cruise.
DRIVING.

By Wat Bradwood.

—ACTION—TANDEM.

Bearing-reins ruin more mouths than anything; but fashion enslaves the majority of owners to continue the mischief. Horses' heads are borne up far beyond the elevation of Nature, their powers of draught with their weight is crippled, and the strain transferred to leverage from the legs, to the detriment of the latter; the continual pull on the mouth.

cab-horses are driven mostly on the ring-snaffle, not ornamental, but powerful, a necessity in crowded streets, where sudden turns and stoppages are frequently required. Harness curb-bits vary
in their severity, apart from the leverage, according to the pitch
of the up "port," or the bend in the bit itself, which presses
against the palate of the horse, causing pain when the rein is

deadens it to the necessary injunctions of the rein; and further, the head and neck, which a stumbling horse would use to preserve his gravity as a tottering skater swings his arms, are hindered from their natural use. Yet ignorant grooms, to whom most owners, from indolence or greater ignorance on their own part, are slaves, insist on the use. Having no "hands" themselves, they tug at their horses, who tug back at them, and therefore they find the bearing-rein useful in taking some of the strain off their arms, to the sacrifice of mouth and powers of draught. Ignorant of the anatomy of a horse, they believe that a perpendicular neck looks nobler than one at a natural elevation. A horse accustomed to hang his head on a bearing-rein, will perhaps drop it below proper level when the support is removed, but if always worked in a natural posture he will in most cases carry a natural head.

The ordinary curb-bit is the best for ordinary uses; the leverage can be altered by shifting the rein from bar to bar. London pulled heavily. This is fashion, but it is folly. The first impulse of a horse is to pull against painful restraint, like a pig, cat, or dog, when held by the tail; pain will stop him in time, coupled with sufficient force; but a bit that always presses his lips, without pain or pinching, has more power than one that tortures. The reason why a pulling horse opens his mouth is to shift the pressure of the bit from the corner of his mouth on to his teeth, which have no delicacy of touch. If a second pair of rings are run through the rings to which the rein is attached, and joined to a nose-band, on the principle of a Newmarket snaffle, the upper jaw must follow the lower, the mouth cannot open, the bit always holds the corner of the mouth, the sensitive part, and there is immediate control. A curb thus fitted, and driven from the "cheek," has more power than one from the lower bar, and yet is painless. A horse's mouth is half his "manners," and the latter half his value for domestic use; let any owner who groans over a puller try this system, and he will
find his horse’s manners, his own convenience, and his safety improve thirty per cent.

Though most tyros begin their essay with a horse in single harness, yet in a general way it is easier and safer to drive a pair than one. If the single horse is perfect in manners, all that has to be learned is to keep him straight, and to direct him without collisions. But if a horse has faults he is safer with a companion; though if the two have coincident faults, or could confabulate mischief together, they would be more dangerous than a single animal, yet it is in practice long chances against the two both doing wrong simultaneously. Each is a check on his fellow: the one may not want to bolt when the other does, or if one falls the other will probably keep his legs.

The tyro should take his seat uprightly and squarely, plant his feet well in front of him, grasp his reins firmly, and let his left arm play lightly from the shoulder (not the elbow), his elbows both well squared. Nothing looks so slovenly, or entails such waste of necessary power, as a slouching back, and hands sunk in the lap.

The whip should not be always used because it is handy; it is wanted to make a horse take hold of his collar if he shirks, and to feel his bit if he hangs back when there is difficulty in navigation. Unless he runs up to his bit there is little or no communication between him and his driver. The whip should be used from the wrist, not from the arm; a lash delivered from the shoulder is far less effective and much more ugly than a stroke from the wrist. A good fly-fisher never makes a bad whip in this respect.

But the real plus ultra of driving is the four-in-hand; and vividly has the art deteriorated since the railroads left their mark in network over England. “Teams” still flourish in the “park,” and from certain country houses, but the workmanship of them is mostly a burlesque upon that of half a century ago. It is one thing to handle a “made” team, of which each animal is worth over three figures, and all boast good manners, and to potter along with a couple of cat-like grooms behind to jump down and run to the leaders’ heads if the reins entangle, or obstacles are in the path, when pace can be moderated if required to overcome difficulties or soothe nerves; but it is a different task to handle one “scratch” team after another from stage to stage—teams in which manners are not really made, but depend upon the hands of the coachman, “three blind ones and a boleter,” all thorough-bred—and to keep time into the bargain.

Without making invectives mention, we may safely say that England cannot boast six first-class amateur whips in and out of the Four-in-Hand Club, i.e., men who could have driven to “time” in the old days with the teams placed at their disposal. With high-priced made teams a few more might have done so, but with such a proviso they would not have been worth their wages, and would have ruined proprietors.

Those were palmy days of coaching—the very last of the series, just before the iron horse had began to supersede the road—when Tedder, only so lately numbered with the dead, handled the “Quicksilver” coach, when the distance between London and Plymouth (227 miles), was covered in twenty-two hours, and when the “Comet,” the “Regulator,” and other crack conveyances, were as thorough housewords as the modern “Flying Dutchman” on the Great Western, or the “Wild Irishman” that nightly tears to Holyhead. In those days London to Edinburgh had been reduced to forty-four hours, and even less; London to York was twenty, and to Exeter seventeen hours; but the “Quicksilver” was a mile an hour faster than anything.

Horsing a coach was then a science in itself. To such perfection had the whole system arrived that, as the coachman pulled up at the yard door of the hostelry, eight helpers, each pair with a change horse in charge, stood ready for their task, and by the time that you had looked over your shoulder to count the number of passengers on the rival coach, just entering the town, the whole team was changed, and the coachman, with fresh ribbons in his hand, was starting once more on his way.

“What! have time for breakfast?” a passenger might ask. “Certainly, sir, if you can bolt it in forty seconds,” would have been the reply. And rivalry ran as high between coaches as now between railway companies; nor did they waste sympathy on the mishaps of each other. The Birmingham “Amora” came to grief one day racing against a rival, and over it went, with a crash, at full gallop. Did the oposition stop to lend a hand to pick up the pieces, as passengers and parcels rolled helter-skelter in the mud? Not they. Quoth the triumphant whip, “What, John! all your bees swarming again this beautiful morning.”

That was the school for an amateur to learn the science. Masters good and true abounded, and taught practically as well as theoretically; a douseur would always obtain leave for an aspirant to take the box seat, so long as there was a margin of time in hand. Thorough-breds and short stages (eight miles average) were the order of the day. Half-breds could not go the pace on the crack roads, and a little vice or waywardness was of minor account where the talent of “whips” abounded to overcome such resistance, and yet to be true to time. Punctuality was more attended to then on the road than now on the rail.

The aspirant of modern days may think himself more than fortunate if he can get one practical lesson in the year from a first-class “whip,” so few and far between are such commodities. The artificial resurrection of summer coaching from London to Brighton, Dorking, Belgrade, and Tunbridge Wells, does a little to improve the school; but there can never be an artificial supply equal to that of former days in the absence of natural demand.

To be able to handle one’s own well-broken and well-appointed team at one’s own pace round the park or for a country airing is within the reach of many well-to-do men. And besides the fraternity of the Four-in-Hand Club, there are scores of aspiring “money-o-crats” who parade their teams from country houses, flatter themselves that they have never been upset at a corner, and fondly look forward to the Utopian day when their merits shall no longer be hidden under a bushel, and they shall be solicited to join the above-named réunion.

But it is not to such as these that the aspirant must go for a lesson in his art. If he really would be a master hand in time, he must study his duty not only from the box, but from the harness-room and coach-house, and must understand the tools that he is working with. He must look to his harness himself; half the manners of his team depend upon the harness they carry. He should see that his pads are well stuffed, and free from galls; that each horse is suited with his collar, and, above all, with his bit, or he will have no delicacy of mouth, and it will then be impossible to keep the team evenly to their work. Sheer whip-cord will never effect this.

The shorter the pereh of his coach the more easily she will follow; but an extreme in this respect will make her unsafe on her legs. The box should stand well over the wheelers, not only to keep them in hand, but to bring them within proper range of punishment.

Driving four or driving a pair, he should not travel without his tool box, wrenches, shackles, bolts, nuts, and spare chains and straps; and if by any chance he should get “hung up” by anything giving way, he should know himself how to set about repairs, and not be dependent upon the resources of grooms, whose se plus ultra is the currycomb.
He must study the mouths of his horses; no two will probably be alike. If money is no object, he may buy his "manner's" ready made, but a little practical experience will enable him to make most of his manners for himself. Bearing reins (not beyond natural elevation), may be of utility in such a case, and with judicious use of them, and alteration of coupling reins, till he has hit the right "feel," he will get his team to his hand. Once on the box he must take up his reins to suit the mouths of each of his team, and when he has once got the proper feel he should never part with it. If his horses are overdoing it, and require a stronger pull, he must not pull all the reins through his hands at once. If he does, ten to one he will lose the feel he has taken so much trouble to acquire. Let him take the reins into the parted fingers of his right hand firmly, an inch or two in front of his left, and then pass his hand in front and grip once more. Thus he retains his feel, with a stronger pull than he had before.

In selecting his horses for their places, he should, of course, choose strong animals for wheelers; at the same time his leaders should always be fast trotters, and should be such that, with the lighter work they have to do, they will never tire before the wheelers. A tired wheeler may be dragged home by the rest of the team, but a tired leader blocks the whole concern. And if his leaders break from the trot, the bars are no longer still and parallel; half the power of draught is at once lost in the varied angles they describe. Though it looks less well to see a wheeler canter, less draught is lost thus than when a leader breaks.

In regulating his speed, or increasing his pace, he should first bring his wheelers up to his leaders; and the latter will soon get away in their turn, but he should never begin by forcing the leaders away from the wheelers.

The handling of his whip will be a special study in itself, and he must devote some patient hours, standing on a chair, to acquiring the proper play of the wrist before he can be a workman in this respect. His lash, when not in use to hit a leader, should be caught at the point in the fingers of his right hand, as it returns from the stroke, and with a turn of the wrist should instantly be twisted, from the point upwards, round the crop of his whip, so that the surplus lash, from the top of the crop to the end of the twist, hangs in a close double thong from the top of the stock, ready for application to the leaders. Nothing looks so slovenly as to see a lash hanging as open as a letter U from the top and centre of the crop; added to which it is almost useless for punishment in such a position. The play of the wrist, to catch the point and instantly to knit up the lash, must be a special study of itself. Always hit a leader below the bar, else it takes a dozen strokes to land one effectual punishment. Also hit the freest leader on the near side, where he will be more under control.

True action (not "park" action) is an all-important item in selection of a horse, for though all horses draw by their weight, yet a true-actioned horse will draw, and feel his collar well when a "disher" or prancer will be able to do no more than carry his own weight. A "daisy cutter" should be avoided, lest he should kneel down on the road, which is out of place.

But aphorisms such as these might be multiplied ad lib. far beyond the limits of our space. Let a tyro pay heed to such salient points as have been enumerated, and seek simultaneously practical education, which will teach more speedily and effectually than tons of theory and book-work. What we have said of four-in-hand driving applies equally to the less common but even more difficult practice of a tandem.

Just as a pair of horses are safer than one, for each checks the vagaries of the other, so similarly a four-in-hand is an easier task than a tandem. A tandem leader, more than any animal, requires a good mouth, and a tight hand upon it; otherwise the whip may suddenly find him turning round and staring him full in the face, with a horse-laugh, which would be shared, at the driver's expense, by all lookers-on. At the same time, since there are plenty of well-broken tandem leaders and steady wheelers to be found in livery stables and private houses, when a four-in-hand is not procurable, a tandem is a good and accessible school for an aspirant to commence upon, if, having mastered single and double harness, he seeks to soar higher.

Apart from the injunctions here given to those who essay the higher branches of the art, a few standard maxims to all who essay to take a rein in their hands, or to sit by those who do, will not be out of place. Imprimis, come what may, short of horses bolting straight to a precipice, never jump from a carriage. If horses bolt, stick to the seat, like a sailor to a ship; hold tight. If a collision or upset is to ensue, the carriage must strike the ground or the obstacle before its occupants; till it is reached, nothing can strike them. Thus, care must be taken to hold tight, lest the concussion should fling them out and they fall in the road. Anecdotes exemplifying this might be related till doomsday. Only last autumn, in Cumberland, of two ladies in a runaway carriage, one—a bride—jumped, and was killed on the spot. The other, her sister, kept her seat, eventually gained the reins, and guided the runaway pair into a fence, which stopped them. Not long ago, in Worcestershire, a tradesman alighted and walked up a hill to ease the horses in his chaise; at the summit the old nag began to trot, believing it to be his duty. The tradesman was a few yards behind. His wife, alone in the chaise, screamed, jumped out, and fractured her skull. The horse trotted on at his own pace, and was found next morning stuck, chaise and all, in a miry by-e-lane in the "Randan" woods (neutral covers between the Worcestershire and Albrighton hunts), seven miles from the scene of disaster, the chaise still on its legs, not so much as a wrap fallen from it. For one accident that occurs to persons sitting in overthrown carriages, ten happen from leaps from the same while in motion. A road conveyance has never the momentum of a railway train. Its inmates need never fear that any force of collision will so shatter it as to crush them also. The horses act as buffers to the shock. Broken glass is almost the only danger; therefore, in a runaway brougham instantly lower the windows, and then sit tight.

Last of all (though it is futile to preach this to many constitutions), keep cool; never lose presence of mind, and be chary of trusting to a charioteer who is wanting in this respect. Seek to emulate the coolness of Dick, who drove the Exeter coach.

When in a fog (on Salisbury plain, we think), Dick had lost his bearings; suddenly the leaders disappeared, and though Dick pulled up his wheelers with the strength of a giant, the coach toppled on to destruction in a yawning pit before them.

"Where have you got to now, Dick?" quoth an irritable passenger, who plumped himself on coolness equal to that of Dick.

"Can't say, sir," said the latter, sitting still and impassive as they rolled to ruin, not even removing the cigar from his lips; "never was here before in my life!"
PHOTOGRAPHY.
BY J. C. LEAKE.

THE POSITIVE COLLOIDION PROCESS—DARK ROOM—EXAMINATIONS—PLATE CLEANING—FOCussING—COLLOIDIONS—TO COVER A PLATE—THE BATH.

After our somewhat irksome preparations, it is with no small satisfaction that we observe the morning breaking with every promise of a fine day; a most important affair in photographic matters, as without this it will be impossible to produce any good pictures. A bright blue sky with only a few white floating clouds, but little wind, and a perfect absence of fog—here we have indeed the very ideal of a photographic weather, and every reason to hope for success in our first operations with the camera.

Our first care will be, therefore, to make our preparations in the dark room, by placing all the requisite solutions so as to be found handily and readily, even in the semi-darkness of the laboratory.

The bottle containing the collodion is first examined, and if any dust or fragments of dried collodion are found to be adherent to its neck, these are carefully removed.

The developing solution of sulphate of iron is placed upon the operating table, as well as the glass measure. The fixing solution is ready upon a shelf close by, and, failing tap and sink, a pail of clean water, a spouted jug, and a large basin to catch the waste solutions and the water used for washing the plate, are provided, the latter being placed upon the operating table close to the window.

The nitrate of silver bath is next brought out in the bottle and examined by the light, in order to ascertain that it is perfectly clear and free from floating particles of dust.

Should this examination prove satisfactory, the porcelain trough is carefully rinsed with distilled water, as well as the dipper, drained, and the solution poured into it to within about half an inch of the top.

This vessel should at once be covered with a piece of dark cloth or velvet—which has been well brushed to remove any loose particles of fibre—in order to exclude any dust which may be floating about the room.

The plates should now receive a final examination, in order to ascertain their perfect cleanliness. The best way to determine this point is to breathe upon them. If the moisture is condensed in a perfectly clean sheet over the entire surface, it may be concluded that the cleaning is perfect, but if any lines, smears, or stains appear, the surface must be re-polished with the soft leather.

A good number of plates should be cleaned before work is commenced, both on account of the saving of time, as well as because it is difficult to clean a plate while the hands are damp, and possibly stained with chemicals.

The edges of the glass should be as carefully cleaned as the surfaces, inasmuch as they may retain some impurities which would cause defects in the pictures and possibly spoil the bath.

The next proceeding will be to arrange the background and camera; and as the important operation of focussing has not yet been attempted, it will be well to make a few preliminary experiments therein, before we proceed to take a portrait.

The camera, with the lens properly screwed into it, should be placed upon a firm stand or table, and pointed towards the sitter. The cap being removed from the front of the lens, and the head of the operator, as well as the back of the camera, being enveloped in a large dark cloth, it will be observed that upon the ground glass there is projected an image of the sitter. It will also be seen that this image is indistinct, none of the lines being what is technically known as "sharp." As, of course, it would not do to take a picture like this, the required definition must be obtained by adjusting the camera, partly by means of the sliding body, from the back, and partly by the rack and pinion adjustment which is fitted to the lens.

The sliding back of the camera must be pushed forward, or backward, until some approach to definition is obtained upon the ground glass, when the final adjustment can be made with the greatest accuracy by means of the rack-work of the lens.

The best method of ensuring correct definition is to fix upon some small point of light in the object to be copied, and to turn the lens backward or forward until this appears with perfect sharpness upon the glass of the camera.

In a portrait, the small white spot of light in the eye of the sitter is the best for this purpose, and if the model be well arranged (and we shall have to speak of this shortly), the whole of the figure will be well defined, or, as we shall hereafter term it, "in focus."

Having once seen the image upon the ground glass focussing screen of the camera, the whole secret of the art of photography seems to disclose itself. The lens projects upon any surface, such, for instance, as the ground glass in question, an image of any object properly placed before it.

Now if for this ground glass we can substitute any other substance capable of retaining this image, we shall be able to make pictures. This was the dream of the early experimenters: and even men of science could be found to laugh at the idea.

It is said of Daguerre that when he told his wife of his attempts to fix the images produced in the camera obscura, she at once consulted a friend as to the possibility of such a thing being done, the said friend being a doctor.

"What! trying to fix the image produced by a lens upon a screen!"

"Yes," said madame, "he insists that it is possible, and has been working at it for months. What do you think?"
"He's mad!" replied the man of science. "Keep a good look-out after him; and if he does not give it up, let me know."

How both the good doctor and madame must have been astonished when, in January, 1839, Daguerre laid his beautiful pictures, together with the process by which they had been produced, before the scientific world of Paris, and when, in the July following, a Bill was passed, securing to him a pension for life of 6,000 francs, with one-half in reversions to his widow in case of his decease."

But we are keeping our sitter waiting, and must now return to our dark room, and prepare our first plate. Happily, all the details of the photographic processes have been determined for us, and we are in no danger either of being considered insane, or of receiving a pension from our Government.

In order to prepare a plate capable of receiving an impression in the camera, two processes are required—namely, that of coating the glass with collodion (which is of itself insensitive to the action of light), and that of rendering this coating sensitive by immersing it in a solution of nitrate of silver.

The collodion consists of a solution of gun-cotton, or more properly pyroxyline, in pure alcohol and ether, and is of itself quite inert in photography, being merely the vehicle in which certain salts are contained necessary to the production of a film which shall be capable of receiving an impression in the camera. These salts are the iodides of potassium or ammonium, together with a certain quantity of a bromide which has been found to conduct to the greater perfection of the picture as well as to a higher degree of sensitiveness in the film.

These matters have been duly considered for us by the collodion maker, and we need only notice them because we wish to understand the rationale of the process with which we are to work. As we before observed, the iodised collodion is insensitive to the action of light; but if, after having coated the plate with this substance, we immerse it in a solution of nitrate of silver—which we call the bath—the iodides and bromides contained in the film enter into chemical combination with the nitrate of silver in solution, and we then have a film of bromo-iodide of silver—a compound which is not only capable of receiving an impression by the action of light, but which is the most sensitive to that action of any yet discovered.

Bearing these facts in mind, we now proceed to prepare our plate by coating it with the iodised collodion. This operation requires some practice and skill. The coating must be perfectly even, as any irregularity will be shown in the finished picture.

The plate should be taken between the first finger and thumb of the left hand, holding it by the corner, as shown in Fig. 1. It should then be dusted by means of the soft brush, and every particle of dust removed from the surface. The bottle containing the collodion should then be taken in the right hand, and, the plate being held perfectly level, a pool of collodion should be poured upon the centre of the plate, as shown in the illustration, until about half the surface is covered.

The plate must now be gently tilted towards the farthest left-hand corner, so that the fluid may run to the extreme edge, then to the opposite one, then back so nearly to touch the thumb, and finally off at the right-hand corner, so as to cover the entire plate; pouring the superfusius fluid back into the bottle, resting the corner of the plate upon the neck of the bottle.

The plate should now be raised from its nearly level position to an angle of about 45°, so as to allow all the collodion that will to drain-off, imparting at the same time a slight rocking motion to the plate, to facilitate the perfectly even setting of the film, and prevent the formation of lines.

This part of the work may be executed in daylight if necessary, and it should be performed coolly and steadily.

Try to avoid spilling any of the collodion, and, while remembering that some speed is necessary, on account of the highly volatile nature of the alcohol and ether used as solvents, do not on any account hurry the operation. A perfectly even film of collodion is an essential of success; and should you observe any defect in the coated plate, do not proceed to the next process, that of sensitising, but set the plate up for future use, after cleaning, and coat another.

It will be observed that the film of collodion hardens or "sets" very rapidly, and it is important that it should be immersed in the nitrate bath at the right moment. This may be ascertained by lightly touching the film with the finger, at that part at which the collodion was poured off. When the film will just allow of being touched without coming off, the plate will be ready for immersion in the silver solution.

If the coating operation has been well performed, the film will be perfectly smooth and bright, quite colourless and transparent, so much so as to almost raise a doubt as to there being anything upon the glass at all. This is as it should be; and so far we have been successful.

As soon as the film is set it should be immersed in the nitrate of silver bath without loss of time, as, if the collodion be allowed to harden, insensitive patches will be formed, and of course the plate will be spoiled.

In order to sensitise the plate, it must be placed so as to rest...
upon the ledge of glass upon the bottom of the dipper, of course with the collodion side uppermost, and lowered gently and evenly into the nitrate of silver solution, in the manner shown in Fig. 2.

This operation must be performed with the utmost care. The plate must be immersed without the slightest hesitation or break, or a sharp line will be formed upon the film, which will appear in the finished picture like a crack in the glass.

After having rested a few minutes—not more than two or three—the plate should be gently raised and lowered by means of the dipper, so as to facilitate the evaporation of the ether and alcohol contained in the collodion. It will be observed that the surface of the film presents a somewhat greasy appearance as the plate is thus treated, and this forms a capital test of the progress of the sensitising process, inasmuch as the moment this oiliness disappears, and the silver solution flows smoothly over its surface, the plate is ready for the camera.

By this process the appearance of the plate has been much changed. Instead of being nearly transparent, as it was before sensitising, it will be covered with a creamy-coloured film of a semi-opaque character, formed, as we before explained, by the combination of the iodides and bromides in the collodion with the silver in the bath. The film produced by positive collodion is generally much thinner than that prepared for negatives, but this matter, though important, we must consider hereafter.

In order to get our plate to the camera without exposure to light—for we must remember that it is now so exceedingly sensitive that a moment's exposure to daylight would spoil it—we must place it in the dark slide or case which has been provided with the camera. As we noticed before, this slide has one shutter which can be drawn up from the top, and a second at the back, which is hinged to the top and secured in its place with buttons. For use, the slide should be set up as shown in Fig. 3, resting at the top against a box or other support. The draw-shutter should be closed and the door open, as shown in the illustration. It will be found that at the corners there are inserted silver wires, upon which the plate is to rest.

After removal from the bath, the plate should be lifted from the dipper (which should be replaced in the bath), and well drained, as long as any solution will drop from it, into the trough. After this it should be rested upon one corner upon a pad of clean blotting-paper, and the back wiped dry with a second pad of the same material.

It should then be taken by one corner, and the bottom end placed upon the wires in the lower part of the slide, as shown in the diagram; and being laid with great care, so as to rest in the place prepared for it, the door should be closed and fastened.

It need hardly be mentioned that the prepared side of the plate must be placed inwards, or next to the draw-shutter.

PAPER-FLOWER MAKING.

By Ellen Creffield.

FEEL certain that the amateur is full of impatience to commence some great work, and accomplish without further delay the construction of a glorious rose, an intricate carnation, or some achievement of art equally difficult. Gently, dear novice! If our flower is to resemble the model we have set before us, we must exercise our patience in trying to imitate it closely in all its points. Those details which are too often regarded as minor ones and insignificant, in reality do greatly add to or detract from the beauty of the whole. For example, if the peduncle is not neatly finished off, be the flower it bears as exquisite as possible, the effect will resemble that of some lady who wears a smart cap on her head with her shoes down at heel! Nature is not slovenly in her way of doing things, neither should Art be so.

The shape of the calyx, when spread out flat, resembles that of a star-fish, only that its extremities are not pointed. Cut it out in muslin tissue or soft green paper, make a hole in the centre, then touch the edges of its outline with cement, and join the sides together, it will then assume a cup-like form.

The covering of the peduncle is a matter for practice; and the following is the plan to be adopted:

Take four inches of wire the thickness you require, and holding it between the thumb and forefinger of your left hand, at the same time passing it between the third and fourth finger of the hand for support; take a strip of tissue paper, about a quarter of an inch in width, in your right hand, place one end of it on the wire, hold it in a slanting direction, and the while let your left-hand thumb turn round the wire towards the right hand, until the whole stem is covered. When a thicker peduncle is required, the wire must first be covered with cotton wool, in the same manner as with the paper, the wire being previously dipped in gum. The making of those thick stems is a matter of much greater difficulty to do neatly. When the smaller peduncles of buds or leaf-stalks have to be attached to larger ones, the mode of proceeding, after covering the separate stems, is to unroll a portion of the paper on the parent stem, and work the small one into its proper position, then to make it firm by means of fine wire or thread, and then to re-cover the whole. While speaking of peduncles it will be as well to advise that those on which flowers having a delicate calyx are mounted, should be covered previous to the fixing of the stamens, petals, etc., whilst those belonging to flowers having a hard calyx, should be covered after the completion of the flower. For stems which are of a reddish hue, green paper is used, and then a little powdered carmine paint is rubbed on, which gives it the natural tinge.

As a general rule it will be found better to buy all the foliage required. The French leaves are inexpensive, and are sold by the dozen at from fourpence to a shilling. The stamens of many flowers are also troublesome to make, and hardly repay the labour and time necessarily bestowed on them by the amateur. The same may also be said of many of the calices, especially those belonging to flowers which require hard ones.

All the several parts of the flower should be complete before they are put together; they should be handled as little as possible; indeed, the petals should never be touched by the fingers after they are moulded, but be taken up and placed by
the pinces. Very little remains to be done now to complete our primula. Take hold of the corolla with the pinces, put a drop of cement inside the tube, take the stem, and holding it downwards, let the corolla slip gently down to the stamen, and when the corolla is slightly beyond the anther, that is to say, when the anther can be seen by peeping down the tube of the corolla, give the tube a tender squeeze; then put a drop of cement in the bottom of the calyx, put it on the peduncle in the same way, and when its outer edges rest on the corolla, gently press its base. The leaves of the plant are made to wear the natural dusty look by brushing them over with gum, and then lighty dredging them with a kind of white stuff, which is sold in bottles for the purpose.

It is very easy thus to form a whole plant of primulas which will look perfectly natural, more especially if the flowers are made of various sizes.

Hitherto we have been chiefly occupied in discussing the requisite materials and tools, and in giving general directions as to their use, so that we had time to describe the construction of but one flower only, and that a very simple one; but be it remembered that the primula may serve as a useful model for many other flowers which are its kith and kin, amongst which may be reckoned the auricula, the primrose, and the polyanthus.

To-day we enter on more difficult ground, nevertheless we do not intend to give you the full benefit of all our explorations and researches; we will act as guide until you are a little further advanced on the path of paper flower making, and then we will wish you good-speed and good-bye.

Personal trials and adventures add infinite zest to the amusement; the road would be comparatively dull and uninteresting, if every step the whole length of the way was to be minutely described beforehand.

Our aim then is not to be too prolix, but at the same time to give directions just sufficient to afford effectual counsel and help to those who enter on this extensive field of never-ending interest and amusement, so that, enlightened by our instructions, adventurous spirits may pursue their way with ease and pleasure to themselves.

It is true that flowers of every form and hue can be represented in paper, but the reproduction of some kinds is much more successful than that of others. But take a rose or a convolvulus, an anemone, poppy, aster, rhododendron, carnation, chrysanthemum, and you will find that the imitation of these and of many others, from bushes, hedgerow, and garden, will repay any time and trouble spent upon them.

The flowers which are the most difficult to construct are invariably those whose petals are quite distinct one from another, and in consequence have to be separately placed on the peduncle. Much more care and precision is then necessary, for any deviation from the regular formality with which Nature clothes her perfect works would be fatal to the success of her would-be imitators.

There is a certain class of flowers—the picotee, for instance, is one of the group—which have their separate petals placed at regular distances round the stamen; and in order the better to ensure this regularity, the best plan is to cut out the petal in rounds or circles, which in flower-making parlance are called "patterns"—each pattern comprising the number of petals required for placing once round the centre.

And here let it be noted that each of these succeeding rounds of petals should be placed so that no petal gets behind another but just half way between, in fact the petals of one round must fall over the opening between those of the preceding one.

And now shall we try and make a picotee? only one pattern is required, a specimen of which is given. True, it is rather a troublesome shape to copy; but if you are intent on making the flower, there is no real reason why this little difficulty should be shirked. Of course the first step is to draw the outline of the pattern on tracing paper (Fig. 1).

And here we must apologise for having omitted to make mention of this help-meet, when speaking of necessary materials. Tracing paper is a highly transparent and at the same time a very strong paper, which is made to possess these valuable qualities by preparing it with oil in some particular way. Thus, any object placed under this paper can be copied quickly and faithfully.

Having traced the picotee corolla, cut it out, copy it in thin cardboard, and lastly in the paper selected for the flower itself.

This is of some delicate tint, the faintest of pink or creamiest of white. Then the petals have to be tipped with powder paint of rich crimson or deep purple, if not both.

Now gum the edges in an irregular fashion—this being done, fold the pattern in half, and now in quarter, and yet again, until all the petals shall be one on the other.

In this position crumple them between your first finger and thumb.

This mode of squeezing the petals gives the effect seen in carnations and many other full petalled flowers—namely, that of having burst from a calyx which has been too small for their comfortable accommodation—hence the cramped appearance of such flowers.
Open out the round, and with the ball tool mould its centre into something of a cup shape.

Six of these corollae must be prepared in this manner in order to form one picotee or carnation.

The stamens, if not bought, can be made of the fibres of a quill pen. Those extremities which are visible to the outside world must curl, and this they will readily do if you draw the filaments between your thumb and a blunt knife.

The stamens are fastened to the peduncle with fine wire, and then the rounds of petals are severally settled in their places, the innermost ones being somewhat compressed. Once more let it be repeated that the petals must not be touched with the hand while they are being mounted, and also remember that the cement must always be put on those already attached to the stem, never on those which are about to be placed thereon.

For the calyx I should advise you to go to the shop, the natural one, as you will perceive, being of such a hard thick nature, that I do not think you can well imitate it.

The picotee has two near relations, the carnation and the clove, both of which differ very little from it; the former only with respect to its colouring, and the latter, a dark crimson flower, has the edges of its petals crimped instead of gimped.

A smiling contented countenance hath the aster. Can we produce one alike expressive of good will and serenity? Suppose you forthwith make the experiment. Take Nature herself for the design, which copy as accurately as possible.

Three different sized patterns, and three rounds of each size constitute the necessary petals for one head. The best plan is to cut them out in white paper and colour them according to the natural specimens.

In this way a great variety may be made, for some asters are self-coloured, and some are striped, and some are tipped; there are asters pink and asters red, asters light and asters dark; in fact you can hardly go wrong in colour or size. The next proceeding is to mark a line down each petal, that is to rib it, or indent it, as this process is sometimes termed: this is done with the fine end of the pincers.

The calyx is very similar in form to that of the corolla; indeed, the only difference is that its extremities are gimped instead of being pointed. It is made of green glazed paper. And then there is the stamen, that also you can manufacture, but I do not suppose that you would ever guess how to do it by simply looking at the natural one.

The idea, of course, came into somebody's head, but that somebody must have possessed a rare faculty of invention, I feel quite sure.

Take a piece of wax and mould it into the shape of a button, and then fix it on to the peduncle. After this is done, make the wax very soft by warming it at the fire, and then take a square inch of fine Brussels net, stretch it firmly over the wax button and tie it tightly underneath. Instantaneously little round yellow heads will pop up through every hole, quite a regiment of them, all in regular file, a perfect imitation of Nature.

You complete the flower by putting the nine circllets of petals round the stamen, and finally by affixing the calyx. I do not know whether you are aware of the fact, but you have now added to your store of knowledge that of making asters of every size and hue, chrysanthemums of every shade, and daisies big and little.

The next flower shall be of quite a different class—we will speak of the tall pyramidal campanula, which the French call La Cloche. And we will consider how its bell-like pendants are formed.

There is generally quite a family group of campanulas attached to one stem—father, mother, with five or six children, the latter in all stages of development. This being the case, all the buds and blossoms should be prepared previously to any of them being mounted. For the elder members of the campanula family, cut the corolla like the opened blossom—cut on one side and laid flat—mould it, and then indent each petal from the lowest part of the vandyke to the base, that which will in the future be the centre of the flower.

These creases must be inside the corolla, the petal outside must look as if ribbed.

Next cement the edge of the side, fold the other over it, and then screw up one end to form the bell. But, see, the bell collapses, and looks altogether dilapidated. That can soon be remedied. Take a tiny cork, make one end of it round, and push it up, round end first, to the extremity of the flower, whose petticoat will now stand out in proper fashion.

The stamen, or rather pistil, is made of fine wire, one end of which is twisted round itself to form a little knob, and then the whole is covered with green paper. This piece of wire should be between two and three inches in length, as it is destined also to attach the flowers to the parent stem. The buds are formed by making the corolla of different sizes, forming the bells in the manner above described, and then cementing the indented edges of the petals, then fitting one vandyke into the other, and thus closing the flower. No pistil is therefore required, but each bud must be mounted on a piece of covered wire, varying in length according to the size of the bud. For the main stem take a piece of the thickest wire, and cover it with green paper, and then arrange the buds and blossoms in regular gradation down it, interspersing a leaf or two here and there. You begin at the top, with the baby buds, and place them according to their sizes, the largest flowers being at the base.

The manner of mounting is to attach each peduncle to the parent stem with fine wire, at the same time hiding the fastening.

Take a long narrow strip of green paper, and as each peduncle is fixed into its position, wind the paper round until you come to another halting place, then fix another flower, then resume your covering process, and so on until the whole family are on. Then slightly bend all their necks so as to give them their proper drooping effect.

The result should be a charming group, worthy of a prominent position in any drawing-room. Should, however, the completed flower not prove a success, patience will overcome in the end, and every attempt give distinctness to the fingers, and finish to the handicraft of the young artist.
WHILE upon the subject of casting to long distances—so admirably followed by the Trent fishermen—and thus conveying the bait amongst swarms of timid fish, which no allurement would tempt nearer the we possess, and which is our occasional companion as a support on land and a pleasure-seeker afloat. This rod is of five joints, each of three feet in length. Each joint, of course, is hollow, including the top, which is entirely of thin bamboo, tapered

angled, more particularly in bright and shallow waters, we ought to mention that even this acquirement meets with great drawbacks in wet, damp, or moist weather, when the line gets saturated and swollen, its additional weight causing it to bag between the rings, and cling with some tenacity to the rod, rendering it a matter of no little difficulty to get out the line. Many attempts have been made to remedy this hindrance, but we know of none more effectual than is shown in a walking-stick rod of an old-fashioned make which down to almost a point. The butt, or outer joint, has a hole made with a red-hot skewer, in a lateral direction. Through this, when the rod is put together and the line is to be arranged, a piece of lead piping fastened thereto is passed, and then a slight inclination of the rod with the point downward permits the weight to travel, carrying the line with it, until it passes out at the end of the top joint, made slightly trumpet-shaped to allow of the line working freely around it. The reason why the perforation both in the side of the butt and at the
THE POPULAR RECREATOR.

Extreme end of the top joint is made with a red-hot iron is worthy
of mention. A hole thus charred does not chase or fret the
line, which even the smoothest hole made by any other means is
liable to do. It may be urged that the line is likely, when wet,
to adhere to the inside as it was to the outside of the rod; and,
doubtless, this it does, but it is equally clear that it does so in
a straight line, without the weight of the tensoons or the friction
of the rings; and practice proves this to be the case, for we can
throw a distance by its means so as to astonish the Midland
fishermen. We find it no less useful in the lighter phases of
spinning, more particularly for trout in shallow waters, in
which a long throw is of primary importance; and for the pro-
tection of the line from catching in stable or bushes, so annoying
to the angler in our best English burns and streams. Of course
a reel has to be fitted on to the butt, and this is best effected
with a couple of extra strong elastic bands.

If your rod is ringed, the rings should either be the solid
upright brass ones or the old-fashioned sort tied on with a
tongue of metal (see Fig. 1), to lie flat, but not on any account
fastened so as to stand out at right angles with the rod. The
solid ones have the objection of extra weight, otherwise they
are all that can be desired; but the others are an unmit-
gated nuisance, as they are for ever claiming too great an
attachment to the loose threads of the rod bag; "the line,
especially if a light one, is ever getting looped or twisted round
them, defying their release with the fingers, particularly in cold
weather, and reducing the perplexed angler to the verge of
despair at some critical moment; they are perpetually getting
broken and knocked off, and, in fact, a constant source of
trouble, and too often, we fear, excursion." But there is even
here an alleviation, if not a thorough remedy, and as stand-up
rings have their advantages where rods made in one piece are
used, to keep either in the punt or fishing-house, and the first
or bottom ring is generally the delinquent that creates the
annoyance, this ring should be guarded with two wire sides,
which will defy the catch of the line, even when thrown by the
merest tyro.

Mr. Francis Francis, one of the best authorities on the
subject, tells us, in "A Book on Angling," that "it is always
advisable for the angler to use as long a rod as he can con-
veniently manage, as it gives him not only a longer swim, but
more power over it;" and while agreeing with us as to the
choice of bamboo in preference to solid and heavy woods, adds:
"The best rod to stand work I ever had was a single stick
of bamboo, without joint or ferrule of any kind, with merely a
spliced top lashed to it, of some eighteen inches or two feet in
length. I have used this rod for twenty years, and it is as
straight as ever it was." It is obvious, however, that such a
rod is not adapted to town residents, or if so it must be left at
the fishing station, and this would entail a similar piece of
tackle at each of the places frequented.

These rods are to be purchased at the wholesale cane and
umbrella makers', and many of the cheaper fishing tackle manu-
facturers keep them, their prices varying from eightpence
to half-a-crown each. Rings can readily be whipped upon them
if necessary, and winch fittings added.

"The Book of the Roach" has a few quotable words upon
the rod adapted to roach, dace, gudgeon, smelt, and other light
and fine fishing. "It varies in its length according to the acces-
sibility of the place fished, ranging from nine to seventeen feet,
while many professional roach fishers often use one of eighteen
to nineteen feet. Buddeney, indeed, says that 'in some of the
best swims in the Lea a rod twenty or twenty-four feet long is
requisite, made of the lightest materials, so that it is straight
and strikes true.'

"As there are several distinct schools of roach fishers, and
as these agree in a few particulars, we will briefly state the
principal points of difference in the rods used. The Lea school
generally prefer rods from fifteen to twenty feet long, made of
a white sort of bamboo cane, reported to be found in perfection
in South Carolina. These rods taper very evenly from tip to butt
when they are of large size. There is little spring in them,
except in a few feet at the top, and they are used sometimes
with running lines, but generally without. The Nottingham
rod is from ten to twelve feet in length, and generally made in
four pieces, the two lower of choice tough white deal, the two
upper of lance-wood. It is light and springy, has small upright
steel rings, and carries a wooden reel with very light silk run-
ing line. The rod generally used for Thames punt fishing is
about nine or ten feet long, made of hackberry or bamboo; but
we prefer a light Nottingham rod for the purpose. That for
Thames bank fishing may be from eleven to fourteen feet long,
but of the same materials as the punt rod. We rarely see on
the Thames any very long rods, except now and then in the
hands of solitary disciples of the Lea school. A running line is
almost invariably used on Thanes and Trent. The rods used
for punt fishing are generally similar to those used on the Lea;
a running line is often imperative, particularly when there are
large carp or bream in the pond."

It will, therefore, be seen that a long Lea rod may, by the
removal of a lower joint or two, be rendered available for most
descriptions of roach fishing, and other light angling, excepting
with the fly; and as one of the charms of angling is to over-
come difficulties, and produce successful results by the simplest
means, the would-be fisher need not envy his brother the most
expensive paraphernalia while he himself possesses all sufficient
for the end desired, be his rod a mere splinter cut from a
neighbouring hazel cope, or the most elaborately fitted rod,
with all its shine of varnish and brass embellishment, that ever
astonished and frightened the natives of the waters out of the
best of appetites.

The Japanese have of late years obtained the introduction of
their extremely ingenious rods into this country. They are
remarkably strong for their exceeding lightness; and as they are
not hampered with ferrules of metal, but their sockets and joints
are secured by a peculiarly hard cement, they are thus far rid of
the objection which is made to our own manufacture. Some of
these Japanese rods go up into a singularly small and compact
compass, while the joints of others, fashioned like our walking-
stick rods, are sent forth to their full length by a puff of the
breath impelled at one end, and are thus made to fit their
respective places, somewhat after the principle of the telescope.
Those we have tried have been fully up to the requirements
for which we have used them; but their fragile appearance
certainly impresses one with the idea that under any extra-
ordinary strain they would not be equal to the rods of British
manufacture.

We have treated upon the rods best adapted to the or-
dinary requirements of the angler. We may, however, have
occasion to refer to rods again when we arrive at the objects
of their capture, as certain little peculiarities of construction
may then have their value.

Rods should be varnished at least once a year, and this may
be done at the conclusion of the season, that they may be dry
and get hard for use when required. Take, therefore, the best
coaches’ varnish, and well, but thinly, over each joint, over
whipping, ferrules, &c. One coat will be sufficient for most rods,
but if two be required, the first must be well set before the
second is applied.

Fishing lines used to be made of various materials, but they
are now principally confined to the gut of the silkworm, horse-
hair, silk, and cotton. Lines for the most part are bought as
cheaply as they can be made, and locality has its influence upon
the value of the supply.

For instance, barbel or roach lines can scarcely be procured
out of London, and it would be vain to seek for them at all in
Edinburgh or Dublin; while the North of England is famous for
symmetrically taper fly lines; the latter description of line re-
quiring more judgment in the selection of the several pieces of
gut, etc., than most possess, and more patience than most will
bestow, and yet without these requisites no good line can be
made.

Our custom is to purchase our fly lines of some experienced
local fisherman, and, if possible, to secure those, together with
similar flies, to what he is using.

For roach fishing we confess to a strong predilection for
single hair-lines, and always use them ourselves. For moderate
waters, the hook, or bottom length of about a foot, should be of
fine round hair; of a scarlet or cinnamon colour, the next length
of the best and strongest hair to be obtained, of the same
colour, and the upper part of two hairs twisted together.

To make a reliable loop, first wet the hair, then tie a common
knot within a quarter of an inch of the end, or singe it in the
flame of a candle; after tapering it, lay the end back, and whip
it down to the other part of the line with fine silk and shoemaker’s
wax, whipping over the knot to prevent the short end slipping
out. The split shots to balance or “cock” the float are generally
placed near the lower end of the single hair length, and to prevent
cutting or chafing the hair, the end is turned back and whipped over
one or two inches, instead of half

an inch, which is usually ample. The shots are thus pinched
on to a part where the hair is double, and protected by silk
whipping. Should more than three or four shots be necessary,
the remainder ought to be placed on the next length above in
the same manner.

There are few subjects on which anglers differ so widely, either
in theory or practice, as in the knotting of lines for float fishing.
Of course, it matters little in worm fishing how far from the
shots the hook may be, provided there is length enough left to
arrange the float to the depth of the water fished, inasmuch as
all fish will make their presence known by moving away with
the bait under such circumstances. Not so, however, when paste

is used as the lure, in which case it is possible for a whole shoal
of roach, one after another, to take in their mouths the pellet of
paste, and refuse it upon finding it attached to the line, without
the slightest indication being visible upon the float, at least only
to those of extreme practice and experience; even then, if there
is the most ripple on the water, it frequently happens that
the act of expulsion is indicated by the float, and not that of
stroke, consequently the most rapid action of the rod is behind
the occasion.

Now, how are we to remedy this? It will be seen if we place
our shots too far off the hook, only permit of a wide pendu-
lous movement between the lowest shot and the bait, which
movement, extensive as it is laterally, does not act upon the
float, although it affords range enough for the operations of the
fish, and time sufficient for it to taste and get rid of the bait
after detecting its suspicious nature. If, on the other hand,
we place our shots too close, we are presumed to scare the fish
by the presence of the foreign body threateningly suspended
over their heads.

There is no doubt that in thick or partially turbid waters
the shots may be placed pretty closely to the lure with impunity
and advantage; but in perfectly clear waters it is out of the
question.

To get rid altogether of the objectionable appearance of the
shots, or to anticipate the objection of their attachment far above
the hook, we have tried with partial success the following plan:—We
take a perforated shot, and hold it on a needle, beat it roughly into a
somewhat elongated or pear shape, this we pass over the gut of our

hook, and let it fall down over the Shank and its whipping, and
over this, shot, hook and all, we put our pellet of paste.

It is obvious, therefore, that a fish cannot meddle very well
with this loaded lure without the float telling tales; and so we
have found it, but, unfortunately, a few bites are missed, the
lead serving as a guard occasionally in preventing the hook
taking effect, and even when the barb has done so, assisting
the fish in its struggles to get free. Still our takes in rough
water have averaged far more than they would otherwise
have done. The lead should be painted white or flesh colour,
or kept bright by scraping, that no great contrast should be
presented between it and the paste.

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CRICKET AND CRICKETERS.

By C. W. ALOCk.

SHALL not make any apology this time for diving at
once in various seas.

For fear that you may not understand me precisely I
must ask you to allow me to explain.

Do not be misled by the quotation, for it is harmless. Do
not be disappointed if I represent that my header signifies
merely an intention to devote a chapter to the chief implements
of the game; but lend me your ears alike, friends, countrymen,
and brothers. It is of arms and the man that I sing, or, pros-

aically, of bats and balls.

BATS AND BALLS—OLD STYLE—LITTLE JOEY—GLOVES—SHOES—LEG-GUARDS.

Cricket without bat and ball would be like the play of
Hamlet with the wholesale omission not only of the Prince of
Denmark, but of all the rest of the royal Danes.

You will have seen from the illustration in the previous
article (page 32) the difference between the old-fashioned clubs
of the old days and the light ornamental weapon of the present.
At first the bat was without form, and clumsy, and more
resembled the shape of a sickle than anything else. You would
have found it difficult enough to wield the old instruments in
vogue when Hambledon was the centre of cricket, and Windmill
Downs resounded with the old Hampshire war-cry of "Tick and turn." It required some strength, believe me, for I have tried their weight, and have succumbed under the ponderosity of a machine that might even now be more suitable for the exercise of Indian clubs.

The old bat was, as I have already said, carved in the form of a butter-knife, and was obviously of little use except for the purpose of hitting—blocking or scientific pla ...ing things at that time not dreamt of in the philosophy of a cricketer. The bowling was what is known as underhand, and the mysteries of roundhand, of curves, spins, and the other secrets of attack now so skilfully employed were utterly unknown, so that the great point of the game was to hit without thought of defence.

And hit they did with a vengeance, if we can believe some of the traditions of our forefathers. At least there were some giants in those days, when every one had a sobriquet by way of distinction, and even the bats themselves bore these friendly appellations, if reliance can be placed on one that was seen in the pavilion at Lords in 1869 with King's nickname of "Little Joey" only inscribed.

It would be interesting to trace the history of some of these old bludgeons from the cradle to the grave, did space admit. If you wish to see an eccentricity, though, in this line you will find in the pavilion at Lords, duly and religiously preserved, a very peculiar bat, which was used by an old Hambleton hero, one Robert Robinson, a gentleman who was popularly known as "Three-fingered Jack."

But what about the bats and balls of the present day? What about their method of usage and their different qualities?

* From "Echoes from Old Cricket Fields," by Frederick Gale Simpkin.
CRICKET AND CRICKETERS.

You mean to say that you want some practical advice on this particular subject; and you are quite right in asking. You need not trouble yourself about the ball (Fig. 8), however, in the first place, for, by a wise arrangement of things, the selection and provision of balls, in the case of matches, falls on the management and exchequer of the chief club, and directly proceeds, like many other calls, from the public purse.

But with the bat (Fig. 9) the case is different, for there are imperfections that should be avoided and as critically studied as the points of a horse. See that your own special taste is satisfied first, or you will do little or no good. You can rely on the judgment of honest bat-makers, of course, but it will be much better to be informed of the principal things that should be noticed in the constitution of the article that is required.

See that the wood is well seasoned and of good growth; for on this you will have to depend greatly if you want a bat that will do you any honest service.

See that the wood is straight grained, if possible, and give it time before you determine to subject it to hard and persistent usage. A bat, like wine, improves with keeping; and do not use it if you can avoid so doing, until it has had a chance of getting mellow, and becomes well saturated with the oil that you have used.

The bats used now have all the advantages of cane handles, which of course greatly increase the force of repercussion, but many prefer to have an ordinary bat at first, and, if suitable afterwards, make the addition of the cane handle, as is easily done. Much of the difference of opinion that exists on the subject of bats is obviously due to fancy, but as much work has to be done with the weapon, it should suit the ideas as much as possible of him who has to wield it. If you have a good bat it will be your own fault if you do not realise your most ambitious dreams. Only do not, like a bad workman, quarrel with your tools. Do not ascribe your ill success to any demerits of bats or balls.

There are other implements necessary to the satisfactory outfit of a cricketer or of a cricket club that suggest their own different spheres of usefulness without the need of special illustration. The illustrations themselves, indeed, will best explain their purpose. If you are not a wicket-keeper you will be able to estimate the advantage of gloves (Fig. 1) specially manufactured for that post. They are positively essential in the case of fast bowlers; and it would be mere foolhardiness to attempt to undertake the task without them in those days of lightning bowling. They are made of the best mock buckskin, and perforated, so as to give ventilation to the hands without interfering with the resistance given to the ball. Batting gloves too (Fig. 2) are now requisites, and are only dispensed with by the more reckless followers of the game.

To play cricket and enjoy it you should lessen the risks of an ugly knock as much as possible, and unless you use these articles of defence, you may get your hands or fingers injured for life. Experience has made these accessories as perfect as they could well be. They are also usually made of mock buckskin leather, and the palm of the hand is cut away so as to allow a firm grasp of the handle of the bat, a strip of elastic fastening each to the wrist by means of a button. On the back of the hand on each finger are strips of thick tubular india-rubber arranged so as to keep every portion likely to be hit by the bowler well protected. You will see that different provision is made for
the two hands. Obviously, in holding the bat, the back of the left hand is exposed to the bowler, so that almost every part is covered, the hoop of india-rubber preventing many a nasty crack in the neighbourhood of the wrist. As the thumb of this hand is guarded by the bat, no special protection is necessary, while the risk to the right hand is mostly on the knuckles and fingers, no other part being so much exposed. Cricket shoes (Figs. 3, 4) are obviously accompaniments that can hardly be spared, and spiked soles are not luxuries that can be dispensed with. Laced boots though more the fashion, made of buckskin leather, and these are more useful as giving a better support to the foot and ankles; nails too are very popular in the place of spikes, but I am conservative enough to have a preference for the spiked soles, and I vote for them unhesitatingly. It would seem superfluous to mention the necessity of leg guards (Fig. 5). Get a fast bowler to pound away at you for an hour without this outer cuticle, and I wish you joy. They are well padded with strips of cane, and reach well above the knee, so that all the lower part of the leg is thoroughly covered. You can get a good knock even with these stout coverings, so do not be foolish enough to play to any sort of bowling without them. It is a mistaken policy, even if you do not get hit, for I defy you to play as resolutely as you would with the consciousness that you are so much at the mercy of a tear-away bowler.

Prudence in these matters, believe me, is a virtue, and not a sign of cowardice. Fig. 6 is a specimen of the telegraph, and Fig. 7 of the nets used for practice in cricket. To a cricket club I can safely say that there should always be one of the latter. It is not always that you can ensure a sufficiency of players, even to form a number for practice. With one of them your work will be easy enough, or at least your labour much reduced. If you have one of them with sides in addition you will find yourself still further assisted, as most of the hits will thus be stopped, and no long-stop will be required, and one bowler and two fieldsmen will enable you to have a good practice. If you determine to have a complete outfit, take my advice and get the different articles of good stuff and of good makers. You will find that an unwise economy will be an expensive luxury in the end.

ORNAMENTAL EGGS.

BY ROSA FENNELL.

THE time since a little book was given away by Mr. Cremer, of Regent Street, in it he says:—"If you stroll into the Etruscan bronze-room of the British Museum you will see some large imitation eggs (ostrich). The surfaces of these eggs are elaborately decorated with figures of animals (phalaries), etc., and with festoons; and they were very beautifully painted, for we have proof positive that the Etruscans were excellent artists, and those eggs have still patches of colour lying thick upon them."

The same book also describes a drawing of two eggs by Fr. Bartoli, in the words of the artist:—"Two Easter Eggs ye which are saved open w.: a fine instrument made for ye purpose; ye shells within are cleaned & dried, ye lined w: gilded paper & adorned w: figures of saints made of silk & gold; they are made to open & shut, & are dyed together with rubains. Eggs of this sort are made for presents to Ladies of quality. These two were presented on Easter day, 1716, to ye Beautiful young Lady Manfroni, of a very ancient Family, by Sig. Bernini, who soon after married her." You will see from this that the amusement of decorating eggs is of a very early date.

But to return to our font. First give the surface of the plaster a good soaking of boiled oil, and after this, when dry, a thin coating of copal varnish, which will render the font, which was before of a crude and offensive whiteness, in appearance quite equal to marble. Now we draw (after allowing the varnish to dry) two parallel lines of any width around the plinth, and giving this a second coat of varnish—only, be it observed, as far as we suppose the work will proceed—we dip the point of a camel-hair brush, finely pointed, into the varnish, by which we can select from its compartment the most minute portions of egg-shell, and placing these on the varnish of the plinth, which is of a greater body, and therefore more retentive than that on the brush. Another and another piece of shell, according to fancy, is placed as near as possible to the former, taking care not to approach the boundary of the band too closely for the present. This having been done, it will be found that interstices are left here and there, which may be either filled in with minute portions of shell, or finished, when the whole is dry, with bronze, gold, or silver powder, a re-touch of varnish having been applied to such parts.

As some difficulty may be experienced in carrying the mosaic with great evenness to the defined lines, space may likewise be left for a band of gold to be run round them, carrying the gold into the serrated cavities uncovered. The work has to be again varnished, confining it this time to the mosaic alone. Proceed with the other parts of the font in the same way, after seeing that your former work is quite dry.

Flat surfaces may thus be treated with great ease and facility, and it might perhaps be well—although we do not anticipate any particular difficulty in decorating round subjects—for the tyro to commence upon a level object, say a paper-weight of white or coloured marble, the solidity of which will provide a greater steadiness to the manipulation than an article with a comparatively small base.

There is no reason, after a little practice, why this really pretty branch of art should not be extended to more important objects; and that kind of mosaic or coloured inlaid work occasionally employed in Italy during the middle ages for external decorations could be readily imitated for the inside of summer houses or artificial grottoes. Indeed, the outside of such retreats might be characteristically ornamented by such means as well; and perhaps, in that case, the most classic example would be the façade of the Duomo at Fies, where, though the pattern is chiefly in black and white, brilliant reds and blues are intermixed at intervals.

Nor need the pupil, when sufficiently advanced, fear to essay a higher flight, for what could be done by the old masters in mosaic, and is yet-done by a very large school in Italy, could be effected by the simple aids we have at our disposal. Not
only elaborate ornamental scroll-work is thus within reach, but
even figures, human and animal, can be just as readily encom-
passed; certainly to the extent they were carried, by the
ancestors, for many of their examples are executed in a few
simple colours, with hardly any attempt at variety of tints or
due gradation of tones.

What more beautiful border could be made for the frames of
prints than by these means. The broad deal frame in the
Oxford pattern of a worsted worked sampler we have seen thus
finished, giving it a value and apparent consequence it would
be scarcely able to maintain by more expensive surroundings.

We scarcely dare suggest a yet loftier ambition for the aspir-
ant; yet it is possible a more exalted stage is open to those who
possess perseverance and have a correct knowledge of outline.
It is true, the outline might be rendered by another hand, or
the rudest tracing from a skilful but bold work of art would
suffice to fill in with the egg-shell. Real mosaic, which have the
effect of paintings, are attended with infinitely greater cost,
and are beyond all comparison more laborious and tedious in
their process. We are therefore extremely tender in alluding
even to the possibility of such a standard of attainment, but it
may be just of use to give some notion of its difficulties, even
in actual mosaic. As each separate piece of glass is of the same
individual colour throughout, the graduation of tints, the melting
off or blending of any one colour from its highest lights to its
darkest shadow, can be obtained only by an immense number of
small pieces, of which those contiguous to each other exhibit
scarcely any perceptible difference to the eye. It is acknow-
ledged, even by connoisseurs and collectors of mosaic, that the
sole advantage, in any degree proportionate to the cost attending
it, is the extreme durability of the work when accomplished, an
attribute which the more fragile egg-shell could not claim.

Still we cannot but think that if such "industrious idleness" were
undertaken for mere curiosity, or to produce something
perfectly unique in egg-shell, that certain difficulties alluded to
in real mosaic might be modified or entirely got rid of. For
instance, sharpness of outline is arrived at by grinding the
different pieces of glass to even sides to fit each other. This
we are assured could be done with egg-shell, each piece being
held by tweezers and rubbed upon a fine flat watch file, or
on a Turkish whetstone of close texture. But what a labour!
Granted, however, this task completed, the outline might be
followed as closely as possible with pieces of one dark-coloured
shell only, and when all the outline was defined, the parts filled
in according to taste and discretion, remembering, as matter
of encouragement, that some of the best of the great mosaic
masters gave to their works a certain angularity or eccentricity
of outline—whether by design or otherwise—not in accordance
with the canons of true drawing or the rules of Nature.

We have further evidence that the ancients were not altogether
ignorant of the great beauty and variety in the form of the egg,
in the various ways in which its shape is made to blend into,
although partly hidden, in the graceful cups, vases, and other
domestic utensils which they have left to us, and which we only
of late years have had the wisdom to take as our models. Nor
were their architects unmindful of its excellence, for we have in
the oval or egg-shaped moulding a proof that they were not
ignorant of its application, and thus we find it mostly under the
abacus of capitals, placed between the corona and the dentils
in the Corinthian cornice, and by its form suggestively fitted to
support another member. But it is, or ought to be, always used
only in situations above the level of the eye. This fact has not
been lost upon an amateur taxidermist a friend of ours, the
celling of whose museum of cabinets is supported by this mould-
ing, and its oval, which are really cavities, each containing an
egg placed horizontally therein, dropped in their respective
places from unseen apertures at the top of the frieze.

We must here draw to a close, but it is obvious that the
subject would admit of yet greater if not considerable ex-
tension. If, for instance, we were to speak of the adaptability
of the egg as a mould for wax decoration, or even minute
rossettes in paper, ribbon, etc., we should be led into other more
space-occupying regions. But we trust we have said enough to
justify the observation that there are many pleasing uses
left to us for an egg, even after it has been contemptuously
thrown aside as "a mere shell."

COLOURING PORTRAITS.
By the Author of "Harmonious Colouring as Applied to Photographs," "The Art of Miniature Painting," etc.

COLOURING LIPS—SHADOW AND CAST SHADOW—HAIR AND FLESH—SCARLET AND DRAPERIES—COMPLEMENTARY COLOURS.

As a matter of course, the beginner will meet with many
little difficulties, some of which will be of a discourag-
ing nature, and tend to produce that sensation of dis-
appointment felt more or less by all who take up a new
subject. But he need not despair, for in no branch of art can
advance, with even moderate application, be made with more
rapidity than in colouring photographs. The tyro has, too, this
advantage, that though he may err in his choice of pigments,
and lay on a glossy colour where one of a subdued nature is
requisite, still his lines are so defined, that the result can hardly
fail to be pleasing.

Now colour the lower lip, using pink for the high light, and
for the other part carmin and scarlet, avoiding covering the
dark line between the lips, and making them more or less
brilliant, according to the nature of your subject. Work a little
pink over the cheeks, chin, nostrils, and just above the brows.
Touch the edges of the shadows very slightly with a little
green, worked gently into the local or general colour of the
flesh, which must next be taken up and used, to bring softly in
combination the colour you last used and the green at the
edges of the shadows, which will serve to break the purity of the
flesh tints retiring from the light without rendering them dirty.
In selecting the local or general flesh colour, modify it with a little
yellow or carmine, to make it accord more nearly with the com-
plexion of the original. For the upper lip, use a little carmine
and madder brown; for the deeper shadows, carmine and green;
and for the deepest, carmine and a very little black or deep brown.

And here, in accordance with my plan, I may as well make
clear the meaning expressed by the term cast shadow. All
shadow is of course simply a deprivation of light, and this
may arise either from the surface retiring from the light, or
from the light being received on some intervening surface, and
so prevented from reaching it. The first kind is called shadow;
the second kind, cast shadow. Thus, the nose projecting pro-
vents the light from falling on the surface beneath it, which
consequently receives a cast shadow (see p. 15, page 15).
For the same reason we speak of the cast shadow of the chin
or neck, meaning that the chin casts a shadow from the chin
upon the neck.

If the hair of your subject is dark, it should be left
untouched; if light, the requisite tint of red, brown, or yellow should be selected, and applied thickly on the high lights and lights, more sparingly on the half tints, and very slightly indeed on the darkest shadows.

Having finished colouring the head, now proceed to colour the hands. Use for the nails and the knuckles a little pink, and finish with the colours given for the face, preserving, at the same time, the gradation of light and shadow with jealous care. In the same way colour the arms and bust, should they be, as in the case of a lady in full dress they will be, uncovered, using for the lightest portion of the bosom the lightest flesh colour, with a very little pink added to it, and keeping the half-tints cool with either green or blue, preferring the latter if the flesh of the original should be very fair or white.

In colouring draperies with powder colours much care must be exercised to secure a good effect. If very dark they are always best left uncoloured, or at most only a little colour should be applied on the lighter tones. In any case the darkest shadows of the drapery must be left untouched. The high lights of a silk material may be judiciously strengthened with light touches without destroying the characteristic forms of the folds.

A soldier’s scarlet coat is very troublesome to the amateur colourist. In this case we have found it best to apply a wash of transparent crimson water colour before proceeding to employ a brilliant scarlet in powder.

The more brilliant and powerful greens, yellows, and reds may all be employed in colouring draperies. For white satin a little white on the high lights is all that will be required.

There is a powder colour sold called damask, which will be found very useful for draperies, as will also the carmine, lavender, violet, and plum colours, all of which are prepared for the process, and sold by the dealers in photographic materials.

The background is a very important portion of your work, upon which the general artistic effect will very largely depend. In the photograph it should be neither very light nor very dark, but, should it be the latter, allow it to remain untouched.

For your purpose the best kind is that which is sufficiently dark to give brilliancy to the high lights of the flesh, and delicacy to the half-tints, without decreasing the vigorous touches of dark shadow to which, if they remain darkest, the face will owe a forcible striking effect, and the features an appearance of relief.

The colour of the background must be selected with a view to effect in colour, and to giving relief to the figure. If the flesh is of a cold and pallid character, as, in deference to the facts of the living-model, it sometimes must be, give it the warmth, afforded by a complementary colour in the background.

Here some of my readers may ask what is a complementary colour?

As I write alike for wise and simple, I reply practically—no illustration beats the practical one—by asking the reader to place before him, on a sheet of white paper, a brilliant red wafer, and to look steadily at that interesting disc, and that alone, for a few seconds.

Then let him remove his eyes from the wafer and look at the white paper. He will there see another wafer, the spectacle of the first, but instead of being red it will be green, green being the complementary colour of red. Availing ourselves of this optical principle, we therefore make the background to our sickly-looking lady or gentleman green, and thus, without violating truth in the colouring of the flesh we render its most striking defect less conspicuous. As the effect of green colours is to give complementary rosy hues, so blues give complementary yellows; and reds, as already explained, give a complementary green.

These facts, which a repetition of the above experiment with wafers of these colours will demonstrate, are to be carefully borne in mind when you are deciding upon the colour or the prevailing colour of your background. In reference to the statement we have made about giving relief to the figure, back grounds serve this purpose in proportion to the effect of being distant which they have, an effect which is dependent upon the colour and upon the disposition of light and shadow.

If coloured of one uniform tint, backgrounds are too flat to indicate a retiring surface, which would necessarily receive various half-tints of light and shadow. If they are too positive in colour they do not suggest the presence of air between their surfaces and the figures placed in front of them. By using quiet retiring colours more or less warm in hue the colourist will “keep back” the ground, and by varying their tints and shades he will introduce an effect of light, atmosphere, and space behind the portrait which is all important to its success.

Sometimes, however, the considerations involved in the selection of a background are very complicated, and it is not at all easy to manage an effective one by the means above indicated. A little bright positive colour in a background will occasionally be most valuable, either as aiding the general effect of colour, or as tending to give a strongly complementary hue to the flesh. In this case a pictorial background usually takes the place of the mere expression of monotonous space, shadow, or colour, behind the figure, and we have well-defined skies or landscapes, a room, a garden, or a terrace.

To get such effects with powder colours is somewhat difficult, but, nevertheless, some very charming backgrounds of the kind have been common in the works of our best colourists.
To illustrate the process we need a few illustrations. Fig. 2 shows us what we will suppose to be the photographic background, not too dark, and quite untouched, a slightly indicated figure representing the place where the portrait should be.

To produce on this a background of sky and cloud.

Take first the bottle of colour labelled "horizon." Apply this as shown at A, the undulating line showing the outlines of hills dark against the horizon, making it strongest nearest to these outlines, and working it softly upwards towards the top of the picture to the line B, not, however, preserving a line there, but breaking it irregularly into the tint.

Next, with the same colour, give the touches of light indicated at C C C, and the light indicated at D. Next take your bottle properly blended and softened one into the other, the young colourist will be able to judge the degree of success he has attained and the effects he should endeavour to obtain.

This completes the first colouring of such a background, as the previous colouring did that of the flesh and drapery.

We shall have occasion to refer to Fig. 3 again when we describe the second colouring, which is given after varnishing.

Having completed the sky, take a little of the darkest blue, mixed with a little from the bottle labelled "damask," and work this over the distant hills at J, working in here and there with a fresh brush, and on the side of the hills nearest the point from which the light falls, K, a little of the horizon tint. A few dark green touches softly blending with the dark grey and

![Fig. 2.](image)

![Fig. 3.](image)

of lavender, and work a very little of it over the clouds at R, softening it into the touches of horizon colour until they blend with it by imperceptible degrees. Take the darkest grey you have, and indicate with it the forms shown at R, softening this into the lavender, as it was softened into the previous tint.

Now take a bottle of clear bright blue, it is frequently labelled "sky colour," and with this fill in the spaces G, bringing them softly to the edges of the grey, with which it should slightly blend, and sharply to the edge of the light touches C, which it must in no wise sully or degrade, softening it down into the horizon colour to the line marked N, where let it break irregularly into it. At M we have indicated where some dark green, touched on in the form of a little foliage, will add both to the picturesqueness of the whole, and give value to the carnations in the flesh, giving the finished effect shown in Fig. 3. By referring to Fig. 2 for the position of the different colours, and to Fig. 3 for the effect such colours should produce when blue at L, will complete this background, which, if well done, will be very pleasing to the operator and to his or her friends.

Another kind of excellent background is that introducing a curtain, the folds of which are often excessively valuable in affording effects of relief, colour, and space behind the head and figure. The photographic background should for this purpose be darker than that required for effects of sky and cloud. Fig. 1 shows the plain background of the photograph. Take the colour selected for your curtain, say damask, remembering that it must be but one tone lighter than that of the photograph, and apply it at the parts marked A.

Then take carmine, with a little of the horizon colour, and work in touches of light, as shown in parts marked B.

For C use the carmine with the damask. Let the colour be thicker here than at A. A little sky and cloud in the space marked B, with hills against the horizon, as in the background previously described, will render this very effective.
ROUND GAMES.

By James Mason.

TWO EXCELLENT GAMES—NOUNS AND QUESTIONS—CAPPING VERSES.

N the evening of the second meeting of the Round-Game Club every one came early except Emily and her friend—"it was his fault, we were sure, for he had promised to call for Emily and act as escort. At length in walked the two expected members of the Club.

"Behind time!" said David, looking at his watch.

"Blame Emily for that," said the gentleman; "she was not ready when I called."

"Oh, speak as truly as you can!" said she; "you came late, you know."

And it afterwards appeared that there were faults on both sides, and that one was not more to blame than the other.

It was at David's house that we had met again; indeed, it was agreed that we were always to meet there—so it was the most proper thing in the world that he should have the principal hand in settling what games were to be played.

"What is the first to be?" asked Alice.

"Nouns and Questions," she was told.

"A game requiring mental exertion," said the Reporter.

"Then we can't play it," said Emily and Tom, who have both a modest opinion of their powers.

"Stuff and nonsense!" cried David; "it is mere child's play. If you have just ordinary ingenuity and can rhyme "trees" and "breeze," and "mountains" and "fountains" together, you will succeed in it very well."

"If that is all," replied they, "we'll do our best."

All then took their seats round the table, and David, who by general consent was appointed leader for the evening in all games requiring a leader, handed two pieces of paper, one large and the other small, to each player. "On the large piece," he said, "every one must write a question—say one that comes into his head; on the small he must put a noun: then he must fold up the papers separately."

There was much fidgeting about, and biting of nails, and many other signs of mental perplexity after that, but at last all had chosen nouns and questions to their minds.

Two vases were then passed round, and into one vase the questions were dropped, and into the other the nouns. They were then well shuffled by David, and each one in turn drew a question and a noun.

"Now," said the leader, "you have each to write a stanza on the large piece of paper answering the question, and at the same time introducing the noun which has fallen to your share."

"Why?" said Kate, "my question has not the remotest connection with my noun."

"Neither has mine," said Arabella; "but perhaps yours will suit my question; let us exchange."

"That's against the rules!" exclaimed David; "it adds to the fun to have the nouns and questions unlike."

There was an interval of silence.

When all had finished writing, the papers were folded up, with the noun inside, and handed to the leader, who read them aloud for the amusement of us all.

"Some one," he began, "has asked, 'How many miles to Babylon?' and the noun is 'day.' Here is the answer:—"

1 How many miles to Babylon?

"Three score and ten," the children say,
But if that roadway we all were gone
We wouldn't be back for many a day."

"Another," said David, opening the second paper, "has 'mustard' for a noun, and has been asked, in the words of Shakespeare, 'What shall he have that killed the deer?' He answers:—"

"When'er he dines, to cause him grief,
Let all he gets be so and so,
Give him no mustard to his bees,
Then thrash him well and let him go."

David read this with such emphasis that it was as clear as day-light he had written it himself, and took no small pride in it. So everybody remarked that it couldn't be better; and he proceeded to the reading of the rest, which were of various degrees of merit. John Ferguson, who possesses the gift of rhyme, was found to have written about sixteen stanzas. They were by no means well received, however, it being generally held that he should keep his gift within reasonable bounds, and that in this game the shorter the answer the better.

We left off playing now at Nouns and Questions, but not before Notes-and-Queries had told us that it was sometimes known as "Crambo," and sometimes as the "American Game," and that Oliver Cromwell and ever so many other distinguished men had been known to play at it. Our next diversion was another writing game called Capping Verses.

"I shall give you all sheets of paper," said David, and he gave them. "Now," he continued, "at the top of your papers write a line of poetry, either original or a quotation; then turn down the papers so that the writing cannot be seen, and pass them on to your neighbours on the right, mentioning, as you do so, the last word of your line. Your neighbour will insert a line to rhyme with yours."

"And after that?" said Emily.

"After that," said the leader, "the papers are to be passed on again to the right, and on and on, round the company, till the poems are long enough."

"Had we not better choose a metre for our poems?" asked Notes-and-Queries.

"No, no," said Alice, "let us leave that to chance"—which every one thought the best plan.

When the papers had gone twice round our circle, we began to be impatient to see what sort of nonsense verses we had turned out. So they were gathered together, and handed to David, who opened the first and read:—"

"The way was long, the night was cold,
Often have you heard that told.

Pan the crooked pipe found out;
Pinch him and burn him and turn him about.

On the topmost bough that looks up to the sky,
She weared a sash and wiped her eye.

"Is this fair face the cause," quoth she,
Fate's hidden eyes cannot see.

Her eyes are wild, her heart is bare;
None but the brave deserve the fair.

He carried with him hawk and hound,
With hollow sound he smote the ground.

What hath he done? What promise made?

The moving accident is not my trade.

Old King Cole was a merry old soul,
All frozen was his roil.

Cry cock-a-doodle doo,
Say I died true.

Charge, Chester charge! on, Stanley on!

The rain is over and gone,
And nice long tedious days,
Which make me look a thousand ways.

Hark! the first and second bell,
Sweets to the sweet, farewell!"
FENCING.

BY MAJOR HUGHES.


THOUGH Italy seems to have been the cradle of modern fencing, France soon became the university of the art, and remains so at the present day. It is much to be lamented that the barbarous practice of duelling should in that country be fostered by the taste; but of that we fear there can be little doubt. A politician or a journalist keeps himself in health and exercise by daily practice in the fencing-school; he becomes exceedingly expert with the foil; and the confidence which the knowledge of this gives him tempts him to use his tongue or his pen with undue freedom. The man assailed might probably treat his servility with indifference, if it were not for his reputation as a swordsman, and the consequent dread lest quiescence should be attributed to pusillanimity; and so an encounter takes place between two men who have no personal enmity whatever.

It is strange to us that a custom so absurd should still continue amongst a people so witty, and with so keen a sense of the ridiculous.

Fencing has never been cultivated so extensively in England as in France, though at the time when every gentleman wore a sword at his side, and might be forced at any moment, however pacific his disposition, to use it, the learning how to do so effectively was, of course, a necessary branch of education. But it was a French master of the art who instructed him.

Of late years, however, fencing has revived in England, and the taste for it is increasing. This is owing partly to what may be called the renaissance of athleticism, and partly to the voluntary movement, which has raised sheds and drill halls throughout the length and breadth of the land, where young men assemble to practise military exercises.

Now, of these, mere drill is the most tedious, and fencing (under which title we include the broadsword and the use of the bayonet) the most fascinating; and since fencing proper, of which we are at present treating, is better adapted to the "setting-up" of the figure, and giving a free and soldierly appearance, than all the extension motions in the world, it is wise, as well as pleasant, to encourage it.

We explained in our first paper the position in fencing; this shall be devoted to the Defence.

The foil is a quadrangular blade; it should measure thirty-four inches from point to hilt. The most esteemed foil blades are manufactured at Solingen, and bear that name.

Beware of the flat blades, flexible as a riding whip, sold in some toy-shops.

The handle should be seven inches long, almost square, slightly curved, of uniform size throughout, and should be covered with twisted twine of two sizes; the pommel not too large, and just heavy enough to balance the blade when placed on the forefinger between two and three inches from the guard.

The best hilt is the ordinary open iron one, but both sides should be bent upwards, to protect the thumb and fingers from injury, and should also have a piece of strong leather or buffalo hide on the side next the handle.

The button on the point is sometimes covered with a bit of cardboard, with wash-leather tied over it, but gutta-percha will be found more convenient. Take a small square of that substance, warm the point, and mould the gutta-percha over it.

That half of the foil which is nearest the handle is called the forte; the other half the faible.

Constantly to oppose the forte of your own blade to the faible of your enemy's is one of the secrets of fencing. Therefore you should try to keep your wrist raised a little above that of your adversary, so as to dominate his, in the upper lines; in the lower lines, keep your wrist a little lower than his.

The Line is the direction which the foil should take either for attack or defence, pointing to the opponent's body, not his extremities.

The Defence.—Pupil and instructor are on guard opposite to one another, at longening distance; the blades of their foils joined on the inner line, touching but not pressing one another.

The best and clearest description of the lines of defence is afforded by the diagram, with its explanations given by Captain Chapman in his excellent little work on foil practice, which we cannot do better, with his kind permission, than reproduce here.

A swordsman presenting his point to the front, either defensively or offensively, may be himself attacked in any one of the following four directions, termed the lines of defence:

1. On the left of his sword hand beneath the hilt. The low inside line.
2. On the right of his sword hand beneath the hilt. The low outside line.
3. On the right of his sword hand above the hilt. The high outside line.
4. On the left of his sword hand above the hilt. The high inside line.

It will thus be seen that, with a sword of ordinary length, only one of these lines can be defended at a time, and consequently the three other lines must remain open to attack.

For the defence of each line there are two parries (see Fig. 3); the sword in both parries being placed in a similar direction, the parries themselves differing only in the position of the sword's edge, the sword-hand being held in the one case in supination (the nails turned upwards), and in the other in pronation (the nails turned downwards).

These eight parries are called:

1. Primo. 5. Quinta.
3. Tercio. 7. Septimo (or half-circle).

The allotment of these eight parries to the four lines of defence is thus:

From the centre of the breast, and with the elbow moderately bent.

1. Primo and 7. Septimo (or half-circle)
The hand tending to the left, the point lowered and inclined to the left, the nails turned down.
The same, but with the nails turned up, and the arm elongated.

2. Secundo and 8. Octavo
The hand tending to the right, the arm straightened, the point lowered and inclined to the right, the nails turned down.
The same, but with the nails turned up.

3. Tercio and 6. Sexta
The hand tending to the right, the point raised and inclined to the right, the finger nails turned down.
The same, but with the nails turned up.

Parry the attack directed on the inside low.

Parry the attack directed on the outside low.

Parry the attack directed on the inside high.

Parry the attack directed on the outside high.
4. **Quarte.** The hand tending to the left, the point raised and inclined to the left, the nails turned up (slightly). Parry the attack directed on the inside high.

5. **Quinte.** The same, but with the nails turned down.

These parries are effected with the forte of the blade upon the adversary’s faible, either by a sharp beat or a simple pressure.

Observe that in each of the two parries which may be employed to meet the same attack, the foil blade follows the same line, so that the point is in exactly the same spot when the movement is completed, the difference lying in the position of the wrist, arm, and elbow, caused by turning the nails up or down.

The question then may be asked, why this complication? Why not simply teach four parries to meet the four attacks?

Because the parry should always be formed with the view to riposting, or attacking immediately the adversary’s blade is turned aside, and this is most readily and effectively done, sometimes with the hand in supination, at others in pronation. Thus, the double parry gives scope for the attainment of that most desirable object in fencing, variation in the attack.

There is also another object in having these two parries for each thrust, which is not apparent in the use of the foil, and need not be more than summarily alluded to. Fencing is adapted to the use of swords of different form, and when your weapon is of the two-edged description, such as a rapier, it is requisite to avoid parrying with the flat of the blade.

Crossing swords with your opponent is termed the engagement; when in attacking you be shifts his blade into a new line, as from the inside to the outside, or vice versa, he disengages. In the engagement the sword should be held securely, but without strain; at the moment of parrying the hold should be tightened.

Simple parries are those which are made when, on the adversary’s disengagement, your point is passed in direct course either from tierce to quarte, or quarte to tierce (high lines); septime to seconde, seconde to septime (low lines); or when the point is raised and lowered from the high to the low, or from the low to the high lines on the same side, e.g., from quarte to septime, septime to quarte. Thus the simple parries always throw off the attack in the line in which it is directed.

Counter-parries are when the sword-hand, in parrying a disengagement, describes with the point a circular course round the adversary’s blade, until it meets it again in the line of the original engagement, throwing off the attack in an opposite line from that in which it is directed.

This circular movement—done by the action of the fingers more than by that of the wrist—commences under the adversary’s blade in the high lines, and over his blade in the low; thus, from the engagement of quarte (the foils joined on the inside), on the adversary’s disengagement the circle is described by lowering the point, passing it under his blade, towards the right, returning upwards and resuming the position of quarte.

From the engagement in the other lines, the disengagements are parried upon the same principle, as will be clear if you refer to the diagram, where the arrow-heads denote the course taken by the foil.

The counter or round parry may also be used to meet a direct thrust, without disengagement; in quarte, by dropping the point under the adversary’s blade and circling upwards, throwing off the attack in the opposite line, that of tierce; in tierce, by the reverse action, throwing it off in quarte.

The parries are termed semi-counters when, by a half-circular action, the attack is thrown off from a high line into the opposite low (e.g., from quarte to seconde), or brought upwards from a low line into the opposite high (as from septime to tierce).

As a general parry a circular or deep elliptic movement of the point directly in front of the body, from right to left, or left to right (the hilt maintained at the centre), may be adopted. (See oval parry in Fig. 3.)

Two or more parries are often combined in continuous action, so that if the adversary’s blade is missed in one line it may be met in another; a simple parry is performed after a counter, or a round parry after a simple. But systematic combinations are only to be learned by constant practice; the great thing is to take pains in studying the correct formation of the regular parries.

And here it may be observed that all these parries which have been indicated and described are not of equal importance. Tierce, with its counter (or the outer circle), and quarte (with its counter (or the inner circle) should be principally employed. (Figs. 1 and 2.)

In parrying during the action of recovering from the longe, the outer circle is preferable to the inner. All other parries are but variations of quarte and tierce in lowering or raising the point.

At the same time the practice of the...so other parries is by
no means to be neglected by men engaged in any military capacity, who desire to know how to make practical use of the swords they wear, seeing that they are a defence against cuts as well as thrusts; and as due attention to the position of the nails in pronation or in supination can readily be paid when practising with the foil, while it is almost impossible to carry it out in stick play; and as such position of the finger nails is absolutely requisite to secure the presentation of the edge of the regulation sword, rapier, sabre, or cutlass, and not the flat, to the attacking blade—without which the guard would be ineffective—fencing with the foil, properly and carefully taught, is not only a sufficient instruction in the use of a cut and thrust weapon, but the very best. So that a really good fencer, who had never touched any weapon but the small-sword or its representative, the foil, would be a match for any adversary, whether armed with broad-sword, sabre, lance or bayonet.

Practice in Parries.—Engage in quarté, press the instructor's blade lightly—you have the advantage, being protected while he is exposed. He therefore disengages, by directing his point under your wrist, with the intention of passing to the opposite side of your blade. Before his point is raised, lower your own by the action of the wrist and fingers, with the nails up, and in straightening the arm. You have parried, half-circle, in the inside line low. He disengages by passing his point over the forte of your blade. Turn your nails down, pass the hilt a little to the right, on the same level, and catch his blade with the forte of your own. You have parried secondé in the outside line low.

He disengages by raising his point above your hilt. Raise your hand and point, bending the elbow, and catching his blade with the forte of your own. You have parried tierce in the outside line high. He disengages by directing his point past your blade. Turn your nails to the left, catching his blade with the forte of your own. You have parried quarte on inside line high, the original engagement.

THE MAGIC LANTERN.

By Samuel Houllay, F.G.S., Etc.

OPTIC—LIGHT—VARIOUS THEORIES—WAVE MOTION—RAYS, BEAMS, AND PENCILS OF LIGHT.

From the period we arrived at in the previous article, little advance was made, till the introduction of the circular-wicked burner, with central air-way and oxygenating conical chimney, by Aimé Argand, or the now well-known powerfully illuminating "Argand Lamp." Next came the addition of that most perfect collector of light (when properly constructed) the parabolic reflector. In recent days the single condensing lens has been improved on by the introduction of the "double condenser" of Herschel, or its modifications and the "triple condenser" of Andrew Ross and others. The "sources of light" have also been improved on by the discoveries of the "oxy-calcium" and "oxy-hydrogen," or "lime light," the "magnesium" and electric light; and the entire instrument has been rendered perfect by carefully-devised
arrangements for making it compact, portable, and so ready to
the hand of the exhibitor, that all its parts and accessories
may, in the course of a few minutes, be unpacked, placed, in
any position for work, without having to disturb the arrange-
ment of furniture, wall pictures, etc., and be re-packed and
removed as quickly, which to the travelling lecturer means a
saving of money both in regard to carriage and assistants, and
a position of independence in regard to extraneous aid in strange
places, that can only be appreciated by those who have had
experience with the cumbersome arrangements of former days.
Further, by the adoption of refined methods of painting on
glass and photographic reproductions of scientific and artistic
subjects, and natural scenery, the magic lantern has been
raised from the position of a nursery toy to that of an
important physical instrument of acknowledged educational
value.

In describing the optical construction of the magic lantern,
it is a matter of absolute necessity that I should use certain
technical terms employed by opticians. I will therefore proceed
to introduce my readers, through the intermediate agency of
our friend the magic lantern, to what the French, in their
excellent scientific manuals, call notions élémentaires, or pre-
liminary ideas, on optics.

Light.—First we must try and get a clear idea about the true
nature of "light," for though every one can distinguish between
light and darkness, and recognize light when they see it under
various aspects, there are but few who know in what manner
this effect is produced, or why their vision is excited.

They know that when the sun rises, light spreads over the
face of the earth, and that at midday, when fine weather the
great disc of the sun gives forth light of such intensity that
they dare not look in the face with unguarded eyes, and, when
this great luminous sets, darkness creeps over land and sea.
Or by applying fire to the wick of a candle or lamp, or to a gas
jet, they know they can produce light artificially, as we are
acustomed to say; but as light, whether from the sun, a

candle, or a lamp, or a gas burner, arises from the gaseous
products of "combustion," they may be regarded as natural
and independent "sources of light."

Besides light originating from the chemical process of
combustion, we know that it is also generated by bodies in a state of
"incandescence," as from charcoal, the metals, and earths
(such as lime), when heated to high temperatures; and of
"phosphorescence," as from flour-spar (when exposed to the
sun and then observed in a dark room), the glow-worm, decaying
fish, etc., produced at low temperatures.

All "luminous" bodies generate and emit light, and do not
"borrow" the light they give out from other sources.

There are some bodies that seem to be "luminous," but in
reality are only "illuminated," for these reflect light borrowed
from independent sources. The moon, a mirror, a white cloud,
a snow-field, trees, living beings, furniture, buildings, are
examples of illuminated bodies which become perceptible
through the organ of vision, by virtue of the borrowed light
they reflect or scatter in all directions; and one object is dis-
tinguished from another by the excess or defect of light thus
indirectly transmitted to the eye. A bright object placed before
a dark background is distinguished by its excess of light; a dark
object against a bright background through its defect of light.

Corpuscular Theory.—The ancients imagined that the sense
of light was produced and vision performed by something
which emanated from the eye to the object, and the sense of
Vision was explained by the analogy of that of Touch. The
Arabian astronomer, Alhazen, who lived at the latter part of
the eleventh century, seems to have been the first to refute
this doctrine, and to demonstrate that the rays which created
vision came from the object to the eye. Sir Isaac Newton, with
others, held the view that luminous bodies shot out minute
particles with inconceivable rapidity in all directions, which
penetrated the pores of transparent matter, and that the sense of
vision was excited by such particles striking the optic nerve.
This is known as the "corpuscular" or "emission theory."

Formidable objections have been raised, both by math-
ematicians, astronomers, and physicists, to Newton's idea; the
one most comprehensible to those who have not studied optics
being that, as we know light is transmitted with enormous veloc-
y (according to Foucault 185,177 miles in a second of time),
if such corpuscles were of any conceivable weight, they would
without doubt destroy so delicate an organ as the eye, for a
shot weighing one gram, if moving with the velocity of light,
would possess the momentum of a cannon-ball of 150 lbs. weight,
moving with a velocity of 1,100 feet a second.

The Wave Theory.—The theory of the emission of corpuscles
from luminous bodies was first opposed by Hooke in his "Micro-
graphia," published in 1665, who substituted the idea that
light, like sound, was the result of wave motion; and this notion
was subsequently developed into the now universally received
"wave theory" by the investigations of Huygens the astro-
nomer, Euler the mathematician, and Young and Fresnel the
physicists.

The wave theory supposes—first, the existence of an all-per-
vading medium of extreme tenuity, and of extreme elasticity,
tormed the "luminiferous ether;" secondly, that a luminous
body excites, by the vibrations of its molecules, wave-motion in
this ether, which transmits the undulations thus created
through intervening space, till, impinging on the nerve-woven
retina of the eye, the sensation of light results, in the same
manner as when a violin string is made to vibrate, it imparts
a series of little pats to the air surrounding it, and the atmo-
spheric particles, taking up the pulsation, "pass it on" through
intervening space till a pat is in turn imparted to the nerve-
woven tympanum (or drum of the ear) of the listener by the
surface of air in immediate contact with it, and the sensation of
sound is produced.

We may demonstrate this in the manner shown in Fig. 2.
Let c be a solid wooden rod of some length, supported on an
insulating stand; on applying a tuning-fork, p, that has been
struck upon a leaden cone capped with leather to one end of
the rod in the manner indicated, the beats of its almost inaudible
vibrations will be perceptible to a finger placed at the other end
of the rod; but if we place this end of the rod lightly in contact
with the sounding-board of a lute, as at r, the vibrations are
rendered sonorous, and can be distinctly heard over a room.

This arrangement serves as a rough model for illustrating the
transmission of light from its source to the eye. The vibrating
fork, r, would represent the "source of light" which
excites undulations in the theoretical "ether," represented as a
section by the rod c; while the sounding-board, r, indicates
by analogy the manner in which the nerve-woven retina renders
the imperceptible vibrations of the source into the perceptible
sensation of Light. The source of light, r, may be the sun;
the rod c may represent the 92,000,000 miles of luminiferous
ether existing between the sun and our earth, by which a wave
is transmitted at the rate of 185,177 miles per second.

When reading of the velocity of the propagation of light, the
novice in optics is too apt to conjure up in his mind's eye the
idea that something tangible travels from the source of light
to the eye at the rate of 185,177 miles in a second of time, thereby
unwittingly adopting the corpuscular or emission theory in
place of the generally received wave theory. The manner in
which an impulse is transmitted over a distance may be de-
omonstrated experimentally in the following way—Let us
suspend half a dozen elastic balls by separate threads to a
horizontal rod, so that they shall hang in a straight line, and just touch each other lightly, as shown in Fig. 3. On pulling ball No 1 aside, and letting it strike No. 2, the first ball will come to rest; but the second ball will transmit the impulse to No. 3, and also come to rest; and so the motion will be carried on by the intermediate balls, 4 and 5 (or more), till the original impulse is transmitted to the last ball, which, having caught in contact with it, is put in motion as indicated in No. 6.

Thus we get a distinct notion of the manner in which a motion of transmission is communicated successively from one ether particle to another over a considerable distance, without such particles moving from their original planes of vibration when excited by a luminous body. As it is desirable we should obtain an equally clear idea of the true nature of "wave motion," let us watch the form and method of propagation of waves on a fluid surface.

If we drop a stone into a stagnant pool of water, a series of concentric waves will arise around, and spread out from the spot where the pebble sank, as shown in Fig. 4, the water, we shall notice, rises and falls in undulations decreasing in height and depth as they are generated furthest from the centre of vibration, as shown in Fig. 5. All those particles of the water which are raised at the same instant constitute what is termed a "wave." The particles 1, 2, 3, or the particles 4, 5, 6, Fig. 6, are said to be in similar "phases" of vibration; from which it will be seen that a wave or undulation consists of all the particles between two which are in similar phases, as between 1 and 2, or between 4 and 5; and the length of a wave or "wave length" is the distance between two similar phases, estimated in the direction in which the motion is propagated. A wave, therefore, comprises particles in every phase of vibration.

Waves diverging from a centre, as shown in Fig. 4, spread gradually outwards at right angles to the nearly upward and downward vibrations, as shown by the arrows in Fig. 5. It is obvious that in waves of liquid the direction of vibration of the molecules is vertical, while the propagation of the waves is horizontal or "transversal." In sonorous waves the direction of vibration is longitudinal to the direction of transmission. In luminous waves the direction of vibration is said to be transversal to the direction of propagation.

If, instead of viewing the miniature undulations created by throwing a stone into a small pool of water, we look out upon the waves of the ocean, apparently we see them advancing and moving steadily onwards to the shore.

Again we are possessed with the idea of "a wave of motion" of the waters towards the observer; but if we fix our eyes upon any object, such as a sea-bird, on the bosom of the ocean (in any part where it is not greatly affected by stormy winds or by a set current, such as sailors call a "rae"), we shall find that it rises and falls as it is reached and passed by each wave, but does not advance as it would of necessity do if the particles of fluid on which it rested had a progressive motion. This proves that a wave does not consist of the same particles in two successive instants.

But we may convince ourselves in another way that wave-motion is not a motion of translation. If we observe the very beautiful undulations of waving corn on a windy day, we shall notice that waves appear to flow from one end of the field to the other; but as we know each ear of corn is anchored by its stalk and root to a fixed spot of earth, we are perfectly certain that this charming effect is nothing more than an optical illusion, similar to that produced by twirling a piece of twisted barley-sugar or glass from left to right, when the wavy rod seems to move onwards, or, if held perpendicularly, downwards, like the flow of a jet of water; and when the rotation is reversed from left to right, the motion then appears to be backwards or upwards.

I trust my readers have now a clear idea of the real nature of "wave motion"—that there is no motion of translation or onward advance of the particles, whether they be solid, liquid, gaseous, or otherwise—and, as illustrated by the corn-fields, that the direction of progression ("transmission" or "propagation") of the waves is at right angles (or "transversal") to the direction of vibration.

We are now in a better position to comprehend in what manner a luminous body creates the sensation of Light. If we place an iron ball in the fire, it quickly rises in temperature and gives out heat; but these "dark heat rays," as they have been termed, are not perceptible to the eye; presently the ball radiates heat in a manner that begins to affect the eye, becomes "red-hot;" then passes to a yellow heat; next glows at a white heat; and finally becomes incandescent, and gives out intense light.

Now we know through experimental investigations that a heated body is in a state of vibration, and, like the violin string previously referred to, its particles impart a series of little pats to the surrounding ether, which excite wave-motion, and create the sensation of light in the manner previously described. Such a source of light as this fire-ball—like a miniature sun—gives forth in all directions from every point of its surface an infinite number of undulations of equal magnitude, and propagated with equal velocity to points equally distant in the same space of time; so that all points in a similar phase of vibration would be situated on the surface of a sphere of which that source is the centre, as shown in Fig. 7. Now it will be observed that if waves of equal magnitude radiate from every point of a small globe towards the surface of a larger sphere, as stated in our illustration, the interspaces apparent in Fig. 7 must arise, and the question will naturally "crop up."—Are the light-creating waves surrounded by cones of unaffected ether? The answer physicists give to such a question is that the original waves starting from any luminous point impart their vibratory motion to all neighbouring particles of the luminiferous ether in a manner similar to that in which, during frosty weather, we see ice crystallisations start from a point on a window-pane, and spread out in fan-shaped forms, as the crystal-generating influence radiates from atom to atom of the watery film diffused over the glass.

Each physical point in a luminous body is an independent source of light, and is termed a "luminous point."

Ray.—Light is propagated through the same homogeneous medium in right lines, whether it emanates from a luminous body, or is reflected from one that is only illuminated.

* Same kind of matter of equal density throughout.
nated. Any right line proceeding from a luminous body is termed "a ray." A ray is the smallest portion of a beam of light which we are capable of conceiving, as indicating a direction around which the luminous waves are vibrating, for, unlike the wave, a ray has no material existence.

regarded as a pencil, it is then termed a "beam," which may consist of parallel, as in Fig. 8, or diverging as from P to B, in Fig. 9, or converging rays, as from B to P, in same Fig.

Focus.—The point P, Fig. 9, from which the rays diverge, or to which they converge, is termed the "focus."

Pencil of Light.—The lines of light or rays which come from a luminous point, reach the eye as a cone with the pupil of the eye as a base, and the point for an apex, as in Fig. 1. Such an assemblage of rays is termed a "pencil," or conical pencil of light. When such a pencil extends over a great distance, as from the sun to our earth, conical rays virtually become parallel to the eye of the observer, as seen at P P, in Fig. 1; and we then speak of a cylindrical pencil, more commonly of "parallel rays."

Beam of Light.—If an assemblage of rays is too large to be

Normal.—A straight line perpendicular to any point of a surface is termed the "normal" to that surface.

Having gained a fair idea of the generally received conceptions as to the nature of light, and of certain technical terms connected therewith, we will proceed in our next article to demonstrate such of the laws of light as it is necessary my readers should understand for a thorough comprehension of what I may have to say on the optical construction of the magic lantern and other optical instruments and appliances on which I shall hereafter have to treat.
OLD OUTRIGGERS—TUBES—OARS AND SCULLS—THE SEAT—ROWING—FEATHERING.

CLASPER was defeated in his match, and this he attributed to his old-fashioned heavy boat. He therefore completed his new four-oars, and he appeared with her at the Thames National Regatta, at Putney, in 1844, and succeeded in winning the £40 prize on the 21st June, although he was defeated, perhaps owing to bad steering, by Robert Coomber's crew in the champion race for the purse of £100 on the following day. In the succeeding year, however, he won the chief prize for a half inches long. She was, moreover, in very fair repair, and in pretty sound condition, considering that she had attained the age of twenty-seven years.

A sculling outrigger also appears to have been built at Putney in the summer of 1844—the same year in which Clasper brought his novel boat up to London, but six months beforehand—by Samuel Woolacott, of that village, for Mr. Westropp, of the Civil Engineers' College, which then stood on the spot whence

This boat was built of mahogany, in several narrow strakes; she was called, it is believed, the "Five Brothers," and her iron outriggers were only eight inches long. At a subsequent period Clasper brought out a single-strake boat.

In 1838 a pair-oared outrigger, called the "Knife," was built in Dublin by a coach-builder named Allpress, who constructed various kinds of boats; and only a few years since she was lying in the boat-house of the Dublin University Rowing Club, at Ringsend. She was built in seven strakes on each side, and measured thirty-two feet two inches in length, two feet eight inches from gunwale to gunwale (outside) at her widest part, and was fitted with iron outriggers each seven and the Cedars now overlook the Thames below the bridge. She was a single plank boat, but she soon split, although when repaired she lasted some years.

In 1845, the following year, a four-oared outrigger was built by W. Riffin of Hammersmith, and was his first attempt at the new craft. In her he rowed for and won the landsmen's prize, at the Thames Regatta of that year. The introduction of the outrigger now became more and more improved upon, and outer keels were discontinued. Outriggers were first used in the match between Oxford and Cambridge in 1846, and in 1857 the universities met in the modern keel-less eights, using also round loomed oars.

Honour to whom honour is due, however, and it must be
admitted that the boating world of the present day is indebted to Harry Clasper for the adaptation and adoption of the racing outrigged boat. At the hands of Clasper himself, Searle, Biffin, Sailer, Jevitt, Messenger, Tagg of East Moulsey, and others, she has received those artistic finishing touches which made her what she now is.

The "tabs" come here as a kind of mongrel racing-boat; in fact, a cross between the rapid sculling wager-boat of the present day and the antiquated heavy wherry all can remember being used in the race for Doggett's boat and badge. These "tabs" are outrigged, but built of several strakes of fir, with keels, and, from being much heavier, are generally used for training novices and oarsmen for the lighter and faster kind. There are amongst them eights, fours, and pairs. Gigs are also often used, with very upright or "walled" sides for the instruction of raw hands, as, from their width, they are very steady.

The sculls and oars are made of white deal, and consist of three parts or divisions, known as the handle, boom, and blade. The handle and boom occupy the length from the rowlock to the middle of the boat, where they should (for river rowing) overlap one another from four to six inches for the style of sculling known as the "overhand," in which one hand passes over the other; but to avoid this the rowlocks are sometimes constructed far enough apart to allow a sufficient length of row to overlap, so that the length of the outrigger iron and half the breadth of the boat, when added together, give the length of the inboard part of the scull, which may be generally taken as something over two feet; but for the over-handed arrangement the boat should not be less than twenty inches wide, and the outrigger must project at least fourteen inches beyond the side of the boat. The handles of sculls or oars are made round for the width of the hand, but the makers are careful not to polish or make them too smooth, usually leaving them just as finished by the rasp.

From the handle to just outside the rowlock most sculls are made square, with an oblong leather button nailed fast to the upper side, which corresponds with the back part of the blade, so as just to bear or butt against the inside of the thole, and keep the scull or oar from sliding out. The "Clasper oar and scull" is different, as it is quite round and covered with leather, with a very peculiarly shaped button encircling three-fourths of the oar at this part, and projecting nearly an inch. Outboard the scull or oar is round at the back for some distance, and square in front; then it gradually becomes oval in section, tapering till it reaches the blade, which gradually spreads out till it forms a breadth of thin wood some four inches wide, or in some cases even more. This blade is curved, the centre being nearly two inches deeper in the hollow than at either end, and is hollowed out somewhat like a spoon in shape, with a web or strengthening piece running from the loom half down the middle, very much the same as the raised rib in a spade; the back of the blade is a little rounded, and the hand is usually guarded and finished with a strap formed by a narrow strip of copper carefully nailed on so as to prevent the wood splitting.

The oar or scull should be nearly balanced at the nut or button, but in all cases must fall out rather inboard. In racing-boats the sculls should never be less than ten feet or more than ten feet four inches long.

We now come to rowing, and sculling, and will describe the first-named, taking the generally accepted definition for our purpose,—i.e., the propulsion through the water by means of oars, the water being the fulcrum, the rowlocks the weight to be moved, and the hand giving the power; the whole being a lever of the second kind in mechanics, the person or persons operating sitting with their faces towards the stern, and his or their back to the bow or front of the boat. The action of rowing consists in reaching forward with the oar in the air a little above the surface of the water, then dipping it into the water, and forcing the body straight backwards, the oar being thus dashed through the water, and quickly pulling the handle home with the arms to the chest, by means of the resisting power of the thwart or seat, and stretcher or footboard.

The rower in the modern outrigger sits nearly in the middle of the boat, that is to say about on that part which is one-third of the length of the thwart from the side opposite to his rowlock, where his mat is firmly tied, and upon the front edge of this he sits, bending his knees, separating them about a foot, and placing his feet, with his heels close together, firmly against the stretcher, exactly in front of the middle of his body. Thus, he sits quite square to his work, and will then be sure to swing backwards and forwards exactly in a line with the boat's keel, or parallel with it. If his feet are nearer the side of the boat than they ought to be, he will swing towards the middle, or "row into the boat;" and if they are too near the middle line, he will "row out of it," both being bad faults, and making the boat rock and roll very considerably; the stretcher should be adjusted to such a convenient length that in the stroke the oars should just clear the knees, and the strake should be buckled tightly over the inside foot, which is the one upon which most strain falls in feathering the oars. The thwart on which the rower is seated should be of such height that the rower may have a good command over his oars, but sufficiently low to let him get well over his knees, the lower the seat the more likely is the rower to depress or drag his oars' bow under water; and the higher in reason that he sits—so that his hands clear his knees—the lighter and smarter will be the stroke, and the less will be the boat's dip when she is hanging on the rower's hands.

The action of rowing is made up of two portions, and therefore two-fold, i.e., the stroke and the feather. The stroke is the putting of the oar through the water, with the blade, to which the water offers a resistance in its passage at right angles to the fluid traversed.

Feathering is strictly speaking the turning of the oar at the conclusion of the stroke by dropping the hands and turning the wrists, and thereby bringing the blade into a plane with the surface of the water; but the term is also commonly used as including the carrying back of the oar, in the same position or plane and recommencing another stroke, as the oar is then said to be on the feather. This great accomplishment of rowers can only be acquired or caught by the learner carefully watching and imitating masters of the art, and this is succeeded instantly by the oar being restored to its former state, in which the wrist is straightened, and both hand and elbow thrust rapidly forward at the same time, to which is added a forward action of the shoulders, so as to carry away the loom from the body at once, and then when the arm becomes straight the body follows as rapidly as is necessary.

The head is kept well up, and the eyes looking full at the back of the man in front; the chest full, and well to the front; the back slightly arched forward, but without constraint; the shoulders moving easily forward; and the hands reaching well over the toes.

All these evolutions cannot be carried out in the first few lessons, the pupil gradually learning the first rules of rowing, i.e., the power of swinging his body properly, and of preventing the catching of "crabs," which usually result from the water being allowed to catch the oars when the boat is moving rapidly through the water, or technically speaking has considerable "way" on her, and turning the blade flat, so that the rower cannot bring it out, and by the impulse of the boat is forced backwards over his thwart.
JOINERY AS A RECREATION.

By Elias A. Davidson, Author of "Drawing for Carpenters and Joiners," "Drawing for Cabinet-Makers," "Happy Nursery," etc.

THE SHELVES—THE SMOOTHING-PLANE—JACK-PLANE—CHISELS—STAINING—FINISHING TOUCHES—TO FIX OUR BOOK-CASE.

Now you must understand that the shelves are not to come quite to the front of the book-case; joiners would say they are not to be "flush"—but are to be "set back" one inch, so they must be made one inch narrower, and this requires us to introduce to you a new tool, the "gauge" (pr. gage), Fig. 4, page 52, the price of which is about sixpence. In its simplest form it is a flat block of wood, through which a stick is projected, in this there is fixed a steel point. Now, if you use this in the present case, loosen the screw by which the cross-piece is held in its place, with your hammer strike the end, until the steel point is just one inch from the face of the block, and then tighten the screw again.

Holding the tool by the long end of the cross-piece, with the thumb on the block, and keeping the block tightly against the edge of the board, move the gauge along, by which means the steel point will mark an indented line one inch from the edge of the board.

This strip is to be sawn off; and in doing this, observe, that as the cut is in the direction of the fibre of the wood, the saw will move more easily than when working cross-wise, too easily in fact, unless great care be exercised, for if the tool be merely pushed, without being guided, it will be likely to get into the direction of the fibres, which may not run straight, and if the saw once gets out of the line, the evil, like everything else that strays from the right path, will go on increasing with every stroke.

Now take in hand your wider board. You will remember that the inside width of the case is 3' 6" then the thickness of each of the sides is one inch, so that the external width is 3' 5". Cut from your broad board four feet, to form the top of the case, which will then project two inches on each side, and as its width is eleven inches, and the upright sides only nine inches, it will project two inches in front as well.

From the remaining portion of the board cut two lengths of 3' 6" for the remaining two shelves, and cut off each of them a strip of three inches wide, reducing them to the width of the other shelves—viz., eight inches—put these strips away, as you will want them presently.

Now plane the edges of the shelves you have sawn, so as to get them nice and smooth, and be careful that they are square with the face of the boards. If you had a "bench" you would screw two of them together in the jaws of the vice, and thus plane them; if you have not a bench, you may nail two of them together (the nails passing through at the ends only), and you thus afford a broader space for the plane to act on than the edge of one shelf would give. Plane also the edge of the one-inch strips, and cut from them, or any other space wood you may have, ledges 7½ inches long, bore holes in these with your gibbet, (price 3d.), place them under the lines marked for the shelves, and bore holes into the sides, using the greatest care not to bore through the boards; the ledges should be cut slanting on their outer end, and their edges should be taken off with the plane. The plane used should be one called a "smoothing plane," price now, about 3s., second-hand, 1s. 6d. or 2s.

Now proceed to put the parts together; and here you will have to descend to the floor. Lay your sides flat down and screw the edges in their place (the screwdriver, Fig. 7, p. 52, costs from 1s. to 1s. 6d.); you should cut away the edge of the hole all round with your gouge or chisel (tools which we shall describe directly) so that the head of the screw may sink flush with the ledge, this is called "countersinking." The screws should be 1½ inches long, and cost about 3d. or 4d. per dozen.

Now rear the boards on edge, and having bored holes in the ends of the shelves, nail them to the ledges (a good hammer, Fig. 8, p. 52, may be obtained for 1s. 6d.), observing that they are to be flush at the back with the edges of the sides, but not in the front, using 2-inch nails, and as you will want some rather larger, say 2½, for nailing on the top, buy a pound of these two sizes mixed—the price is 3d. per lb. Next nail on the top flush at the back, projecting two inches in front and at the sides, plane the edges of the 3-inch strips, cut pieces of them nine inches long, and nail at the bottom of the sides outside. Cut the remaining one 3' 2" long, and nail across the bottom of the front, thus forming a low wall or ledge to prevent the portfolios slipping out.

Having thus described the construction of the whole set of shelves, we will now proceed with the finishing.

Measure off on the moulding, 3' 10", that is, two inches more than the external width of the case. Now let the annexed sketch represent the top edge of the moulding, the line A B C, being the back, or flat side. Mark the distance A C, equal to A D, and draw the line C D. Place your square against C, and carry a line from it down the back of the moulding, hold the piece quite upright, and with your saw cut straight down in the line B C, thus removing the triangular piece D A C. Cut two more pieces ten inches long each, and saw them off angularly also, so as to fit the long piece, and thus you will be able to nail these three pieces under the projecting top, to form a cornice round the three sides.

The saw which should be used for this purpose, is the "tenon" or sash saw (Fig. 2). This is a smaller size than the hand-saw; is much thinner, and has its upper edge encased in a brass or iron binding. A useful size is fourteen inches, the price of which is about 4s. to 6s.

It will add much to the graceful and light appearance of your work if you shave off the edges of the bottom and of the sides. In regard to the edges of the bottom ledge, the work is simple, as they are removed by running the plane along them; but when you come to "chamfer" off the edges of the sides, the work is a little more difficult. You must begin with your chisel, making a deep oblique cut at A B C, Fig. 3, and then working towards this cut, shave the corner of the wood away so as to give room for the plane to work, for, of course, you know that
the blade or "iron" of the plane is situated near the middle of the block in which it is fixed, and that it will not, therefore, work up to the point where you desire your chamfer to cease.

You must also mark with your gauge, on each side, the exact width of your chamfer, otherwise you will have no guide for your plane, and the slant will encroach more on one side than the other, which would give a very unpleasant appearance to the work. The chamfer is to be started at the top, at about an inch from the bottom of the moulding, in the same manner.

Now, as to planes; these are of various kinds. The one alluded to here, as most useful to the amateur joiner, is called a "smoothing plane." If you want a rather thick shaving taken off—that is, if you wish to remove a good deal of wood—hold the plane upside down, with the front end towards you, and strike a few blows on that end of the block with your hammer, and if you keep your eye fixed on the under side of the plane (then turned upwards) you will see the blade gradually rise, and then, of course, it will cut deeper into the wood. If, on the other hand, you wish to cut off very little—in fact, only to smooth the surface—strike on the other end, when the iron will recede. You must, however, be careful as you do this to give a tap every now and then on the wooden wedge by which the iron is kept in its place, which will otherwise become loosened, and then, of course, the iron will slide upwards, and will not cut the wood.

Of course, you can easily understand that a plane is only a chisel kept in one position by a wooden block, in which it is fixed, but if a chisel itself were to be used, it would be almost impossible to prevent it cutting deeper in one part than another, either from inequality in the hardness of the wood, or from the workman pressing at some moments more heavily on the tool than at others.

The blade being, however, fixed, is kept by the block to a uniform position, and as the block extends over some length of surface, the blade is prevented from working deeply into it.

The plane used for taking the rough face from wood is called the "jack-plane," Fig. 4. I don't know why, unless, perhaps, some kind old joiner once made one like it for his little boy Jack. In order to get the surface of the boards quite level, the workman uses a "trying-plane," which is longer, and in every way larger than the "jack"—Jack's big brother in fact. Thus, to get the surface of a large board perfectly level, he uses the "trying-plane" and the "long plane," and for planing the edges of long boards which are to be glued together, he uses a plane longer still—the head of the whole family—called the "jointer."

The jack plane is from 14 to 17 inches long, and varies in price from 4s. to 5s. 6d.; the trying-plane is 22 to 24 inches long, and costs 6s. 6d. to 7s. 6d.; and the jointer, which is from 28 to 30 inches long, costs from 8s. to 9s. 6d. There are numerous other kinds of planes used for different sorts of work; should either of these be required in making any of our examples, they will be described in their places.

Now, as to chisels: these are of various kinds. The three most likely to be required by an amateur are the paring chisel (Fig. 5), the gouge (Fig. 6), and the mortising chisel (Fig. 7).

The paring chisel is the one referred to in the present article, and costs from 8d. upwards, according to the size. Three will be found useful, one ¾ inch wide, another 1 inch, and the third 1½ inches, or thereabouts. These may all be had with or without handles. In the latter case they are cheaper, and you will soon learn to make handles for yourself, either by turning or by planing them in an octagonal form; or handles may be bought very cheaply at second-hand tool-shops, so may chisels, bearing in mind the caution already given, viz. that only tools which have been used, so as to show that they really are second-hand, should, as a rule, be bought at such shops.

The wood generally used for handles is beech. Pieces which are of use for but little else may be purchased at most timber yards or saw-mills, for a nominal sum.

Gouges are chisels the surfaces of which are curved, so that they cut a groove instead of a flat cut. They are also made in numerous sizes, and of various degrees of curvature. They vary from 10d. to 3s. each. The sizes most useful for amateur joiners will be ½ inch and ½-inch, the curve not being quite as deep as a "half-round."

We will defer the consideration of the mortising-chisel until we require to use it, and will now proceed with the finishing processes of our book-shelves.

In the first place, rub down the edges and surface with fine glass-paper, which may be purchased at about 1d. per sheet, so as to remove all roughness, etc., and when this is done, rub the whole again with a piece of rag or old towelling, to clear off all the dust which would otherwise interfere with the staining, by giving the work, when finished, a rough and gritty appearance. There are several stains sold. Oak will be the best for the shelves. The price is 6d. and 1s. per bottle; but that in the bottles is much too strong for use. Pour some of it into a basin and mix water with it (by stirring with a piece of stick) until you have ascertained, by trying it on an old piece of wood, that it is the right colour.

Place your book-shelves in such a position that the part you are going to stain may be horizontal, and apply the liquid with a piece of a sponge, using a common paint brush (called a sash tool, price about 4d.) for angles, and for the moulding.

As you are putting on the staining, you may improve the
appearance of the sides by doing a little in the way of
graining; if the boards themselves are not quite as prettily
veined as you would like, you can, when the staining is nearly
dry, wrap a piece of damp rag round your thumb, and, by a few
hard touches, partially remove the colour in cer-
tain places, or you may draw a piece of an old
combs over it, and you can add a knot or two
with your brush or sponge.

This is entirely a matter of taste, and you will
soon attain the little skill required. When you see
a grainer at work on a door or shutter, as you pass along and observe his method of
working, from which you cannot fail to get a very
good lesson.

When one side is dry, stain another, and if
when the whole has been stained, you do not
think the colour dark enough, pass your sponge
over it again, so as to give it a second coat.

The next process is "sizing." The size is
merely thin glue. It may be bought at the shop
where you buy your staining; you will get as
much as you want for a penny or twopence.
Break the thin cakes up, and put the pieces into
a jar or basin, just covering them with water,
to allow them to soak; then put the jar on the
hob, and allow the size to melt away entirely in
the water. This size should be used whilst quite
hot, and is to be painted over the stain with
a paint brush.

When quite dry, a second coat may with advantage be
given, but in this case care
must be taken that the first
cost of size is thoroughly
dry before the second is ap-
plied; and it is well to bear
in mind that two coats of
thin size answer the purpose
much better than one thick
coat. Thick size should, in
fact, be avoided, as it dries
in working, and dries streaky
and lumpy.

The varnish is to be laid
on with rather a large hog-
hair brush, the price of which
ranges from one shilling up-
wards. A great annoyance
is created by a few of the
hairs coming out of new
brushes during use. This
may be in some degree pre-
vented, by putting the brush
to soak in water for a day
or so, by which the hairs
become expanded, and so
are made to hold more closely together in their string binding.
When the brush has been soaked, strike it against a stick
or wall, holding it by the end of the handle, until the water
is nearly out of it, then place it either in a warm room, or
near the fire to dry. The free parts of the bristles will, of
course, become dry much sooner than those which are bound
up, and few if any of the hairs will come out. See that you
lay on the varnish evenly, and work as rapidly as you can; for
the varnish dries very quickly, and if worked slowly is apt to
become streaky.

The front edges of the shelves need neither be stained nor
varnished, they are to be finished in the following manner:—
Get some American cloth—green or brown. It is sold at
 drapers' shops, at a low price per yard. Cut strips, say four
inches wide, and cut them into semicircles at their edge,
as shown at Fig. 8. To do this nicely, cut the pattern in a piece of cardboard, to act as a
"templet;" lay this on the white side (or back)
of the American cloth, and mark around it with a
pencil; move this along until you have marked
as much of the strip as you will require, then
cut the edge in these pencil lines. Paste the
strips to the edges of the shelves, with very small
tacks, of which you can get a quantity for a
penny. The small dark blue tacks are the best
for this purpose. They should be hammered in
as far as you can get them, until their heads
sink quite into the American cloth.

Now, to finish the shelves and make the whole
case look nice and bright, buy at a carver and gil-
der's some flat gilt moulding, of a pattern some-
thing like this (Fig. 9); the flat surface (a) being
dull gold, and the curved part (b) burnished, or
bright. This is sold in lengths, at about a penny
a foot. The size required is ¾ inch wide and
¾ inch thick. You will require four lengths of
3 0" each, for the shelves. You can, of course,
carry this gilt moulding round the upper edge of
the cornice, just under the
projecting top, but this is
not really necessary, and is
purely a matter of taste.

In cutting these pieces
from the lengths, you must
use your tenon saw very
carefully, for you must know
that under the gilding there
is a thick coating of com-
position, which is very liable
to chip off. Begin, therefore,
to saw just at the angle,
using the saw very lightly
until you have cut through
this brittle skin.

The gilt mouldings are to
be nailed in front of the upper edge of the border of
American cloth, the top edge
being level with the surface
of the shelves. The nails to
be used are little brass ones,
called upholsterers' pins.
You must carefully bore
holes for them through the
gilt moulding, and in strik-
ing them with the hammer,
be careful that you hit them on the head, as a sideways blow
on the moulding would chip off the gilding.

The method of fixing the shelves here given is the very
simplest; but many other plans are adopted by which the
shelves are rendered movable, in order to suit the sizes of
books.

The following is the most generally used:—
Cut four strips of wood, rather harder than the other (beech
or birch), ½-inch thick, 2 inches broad, and saw angular
recesses in them at definite distances, as shown in Fig. 10.
These strips are then to be screwed against the sides of the book-case, and ledges made to fit into them, on which the shelves are to rest, as shown lower down.

The shelves must be cut as shown in Fig. 11.

Where this plan, however, is adopted, a piece of wood, broader than the mere thickness of the sides of the case, must be nailed over them, as shown in Fig. 12, to hide the strips and ledges here referred to.

The alteration in the distances between the shelves is effected by moving the ledges into the recesses at the height required.

In order to prevent the whole book-case from falling forward, it is advisable to secure it by an iron "holdfast," driven into the wall just under one of the shelves, and attached to it by a screw. The wall must, however, be probed first with a Bradawl, so that the holdfast may be driven in between two bricks. It is also safe to plug the wall—that is, to drive a wedge of wood in first, before inserting the holdfast.

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**WINDOW GARDENING.**

**BY J. C. LEAKE.**

**NEW TRAYS—DAY WINDOWS—A SIMPLE FERN CASE—ANOTHER PLAN—MOULDING—GLAZING THE CASE.**

The only modification of flower-boxes necessary when they are to be employed in-doors consists in placing a tin or zinc tray at the bottom, which may catch the drained-off water, and convey it into a vessel prepared for its reception. This is important, as both carpet and furniture would inevitably be spoiled without it, since it is frequently difficult or impossible to remove the plants for watering without injury.

To fit a zinc tray to a trough or box of this description is a very simple and easy matter. We will suppose the box to be eight inches wide, and four feet in length. A piece of zinc (that known as No. 13 thickness will answer perfectly) should be provided, four feet four inches in length, and twelve inches wide. This will allow of the edges being turned up two inches on each side. The size of the bottom of the box should be marked out on this, as shown by the dotted lines in Fig. 1, and these lines should be scratched in (not too deeply) with a knife or blunt chisel. As will be seen by the Figure these lines will leave four squares marked A A A A at the angles, which must be cut out. The edges must then be turned up so as to form a tray, which should be fitted into the box before soldering.

After this the angles should be soldered up, which may be effected by first damping by means of a feather each angle for about half an inch on each side with muriatic acid or spirits of salt. The solder being melted with the soldering-iron, or copper-bit, as it is technically termed, the edges will speedily become united, and a watertight tray will be formed. In this, near one end, should in like manner be soldered a short piece of lead or zinc pipe, which should be passed through the wooden bottom of the box, and which will serve for the escape of the water.

It is an improvement if a small tap, such as those used for gas fittings, be applied to the end of this pipe, but it is not essential. In this case the slips of wood upon which the pots are to stand should not be fixed, but merely laid upon the bottom of the zinc tray. Of course, in order to facilitate the outflow of the water, the boxes should be fixed slightly lower at the end where the pipe is placed; and before the plants are watered, a pail or other suitable vessel should be so arranged under the pipe as to catch the waste. This is a very cleanly method of procedure, and should always be adopted.

Hitherto we have spoken only of a single box, suitable for the ordinary plain window, but this system of window decoration may with much greater effect be displayed in the large bow or bay windows, now so common. For boxes to fit inside the window the ordinary form may be employed, merely making the boxes fit one to the other at the ends. As, however, outside there is usually a pillar or pier to support the top of the window, the boxes must be fitted round this so as to form a continuous line outside. This may be effected as shown in Fig. 5, p. 55, in which A represents the pier or column and B the boxes. It will be observed that the front of the boxes must be longer than the back by the distance from C to D, and these must, of course, be nicely fitted together at the junction C. It is better to make the ends finish square, as the work will be both easier and stronger. The space C should be filled up with pots containing running plants, which may be trained to cover the pier, which will materially enhance the effect.

Having described the various forms of window-boxes, which are mostly intended for external decoration, we may now proceed to notice the methods which have been devised for the cultivation of ferns, which are more especially adapted for indoor decoration.

There is no need in this place to describe the exquisite beauty of the fern tribe, it is too well known to require any attention from us; but it is requisite to remind the reader that the plants may be easily cultivated, at but small cost, either of money or labour. It is a fallacy to suppose that fern cases need be either very elaborate or expensive; and we shall in this article proceed to show how the amateur may for himself construct a simple and useful case.

There are many varieties of ferns which will grow well in open pots in a room; but those of a more delicate character are best cultivated under glass. Indeed, even the more hardy plants acquire more than their natural and ordinary delicacy and beauty when thus protected; and as this protection may be easily and cheaply afforded, it is well worth while to employ a covering of glass in all cases.

To those who have been accustomed to the more elaborate and expensive constructions usually employed, it may seem startling when we observe that a perfectly effective fern case may be made at the cost of less than one shilling. Yet this is strictly true, as we shall show. All that is necessary is to provide a common garden saucer of brown earthenware, and having planted a small fern therein, to purchase an ordinary glass shade of about four inches in diameter; this, placed over the plant, and gently pressed into the earth, will be found
to form a perfectly effective fern case, in which the smaller varieties of plants may be most successfully cultivated.

Bearing this in mind, it will be readily seen how this principle may be extended to the larger and more elaborate cases; such, for instance, as those proper for employment in the decoration of a drawing-room window. In Fig. 4 we show a case of this description, suitable for standing upon a small circular table, or for employment occasionally, as an ornament elsewhere, as required.

This case consists of a base board (A) of the required size—that is to say, about two inches larger than the diameter of the glass shade employed. This board should be not less than one inch in thickness, and strongly put together, as by this the case will have to be lifted. Upon this must be secured the circular rim, also of wood, marked n in the illustration, and which should have upon its upper edge a groove to receive the glass.

The pan or trough to receive the earth and contain the plants may be either of earthenware or of zinc, and it should be perforated as shown at c to receive a short piece of pipe, and so ensure perfect drainage. Three or four blocks of wood or knobs of metal should be screwed into the base board, as at D, so as to raise the case from the table and ensure steadiness.

This practically completes the case, which, which now only require decoration.

The chief difficulty in constructing such a case as this is the formation of the circular rim of wood which supports the glass shade. The best method of proceeding will be to cut out of clean soft pine a number of segments of a circle, as shown in Fig. 2. As this rim will not need to be more than three inches deep—just enough to hide the dish or trough—three complete circles, cut out of a board one inch in thickness and placed one upon the other, will make up the required thickness.

These layers should be secured—the first one to the base board, and the second and third to this, by means of nails or fine screws; and the rabbit may be made by braking a thin chip of wood bent round to follow the outer case of the circle.

As these segments of wood are laid on the base board the mixing soft cement or plaster and embedding in it fragments of rock, stone, or shells, as the good taste of the constructor may suggest.

In order to secure this rim to the base board it is well to drive a few rough old nails into the wood in the circle which will be included in the plaster. These will become imbedded in the soft material and will firmly secure the parts together. The only drawback to this style of construction is that it makes the case rather heavy and difficult of removal, other-
wise it is an excellent plan, as it is very durable, and the rockwork if properly executed forms a very suitable and tasteful setting for the ferns.

The decoration of the rim of the case, where wood is employed, is a matter which of course allows the widest margin and the fullest scope for the taste of the constructor. One of the simplest methods is that previously mentioned in our article on window boxes, and consists of covering the work with short branches, as shown at p. 85, in Figs. 3 and 4.

If neatly executed in wood of different colours and well varnished, this sort of work presents a very neat appearance. There are of course various patterns which may be easily executed in this manner by crossing the slips of wood, some of which are indicated at Figs. 5 and 6.

As the surface is curved some little difficulty may at first be experienced in fitting and bending the slips to the required curves and shapes. The slips should be cut as thin as possible, and before bending they should be well steamed or soaked in hot water, which will render them pliable. It is advisable to use copper brads or very fine brass screws rather than iron, as the latter will rust and discolour the wood.

One other hint will suffice to indicate to the constructors the various designs and substances which may be employed for this purpose. The material known as virgin cork may be most fitting and elegantly applied to this use. This substance is moderately pliable, and may be easily bent to the required curves; it is very rapidly worked, and durable. As the natural colour is agreeable, it will need no colouring or varnishing, and, finally, it is exceedingly cheap.

With these suggestions we may safely leave this part of our subject to the taste of our readers, and pass on to consider the other and larger forms of fern cases.

To construct a case of rectangular form (Fig. 6) is not at all a difficult matter, nor is it beyond the power of the veriest amateur. We shall suppose that it is desired to make a case say twenty inches long, fifteen broad, and of the same height. The first thing will be to provide the glass. Of this there will be required two squares, each twenty inches long by fifteen wide for the sides, and one of the same dimensions for the top; the two ends will be required fifteen inches square each, all exact measure.

The most suitable glass for the purpose will be that known as "sheet," and it can be procured of good quality at about fourpence or fivepence the square foot. This glass should be selected as flat as possible, and if the purpose for which it is required be explained to the dealer there will be no difficulty in obtaining it.

For a case of the dimensions proposed the ordinary glazing thickness will be sufficient. This is known as "thirteen ounces" glass—that is to say, it weighs thirteen ounces per square foot. The glass should be thoroughly cleaned by means of a paste of whiting and water, especially at the edges.

This having been effected, a pot of strong glue should be made, and some good black tape provided, some of which should be about an inch in width, and some of three-quarters of an inch. The piece of glass which is to form the top of the case should now be laid upon a table, and a slip of tape of the required length having been well covered with glue—which should be used very hot—should be placed for half its width upon the edge of the plate, and well rubbed down.

For this the wide tape should be used. This operation should be repeated for the other edge and the ends.

This top plate of the case should now be supported by placing it upon a box or other suitable contrivance, at the height of fifteen inches above the table, so that the sides and ends of the case may be easily brought up to it. One of the sides should then be placed quite close, and the overlapping edge of the tape having again received a coating of hot glue, should be turned down over the side and attached to it, so as to secure the top and side together. This process must be repeated with the other side and the ends, taking care to keep the tape at an equal distance from the angle, and to rub out the glue as much as possible.

Without moving the case, the upright joints at the angles must now be joined in the same manner, when the whole should be left for ten or twelve hours in a dry room, to allow of the perfect hardening of the glue. As soon as the glue is quite hard and dry the case should be inverted, and a slip of tape glued
tightly into each of the internal angles, taking the utmost care to ensure perfect adhesion. For this purpose the narrow tape should be employed, and care should be exercised so as not to let it overlap that on the outside of the glass, or it will present an unsightly appearance. After allowing this to become perfectly dry and hard, some slips of tin-foil should be cut to a width rather greater than that of the tape, and these should be glued exactly like the tape, and so as to cover it. This should be done both inside and out.

After drying, this tin-foil should receive at least three coats of good oak varnish to protect it from the moisture which is sure to rise in the interior of the case. The outer angles should have one or two coats of black Japan varnish, which will cover the tin-foil and protect it, as well as improve the appearance of the case.

The next business will be to provide a tray and box to form the base of the case. A frame of wood about one inch in thickness and of the size required, should be constructed so as to allow the glass forming the case to rest in a rabbet upon its top edge, as in the circular case previously described. To the edge of this frame the bottom of the case must be secured so as to form a shallow box. The rabbet may be formed as before suggested, by brading a slip of wood to the top edge of the tray.

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**WHIST.**

By R. B. Wormald,

THE MODERN GAME.

"Whist is a language, and every card played is (or ought to be) an intelligible sentence."—J. C.

"It is of more importance to inform your partner than to deceive your adversaries."—J. C.

"The rules of play are the result of calculation and experience as to the best chances of trick making, and the inferences made from play are rational and logical deductions, and not merely conventional knowledge."—Moore.

WIST may be said to be embodied in the three short sentences cited above. "Combination," we have often been told, "is the cardinal principle of the modern scientific game," and it is, of course, an essential condition to the success of this combination that each of the two partners should conceivably adopt the modes of play as will most efficiently carry it out.

"It is not necessary" (to quote a recent writer) "that each should be equally skilful, or shall bring an equal amount of judgment to bear; but it is essential that each should understand the game in the same way; should be guided by the same main principles, and should adopt the same system in the general treatment of his hand."

To attain this, a knowledge of what has been sarcastically termed "Book Whist"—but which we may observe is merely another name for the concentrated experience of the best master players—is absolutely indispensable. We would not be misunderstood. We readily admit that there are a number of whist players who have probably never opened a book on whist of later date than Hoyle or Mathews, but who
by long practice, careful attention, and natural ability, have
acquired a very considerable knowledge of the game—up to a
certain point.

In the words of a writer in the Quarterly Review—"They
are very observant, recollect and calculate well, draw shrewd
inferences as to how the cards lie, and generally are adept in
all the accidental features of good play. * * * * But,
shifty as these players are, they commit, as Deschapelles
says, 'one long and continual fault which they do not see—
they are fous jouers qui sont detestables partenaires.' They
do not play upon system; they will not conform to the conven-
tional language of the game; and hence they lose the great
advantage of the combination of their own with their partner's
hand. Worse than all, they habitually—we were almost
tempted to write invariably—play solely for their own hand—
'the worst fault,' remarks Mr. Clay, 'which I know in a
whist player.'"

A mere beginner, possessed of a bare smattering of the
recognised routine of the game as laid down in the "books,"
would be infinitely preferable as a partner to a player of this
stamp.

In whist "a little learning" is not the "dangerous thing"
it is in other pursuits. A knowledge of the leads, and of the
proper card to return in your partner's suit—which may be
readily acquired by a few hours' "book" study—is no slight
step in advance, and if the student knows this much, and will
content himself with playing an honest straightforward game
—always bearing in mind the golden principle that "every card
played ought to be an intelligible sentence," he will speedily
make good progress.

In the words of "Cavendish," "If you adhere to this, you
will soon acquire a reputation for playing a straightforward,
intelligible game, and this character alone will counterbalance
the disadvantages which will sometimes attach to the fact that
you have enabled the adversaries to count your hand. If your
partner knows that you play at random, and without method,
he will be in a state of constant uncertainty; and you almost
preclude him from executing any of the finer strokes of play,
the opportunities for which generally arise from being able to
infer with confidence the position of particular cards.
The extreme care of two skilled players against two unskilled ones
amounts almost to this, that towards the close of a hand the
former have the same advantage as though they had seen the
others' cards, while the latter have not."

Above all things a beginner should avoid the vicious habit
—which we are satisfied is the fertile source of half the bad whist
which we see at the present day—of playing "false cards."

We do not say that a false card is never right; on the con-
trary it occasionally happens that a departure from the
routine is the only method of saving or winning a game, but
it should be remembered that an experienced player is justified
in attempting a coup that would be unpardonable in a tyro.

In the first place, a false card, when played by a beginner in
nine times out of ten, a blunder; while, in the second place, a
good player will instinctively suspect, and hence lose all con-
fidence in a partner whom he knows to be addicted to the
practice—and when once mutual confidence is destroyed there
is an end to the combination and co-operation which constitute
the essence of whist partnership.

To the uneducated whist player it may seem a matter of
small moment whether a player, holding king, knave, ten, and
others, lead the knave or ten, or whether, with only two and
three of a suit, he put on the higher or lower card, as second
player—but in reality it is all important. If in the one case
he lead the knave, and in the other play the three, he has either
wilfully, or through carelessness, deceived his partner as to the
nature of his hand, by withholding from him information which
he was in duty bound to give.

Such conduct in the ordinary concerns of life would be
called by a harsh name; and yet we witness it daily at the
whist table, simply because players will not be at the trouble
to learn the alphabet, or, as some term it, the conventionalism
of the game.

For our own part, however, we repudiate in toto the term
"conventionalism" as applied to whist. To say, as some contend,
that modern whist is simply an arbitrary and conven-
tional system of signals, which are adopted by the general
consent of a certain school of players for the purpose of
enabling A to convey certain information to his partner B,
or for the purpose of enabling B to draw certain inferences
from the fall of the cards as to the contents of A's hand,
is, we submit, a rank libel on the king of card games; in-
deed, assuming this to be the case, it becomes a moot point
whether two persons, acquainted with the conventional code
of signals—in other words two good players—would be morally
justified in sitting down to a rubber for a stake against two
others unacquainted with the system, i.e., two bad players.

But in reality the term conventional is altogether inapplicable.
What are called the "conventional rules" with regard to the
lead, the return lead, and the play of the second, third,
and fourth hands, etc., are not "conventional" in the ordinary
acceptation of the term, but rules based upon the experience
and authority of the best players—or, in the words of "Mognl,"
"the result of calculation and experience as to the best chances
of trick-making"—reduced to a system.

Take, for example, the following simple case. I am third
player, and hold king, knave, and two of a suit led by my
partner, and win the trick with the king. If I intend to return
the suit I am bound by the "conventional" rules to return the
knave. Why? Because I infer my partner to be strong in
the suit, and, being numerically weak myself, I return him a
strengthening card, with the double object of getting rid of
high cards which might subsequently stop his suit, and of giving
him an opportunity to finesse, should he think proper to do so.

Similarly, if I win the trick with the king, and hold the nine
and two, eight and two, or seven and two, it is equally my
duty to return the higher of the two remaining cards, as by so doing
I may possibly strengthen my partner, and cannot, by any
case, injure my own hand.

By a parity of reasoning, if I am left with the three and two,
I must return the three.

Here the advocates of the "conventional" theory step in
and say—"This is the weak point in your case. It cannot be
pretended that by returning the three instead of the two, you
can by any possibility strengthen your partner. On the con-
trary, your only possible object in retaining the three in prefer-
cence to the two, is to convey information to your partner, who,
on the fall of the two in the next round will naturally infer that
you have no more of the suit left, and this, we contend, is
an instance of pure conventionalism."

To this we reply—"It is quite true that in this particular
case the return lead of the higher of two remaining cards
cannot possibly strengthen your partner, but it is a fair and
legitimate extension of the general principles which govern the
return lead from a three suit, and as such, cannot be termed
"conventional."

We admit that by playing the three we enable our partner to
calculate how many we have left of the suit, and thus, in some
measure, assist him to "count our hand," but this is a collateral
advantage; the knowledge he thus acquires is not the result of
a conventionalism, but is a direct and logical deduction from
the general principles of play.
TOY-MAKING AND TOY-GAMES.


In the beginning of the first article on this subject I quoted Faraday’s remark that toys are the most philosophical things in the world.

This may not be quite clear without an example or two. Suppose we take a child’s kite; may we not by its aid identify lightning with electricity, and receive an instructive lesson on the composition of mechanical forces? Every one knows to what use a common kite was turned by the ingenious Benjamin Franklin. From a pea-shooter too we may obtain evidence of the elastic force of gases, and of their economical employment when used expansively. The snooker, as I have told already, illustrates the weight of the atmosphere, and its equal pressure in all directions. The sling, the hoop, the top, and many other toys, show the proper of centrifugal force. And watch a top when it is in motion; you will see every spot and bruise on its surface converted for the moment into an elastic zone: this may impart a good lesson to physicians in ophthalmic optics. Thus, to a reflecting mind, every toy affords ample food for thought.

Let me take as the first toy-game in this article, that known as the Grace. This pleasant name it owes to the graceful motions which characterise skillful play; indeed, the Grace is one of the most elegant of pastimes. It requires plenty of room: an excellent place for it is—say the lawn in front of an old house. And as for the players—but every one will suit himself as to that.

The way in which the Grace is played is as follows:—The players have each two sticks and two or more hoops of different sizes, and, standing some distance apart, they throw the hoops from one to the other. The hoops are both thrown and caught by means of the sticks. The best mode of throwing and catching has been thus described by an authority on the subject:—

“...in throwing, hang the hoop on the sticks, and then cross them, so as to prevent it from falling off. Hold the sticks with their points downwards, on the left side of the body, the left hand grasping one stick firmly, while the right holds the other loosely between the finger and thumb. Now raise the arms, point the left-hand stick in the direction which the hoop is meant to take, and with the right-hand stick throw the hoop, gliding at the same time the right-hand stick over the other. These movements should be performed as one, without any pause between them, and, if they are properly done, the hoop revolves rapidly, so as to keep it steady as it flies through the air. Unless this be done, it wobbles, or even turns over and over, in either of which cases the player to whom it is thrown can scarcely have a chance of catching it. The hoop should be thrown tolerably high, and ought to be sent with such accuracy that if it were not stopped it would fall on the head of the second player. Catching the hoop ought to be done with both sticks slightly crossed, unless it be flung much to the right or left, when of course a single stick must be employed. Sometimes an unskilled player flings the hoop so that it presents its edge to the catcher. Even in such a case an expert player will catch it by giving the lower edge a little tap with one stick, the effect of which will be to make the hoop fall over the stick.”

A game having a sort of relationship to this one is that of Bags. In Canada and the United States, Bags is a highly popular recreation. It is not so elegant as that just described, but it is a very healthy form of exercise, and especially adapted for warming one on cold days. If the thermometer be low and you sit shivering with cold toes, in spite of the fire, turn out and have a game at Bags, and, my word for it, you will be comfortably warm and uncommonly cheerful in a quarter of an hour.

It is played with four cotton bags half filled with dried peas, and tied at the mouth. These are taken up by two players, two bags each; one bag in each hand. Player number one throws the bag in his right hand to number two, transfers the bag in his left hand to his right, catches a bag sent by number two in his left, throws to number two the bag in his right, transfers the bag in his left to his right, and so on. Player number two does just the same as number one. The object of the game is to keep the bags as long as possible from falling. It is difficult to do this for any length of time at first, but with practice the bags may be kept up for half an hour or more.

BattleDore and Shuttlecock used long ago to be quite a fashionable game among grown-up persons. It is mentioned in an old comedy of 1609, and is also recorded as having been used as a diversion by Prince Henry, son of James I. Nowadays it does not enjoy so high a position as it does, and it is still popular.

The game may be played by one or many, but play by one alone is apt to become tedious; to have any great enjoyment, two at least should join in it. The sport consists in keeping up the shuttlecock by striking it from one person to another. The difficulty of keeping it up increases with the number of players.

Originally battledores were all of wood, but the best kind are those now known as “drum,” with parchment heads. The all-wood ones are easily made, and quite good enough for a beginner to practise with. They are cut out of a piece of flat deal not more than quarter of an inch thick. The spade is to be made about five inches long and five inches broad; the handle should be six or seven inches in length.

If you would make the better kind of battledore, get a slip of lance-wood and let it be about sixteen inches long, one and a half inches broad, and a quarter of an inch thick; the outside edges too must be slightly rounded. Now bend it to the shape of the spade, and along the inside cut slight nicks about an inch apart and almost half way through the wood. Steam or boil the slip of lance-wood, and it will curve to the shape required. Bevel off to fit the handle, which you should prepare previously, making it (the handle) quite round, except at the end which is to be joined to the spade, and that end should be square at the edges. Glue the spade to the two sides of the handle; you see the spade in Fig. 1, and the handle in Fig. 2. Bind the join firmly round with fine waxed thread, and let it stand till the glue is dry.

The next thing is to make ready the parchment head. It is to
be cut to the shape of the spade, with a margin large enough to turn down over the wood-work, and in this margin you must make notches, so that when turned down it may lie neatly. Soak the parchment in water, take off the damp, and glue it by the margin to the wood-work. Repeat this on the other side.

To finish the handle, bind round it a slip of coloured velvet or leather. Now you have the battledore complete.

A shuttlecock is made by cutting a piece of cork to form the body, in the shape of Fig. 3. Fix a short brass-headed nail in the lower end, and in the circle on the top of the cork fasten several grey goose feathers, all of the same size, and let each one stand in an oblique direction to the others. The feathers should not be too widespread, otherwise the shuttlecock is apt to be slow of flight.

The Chinese are great players with the shuttlecock, but instead of driving it with a battledore, they keep it up with the upturned sole of the shoe. Ten or a dozen stand in a ring and dexterously send it from one to the other, the blow being given with the sole of the foot or the ball of the big toe.

The Bandilir falls next to be described. This is a toy made of hard wood, and is something like a pulley with a very deep groove. A piece of string is wound round the groove, a hole being made in the centre of the wood, through which hole the string is passed and out of which it is prevented from slipping by a knot.

In playing with the bandilir, the end of the string is held between the forefinger and thumb, and the grooved piece of wood is let fall. As a natural consequence the string is unwound, but if the fall be suddenly checked by a sharp jerk, the bandilir will commence at once to rise, and will go on ascending and descending as long as the player likes. The movement depends on the same mechanical laws as that of the Outwater, described in the first article.

The Bandilir, by the way, under the name of "Quiz," was a very fashionable toy about the beginning of this century. It is now almost out of date, and, except as manufactured by private hands, is seldom seen.

But enough for a moment of mere matter-of-fact toys. Let us turn aside into the region of music, and see how that fascinating instrument an Eolian Harp is made. Is it difficult to construct? No, not if you are at all neat-handed.

Make a long box of very thin deal about four or six inches deep; mark a circle in the middle of the upper side, an inch and a half in diameter, and in it drill small holes. Fasten bridges at each end of the upper side, each like the bridge of a fiddle, and over these bridges pass seven, ten, or even more strings of very fine catgut; and these strings are to be tightened up or relaxed by means of screw pins.

Tune all the strings to the same note, n is perhaps the best. Place the instrument in the space left by a window when partially open, or in any current of air where the wind can pass over it with full force. When the strings are blown on with sufficient degrees of strength different sounds will be produced; the harp will yield to the inspiration of the passing breeze, and sometimes its tones will be heard in full concert, at others they will sink away in the softest murmurs, most musical most melancholy.

A colossal imitation of the instrument just described was invented at Milan in 1796 by the Abbé Gliboni. He stretched seven strong wires, turned to the notes of the gamut, from the top of a tower sixty feet high to the house of a Signor Moscato, who was interested in the success of the experiment; and this apparatus, called the "giant's harp," in windy weather yielded lengthened peals of harmonious music. In a storm it was sometimes heard at the distance of several miles. Similar sounds must have been often heard by our readers when near the telegraph wires of a line of railway.

Our excursion into the realms of music has not lasted long; and it seems almost a descent from the sublime to the ridiculous when I say that we shall consider now the familiar game of Puff and Dart. But this is a good amusement and worth noticing. It sometimes goes under the name of "Drawing-room Archery."

A large target is hung against the wall, painted in rings, with a bull’s eye in the centre, and with each ring figured to show the number of points to be gained by the players. Towards this target a needle-pointed dart is blown through a brass tube.

Each player has a number of darts, and according to the part of the target he hits, so is the number of points towards game that he scores.

Darts shot by the breath out of tubes are used by the natives of Borneo and some parts of South America as weapons of offence. The darts are of small size, but dipped in such deadly poison that a wound is sufficient to cause death. The tubes through which they are sent are of considerable length, sometimes as long as twelve feet.

Dart and Target is a pastime allied to that of Puff and Dart, just described. The apparatus required for the game is not difficult to make. The dart is a straight piece of stick about six inches long, with a pin at one end and a paper guider at the other. The pin should just be a common pin, with the head taken off; it is to be inserted in the stick with the point outwards and secured in its place by means of thread or sealing-wax.

The guider is made of a square piece of paper, folded twice from corner to corner, and inserted in two slits at the end of the stick, as shown in Fig. 4.

The target may be made of a piece of board; upon it are to be painted a few concentric circles with a bull’s eye in the centre. The player whose dart after each round is found nearest the bull’s eye counts one towards the game, and has the first shot of the next round. A number is fixed on at the beginning of the game, and he who first reaches it is the winner.

A Paper Dart is a still more simple affair than the dart used in Dart and Target. It is made in this way: Take a piece of good stork paper—writing-paper does very well—and cut it so that its length may be considerably more than its breadth. Double the paper so that there may be a fold running down the middle lengthways—from x to z in Fig. 5; then open the paper out again.

Turn up the two corners a a. Now take the two points b b
and fold the paper so that these points meet at c. The paper will then have the form shown by the dotted lines. Fold the paper in two, by the fold z z, when it will look like Fig. 6. Turn the edges d d down so as to be parallel with the fold x z; one edge is to be turned down to the one side, and the other edge to the other side. Now catch hold of the fold z z between the forefinger and thumb, and open out the wings of the dart, which is at last complete. When thrown from the hand you will not find it a very good weapon to aim with, but it is graceful in its motion through the air.

Another paper toy, very easy to make, as

Now insert the thumb of each hand, and pull out the paper so that it may take the form shown in Fig. 9; and you must take care in doing so to arrange the corners d d, Fig. 8, neatly. Turn up the points e (Fig. 9) one to the one side, and the other to the other, till they touch the point f, folding of course to the dotted line. Insert the thumbs again, and pull out the paper to make the form shown in Fig. 10. Take hold lastly of the points g g, and pull them outwards right and left, taking care not to press the inside, and the boat will be complete, as in Fig. 11.

The great poet Shelley had an excessive passion for making and floating paper boats.

Fig. 10

is the case with most things when once one knows the way, is the Paper Boat.

Take a piece of paper, not very thick, but not very thin either, and in size about nine inches by six, or six inches by four— at any rate let the breadth bear about the same relationship to the length as in these sizes. Then double the paper as in Fig. 7; turn up the corners a a till they meet at b, when the paper will look as in Fig. 8; turn down the two sides c, one to the one side, the other to the other side, to the dotted line d d.

It has been said that on one occasion, having no other paper at hand, he launched a £50 bank-post bill on the pond at Kensington Gardens, and, with greater good luck than he deserved, succeeded in recovering it on the opposite bank. This is denied by one of his biographers; but Medwin will have it that such an incident did really occur with a £10 note on the Serpentine.

The last toy to be mentioned in this article is the Prophet, or Sybil (Fig. 12), which does not require much explanation. Its
principal part is made by cutting a circle of pasteboard, a few inches in diameter, and adorning the edges with fancy paper. When this is done, mark on the white surface twenty equal divisions, by means of lines radiating from the center, and within each division place a number referring to the accompanying Table of Prognostications, or, better still, place the prognostications themselves in the vacant spaces.

**Table of Prognostications.**

1. At the end of a changeable life, health.
2. Early and prosperous marriage.
3. Many lovers, but no husband.
4. A speedy and important journey.
5. Rich by a legacy.
6. Hours of pleasure, years of care.
7. He is false.
8. You will marry your present choice.
9. Wed thrice, and die in widowhood.
10. Travels by land, voyages on sea.
11. If not wed now, never.
12. It will be your ruin.
13. Happiness in wedlock.
15. Long life and a merry one.
16. Fears from a rival, but you will succeed.
17. Beware of a false friend.
18. Twice wed.
19. Unhappy, ere long, but the sunshine follows.
20. Your present lover will not be your mate.

**The Aquarium.**

By W. A. Lloyd.

**First Use of the Term "Aquarium"—A Better Name—Air Breathers and Water Breathers—My First Attempts—Collecting Sea Anemones in the Streets.**

The Zoological Society of London, in a book it has published thus calls its collection of animals, ranging, as it does, from zoophytes to monkeys, a vivarium. So Mr. Charles Knight, who died the other day, suggested the word "aquavivarium," which is so far an improvement on the other names, that it conveys the idea of animals in water; and this compound term was first used in print by Dr. E. Lankester, in June, 1853. Yet even it is imperfect, because it does not convey the idea of the plants, which are as necessary as the animals in an aquarium, and besides, aquavivarium is a clumsy and long name. It would be well if it and the other two pedantic-looking Latin words, vivarium and aquarium, were abolished, and some Saxon word could be found which would express a combination of water, plants, and animals. But no such word exists, and therefore it is as well to continue to accept "aquarium," as it has been conventionally accepted for the last nineteen or twenty years, has the one advantage of being employed in all English-speaking countries, and is used without translation in every other country.

It must therefore be understood that the word "aquarium" shall be employed as a collective term for all associations of water, plants, and animals kept under conditions to be presently named, and that the words "tank," "vase," "reservoir," and so forth; and all apparatus, as motor engines, pumps, pipes, etc., and all buildings specially erected to contain such things, shall be considered as parts of an aquarium.

The conditions under which an aquarium must be conducted are as follows:—1. The water used—whether sea-water or fresh-water—must not be changed, and it must not be added to, except to supply deficiency caused by evaporation or accidental loss.
2. Vegetation growing below the surface of the water must assist in its purification in a manner which will be afterwards described.

3. The animals must not be such as respire air by means of lungs, because they are then independent of water for breathing purposes, and for them water is merely or chiefly a medium in which they move, not a medium by means of which they breathe.

Thus, however interesting it may be to see reptiles, birds, and mammals—as e.g., turtles, toroises, alligators, snakes, and newts; diving and other aquatic birds, as ducks, geese, coots, and others; and whales, porpoises, dolphins, seals, otters, water-rats, water-shracs, and very many more—moving about under water, in a manner in which they cannot be seen in a state of Nature, yet none of them are properly admissible in an aquarium, if that word is to be employed, as all words should be, to express a definite idea.

There is no reason why all these animals should not be maintained so as to exhibit them in clear water through which they might be viewed laterally, instead of being kept, as they now usually are, in water so turbid that they seldom can be seen when below its surface, and then only from a point of vision above that surface, and, doubtless, much might be learned from such an exhibition, only it must not be termed an aquarium.

The reason of their exclusion from aquaria properly so called is not merely because their admission would deprive aquaria of all significance in the restricted and conventional meaning it has been found convenient to adhere to for preventing confusion, but because the transmission and keeping of such lung-breathing animals is for the most part much easier than to send non-lung-breathing creatures from long distances, and to keep them when obtained.

Hence the introduction of lung-breathing creatures opens a door for the evasion of difficulties, and obviates a necessity for the honest overcoming of the same.

4. The animals must on the contrary be any or all which by means of gills, or by having a respiratory function distributed over the whole surface of their bodies, possess the power of extracting oxygen from that which is dissolved in the water, which it absorbs mainly from the atmosphere by contact, and in a much lesser degree from the oxygen which is evolved from the plants under the influence of light.

Such creatures (found in both sea-water and in fresh-water, but not in so great a variety in the latter) range from sponges to fishes, and no higher, unless the percombranchiate group be admitted.

The latter creatures form a small division, which seem to divide the fishes from the reptiles. They are all aquatic (and live in fresh-water) and they exist below the surface of water, so that there is no very great objection to their admission, but the selection must stop there, however strong may be the temptation to overstep the boundary line thus drawn, for a given reason.

It will be seen that when aquarium animals are selected according to these laws, the water in which they are kept is not only a fluid in which they may move, but is one in which they breathe, and is, in fact, their atmosphere.

Take for example two aquatic animals, a duck and a trout. A duck may live in water which is proverbially dirty, as when one says, "As thick as a duck-pond." Clean water is not at all necessary for it, as it is independent of it, even when it dives and remains for many seconds below, because the bird breathes air by means of lungs above the surface of the water, which is merely something in which it can swim, and from whose it may extract some of its food by means of a bill specially contrived for the purpose. A trout, on the contrary, not only needs water to swim in, but water to live in; and the water must be sufficiently pure and aerated for the fish to exist in while it extracts from it its "breath of life."

Water, however, is a heavy, dense, inert fluid, absorbing air, and being consequently purified in an infinitely slower degree than a very much greater mass of air; and when made impure, much time is needed to restore it to its pure condition. For example, if the fifty thousand gallons of air contained in a closed room of twenty feet square be contaminated by the breathing of fifty human beings, the atmosphere of it can be almost instantaneously made pure by opening windows and doors.

But if only one gallon of water be contaminated in a similar degree from the breathing of an excessive number of creatures in it, some hours must necessarily elapse before it can be restored to purity by some such simple means.

Then, to send a duck a hundred miles by railway is an easy matter, in a light basket which prevents its escape, and which admits air.

But to transmit a trout a similar distance needs not merely a vessel to contain perhaps a hundred pounds weight of water, but that water (the atmosphere of the fish) must be kept sufficiently pure on the journey.

So it is with the maintenance of all aquarium animals proper; there must not only be a sufficient quantity of water, but that water must be made to absorb air (which it does with comparative slowness) in a degree which is faster than the animals contained in it can use up that air.

Then the amount of air which water can take up varies as to its temperature. Thus, it absorbs much less when warm than when cold, while the animals need air in at least as great a proportion in a warm as in a cold temperature; hence an allowance must be carefully made for this, as it does not require to be made when the animals do not extract oxygen from water, as in the case of a duck.

To instance a duck and a trout is to suppose what seems an extreme case; but it is in reality no further wrong than to introduce an alligator, turtle, seal, or porpoise.
The primary laws by means of which the sea anemone has been so long kept in the simple glass jar shown in Fig. 1, p. 57, are identical in all respects to those which governed its existence in the sea, or, what is perhaps of more consequence to an intending aquarium keeper, they are the same as those which control the well-being of complicated and large aquariums, costing many thousands of pounds.

In my first paper I mentioned that my reading Scoberr’s “Chemistry No Mystery,” when a boy, taught me that costly apparatus was quite unnecessary for the mastering of principles; and I now permit myself to say, before going on further, that though I am writing this in the Crystal Palace aquarium, surrounded by every possible contrivance that can ensure success, I could find many little sea anemones of several species, some hopelessly smashed, but others quite perfect (having been protected by the strong projections of the oyster shell), and unharmed by rain or other fresh water.

It was quite a mistake of the late Dr. George Johnston, of Berwick-on-Tweed, to say as he did, in his “History of British Zoophytes,” that sea anemones are instantly killed by immersion in fresh water.

The species I found thus were Actinoloba dianthus, Sagartia vedua, S. troglodytes, S. bellis, and S. elegans, but very seldom the common Actinia mesembryanthemum.

All those I used to pick off the shells with never-wearying patience and care, and drop them into the factitious sea-water, there was a time, nineteen or twenty years ago, when not only shillings and sixpences were not to be thought of by me to be spent in aquarium matters, but pennies and halfpennies had to be laid out carefully. So, with artificial sea-water made from salts prepared by a Holborn chemist—which salts he kindly gave me because I gave him the receipt for mixing them—I set up small aquaria in wide-mouthed glass bottles costing a penny or twopence each. The sea I had never seen, and was not so presumptuous as even to hope to see it, and I knew of no one living by the sea who could send me marine animals. But that daunted me not, for I used to sally forth at dead of night when heaps of oyster-shells were thrown by day from street oyster-stalls in Smithfield and St. John’s Street, and bring them home. The oysters devoured in such poor neighbourhoods were not the genteel little smooth “natives,” eaten at luncheon bars, but big rough “commoners,” with bold foliations of the upper shell, and deeply ribbed on the lower one, and in and be-
WHENEVER a tour is made extending beyond one day, it is necessary to take a complete change, that is, if personal comfort is to be studied, for many a fine morning is followed by a wet afternoon, and it is not very pleasant to reach one's destination thoroughly soaked, and then have to dine and pass the evening in wet clothes; while, in addition to this, whether it rains or not, a change will be found a great luxury. On these tours the numbers should be limited—two, or, at the most, three companions are quite sufficient, whilst, if even one friend cannot be found, had to be traversed the whole distance on foot, and in some places it was a question whether the machine would not be blown backwards by the wind. It took two hours to reach the Seven Thorns Inn, a distance of ten miles, and nearly two hours more doing the eleven miles on to Petersfield. Soon after leaving the latter town, Butser Hill had to be crossed, and here, though the old coach road has been shortened and improved as to its gradients by a magnificent cutting, the chalk road was so greasy, and the wind blowing so strongly through the gap, that a halt for breath was necessary every twenty paces. The season

the trip may be made alone with great enjoyment. If two or three travel together, the pace should always be regulated by the slowest goer, otherwise, what may be pleasure to one may be misery to the other; and in arranging distances, due regard must be paid to the state of the roads and the direction of the wind, as what may sometimes be easily accomplished on one day, will at other times take two days' hard work. This the writer once experienced to his cost, when he left Godalming one morning about ten o'clock, expecting to reach Newport in the Isle of Wight about six o'clock in the evening. The start was made in a drizzling rain, with the wind blowing a gale from the south-west; in other words, a dead nozer. Hindhead Hill, which in fine weather and the road in good order, can be ridden up, was winter, and soon after passing through Horsham darkness came on, with Portsdown Hill still to be surmounted, and it was with no small feeling of pleasure, when, through greese, slush, wind, and rain, the Portsmouth lights were seen in the distance, and Southsea was at length reached, just in time to catch the last steamer for Ryde. The twenty minutes spent in crossing was the only period of the journey during which the rain ceased, for on reaching the island it came down worse than ever, with the pleasant prospect of nine miles more over a narrow, hilly, unknown road in the dark. To take a fly and sit in wet clothes was not to be thought of; besides, it would have been tacitly acknowledging a defeat by the weather; so a start was made up Union Street, and by steadily plodding on, alternately riding
and walking, Newport was reached about half-past nine at night. The actual distance of road covered was less than fifty miles, but it was as hard a day’s work as the most enthusiastic bicyclist could wish for. Before starting on a tour, be sure and see that your machine is in good working order, that the bearings are free from grit, and properly oiled, the saddle screwed tightly on, and the break ready to be put on should any emergency arise requiring its sudden application. Various substances are used for connecting the break with the guiding-rod, such as leather, catgut, and wire-cord, but the first-named will generally be found preferable, as catgut is very much affected by the weather, and wire-cord is apt to stretch. When driving on a machine with india-rubber-tired wheels, the break should be used as little as possible, on account of the extra wear and tear occasioned by it; and if on descending a hill you keep your feet firmly on the treadles, pressing slightly as they ascend, a sufficient check will in most cases be given to the machine. An all-important point is the position of the saddle. Some riders prefer it as far removed from the front as is consistent with their feet reaching the treadles; but this is undoubtedly a mistake: the nearer you can sit to the guiding-rod the nearer you will be brought to your work, and the greater power you will consequently be able to put into each revolution of the crank, as your weight will materially assist the muscles of your legs, and this is more especially the case in going up hill. It must be remembered, however, that the rider’s height must be taken into consideration in determining this. A man six feet high will not be able to ride in the same position as a man six or seven inches shorter, supposing the two machines are the same size; but a few trials, shifting the saddle each time, will soon satisfy the mind on this point. When riding in company, and you have to pass through a narrow part of the road, or you are meeting or passing a vehicle in a narrow lane, the more experienced of the riders should go on ahead, the others following, but not too closely, in case the leader has suddenly to stop and dismount. By attending to this collision will be avoided. Another mistake beginners often make when riding with others is to try and race for the lead, or, as it is termed, “ride jealously.” In a long day’s work no one can afford to do this. The natural course of events will be the lead will be found to be pretty evenly divided. Never force the pace during the early portion of a long run, let your muscles gradually warm to their work, and when half the day is over you will reap the benefit of it, especially as a reserve of motive power is always useful towards the evening, in case circumstances compel you to finish your journey at an increased pace. Another thing that is only to be gained from practice is picking your road, that is, selecting the hardest and most even portion of it to run on; this will often be found to be close to the edge, but wherever it may be the experienced eye will at once detect it; and a bicyclist who does not attend to this will probably be expending four times as much strength as one who does. The formation of the road will also tell very strongly. Chalk will be found to be a great enemy; even when dry, the india-rubber does not run lightly over it, but when wet it is terribly slippery, and it will be necessary to drive very carefully on these occasions, as the wheels are apt to slip up sideways, in which case a spill is inevitable. We will now venture to hope that you have been practising diligently for some months, and that as you find a run of twenty or twenty-five miles is no longer accompanied by fatigue, you are anxious to test your endurance over a greater distance. By all means do so, and as it is well to have a companion, let us travel together; and our journey shall be no myth, but the counterpart of one actually taken last summer, when neither of the riders had been previously taking more than an ordinary amount of exercise. Being busy, we cannot spare more than one day for our run, so let us have our machines ready on the preceding afternoon, and get as far on our way as we can the same night. The Portsmouth road will carry us through some lovely scenery; and as you have probably often seen Portsmouth before, we will strike off to our right some five miles short of the town, and work back towards London through Fareham, Bishop’s Waltham, and Winchester, to Basingstoke, where, if darkness overtakes us, we can finish our journey home by train. Our machines are at Putney, and have been thoroughly cleaned and oiled; our oil-cans are full; our spanners, pliers, and other requisites are in their case; so, strapping on our luggage—which consists of whatever we require for stopping out one night—we mount, and at 4 P.M. commence our trip. Putney Hill is not very steep, but owing to the road being macadamised it is a very unpleasant hill to go up, and we are not sorry when we find ourselves at the top, running across the Heath, where we strike the main road from London. Putting our feet on the rests, we run carefully down the hill, for the road is loose, and it will never do to have a spill so early. A little farther on we cross the Beverley, and find ourselves at the “Robin Hood,” with Combo Hill before us; and as there is no pleasure in riding up it either in dry weather or wet, owing to its sandy soil, we will get off and trundle our machine to the top, where we mount once more, and after half a mile of level road, run down Kingston Hill through Norbiton, Kingston, Surbiton, and Long Ditton, to Esher. The latter village is prettily situated on a hill, and as by this time it is nearly half-past five o’clock, let us have a little refreshment at the “Brown Bear,” before adding oil to our bearings and continuing our journey. Leaving Claremont on our left, we cross Esher Common and some sandy hills, which brings us to Street Cobham, or, as it is commonly called, Cobham Street. Here the road turns sharply to the right, till, after crossing the Mole, we ascend Pain’s Hill, and bear again to our left (the road straight on leading to Byfleet), when, at the top of the hill, we find ourselves on Ockham and Wisley Commons, the former on our left and the latter on our right hand. Before descending the hill leading from Ockham Common, let us rest a few minutes to enjoy the glorious sunset over Bolder More, with its dark background of fire, and the surrounding gorse lit up into a sea of gold; and may travel many a mile on our way ere we view a lovelier scene. Having spent a few minutes in thus refreshing our eyes and recruiting our bodies, we mount once more, and passing close to the more, another few miles bring us to Ripley, a pleasant, straggling little village, boasting an ancient chapel said to have been founded during the reign of King Edward II. Six miles more over an undulating road, and we find ourselves working up the hill into Guildford; but as it is still light, we purpose pushing four miles farther on, to Godalming. Guildford or Guildford finds a place in many a page of English history, and was in olden times a great favourite with royalty, especially at Christmas; and many are the legends that the old castle could have borne witness to in the days of Henry II. and John. Little of it however remains now but the keep, which is worth a visit. The main street of the town is paved, and the hill at the western end is very steep, so we had better, soon after entering the town, take a turning on our right, and wind round the back of the High Street, joining it again at the foot of the hill near the Wey, which we cross, and then take the left-hand road, the other leading over the Hog’s Back to Farnham.
It is a stiffish hill we are climbing, but the road is good, so there is no occasion to dismount.

With St. Catherine's hill and the range known as the Hog's Back on our right, and St. Martha's Hill away to our left, we feel inclined to agree with Cobbett, 'that there is hardly another such pretty four miles in England. The road is good, the soil is good, the houses are neat, the people are neat; the hills, the woods, the meadows—all are beautiful.' And through this lovely scenery we finish our evening's run, just as the shades of night are falling, at quiet old Godalming.

Immediately after crossing the Wey again, the hill into the town begins, and it is better here to dismount, as, though the road is not steep, it is very badly paved, and the consequent jolting will neither improve our tempers nor our machines.

At the top of the hill we turn to the right, and soon afterwards wheel our machines into the stable-yard of the "King's Head," and as they are not muddy, we will at once see them safely housed, and go in and order dinner before mounting to our rooms to have a good wash and to unpack our luggage.

One article of this same luggage may excite curiosity amongst the uninitiated who have never seen an "Eton," which is capable, with the aid of some methylated spirits, of warming up tea or coffee at a few minutes' notice; and as to-morrow morning we mean to be off soon after daybreak, and breakfast some twenty miles on, the "Eton" will prove serviceable.

After dinner we order sandwiches to be cut, and some tea brewed and bottled, to take with us when we start, making arrangements at the same time with the landlord for letting ourselves out between five and six o'clock in the morning.

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CROQUET.

BY CHARLES BLACK, CHAMPION.

MArELS—ECCENTRICITIES OF PLAYERS—STRANGE TOOLS—HANDLES—TO HOLD THE MALLET—TO STRIKE.

The first advance in the shape of mallets is to be attributed to private enterprise. Probably some player who had a private lathe thought that if he turned himself a little larger head, he might be more often successful in his shots, and then, when he had hit, he might send the face such a tremendous way, perhaps right into the shrubbery, and then have a hunt for the lost ball with a pretty partner. Whatever noble or wicked idea prompted the conception, the big mallet appeared in due course of time; and for a time every player who could produce one a little bigger than his neighbours was dubbed the local "swell."

Most of the manufacturers were, and still are, very loth to fall in with the new conception of a mallet, as the increase of wood needed to make eight mallets is considerable; and the mallets which are even now sent out in the ordinary croquet box are ridiculously inadequate, compared with the average match-mallet, putting aside the more ponderous weapons. It is a serious difficulty which those who wish to popularise good croquet have to contend with.

Private judgment having asserted itself in respect of the size of the mallet, it was not long before it took the shape into consideration, and the result is a medley indeed. There is nothing like figures to illustrate results. Well, in 1869, a great advance was supposed to have been made on the toy mallets, and those used in most of the public tournaments were 6 inches long, and 2½ inches in diameter, weighing about 1½ lb. 13 oz.; there were mallets heavier than these then extant, some being used at the Crystal Palace tournament in 1868; but the figures given represent the average.

In 1872 the mallets used in public tournaments varied in weight from 2½ lbs. to 3½ lbs., their length being from 7 inches to 9 inches, and their diameter full 3 inches. The increase in weight is to be partly attributed to the use of plates, which will be now explained.

Some players, notably Mr. Peel, the then champion, finding that the stroke which has been described as the "rush" was difficult to achieve without striking your own ball too high, and thus making it hop over the other, conceived the idea of cutting away the bottom of the mallet, as shown in Fig. 1, the dotted line denoting the part taken off. The mallet was thus able to be swung nearer to the ground, and the striking centre struck the ball very low, and made it go forward steadily. In many other strokes, too, it diminished the chances of the mallet catching the ground.

This kind of mallet has been now adopted by the majority of croquet players, and many have supplemented the change by "plating" their mallets, i.e., by having a brass plate screwed upon the flat bottom.

Of course this makes the mallet considerably heavier, and, in the opinion of its advocates, renders many strokes easy of execution which are very difficult with light implements. There can be no doubt that much less exertion is needed with a heavy mallet, and so a lady who aspires to excellence in match play, will probably do well to use one; but given strong wrist-power, and fairly muscular arms, it becomes a question whether the additional weight does not make the mallet too unwieldy, and incapable of very delicate play. No one, however, can be dogmatic on this point, for it is a matter of private taste, and each player had better choose the weight which suits him best, and make himself master of its peculiarities.

The passion for very heavy mallets must have now reached its maximum, for we heard the other day of a gentleman using a weapon weighing seven pounds. The development of the croquet mallet as the peculiar implement of any individual player, and not the mere adjunct of the croquet-box, has not been without its comic side. There are some people who are always professing to have the "last thing" about mallets with which you can hit at any distance, and the result is generally very typical of misapplied genius (f).

We have had mallets with looking-glasses fitted in them, in which the ball aimed at was to be reflected; mallets with black lines drawn along them, which were to guide the eye unerring; mallets with long handles; mallets with short handles, sometimes heavily weighted with lead; mallets, also, with one end of the head more heavily weighted than the other; and innumerable shapes and sizes of heads; but all former peculiarities
had to bow before the combined oddities of a mallet which graced the Wimbledon lawn this year (Fig. 2).

The head of the mallet was a large square slab of wood, octagon-shaped at the top, and sliced at the bottom; but the handle which was inserted in it was the great curiosity. It was shaped at the top like a spade handle, and the shaft was bound tightly round with leather and whipcord, in order to ensure a firm hold and deaden vibration. But there was additional provision made against vibration being felt at the moment of striking, by the manner in which the handle was inserted into the mallet-head. The wood shaft came to an end, and then two pieces of thin iron, quite separate, were the connecting link between the handle and the mallet-head. The springy, but there is great danger of its warping in our climate, as it is all imported from Canada; green-heart is inimitable for one purpose, the stop stroke, as its toughness enables the handle to be reduced near the mallet-head to nearly the thickness of a little finger, and thus the elasticity of the handle is something wonderful; but this very quality militates against the use of the mallet for other strokes, for the handle is so elastic that the player unconsciously puts the stop on when he least desires it.

There are various means for ensuring a firm grasp of the handle. Some cover it with leather (Fig. 3), but this gets slippery in wet weather; others bind it with whipcord (Fig. 4), which is liable to blister the hands; others use the octagon-shaped handle (Fig. 5), which is supposed to keep the head of the mallet.

owner of this machine, when about to strike, grasped the spade with his left hand, with his knuckles turned towards the striking end, and steadied the handle by laying hold of the whipcord. It required a most inelegant attitude to perform properly with it, as the player had to stoop completely over the ball, and turn his head askew to take aim.

The owner certainly managed to win one game with this bludgeon, but he lost his first tie, and so his patent did not even gain the guarantee of success. Surely, we need not go back to the days when "Adam delved" to find an elegant model for our mallets!

Apropos of this wondrous spade-handle, a word may be said on the different handles used for mallets. Three kinds of wood are chiefly employed—ash, rock-elm, and green-heart. It is very difficult to procure a really good stick of ash, but if obtained, it makes, in our opinion, the best handle for all purposes; rock-elm is a very beautiful wood, and is light and pointed true; others cut notches in the wood; and we all know the familiar rings turned in the handles of the croquet-box mallet. The head of the mallet is made best of box, as it drives well, when seasoned properly, and is not so liable to chip at the rim as lignum vitae. Ivory mallets are simply expensive toys, as they chip frightfully. Figs. 6 and 7 are fair specimens.

There remains a very important point to notice—the way to grasp the handle so as to ensure good play. Here, again, the words of Lauthier on pall-mall serve admirably as a general principle.

"The hands ought not to be either too close to one another or too far apart; the arms neither too stiff nor too extended, but easy, so that the stroke may be free and unconstrained. The left hand, which is uppermost, ought to have the thumb opposite the middle of the mallet-head, and the thumb of the right should cross a little obliquely over to the tips of the fingers, because if in raising the mallet we do not keep the thumb

Fig. 3.

Fig. 4.

Fig. 2.

Fig. 6.

MALLETS AND THEIR HANDLES.

Fig. 5.

Fig. 7.
so crossed, the mallet swerves in falling on the ball. The right hand must therefore hold the mallet as tennis players hold the racket, for this thumb so clenched with the tip of the fingers (Fig. 8) is much firmer, and better directs the stroke to where one wishes to go, and gives more strength and ease to the wrist, which ought to work with freedom." Every word of this passage may be applied to croquet.

It is the right hand which does the main share of the work. Why, it is not so very long since it used to do all the work, in the days of one-handed mallets; but it was found that playing with one hand did not give sufficient command of the balls, even if it were possible to hit more accurately that way; so the left hand was brought in to aid. And now there are no one-handed "rush" the mallet must be grasped very firmly, and swung rather more from the shoulders than the wrists, that is to say, there must be little elbow work, else the ball will be hit too high, and jump over that which it is intended to drive forward. It is best for this stroke to have your ball as nearly as possible midway between your feet, so that the mallet may be swung like a pendulum, and, as it were, pick up the ball in the middle of its swing, when it is at its nearest point to the ground. It is for getting underneath the ball in order to ensure its travelling that the slice is chiefly useful.

Let the beginner attempt this stroke first at very short distances, and then gradually increase the interval.

The "cut" requires a quick eye rather than any particular

players seen in public matches. The left hand steadies the mallet when great force is used, and the right hand directs the application of that force by the firm grip which the clenched thumb gives. There is no rule without its exceptions; and let no one despair of excellence if he finds that it is more natural to place his left hand below his right, for there is a very successful player who always holds his mallet in that fashion. It is difficult to give any precise rule as to what distance from the mallet-head the hands should be placed.

If a player is not very tall, let him or her stand upright, and taking the handle of the mallet, touch the back of the ankle with the head, and the place at which the handle is then held will give a good position (Fig. 9). Players, however, must consult their own convenience, and try to be at once elegant and effective in whatever attitude they adopt.

A few words on the way of holding the mallets for the peculiar strokes we have described. In order to make a hold of the mallet. For the "split," "roll," and "pass," the mallet-handle must be "gripped" as if for dear life, in all cases, but the method of applying force is very different; for in the "split" there must be almost always a sharp crisp blow; in the "roll" a heavy pressing stroke, with the whole weight of the body put into it; in the "pass" a pressing stroke, with the addition of wrist action, only to be learnt by actual instruction from a proficient. In the "stop" stroke, the handle ought not to be grasped too tightly—just as in billiards the cue is held rather loosely for screwing—but the fingers must be clenched enough to make the mallet hit the ball full in the centre, or the stroke will be a failure. Let the mallet be under-sized, and have a green-heart handle. Dogmatism on the subject of mallets is certainly to be deprecated, but a practical recommendation seems necessary for beginners, so we will leave them to test our recommendations with a shied mallet of about 2½ lbs., with a head of boxwood, and an octagon handle of good ash.
GAMES OF THE PLAYGROUND.

By C. W. ALOOCK.

PRISONERS' BASE.—THE GAME (cont.)—CHIVY—HIS LABOURS—PRISON—DELIVERANCE—THE CAPTAIN—RUSES—TACTICIANS.

Chivy is as a rule not a player of the very highest order of skill, for you can readily comprehend that he acts chiefly in the character of a duddy, or to use perhaps a better illustration, of a reconnoitring party, and a cautious general will never risk the loss of a portion of his best forces until he has had some little insight into the strength of the enemy.

Chivy is usually despatched into the centre of the field, equidistant between the bases and prisons, but this may be said to be only the case when the limits for play are of an extensive kind, and there is plenty of chance for the reconnoitring player to gain and regain his position. But where the bounds are necessarily more prescribed, chivy is despatched from either of the bases, and the one requisite for his safety is that he must in his venturesome excursion pass at least beyond one or other of the prisons before he returns.

Directly, of course, he leaves his base, according to instructions, one of the opposite side, who are in occupation of the white base, is despatched in hot pursuit, and now begins the battle, till it waxes fast and furious. Of course, the player who as I have said follows chivy with the purpose of waylaying him or of cutting off his retreat, is in turn pursued by an antagonist; and so the chase goes on, until, it may be, the whole of the players are hard at work.

You must not suppose, though, that the sport is at all indiscriminate, and that one player may touch any other of the opposite side just as opportunity serves, for, by a wise provision, only those who have left the home before him in pursuit can be touched, so that priority has here a recognised value.

Meanwhile let us follow poor chivy on his perilous trip, and consider how he is likely to fare under different circumstances. It is not easy for him to escape, you may be sure, unless he be capable of turning like a hare, and is fleet of foot, for he has to cross directly in face of the enemy, and, without he be full of expedients, he will inevitably be taken prisoner.

If even he succeeds, there are others of his fellows who are certain to succumb to the vigilance of the pursuers, and whether the case be his or theirs, the lot of a prison is the sure consequence.

Put yourself for a moment, then, in the position of a prisoner, and place yourself quietly, as you will have to do, in the charge of the player who has been lucky enough to effect your capture. He will take you safely enough to your prison, for after a capture his person is as sacred as if he were veritably the bearer of a flag of truce, and he is inviolate until he has placed you in durance and returned safely to his own home once more.

It is not at all improbable, if your capture has been attended with any difficulty, that you will find your prison already tenanted, for the sport allows of no delays, and captures and releases follow in quick succession. Now that you are in prison, though, you will have to begin at once your plans for escape, for it is in his schemes for your deliverance that your captain will have an opportunity for showing either his skill or incapacity.

You will have to look out for the arrival of your deliverers, and the first touch of one of your own side, if he be able to reach you unmolested in spite of the enemy, will prove your freedom, so that no chance must be lost. All that is required of you in your confinement, is that you keep some portion of your body within the limits of the prison, so that the longer your arms and the more extensive your reach, the better will be your prospects of a speedy rescue.

More than this, if there be several of you, as long as one of you show that he has not overstepped the limits of the prison, you have fulfilled the law, and you can thus, by joining your hands together and forming a chain of connection, spread out far towards the region of your own home, and effectually lessen the risks of those who are bent on your deliverance.

You can easily see that as the game progresses and the prisoners become filled, the excitement is of no mean order; and, indeed, the scene is vivid in the extreme, as the one side nears ultimate success, and then, it may be, loses its chance by an unlooked-for rescue of one of the enemy.

The game may go on for ever, for it is not won until the one side has succeeded in placing within the sure confines of its prison the whole of the enemy, and this is an achievement that is rarely gained, unless either one party be vastly superior to the other, or the captain of the one be much superior in resources as well as artifices.

And what of the acts required in the game? It may seem simple enough, you may possibly imagine, but there are niceties in the various tactics that require the supervision of a skilful captain; and the manœuvres in deploying your forces to the best advantage need something more than a drollard to devise.

It is not so easy to perfect the operations for the relief of the several prisoners, you may rely upon it; and it is in this special branch of the game that tact and generalship are most needed. In the selection of captains, it is not so much that they themselves should be the fleetest of foot, but that they should be capable of marshalling their own side, of directing the various players according to the exigency of the moment.

I have seen many clever strokes on the part of a captain that would earn fame in a battle more material in its character. Sometimes you will see him make a bold sally on his own account, and either intercept an unsuspecting foe, or by a dash that seems at first hopeless, secure the rescue of a prisoner when all hope was apparently well-nigh abandoned. At another you will find him equally sage in counsel in the direction of an assault on an unguarded position.

There are many ruses in this sport, be asured, and certainly not the least creditable is that which I remember as invariably successful, of a player, in the heat of a spirited engagement, when the opposing forces are so hopelessly immersed in the fury of the warfare as to be oblivious of every external point, calmly utilising the occasion to steal undisturbed up to one or the other of the prisons, and set at liberty the whole of its contents.

It is not always the most complicated inventions that succeed best; and you will find that the easiest way is not only often the nearest at hand, but as often is that which is the least suspected and the least suggestive. At any rate the simplicity of prisoners' base is very much on the surface, so do not count on immediate promotion. You may act as chivy at first, until you reach higher flights, for you may stumble. It is not a rare occurrence, though, in ordinary life to see chivy in the best position, taking advantage of every wayfarer incapable or slow of foot to pass his way. Only he, too, sometimes slips himself, and is taken to prison.
FEATHER WORK.

By Eliza Crearle.

HAND SCREENS (continued)—BASKETS—PENWIPERS—MUFFS—ANOTHER KIND OF BASKET—FEATHER FLOWERS.

The handle, instead of being the last consideration, is, in the screens in question, almost the first thing to be thought of. Prepare a piece of wood four inches long, and bind the two middle feathers firmly on to it; then work from the centre. The fibres of each succeeding feather should lie over and completely hide the shaft of its predecessor. One set only of fibres belonging to each feather is to be visible; the bare stems are ranged very closely side by side, and bound down to the handle evenly and firmly. Any one who has spliced a bat will be an adept at this performance.

Having arranged the feathers of one half, you go back to the middle, and place those of the other half in a like orderly manner.

In the front of the screen, the fibres visible of each feather are to face towards the centre one; and no shafts should be seen except those of the two outsiders, which, of course, have no wing underneath which they can hide any part of themselves. Their outside fibres are cut away to about half the breadth of those which are on the other side their own and their neighbours’ shafts.

If you prefer it, you may fix the quills to the handle in a different way; and that is, to range the quills together while holding them in your hand, and having made half the depth of your handle hollow, to deposit therein the little bundle, fixing it with glue.

But which ever way you adopt, you must afterwards pass a piece of strong wire through the shafts. Curve the wire first, and then string the feathers on to it, as it were, close to where the fibres begin. There is no need to fasten it at either end, and the shafts being very close together, the wire will never be perceived. This will hold the lower part of the screen properly together.

And now it is time to thread a strong darning-needle with a long length of white thread, therewith to keep the upper part of the feathers in order. Push the needle through the shaft of the outside feather, about three inches from its tip; the needle should go in at the back and out at the front, and a knot should be ready to prevent the thread from escaping entirely through the aperture. Pass the needle through the fibres, close to the shaft, and draw it out at the back; if you can manage without ruffling the feathers—and as it has been done I don’t know why you should not do it also—pass your needle and thread through the shaft of each feather, not as at first, from back to front, but through the sides, so to speak, of the quills, and immediately pass it through the fibres to the back again, so that no stitches are seen on the right side.

If you cannot pierce the shafts, then you must just span them with the thread, but this will not hold the feathers as firmly as the other plan. You gradually ascend, going through each shaft a little nearer to the top, so that when you have reached the middle feather you are within an inch of its tip; then begin to descend until you come to the other outside feather, at which point you ought to be in a straight line from where you started.

On the smooth soft white surface paint some flowers and leaves, using powder paints for the purpose. The flowers should not be very large representations, and they are not expected to be very true to Nature.

Birds sporting lengthy tails, and butterflies fluttering gaudy wings, add character to those screens, and give them a foreign appearance, but of course more art and genius is requisite for these productions. You must remember to be very particular to draw your brush one way, and that the way of the fibres, or the consequences will be disastrous indeed. You can if you like, cut out flowers, etc., in rice paper, and then gum them on, but the general effect is not nearly so charming.

And now cover the handles. Narrow coloured ribbon, plaited closely, makes a pretty casing; handles which are simply bound are liable to suggest the idea of sprains and broken limbs.

The last thing to be done is to make two handsome round rosettes, large enough to cover all the bare shafts which verge towards the centre, and which are lost to view beneath these ornaments; one is stitched on in the front and the other—the same size and colour—is sewed on at the back, for the same purpose of concealment. The fastenings of the handles should also be hidden by these rosettes.

We will now bid adieu to screens big and little; but I imagine that for such a number and variety you will have made a goodly collection of feathers, and in all probability you have not found use for them all. It is a pity that any of them should be doomed to obscurity, so I will tell you a few ways in which they can be exhibited.

Elegant little baskets may be made of feathers which have been taken from the backs and breasts of birds. Cut the sides and bottom of cardboard, square or octagon, or with as many sides as you please. Cut in buckram as many pieces as will cover the sides; these should be a shade larger than the cardboard. Sew feathers separately on to each piece until they are quite covered; begin at the top, and work down to the bottom. Gum the cardboard together in the form of the designed basket, line it with silk, and then paste the buckram on to the outside. If a handle is added, make it of cardboard, cover a strip of buckram with thin feathers, and paste it on to it. This plan is more secure and lasting than that of fastening the feathers on to the cardboard only with gum.

Pretty penwipers can be made by cutting a round of velvet or cloth, and either edging them or completely covering them with breast-feathers.

You work towards the centre, and when that is reached, you complete the useful ornament by crowning it with a thick flat button, covered with black velvet, the size of a shilling.

If you are benevolently disposed, you may delight the heart of some little maiden by presenting her with a muff for her own small person, or for that of her doll. The former is made of black velvet with bands round of peacocks’ “eye” feathers, or of peacocks’, fastened on to strips of jacquet or buckram. The latter is made of jacquet, on to which small feathers are stitched until the whole is covered. The plumage should all stroke one way, as it does when on the bird itself.

I am afraid you will think that I am always robbing the
peacock, but really it is in a great measure his own fault, for he spreads out his tail-coverts in a vain-glorious spirit, and displays such splendours and magnificence, that he inspires others with the wish to be robed in like manner, even though it must be in borrowed plumes. His "eye" feathers, laid one after another in single file on strips of “jacocet, make a rich, unique, and most recherché trimming for dresses, and also for hats.

If you happen to have a few wing-feathers remaining, you can make another kind of basket. Cut a piece of cardboard either round or square, to serve for the bottom; cover it with watered silk, or else ornament it with a butterfly, flower, or bird; pierce holes with a stiletto all round it, near the edge, and at perfectly regular intervals—they should be pierced on the right side, as the part where the stiletto first enters is always nearer than that where it makes its exit.

Cut your feathers all exactly the same length, and dip the point of each shaft in gum; push them through the holes. They must only just come to the surface on the other side, otherwise the basket will not stand steady.

The feathers stand upright all round, their fibres reaching down to the ground, for no bare shaft ought to be seen. Cover a wire or a narrow flat piece of steel with ribbon wound round it very neatly, and place it inside the basket, nearer to the top than the bottom, and tie each feather to it. This is done by needle and silk, which should match in colour the covered wire. Pass the needle from the inside through the fibres, close to the shaft; just span the shaft, and pass it back again. There may be a handle to this basket or not; but two feathers crossed about one inch from their tips, and fastened together by a bow of ribbon—their other ends being fastened to the wire—form a very pretty finish.

Before closing this description of feather work, let me say a few words relative to the construction of flowers. There is certainly something very stiff and formal about feather flowers, but then some of Nature’s own productions are decidedly prim, and those specimens only should be attempted with feathers as the material. Tulips, daffodils, crocuses, anemones, carnations, and such-like flowers will look the most natural. The general rules are to take two natural flowers, pull one to pieces, cut out the shape of its petals in thin paper, and then, with small scissors, cut your feathers like manner (before using feathers for any kind of work, remember to gum them), then bend the feather with your finger and thumb to its required shape.

Supposing you wish to make a "bachelor's button"—it is a pretty little flower at all times, and looks particularly well when made of feathers; it rejoices in the important name of Ranunculus acris flore pleno, so don't despise it—take a piece of fine wire, and about a yard of green sewing silk; wind the silk round the wire half an inch; then take four wee white feathers, with rounded edges; put them flat and close together, so that they will stand up and look like a little tuft; fasten them to the wire by winding the silk round them closely and evenly. This forms the centre of the flower. Then take twenty petals, rather larger, and, after rounding their edges and bending them slightly back, range them, one by one, round and round the wire, each row a little lower down the wire than the previous one, and no petal directly in front of the one before it. Wind the silk two or three times round each petal. When all the petals are fastened on in this way, form the calyx by winding the silk very closely and evenly over the shafts of the
feathers, and then cover the stem in the same way. The flower, should be kept in one position in the same hand.

The buds are formed of cotton wool, rolled tightly round one end of a piece of wire, in the form of the pattern bud; the little ball is then gummed, and a fluffy part of the feather laid on and smoothed down. The leaves are of green feathers.

Very exquisite carnations may be made in this way, by cutting the petals rather larger and gimping instead of rounding their edges. When stamens are required for other flowers, those from artificial flowers whose day has gone by will stand in good stead; frequently they look fresh, although the petals are spoilt.

In the illustrations on the previous page we give examples of flower and leaf drawn from those composed of feathers.

For fastening the feather petals of larger flowers, fine wire will be found better than silk, and narrow green ribbon is sometimes wound round their stems instead.

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THE USE OF THE REST.

BILLIARDS.

By A. G. Payne, B.A.

THE REST—STRIKING—WHERE WILL YOUR BALL GO?—THE CUSHIONS—INCIDENCE AND REFLECTION.

It is often a difficult point to decide when it is absolutely necessary to use the rest. We have hitherto, in speaking of striking the ball, taken for granted that it is sufficiently near to the player to enable him to use the ordinary bridge made with the hand; but when this is not the case it is necessary to have recourse to the contrivance represented above.

Mr. Bennett, in his book on billiards, which, as far as we can recollect, is the only one that gives any directions as to how to use the rest properly, says: “In using the rest its head should be placed on the table about the same distance from the ball as the bridge, or a little further. The hand holding the rest is to be on the table, with the knuckles downward. The rest should be held slightly to the left of the cue, say four inches. The cue-butt is to be held between the first finger and the thumb, the thumb being under the cue, which should be raised about a foot off the table. The hand should be on the same
level with the elbow. The arm should work from the elbow, the shoulder being kept stiff; and the hand should work under the chin. The feet should be two or three feet apart, and both at an equal distance from the table."

We are upon the whole inclined to agree with this, with the exception perhaps of holding the rest with the knuckles downward, which is a point we consider at the least immaterial, the generality of players keeping the knuckles up. A more important point is to keep the cue as far as possible horizontal. Many in using the rest strike the ball too low; this is to be avoided except in screwing, when of course it is necessary, in which case the head of the rest should be brought nearer the ball.

As, however, we have quoted other books on billiards, we would warn our readers against the enormous amount of rubbish and inaccuracy contained in many works on the subject. For instance, even Mr. Kentfield, speaking of aiming, says: "In all strokes where it is determined to strike the ball in the centre, or above or below it, the cue should point with precision to that part of the object ball which it is the intention of the player to strike." These words we have quoted are printed in italics. Take a simple case, a very fine cut. It is evident that the finest cut possible would be to cause the ball to strike the object ball on the extreme edge, the limit of a cut being an angle of 90° with the line the striker's ball traverses before contact. Should the player aim as Mr. Kentfield directs, he would point his cue in a direct line with the extreme edge of the object ball, and, consequently, instead of a cut, the object ball would fly off at an angle of 30° instead of 90°.

It is evident that in the case of wishing to hit a ball as finely as possible—should the balls be, e.g., two inches diameter—the cue would have to point exactly one inch away from the edge of the object ball.

Again, we are likewise informed that "there are seventeen different points or sides at which a ball may be struck by the cue, and each point when struck will give rise to a different motion."

The number of different points in which it is possible to strike a ball are of course infinite.

But we wish to be practical rather than mathematical; and as we are writing probably for those who know but little of the game, and the majority of whom will not possess the advantage of a private table, it may be more to the point to give them a few hints how to make their debut.

Before opening the door, listen for the sound of the balls striking, otherwise you may be the cause of what is called "putting a man off his stroke." Even one who is not a player can readily enter into the feeling of being made to start, if just as in the act of striking, after having taken a careful aim, a door behind is suddenly opened.

This is one of many points of what may be called billiard etiquette, on which beginners, of all others, should be on their guard. Speaking to any one in the act of striking, walking across the line of play, etc., may often be done through ignorance, and give rise to extremely unpleasant remarks being made, as any of these acts done "with intent" would be simply deliberate cheating. We should recommend any indiscreet novice to instantly apologize, should he inadvertently balk the striker, and also to remember that some little allowance ought to be made for any one who has missed his stroke through the fault of another.

Another point we would warn beginners about is that, as a rule, in practising all they think about is making a score, and it is on this account that we would recommend them to commence practising with one ball only. It will almost invariably be found to be the case, that when any one is "knocking the balls about" for practice, that the sole object of the striker is to make either a hazard or a cannon, and that, if anything, he thinks less rather than more about "position" than when playing a game. A bad player, too, in eager search to play, or rather to score, will be often observed not even to wait till both balls have done rolling before playing again.

This sort of practice is, of course, worse than useless. Let a learner therefore take one ball, and, before striking, mark with a piece of chalk any spot on the cushion, and ask himself the question, "If I play at that spot where will my ball go?" By this means he at any rate will begin to have some idea of what is called the angles of the table.

For instance (vide Fig. 1), let him spot his own ball on the centre spot in baulk, d, and, by playing a little above one of the middle pockets, let him try and run a coup, by sending his ball all round the table into one of the bottom pockets. This one stroke will teach him, perhaps for the first time, many things about the game that he did not know before. His first impression probably will be, "What a capital stroke this would be if both the other balls were in baulk near each other, over one of the bottom pockets, I should very likely make a cannon, or knock one of them into the pocket." But by trying the stroke over several times he will see that different degrees of strength cause the ball to rebound from the cushion at different angles. Thus (vide Fig. 2), suppose he plays from the centre spot in baulk (very slowly) at the point in the left-hand side cushion marked r, the ball will rebound in the direction P R; but if he plays (of course, in both cases, without putting on any side) with some considerable amount of strength, the ball will rebound in the direction P R'.

It has often been laid down as a maxim in billiards that the angle of incidence is equal to the angle of reflection; this is, however, never absolutely the case, the nearest approach to it being when the ball strikes the cushion with such a small amount of force as to scarcely rebound at all.

If the ball be struck very slowly, the angle of reflection is very nearly equal to the angle of incidence. If the ball be struck hard the angle of reflection is smaller than the angle of incidence.

Thus, in the case we have mentioned (vide Fig. 2), the angle of incidence is the same in both cases, but the angle of reflection when the ball was struck gently, viz., B R N, is considerably greater than the angle of reflection, P R N, when the ball was struck with force.

In the old times, when the cushions were made of felt, which
gave" very little, there was much less difference in the angles
which the ball made with the cushions at different degrees of
strength than in the modern india-rubber ones, that yield a
good deal. Figs. 3 and 4 are an exaggerated representa-
tion of the cushion at the moment of con-
tact with the ball.---Fig. 3 when the ball has been
struck gently, Fig. 4 when the ball has been
struck hard. The arrows show the
direction of the ball in both cases,
and it is evident from the compres-
sion of the india-
rubber of the
cushion in Fig. 4
that in the re-
bound into its
original shape it
will cause the ball
to fly off more per-
pendicular to the
cushion than in the
case of Fig. 3,
where it has not
been so much com-
pressed, owing to
the less amount of
strength with which it has been struck. It is somewhat
strange that many who have played billiards for years are
ignorant of this and many other facts which are in reality first
principles. It is, we believe mainly owing to their concen-
trating as a rule their whole attention on making a score, and
it is on this account we would recommend them occasionally
to play with only one ball. Let any player take a ball and
play a stroke gently up the table, striking any spot on the top
cushion (previously marked) with just sufficient strength to
bring his ball back again into baulk. Let him observe
carefully the angle at which the ball rebounds, and let him try
his same stroke again with the
same strength.

In all proba-
bility he will find
that the ball re-
bounds at a some-
what different
angle. He will
now have ocular
demonstration
that he has not
yet learnt to hit
his own ball pro-
perly, and that he
puts on side invol-
untarily. Should
a somewhat good
player attempt it,
and fairly succeed,
let him try and
hit his ball with
sufficient strength
to send it up and
down the table
times. Even
even the best of players
cannot do this
without putting
on a little side un-
consciously. It
will be found very
good practice for
a beginner to regulate side, and to accustom himself to put on
a small or large amount at will.

Let him play from the centre of baulk (d, Fig. 5) and
play at a spot, r, in a line with the spot, and try first to bring
his ball back straight. Secondly, to put on just sufficient side
to bring the ball back, as shown in the diagram, first into or
towards the right and left bottom pockets and afterwards into
or towards the right and left middle pockets.
ELECTROTYPEING.

By CHARLES HIRSCH.

ELECTRICITY—SIMPLE, CHEAP APPARATUS—MOULDS—SOLUTIONS—TO MAKE A MEDALLION.

It is now about thirty years since attention was attracted by some very remarkable reproductions in copper of well-known basse-reliefs, such as the copy of the “Last Supper” of Leonardo da Vinci, which were exhibited in the opticians’ windows of London, Liverpool, and some other large towns. Most faithful copies they were, to the most minute and accidental particulars, of the plaster models from which they had evidently been taken. There were the initials of the Italian image-maker in the corner, and there was the print of the fracture which had deprived one of the characters of a nose. There was the same blurred indecision about the outline of the figures which a plaster cast would naturally present, when it had been produced from a mould which had in its turn been made from another plaster cast, and so on, in long succession from the original. They were not castings, the metal was too thin; and the peculiar appearance of the under side showed that they had not been raised with the stamp and dies. It was rough and granular, like the surface of a rock which had been formed by geological deposit in the ocean-bed. The depres-

sions, too, had a strange minuteness about them, as though the metal had not been forced into the hollows of the matrix, but had fallen there, as by its own gravity. Curiosity was even more whetted than satisfied when it came about that these beautiful productions were indeed the result of deposition; that the metal had fallen upon the mould, not in a molten state, but in the shape of a shower of grains inconceivably minute, which had massed together by their own power of cohesion; and that the producing agent was that mysterious force which pervades all Nature, of which we know so little, and yet of which every new and startling discovery we have made has proved of such immense importance to man—the force of electricity.

At the expenditure of a very few pence the reader may begin, on a small scale, to produce such curiosities for himself. For apparatus he will require a glass or earthenware vessel (Fig. 1), with upright sides preferably, capable of holding about a quart; and also a small porous vessel, narrow and upright, to stand inside the other (Fig. 2). A preserve jar will answer admirably for the first purpose, and a very small flower-pot, if tall and narrow enough, for the other. But if the latter is not easily obtainable, a porous cell can be manufactured in a few minutes. Roll a piece of brown paper two or three times round the end of a ruler, fold over the end as a grocer would make up the end of a parcel, close it well with sealing-wax, and also fasten up the side seam in like manner. If there is no passage for liquid but through the pores of the paper, it will do well enough. Should the flower-pot be handy, it is to be preferred, but the little hole in the bottom must be stopped up with a cork tightly pressed in, then cut off close, and both sides well covered with sealing-wax or shellac.

Into the outer vessel now put some crystals of blue vitriol, or sulphate of copper, procurable at the nearest chemist’s shop, and pour upon them some boiling water. They will soon dissolve, and the water will become of a deep blue colour; add other crystals, till the water will dissolve no more, when the solution is said to be saturated. Let it stand long enough to test this, and to set cool; meanwhile prepare the other vessel by nearly filling it with water, and pouring into the water a small quantity of sulphuric acid, not more than one part in ten or twelve.

The smaller vessel may now be put inside the larger, and may rest against its side, care being taken to pour off some of the blue liquor if the inner vessel is not tall enough to stand well above the surface.

Now we have to convert this apparatus into a voltaic cell, and make it produce electricity for us. Get a small bar of zinc, about as thick as a finger, and as long, and attach to one end a piece of copper wire. The wire may be wrapped round, soldered on, or, best of all, the zinc may be run round it in the molten state.

A bar of zinc may be easily made, if there is a melting ladle at hand; and any odd scraps of old spouting, etc., may then be used up. Fill a small box with sand, or even fine garden-mould will do, and having rammed it down well, push in the end of the poker to form a mould. Pour the melted zinc cleanly into the hole, holding the end of the copper wire there at the same time, for the metal to close round it. It is desirable, though, to perform this operation as much at arm’s length as possible, for the fumes of molten zinc are deleterious. If a piece of thin sheet iron can be got, and rolled into a little cylinder, to line the mould, the casting will be cleaner and smoother, and better for a purpose that we shall shortly have to describe. The wire may now be cut off and bent over (Fig. 3), so that when the zinc bar is dropped into the porous cell, the end may dip into the blue liquid in the outer vessel. Directly this is done, electric action begins, and a deposit of copper to form upon the end of the wire.

Now suppose we want to get a fac-simile of a small cast or medal. We must first make a mould, and for a medal gutta-percha will make as good a mould as any. Warm and pinch off a small piece, sufficient to cover the face of the medal when spread out to the thickness of about a quarter of an inch, and knead it between the fingers till it acquires the proper consistency to take a good impression without sticking. Then press it down on the medal with the thumbs equally in every part, keeping the thickness pretty even, or, if anything, greater in the middle, where the relief is highest.

When the substance begins to harden, it is useful to give it a good hard squeeze, in order to gain a perfectly sharp impression. Very little ingenuity will effect this: it may be done by placing a pad of cloth upon the gutta-percha, and over that a piece of wood with a heavy weight upon it; or the operator may stamp upon the piece of wood; or, better still, a bar of wood may be inserted in some convenient niche, and brought down upon the cloth pad in the manner of a lever; or, best of all, medal and mould together may be squeezed between two pieces of wood in a vice. For a very small medal a pair of nut-crackers may be made to answer the purpose.

When the mould is pulled away, it will be found to bear a pretty correct resemblance of the features of its model, reversed, of course. Then take the end of the copper wire, and bend it into a loop, and having warmed this slightly in the fire, press it on the back of the gutta-percha mould till it buries itself in the plastic material; then close over, and allow it to get cold (Fig. 4).

We have now to make our mould into a conductor. At present it possesses no chemical or electrical affinity for the copper particles, to attract them to its surface, and if it were immersed, no deposit would form upon it, but only on the copper wire immediately above it. It will be necessary to give it a coating that shall have an affinity, and for this purpose
black-lead is the most convenient material. Brush it over softly with the ordinary kitchen black-lead brush, taking care to reach all the lines in the impression, and also to black the top of the mould, and a little of the wire; for if there is any break in the continuity the operation will fail.

All is now ready for work. Place the zinc plating in the porous cell, and bend the wire so that the mould may hang freely in the blue solution, not touching the bottom or the side of the vessel, but still as far away from the porous cell as conveniently may be. In about two days there should be formed upon the face of the mould a complete fac-simile of the original in good tough copper.

Some ludicrous mishap may possibly have occurred, the cause of which will be at once apparent, and which will only increase the interest taken in the experiment. For instance, the black-lead coating may have been imperfect at one place, when it will be found that the deposit has carefully avoided that spot, and left a gap in the impression. Or perhaps the black-leaded finger may have touched the back of the mould, near the wire, in which case a faithful copy will be presented of that too. If the face of the mould has been touched by the finger before immersion, the chances are that the print of the skin will be found on the metallic copy; or even a breath upon the mould may leave an impression. These little tricks of the volatile agent will only cause laughter, and give zest to the pursuit.

But failure may sometimes occur from causes which are not so obvious, and require explanation, and of which the tyro will require some further knowledge of the subject to enable him to detect.

We hope that by the time he has finished the experimental course through which we propose to lead him, he will not only be an expert manipulator, but will have acquired a fair knowledge of the theory and principles of the arts of electrotyping and electroplating, together with some general idea of the marvellous agent which produces the effects. But we must start with small beginnings, and get together a few concrete facts before inquiring into the why and the wherefore.

The most likely forms of failure, then, are these:—The metal may deposit in the form of coarse dark grains, like sand, having little or no cohesion, and will crumble to pieces under the touch. In that case the action has been too quick. The acid in the porous cell may have been too strong and must be weakened; or the surface of zinc acted upon has been disproportioned to its corresponding opposite, the mould in the outer cell; or lastly, the mould plate. The advantage of having a smooth plug will now become apparent; if not smooth, it should be made so by scraping or rubbing. The mercury does not coat the zinc, properly speaking, but forms an amalgam upon its surface,
which equalises the action of the acid, and performs an electrical duty which we shall explain further on.

So provided, the operator may amuse himself by producing an endless variety of little objects with which to furnish a perfect cabinet of curiosities. He need not confine himself to producing one article at a time; two or more moulds may be hung in the liquid, by arranging the main wire conveniently, so that they may hang clear of each other. But he must remember to add a few crystals now and then, as the solution becomes exhausted.

Almost anything can be copied, only there are different ways of making moulds to suit the material. Suppose, for instance, that he wishes to get a copy of a plaster medallion; the best way to proceed is as follows:—Place the medallion, face upwards, on a plate, into which has been poured a small quantity of clean water. The plaster will begin to absorb the water, and in due time will become saturated with it, producing a waxy appearance upon its surface. While in this state, bind round it neatly, with thread or cotton, a strip of thick paper or cardboard, so as to form a fence or wall round it a quarter of an inch or so in height. Into this pour melted wax—equal parts of white wax and bees’ wax answer best—till the receptacle is full. When cool there will be a perfect mould of the medallion, which will come away easily, by reason of the plaster having been saturated; otherwise it would have absorbed the melted wax. The black lead must not be brushed on a delicate mould like this, but it must be treated lightly with a camel-hair pencil.

Of course a permanent matrix can be formed at any time by simply depositing upon the original article, and backing the deposit up with lead, solder, or even wax; there is only the double process to be gone through; but if a number of copies are required, the trouble will repay itself. In depositing upon metal, however, either medals or moulds, the back and other parts that are to be kept clear must be coated with resinous varnish, and the face with black-lead. Otherwise the deposit would form all over, and would adhere; the article would be plated instead of copied.

One little word of warning may not be needless: it is not advisable to use as models the Queen’s coin. A galvanic battery forms part of the stock in trade of the professional coiner, and moulds made from new shillings and half-crowns might look a little suspicious. Before depositing a mould upon a plaster cast it must be saturated with melted wax, or the acid in the blue solution will soon destroy it. Pour the melted wax upon a hot plate, and let the plaster cast lie in it.

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BOATS AND BOAT-SAILING.

By J. C. WILCOCKS.

THE FIRST CRUISE—SEA-SICKNESS—THE BOAT—GETTING ABOARD—HOISTING SAIL—TACKING—MAKING A BOARD.

He writer does not think it well for beginners to commence boat-sailing in the open sea, as, owing to the mal de mer, to which the majority of unlucky mortals are liable, they may lose time on the very threshold of the subject; he has therefore chosen for the first cruise an expanse of tidal water about three miles in length by nearly a mile in breadth, where the proverbial uncertainty of our climate is not so likely to interfere with daily practice as it is on the unsheltered bosom of the ocean. The lower end of the estuary is almost shut off from the sea by a sandy beach, leaving a narrow entrance on the south-west side, thus converting the estuary into a harbour, and on the inside the beach is rather steep, rendering it accessible to boats at all times of tide.

It is a fine morning in June, not too bright to be disagreeable from the heat, and we have a nice breeze from the west, which although against us, will be of advantage to a beginner, from the many changes of course we shall have to make in beating up to Aloport, a distance of about three miles up the estuary. It is just 9.30, and as it will be high water at noon, and the tide is not strong, we shall probably occupy the greater part of the time on the trip, for the boat will not be sailed to advantage by a young hand, who should be made to steer and watch the sails from the first.

The tyro, like most others of his predecessors in the art of sailing, cannot see how we shall manage to advance against the wind by the aid of the sails, but when it is explained to him that progress in this direction is owing to a resolution of forces which follows from playing off the powers of two fluids against each other, he makes an approach to the comprehension of the subject. He has, alas! not had much experience of boat work, none at all on salt water, or anywhere in fact on water affording sufficient room for sailing, but is fond of sculling and pulling, and wishes much to become acquainted with the management of boats under sail; be he, however, deferred any attempts in this way until the present time, having witnessed occasional efforts ignominiously terminated, from want of experience in would-be navigators, the unfitness of the boats for the work expected from them, or a combination of both.

But here is the boat at her moorings, let us haul her ashore and start with all speed. We have here the contrivance termed an “outhaul” for keeping boats afloat at pleasure, by which we are enabled to dispense with a second boat to go on board. It is a simple plan, not confined to this locality, but often adopted where it can be conveniently brought into use, and consists of a strong rope passing round a post at high-water mark, and through a large block at low-water mark, secured to a heavy stone, or as in some cases to an anchor, so that the boat being attached to this running rope by another short piece, can be hauled in or out as desired. It cannot, however, be used everywhere, but where you have a steep beach in a sheltered position, or the margin of the water consists of a somewhat sloping rock, or you have a flight of steps or a landing ladder provided, it is an excellent arrangement.

Having hauled the boat ashore, we jump on board, not, however, without the remark from our would-be sailor, that the boat appears to be rather a tub, from her considerable breadth in proportion to her length.

This always strikes the eye of those who have been accustomed to pulling on fresh water, and whose attention is called to going boats for the first time, the requirements for a rowing and a sailing boat being so very different.
It was formerly the custom to disengage fresh-water boats and sailors, which is manifestly absurd, for on some of our larger rivers and lakes there are as fine boats, and even yachts of moderate size, as can be found on our sea-board, and on the larger lakes, where the practice very much assimilates itself to that at sea, there are as smart men to work them as are to be found on the sea itself. It must be confessed, however, that in general both the best boats, and the knowledge to handle them, have been imported from the sea-coast, where nautical matters naturally have their cradle.

But to proceed.

In a locker under the seat at the stern we keep a pair or two of crutches of galvanised iron for pulling, and sundry other little matters, such as the tiller, some spare rope and twine, etc.; we ship the crutches, as, although we intend to sail, the sculls, or paddles, as they are called in sea-going boats, will be brought into use at first, to give us a small offing from the beach whilst hoisting our canvas, for, as the wind has come on to blow freshly on the shore, we shall not be able to get off from the beach with the sails already hoisted.

The masts, stays, and paddles, are kept on board the boat, laid along the thwart, and are defended from wet by a water-proof cover longer than the length of the sails when tightly rolled up; the whole are secured by a galvanised chain, which, embracing two of the thwarts and the gear laid on them, is locked to itself, thus rendering the whole beyond the power of any person to remove them. We unlock and cast off the chain, roll up the waterproof cover, stow the latter in the side of the boat, and the former in the locker.

Our next proceeding is to stop the masts. On the fore side of the lower end or heel of the mizen-mast an r is carved, to show the position in which this mast enters its step, and an a on the after side of the foremast for the same purpose. The masts being both in position, the sails are unfurled, and placed conveniently for hoisting. The mizen-sheet is run through the sheave of the outrigger, which is shipped through the transom board, the tack is hooked on to the small hook provided for it, and the sling on the yard attached to the traveller.

The fore-lug sail is next to be arranged for hoisting, and as we intend first to stretch to the north-westward, we place the yard on the right hand or starboard side of the mast, which will be to leeward of it; and as the wind will keep both the yard and sail out clear from the mast, they will be hoisted easily.

The tack of the sail is to be secured in its place through a hole in the thwart in which the mast is stepped, or if there be a clamp for the mast, a cleat or small brass eye should be fitted to the mast to receive the tack, the main-sheet should be fixed and seen all clear, and we can now shove off, after slipping the buoy of our mooring overboard.

Pulling out a dozen yards, that we may not drive on shore whilst setting our sails, as we are two in the boat, our friend aft hoists the mizen, and the writer the fore-lug, leaving the mizen-sheet slack until the fore-lug is set, and the sheet hauled aft, in order that the boat may keep her head out of the wind, which she would not do if the mizen-sheet were hauled aft before the head-sail were set.

In the chart on page 144 the track of the boat is shown in zigzag, which is manifestly the only route by which a boat or vessel can be propelled by the power of the sails against the wind. Each straight line of the zigzag is termed a board, and they are for the most part of unequal length, in order that the boat may be kept as much as possible in the strength of the current, which, during the latter part of the tide, does not run so strongly close to the shore as in the body of the river.

The enclosed spaces in the body and along the shores of the river are banks or shoals of gravel, sand, and in the upper part of mud, which are more or less found in all estuaries, but always in those which form bar harbours close to their mouths.

The arrows denote the direction of the currents: the first close to the beach has but one feather on the shaft, and signifies that there is a return stream or eddy from the direction shown; the other four arrows point out in succession the set of the flowing tide or flood stream.

The track crosses the various banks, there being ample water over them for boats of moderate size on the last two hours of the flowing tide.

The compass is given at the top of the chart for the convenience of reference, by which the course of the boat or direction of wind or current can be ascertained. The scale of the chart is on that of two inches to one mile.

It will be observed that the boat makes ten different boards or courses of varying length, and tacks or goes about no less than nine times before arriving at her destination, in consequence of the adverse character of the wind.

We stand away from the beach on the port-tack, that is to say we have the wind on our left with the boat's bow to the north-westward. The actual direction of the boat's heel is north-east-west, but on account of the eddy stream setting to the south-west against the lee side of the boat, she is helped so much against the wind as to be enabled to make good the course of north-west by north.

This is what is termed amongst sailors "checking the tide under the lee," and the course of the current against the wind, whether it be directly or obliquely opposed to it, is called a "weather set." When the wind and tide are in unison or approximate to the same direction obliquely, the course of the current is termed a "lee set." In a strong lee set and a narrow channel no ordinary small boat will make head against the wind.

A certain amount of adverse tide may be overcome, which process is termed beating or overturning it, but that amount will depend both on the sailing qualities of the boat or vessel, as well as on the capacity of the helmsman to make the most of them.

This power of overturning the tide may be often seen at the entrances of such harbours as that here delineated, where one boat will succeed in making good her entrance whilst another will be staggered in the narrows, and, after an ineffectual struggle, be obliged to run out again, or anchor, should the ground admit of it. But we are now standing out from the beach, and have trimmed our sails so that they work well together, the foresheet—or as it is in fact in this boat, the main-sheet—having been hauled aft until the boom forms an acute angle at the mast with the line of the boat's keel, the after end of the boom being just over the gunwale.

As there is a good breeze, the writer sits on the weather side and close to the helmsman, holding the sheet in readiness for any requirement, whilst our would-be sailor gives his whole attention to steering; which is quite sufficient for a beginner to undertake for the first time.

After having become a little familiar with steering, the sheet should occupy one hand, and the tiller the other, but at first it is difficult to manage both at one and the same time.

The helm is to be kept a little up to enable the sails to be well filled, and the luff of the fore-lug carefully watched, for if it shakes, the helm must be put a little more up until the sail is properly filled.

We will make only a very short board, as the eddy or weather-set does not extend very far out from the beach, we will then tack and stretch to the south-westward, in order that we may check the tide under our lee on the starboard tack.
which we shall then be on, having the wind on the right-hand side of the boat.

On the word being given the helm was put down, but, as is commonly the case with beginners, much too suddenly, the consequence was that the boat came up to the wind with her way so much deadened, that the rudder had no longer sufficient power to bring her about, and she fell back again on the same tack.

This might possibly, after the commission of the error, have been prevented by the writer taking certain prompt measures with the helm and sails, but he is of opinion that it is preferable to allow the consequences of an error to follow, when no danger is involved, rather than prevent them, because these consequences will impress the error on the mind of the learner, who will therefore, on being instructed, take the required measures to prevent it in future.

The beginner almost always requires to be told that a boat should be sailed round to the next tack, and that no attempt should be made to force her head suddenly to an opposite direction. It should be managed as the writer is about to describe in the present instance.

The beginner was instructed to keep the boat what is termed "a good fill," that is to say, to put the helm up to cause the boat's head to fall off, until the sails felt the full power of the wind, then letting her run four or five lengths, so that she had gathered good way, the boat on putting down the helm gradually came readily to the wind, and not losing the whole of her momentum after the sails had shaken, passed what may be termed the point of hesitation, and the end of the boom being steadied a little up to windward, she fell off, the canvas filled, and she started on her next board to the south-westward.

The boat will not stand nearer to the wind than south-west by south, but through the assistance of the strong weather-set of the flowing tide against her lee side, she makes good a course to the south-west.

The writer has marked the direction in which the boat's head points by a dotted line, the difference therefore can be plainly seen between her apparent and actual line of progress, which is a great gain to windward. If there were no tide in her favour, although she might point or look, as it is termed, up to south-west by south, she would not stand on that course so as to make it good, but would fall somewhat to the southward of it, so that her advance to windward would be but slow, and should the tide have turned, and have made with any strength, she would have the ebb stream on her weather side, and the most she would do would be to sail to and fro on the same or almost the same line of direction, until she must drive away to leeward by the power of the lee set, if sailing were still attempted on the increase of the ebb stream.

As long as the strength of the weather-set of the current continues to be the same the difference between the real and the apparent courses would be alike, it is therefore not considered necessary to continue the dotted lines, but only one line has been marked, so as to show the agencies that are at work, and how they affect the movement of a boat through the water under certain given conditions.

Our second board has brought us nearly opposite the entrance of the harbour, where we are in the strongest part of the weather-set of the tide, and as there are cliffs and very high land behind them to the south and south-westward of the beach towards which we are standing, we determine to go about again and, without further delay, commence our third board.

Under high cliffs, when the wind draws off them, it is often very uncertain and baffling, and frequently ceases for nearly half a minute at a time, and again returning in flaws or blasts of more or less violence, is the very opposite of conducive to a boat's satisfactory progress; we begin to experience these calms and flaws by turns, and as we shall keep in both a better wind and tide towards the middle of the bay, and by aid of the tide, and by aid of the tide, we tack to the northward, and are enabled to make good a course of north-west by north again.
CHES.

By John Wisner, the English Champion.

THE MYSTERY OF THE AUTOMATON—CHECKMATE—THE NOTATION—A PROBLEM.

FEW visitors to the Crystal Palace have failed to observe that singular specimen of mechanical art—the automaton chess player. That a figure should be constructed capable of playing the game (as one was by M. de Vaucanson) was singular enough; but the original inventor of the automaton chess player claimed for his mechanism the power of analysing the intricate combinations of the game of chess. The delusion has long been exploded; but for many years the inventor, two feet wide, and four feet long. All the portions of the apparatus were fixed together, and could be moved to any part of the room.

When an antagonist presented himself, the first proceeding was to open all the doors of the chest and expose the interior of the figure, so as to show that there was "no cheating." When the doors were opened, the chest was seen to be divided into two unequal parts, with drawers at the bottom, the whole, including the body of the figure, being filled with wheels, springs, and other apparatus of clockwork. After the inspection was finished, the doors were closed and the automaton began to play. His movements were deliberate. His arm moved slowly to the piece he intended to play; it was deliberately grasped and deposited on the destined square. All the while a noise of clockwork was heard. If "check" was given, an inarticulate sound was emitted from the figure; if any rule of the game was infringed, the automaton would make the offender lose a move. Napoleon I himself made three illegal moves in succession on one occasion, whereupon the figure swept the pieces from the board, and declined to proceed further.

Such was the marvel which at once amused and baffled Europe for many years. It was bought at great cost by Frederick the Great, who threw it aside after the first charm of its novelty had passed away. But in 1804 it reappeared, in the

attained great renown by the possession of a secret which seemed to defy analysis. The automaton at the Crystal Palace is not the first of its kind, nor is it by any means comparable to the splendid original.

The first automaton was constructed by a Hungarian gentleman, Wolfgang de Kempekin, in 1769, after a promise to the Empress, Maria Theresa, that he would produce a piece of mechanism more striking than any she had ever seen. The period was marked by a mania for inventions of this kind—extraordinary clockwork, flute-players, and the like, but de Kempekin kept his word. In a few months he excited the enthusiasm of Europe by a mechanical chess-player, capable not only of playing chess well, but of defeating the best practitioners of the time.

The delusion was complete. The automaton was a figure attired in Oriental costume, seated on a chair. Before him was a chess-board fixed upon a chest about three feet in height,
possession of M. Maetzol, and made the tour of Europe with unabated success, visiting England in 1819. About this time, easily be removed from one part of the interior to another. The hidden player was seated on a stool, and could transfer himself

most scientific men had come to the conclusion that the "inanimate reason" was really human agency; and that a as readily as the pasteboard machinery. When a door was opened, the man was in the other compartment or in the body of the

living person was concealed within the figure. But nobody could explain in what way. The crowd of wheels, springs, automaton. (See Figs. 1 and 2.) The mode of conducting the game was of course the most ingenious and difficult part of the con-

tubes, etc., seemed completely to fill the small space within the chest and figure. They did not, however, fill either. The apparent mechanical apparatus was of pasteboard, and could trivance. Under the chessboard, which stood upon the top of the chest, was a converse board, exactly representing the one above, except that each square was numbered according to chess
notation, and that under each square of the inside board was suspended a small metallic ball by a silken thread. On each of the pieces above was a magnet. The mystery is now plain. Whenever a piece was moved to a square, the magnet at the bottom of the piece drew up the ball below; whilst the ball suspended below the square from which the piece was moved immediately fell to the extent of its silken thread. Thus the hidden player could watch every operation on the board above.

He repeated the moves on another board, decided upon his course of action, and then worked the arm of the automaton by springs. The player who conducted the operations with so much success for many years was a M. Mouret. He was not a first-rate; but the advantage of being enabled to try conclusions over the board, while the adversary was not allowed to touch a piece unless he moved it, enabled him to win against almost all comers. The original automaton was lost somewhere in New York.

But to return to our lessons.

It often happens that checkmate is given through the king being blocked up or surrounded by his own pieces. The last example I shall give is a singular specimen of this class (Fig. 3).

Here white began by advancing his king's pawn two squares or to the fourth square of the king's file. This move would be called pawn to king's fourth. Black answered also with pawn to king's fourth. White then played his king's knight to king's bishop's third, and black answered with queen's knight to queen's bishop's third. White then moved out his queen's knight in like manner, and black brought out his king's knight.

Abbreviated, these moves would stand thus:

- **White**: 1. P to K 4.
- **Black**: 1. Q Kt. to B 3.

As it is highly desirable that the learner should become well acquainted with this branch of the subject, without which he cannot follow the games and problems I shall submit to him, I subjoin two diagrams, showing the notation of all the squares from the white and the black sides respectively. For the sake of clearness, the distinction of colour is omitted. The first diagram gives the moves of all the squares, counting from the white side. (See Figs. 6 and 7.)

Fig. 6. WHITE.

Fig. 7. WHITE.

Here the king is surrounded on all sides by his own pieces, so that he cannot move. He is checked by the knight, which can leap or check over the heads of his foes. As the knight cannot be taken, it is checkmate.

The learner is now in possession of the primary elements of the game. Before he can go further he must attain a knowledge of the notation by which the moves are described, for unless he does this, further attempts at book-learning are impossible. The notation is very simple, but absolute mastery of it is indispensable. In Fig. 4 the men are placed again for the beginning of a game.

The square on which the king stands is called the king's square, that on which the queen stands the queen's square. The pieces on each side are named after the king and queen, thus:--king's bishop, king's knight, king's rook; queen's bishop, queen's knight, queen's rook. The square on which each piece stands is called its own square, that in front of it, its second, third, fourth, etc., to the eighth. Thus each piece has a file of its own. King's first, which is simply called king's square, is followed by king's second, king's third, king's fourth, king's fifth, to king's eighth. Each player notes from his own side. If a white piece is played to any square, that square is calculated from the white side, if a black piece, from the black side. Thus the learner will readily see mystery is now king's rook's sixth is the black king's rook's third, the white king's fifth the black king's fourth, and so on. Fig. 5 will afford an illustration of a few moves on each side.

It will be seen that the expressions for the various moves are abbreviated in the diagrams. This is always done in practice. We do not write king's square, but K sq.; not king's bishop's sixth, but K B 6; not queen's rook's seventh, but Q E 7.

The beginner will easily perceive from the diagram how each player records his moves from his own side; so that the black king's fifth is the white king's fourth; the white queen's bishop's sixth the black queen's bishop's third; the queen's rook's seventh of one the queen's rook's second of the other; etc. He will also observe that there is no "first" square. The first square is "the" square; the next is the second.

Having given a few examples of the king in actual checkmate, I will now proceed to offer a few simple cases where the king, not being in mate, may be easily forced into it.

In the position shown in Fig. 8, white can compel checkmate in three moves:

White begins:

He has evidently no other move.
2. R Q B 4.
3. R K 8 -- checkmate.

The black king is evidently forced to return.

And the position is similar to the first simple example of checkmate we considered.
No one can be a good conjuror unless he is able to "palm" well. Those of our readers who ever saw Herr Wiljakob Frikell—whom we take as the model conjuror of modern times—will perhaps be surprised to hear that very many of his tricks depended on his skill in "palming" alone.

We will explain, for the sake of those who do not know the meaning of the term, what "palming" is. It is simply taking anything in one hand, and apparently placing it in the other, when all the time it is retained in the first hand.

Now, to do this effectively is exceedingly difficult, and perhaps no sleight-of-hand requires more practice. Let a learner of the art of conjuring take any article—a cork perhaps is as good as anything to begin with—and try and palm it; and suppose, to start with, he palms it from the right hand into the left.

First take up the cork between the finger and thumb of the right hand, and in pretending to place it in the left hand, shut the left hand, but keep the knuckles bulging out as if there was really something in it, and at the same time retain the cork in the right hand, concealed in the palm as much as possible.

Bear in mind. First: To hold the left hand naturally. To do this, place the cork, or whatever is being palmed, really in it, and see how the hand looks, and then imitate as nearly as possible the position when the hand is empty.

Second: Do not be in too much of a hurry to take away the right hand with the cork concealed in it after pretending to put it into the left, as it will at once excite suspicion.

Third: Try and attract attention to the left hand, by pretending to squeeze what is in it, this can be done by slightly and quickly moving the tips of the fingers, which are just, or nearly touching the hand, as it must be borne in mind that it looks more natural—i.e., more as if there was really something in the grasp—if the tips of the fingers are an eighth of an inch away from the hand.

Fourth: Be very careful to keep your own eyes fixed on the left hand. If for one instant only you allow your eye to glance at the right hand slowly conveying away the concealed object, you will be certain to be at once detected.

People are very apt to watch conjurors' eyes, and it is often and well said, that if you want to find out how tricks are done don't watch their eyes, watch their hands. However, you may depend upon it that they—i.e., the audience—will watch your eyes, and will persist in watching what you watch.

In fact you may so safely depend upon their doing so sometimes, that you can purposely look in order to make them think they have found something out.

When speaking of the trick of bringing the bowls of gold fish out of the empty cloth, we recommended the performer, sometimes, after he had safely got the india-rubber cover in his pocket, to purposely pull about the cloth in a nervous manner. Now, to call general attention to this, it would only be necessary to glance at it. Some one is instantly sure to want to examine the cloth.

So in palming, it may occasionally, but very seldom, be desirable to really put the object into the hand, and then take away the other hand rather awkwardly, and at the same time let the eyes follow the hand going away. Some person is instantly (especially that fearful bugbear to the amateur, a horribly sharp child) sure to exclaim, "Ah, you have got it in that hand!"

Of course you can instantly open the hand, and show that the speaker is wrong. You by this means turn the laugh against him, and, what is still more important, in all probability stop him another time from saying something unpleasant, when he really does see that which you do not intend him to see.

The next point for consideration is what is to be done with the article when it is safely passed away. This depends very much upon where the conjurer stands.

For instance, if he is behind a table with a cloth over it, the article is easily dropped, but palming is much more commonly required when the performer is walking about the room away from any confidante or any article of furniture.

This brings us to another point in conjuring which no doubt many people when they read it will be very much surprised to hear, viz., the use of the magic wand.

We have often heard it remarked, "Of course we know that that wand is all nonsense!"
LEGERDEMAIN.

Is it? That magic wand is much more useful than most people imagine. In fact, some tricks absolutely depend upon it. But we will confine ourselves now to its general use. We left our novice in palming in the following position,—We suppose him to be standing—of course in an easy and graceful position, and with a pleasant smile on his face—with his left hand slightly stretched out, the knuckles of which are bulged from what is inside, so much so indeed that the tips of the fingers can scarcely touch the inside of the hand, he is evidently squeezing what is in it, from the slight motion observable of the top joints of the fingers; his eyes are fixed intently also on his left hand. The right hand, the back of which is turned towards the audience, has dropped naturally down, but, oh, deceitful creature! in that right hand is concealed the cork (or other article)—and were we to stop here, he would not know what to do with it.

But we will suppose him to possess two things, a magic wand and an inside pocket in his coat.

We will, for the sake of boys who long to begin at once, very quickly tell them how to make a magic wand. Get a small round ruler about a foot long, and cover it over with a sheet of bright tinned paper, such as grocers use to wrap tea and cocoa in. A little glue or strong gum will fasten the paper on securely, and all that is required is a little patience to wait till the glue is dry: we know that this is hard, and sympathetic.

Suppose that the happy moment has arrived, the wand at last completed and placed in the pocket for use.

Then, to continue the palming, in taking the wand out of the pocket with the right hand, drop the article concealed into the pocket. And now again we must recommend patience. The trick so far as the palming goes is complete. The mind is at ease, which can never quite be the case as long as the article is in the hand, but do not use the wand directly, still keep the eyes fixed on the left hand; and still pretend more than ever to squeeze what is in it. Wait at least half a minute after taking the wand out of the pocket, and then holding it loosely between the finger and thumb (thereby showing for the first time the right hand really empty), tap the knuckles of the left hand gently, say, “pass!” open the hand, and, lo, it is empty!

Very few would believe from merely reading this account how exceedingly effective this trick, which is in fact the very backbone of all sleight-of-hand, really is. And we would recommend any one who wishes to learn how to do it, to go and see some good conjuror perform. We can assure him that even now, after being told about palming, that were he to see Fritell, for instance, palm a handkerchief, he would feel inclined to declare that it was really in the hand, so wonderful was his power of deceiving the eyes.

In all tricks it is an important point to allow a certain time to elapse between what in future we shall call the “critical moment,” and the “dénouement.” Thus, in the gold-fish trick, the critical moment was bringing the bowl from the pocket and getting it into the cloth. The dénouement was of course produced in the bowl. It is of considerable importance that one should not follow the other too quickly. Again, in palming, the critical moment, or rather the critical moments, are pretending to place the object in the hand, and managing to drop it unconcealed into the pocket when getting the wand.

If the left hand were instantly opened after pretending to place anything in it, there would be no trick at all, we should the performer instantly, on taking the wand out of the pocket, use it, and open the left hand, suspicion would fall directly on the last movement, and very likely some one would say, “Ah, it is in that pocket!” but by waiting, the attention is distracted, and the general impression after, is that somehow or other you have worked it up your left coat-sleeve. If you are asked to pull it up to satisfy them, don’t. They are on the wrong scent, and palming is so often used, and is so important, that they had better so remain.

The trick that we mentioned in our last article (p. 85) under the name of the great portfolio trick, is one of the best instances possible of the importance of waiting some time between the critical moment and the dénouement. We will at once proceed to explain how this clever trick, which for a large one is one of the very simplest, was performed.

We described the portfolio as being about six feet long, by rather more than three feet wide, though when closed it was not more than three or four inches in thickness. Now it will be seen that when open with the inside away from the audience, a considerable amount of space would exist, and that if placed upon a table covered over with a cloth, down to the ground, there would be no difficulty in bringing out very many articles of a considerable size, as it would be impossible to say whether they came from under the table, or from the interior of the portfolio. But then we also stated that the portfolio was placed on a small stand, beneath which it was possible to look, and impossible to hide anything.

How then was it possible to bring out a little boy and girl, besides live ducks and geese, and other things?

Those who ever witnessed the trick carefully would have observed that, while the stand beneath which it was “possible to look,” was being placed in position, the portfolio was just for one instant placed on another table (a covered one), and then opened, and quickly lifted forward on to the stand, and that the conjuror allowed some little time to elapse before producing anything very wonderful from the inside.

By this time, however, the majority of the audience had forgotten that it had been opened on the covered table. This opening period, although a very short one, was the “critical moment” we speak of, as, almost as quick as a flash of lightning, were then lifted from behind the table, a boy, girl, ducks, geese, etc., and placed inside the portfolio. Of course, after the performer had brought out a few trifling things, such as children’s toys and sugar-plums, and thrown them right and left, the audience were amazed to see a real little boy
and girl make their appearance out of what, when closed, was not more than three inches in thickness, but having brought out those, which is evident could not have been confined in the space, as well as live ducks and geese, the performer again closes the portfolio and shuts it up, so that everybody can see that it is not of greater thickness than we have mentioned. He then re-opens it, and produces, as we said in our last article, a wire bird-case some two or three feet square, and a large wooden box about three feet long, two feet wide, and two feet deep. Where can these possibly come from? From the portfolio really. Both are made to lie flat by means of hinges at their sides, and when pulled up, shut with a spring which keeps them steady.

A spring opera-hat will give some little idea of what can be done in this way, as it must be borne in mind that these articles are not afterwards handed round for inspection, in fact, conjurers very rarely give boxes to be examined.

We will now proceed to explain how a very ingenious small trick is performed, which can be bought at some toy-shops for as little as sixpence. Fig. 1 is a round box, which opens in the centre, and discloses a small black ball inside (Fig. 2), which can be taken out and examined. The black ball can then be placed in the pocket, and the empty box closed. On opening the box, the black ball appears inside, on re-closing and re-opening the box, it is again empty, and the black ball can be produced from the pockets. The illustrations will explain how this is done.

The box opens in two places. If opened between Figs. 4 and 5, the box appears empty, if between Figs. 3 and 4, it has the appearance of containing the black ball, though Fig. 4 is not a ball, but hollow, and with the top painted black to resemble one.

If the box is a pretty good size, and well made, Fig. 3 will fit on to Fig. 5, in which case the box can be given to be examined by placing the black ball inside, and removing the part (Fig. 4) altogether. Of course the box is by this means made shorter, and this may be noticed, we would therefore advise that it should not be given to be examined, still it is worth knowing how to do so, if it is particularly asked for. Or the box can be placed in the pocket for some little time, and then (after Fig. 4 has been removed) placed on the mantelpiece carelessly; some one of course will go and examine it, but they can find nothing out, and, owing to the lapse of time, the slight difference in the height is less likely to be noticed.

To show how useful palming is, we will explain how much more effective this little trick can be rendered by its aid. Take out the black ball, and close the empty box, having the wand ready in the pocket, place the black ball (apparently) in the left hand, take the wand, and touch first the hand, and then the box, and say "pass." Open the hand, which is of course empty, open the before empty box in the top place, and there seems to be the black ball.

Another small and amusing trick, which can be bought for a shilling, is that of boring a hole through the nose, and passing a piece of string through it. The nose is apparently pierced with a small blunt bradawl, of which there are two, one to be examined and the other not. The one retained is made like the small daggers used at theatres, which go up into the handle when pushed, and which gives the appearance of going into the body. The one which is given to be examined is of course a real one.

Fig. 6 represents a small wooden bridge, which is placed over the nose immediately after it is pierced. The string works round inside the woodwork, but looks on pulling it as if it went straight through the nose. The bridge (Fig. 6) can be easily made with the help of a glue-pot, two or three sticks of firewood, and a piece of whippord, which is better than string, as it is less likely to catch.

The tools required to make this are very simple—in fact a plain pocket-knife would do, but we will refer our readers to our papers on joinery, should they wish to turn out a neat and workmanlike article, and we would recommend them also to read and study those same papers very carefully before proceeding to make a proper conjuring table, which we intend before long explaining how to do.

But we have not yet explained how to pick out the marked shilling from the hat. We have no doubt but that many have guessed it, but we are still more confident that many have not, and we would remind the latter class that we before told them that conjuring generally depended upon very simple means. And the very simple means by which this trick is done is as follows. The marked shilling is sure to be warmer than the others, owing to its having but very lately been in the hands of those who marked it, and all the conjurer has to do when he puts his hand into the hat is to take out that shilling which is perceptibly warmer than the rest. Care, therefore, in performing this trick must be taken to have the shilling cold at starting. For instance, it will not do to take them fresh from the pocket, and place them in the hat, as the warmth of the body is as bad as the warmth of the hand, and it would be impossible to distinguish the shilling which had been in the latter. Care, too, must be taken that only one shilling is removed from the hat, as sometimes people will take them all out, and look at them, marking only one of them; of course when this is done, you cannot determine which one has been marked.

The trick called "burning the handkerchief" is one that requires no apparatus, but simply depends upon sleight-of-hand. Ask any lady to lend you her pocket-handkerchief, and have a lighted candle somewhere near, pull the centre part of the handkerchief between your finger and thumb, and thrust it into the candle while it is blazing; you can call her attention to the name in the corner, in order to prove that it is really hers. You can afterwards roll it up into a small ball, take your magic wand, and touch it, shake it out, and it is restored again as it was before. We will explain how this trick is done in our next paper.

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**DRIVING.**

By Wm. Bradwood.

**CONCLUDING APHORISMS—THE REINS—TURNING—A LIGHT HAND—RULE OF THE ROAD—AVOIDING DANGERS—LADY DRIVERS—SLUGS—SHIRES.**

Few more standard aphorisms may not be out of place for the benefit of the tyro. Let him commence by casting an eye over his harness: at first, rather that he may learn by inspection the place for everything and everything in its place; but later, when he has passed his apprenticeship, still he should do the same, and this time with a master's eye, to see that nothing is wanting before he mounts to his seat. Let him note that the breeching, if in single harness, is neither so loose as to be
DRIVING.

useless, nor so tight as to hamper the action of the horse and to rub the hair off. Let him see that the rein is on the proper bar of the bit; else if the horse has been accustomed to be driven from one bar, and his bitting is suddenly altered, his manners will probably change at the same time. If he is driving double harness, let him note the length of his traces, and see that his horses are properly "pivled up," else the carriage will overrun them down hill.

In very light single two-wheel harness, broaching is sometimes dispensed with, and the holding back done from the saddle. It looks more elegant and shows more of the horse; but of course it adds to the wear and tear of his fore-legs down hill, by throwing the whole weight of retention upon them, instead of letting the hind quarters bear their share with the breeching; and with a heavy load, such a system is unsafe, however good the horse may be on his fore-legs.

Having cast a careful glance round his harness, the driver will then proceed to mount.

Let him take the reins in his hand before he mounts the box, then, when seated, let the "near" or left-hand rein pass between the forefinger and thumb, the "off" or right-hand rein between the fore and middle fingers—palms of the hand uppermost.

Then let the grasp of all the fingers close tightly on the upper loop of the rein, which should pass out under the remaining fingers. Though the grasp should be tight the torch should be light; let not the exercise of the muscles of grip confuse the driver into adding to this a tug from his shoulder upon his horse's mouth. However light a horse's mouth is, or supposing he is a sing, that does not take his collar and run up to his bit, still the driver should always feel the mouth, else he has no control over him in sudden emergency if the reins are hanging loosely. There is more danger in driving a sluggish or dead-mouthed horse in a crowd, than a free goer. The latter runs up to his bit at once, and so feels your orders; the sing does not feel, and may interpret a touch of the reins to direct him into an order to stop in the teeth of a Pickford's van, or on a level railway crossing in sight of an express. Whisper, must keep a sing to his collar, and so to his bit, or the absence of constant communication between his mouth and his driver's hand may lead to collisions. And now in the seat, and the grasp of the reins first secured, let the tyrro make a start; not in a hurry, not with an instant dose of whisper—a word of encouragement to his horse should suffice at first. Even supposing he knows beforehand all the characteristics of the animal, warranted quiet in harness, he had best progress steadily and surely, till he feels that he has even this docile beast fully under his control. Let him learn to allow free room for his own wheels in turning corners or passing obstacles: he has got two things to provide for, his vehicle as well as the horse. Better give a wide margin at first than collide; though before long his eye will guide him, and he need not then make himself conspicuous as a greenhorn by giving too wide berths at corners and rencontre. Go steadily round a corner; remember there is such a thing as centrifugal force; and a two-wheeled vehicle, high hung, may easily be upset to the outside by a hasty whick round a sharp corner, even without the help of a bank to lift the inner wheel.

Then, as to the rule of the road. If he meets anything coming the opposite way, he must take it on his right hand; if he overtakes it, on his left; if he is overtaken he must keep to the left, and be passed on the right.

"The rule of the road is a paradox quite,
For if you go right you go wrong, and if you go left you go right,"
is an old saw which he may bear in mind as implicitly as do sailors the rhymes which tell of the rule of the road at sea.

Down hill he should progress carefully, especially when on two wheels, for then the extra weight of the cart hangs on the pad or saddle on the horse's back. A stumble and fall will probably break the shafts, certainly cut the horse's knees, and may pinch the occupant over the splash-board. Let him hold well in, sit well back, play firmly and lightly with his hand, ready to hold up sharply in event of a stumble. Even a sure-footed horse may make a false step from the pain of a loose, sharp-pointed bit of stone cutting his foot. A judicious and timely support from the rein may save the horse and preserve his balance, by thus suddenly shifting part of the weight of his head and neck on to the carriage itself. When the tyrro has forfeited that name, it will be time enough for him to indulge in a little extra steam towards the bottom of a valley, so as to "cheat" the next hill of some of its terrors by the impetus thus gained. On four wheels, and with sure-footed horses, these tactics are safe enough.

Next to a powerful seat the mouth of the horse, and the lightness of the hand upon it, are the requisites. "Half the value of a horse is in his mouth," is an old maxim. Few owners are aware how much "manners" depend upon the bitting and handling of a horse. Shifting the rein from one bar to another makes all the difference in the going of the horse. The mouth is the link of communication between him and his driver; the bit must control him without fretting him, and the touch of the hand, unless light, deadens its own injunctures.

As he progresses in his craft, he will note many other minor details, apart from mere safety, which conduce to the welfare of his horse and carriage also. Though he is bound by rules of road at encounter, he may choose his own path when all is clear; he need not take his share of rolling into shape newly-laid stones, if a smoother passage presents itself. Even if he cannot altogether avoid stones, he may yet ease the draught if he can manipulate only one wheel on to a smooth surface.

But suppose all this time we have been talking to a lady. Well, the opening sentences, as reins, rule of road, care at corners, and such-like aphorisms, apply equally to her, for her strength is less and her seat less advantageous than that of a man. The latter we have already condemned; but since ladies will insist upon fashion at all hazards, we must assume that our fair friend in this case is making the best of a bad job, and is driving from one of the stereotyped powerless lounges of a lady's phaeton. It is more because of this sacrifice to elegance, than to the difference in physical strength between women and men, that "manners" command so high a price, apart from make and shape, in ladies' harness horses. Artificial high action is also inoculated by early lessons at 'draught' across deep-ploughed furrows, to give the animals an appearance of higher mettle than they can safely possess. Now and then mistakes are made, and animals are selected which a lady could control from a box seat, but which are beyond her powers from the armchair seat of a phaeton. Even if no bad casualty occur, a dispute with the trader for breach of warranty as to "quietness" is the result of the system. Well, it cannot be helped. Let us assume and hope that the pony is a quiet one, and that the lady has nerve. Though the pony is quiet, we also hope that he is a free goer; if not, he will work only as much as he likes. A lady at the best of times has no great strength of wrist to wield a whip, and with a splash-board as high as her face between her and her quadruped, she can only administer a "reminder," which may suffice if he is free, and springs to a touch of the lash; but real "punishment" is out of her power.

But of all ladies' phaetons the most dangerous are those in which four occupants sit inside, those riding backwards sitting вид-вид to the driver, who thus has to drive over their heads, and is farther removed than ever from control of her pony, for which propinquity as well as elevation is essential. It may
seem a light matter that a lady should be so placed as not to be able to punish her pony severely; her gentler nature of mercy may lead her to think this but a slight drawback, involving only slow progression at worst. Yet, with a slug or a shier there is danger; for the former, if he cannot be made to run up to his bit, may bring her into danger where she seeks to guide him clear of passing vehicles, especially in a crowd; and though it is always best in the case of a shier to undeceive his terror, by leading him gently up to what frightens him that he may smell and reconnoitre it, and so reassure himself for the future, yet there are times when a shy horse that cannot be whipped up to his bit may involve those behind him in a dangerous predicament. Shiers are *prima facie* outside the warranty of "quiet to ride or drive," but slugs are compatible with the terms. He who caters for a lady in horseflesh should avoid the latter almost as scrupulously as the former.

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**PHOTOGRAPHY.**

By J. C. Lawn.

The plate will now be ready for exposure in the camera, and it should be kept as nearly as possible in the same position as that shown in the last Figure (p. 93), until the exposure takes place, and on no account turned over or laid flat, or the solution will run about the plate and cause stains and marks in the picture.

All this time, however, our sitter has been anxiously waiting the advent of the magical tablet which is at once to prove her beauty and our skill; we therefore wrap our slide in a cloth, in order to exclude any stray light from the plate, and proceed to take our first portrait.

The first thing will be to arrange our sitter so as to secure the best view of the face, and we soon find that any position is better than one which seems to be the favourite with many photographers—that of sitting directly in front of the camera and looking into the lens. We therefore turn the head slightly round towards the shaded side of our studio, until we get a three-quarter face, and instead of holding the head up, so as to produce an idea of a stiff neck, we ask our sitter to look slightly down, not merely turning the eyes down, but slightly inclining the head.

As we only intend taking the bust, we need not trouble to arrange the hands, but we turn the figure so that it may not be in exactly the same plane as the face, in order to secure as graceful a pose as possible.

This being secured, we return to our camera, and by means of a line drawn with a pencil upon the ground glass, adjust it so that the head occupies a nearly central position upon the screen.

The focus is now finally adjusted, by means of the rackwork, and the cap replaced upon the front of the lens-tube. The focusing screen is now withdrawn—taking care not to move the camera—and the slide containing the plate inserted in its place, the whole of the camera being covered with the cloth in which the slide was wrapped.

The hand is now inserted under the cloth, and the sliding-shutter gently drawn up to its full height. Now all is ready, so, with a final glance to see that our sitter still retains the position in which she was arranged, we draw the cap to the edge of the tube, so that it may be removed without shaking the camera, and observe, "Now, miss, please to let the eyes rest upon that spot, to remain perfectly still, and to put on a pleasing expression." As soon as the smile caused by the repetition of Mr. Hello’s formula has slightly subsided, we slip off the cap, count one, two, three, four, five, pop the cap on the lens again, and there, no doubt, we have secured our first portrait.

As, however, this remains to be developed—an operation which must be performed in the dark-room—we again re-insert our hand under the cloth, close the slide, and take our plate, slide and all, still enveloped in the cloth, into the laboratory, to undergo the process which will at once prove the success or failure of our operations.

It is with no slight anxiety that we retrace our steps to the dark-room, slide in hand, in order to develop our first picture. Shall we succeed? Have we left anything undone? Has our sitter moved? These, and twenty other questions rise in our minds in the few moments between the exposure and development of our plate. Well, if we have, the murder will soon be out now, we think, as we place our dark slide down upon the operating table, and carefully remove the plate. Shall we see our picture now?

We hold our plate so as to examine its surface, half expecting to see some trace of a picture upon it, but no, there is not even an outline.

We look through it and find no suggestion of a picture; simply a clean flat film of a yellowish creamy tint and character, without any alteration whatever through exposure to light. Stay! is this correct?

That is what the first experimenters thought before the idea of a latent impression was hit upon.

To them our plate would have been a failure. They expected that the image would develop itself in the camera, so that when the plate was removed, the picture would be visible, and at most only require fixing. This was the object aimed at for some time, but it was found that it was only by prolonging the exposure for an enormous period that any impression could be produced directly in the camera.

Fancy, if you can, the sufferings of the enthusiast who really did sit for three mortal hours in the full blaze of a summer sun, in order to be photographed, and then bless the happy genius who discovered that in less than three seconds the picture had been perfectly impressed, and only required the persuasions of a little developing solution in order to induce it to reveal itself.

Let us therefore try what our developer will do for us. We pour our solution of sulphate of iron into a measure—about half an ounce will suffice—and holding our plate by the same corner as we did while applying the collodion, and, as shown in the illustration, we by a dexterous turn of the hand at once, in a clean even wave, cover its entire surface.
We do not, however, pour the whole of the solution off; but, by raising the plate, so contrive matters as to keep enough of it on to flow gently backwards and forwards over the film. For a few seconds there is no perceptible change, and we begin to doubt our success; but, stay! there comes something. The film begins to darken, and now—there is no doubt about it—it is the outline of the white lace collar. More and more distinct it grows every moment, and now we can trace the outline of the head against the background, then the light over the face—now we see the eyes, and now one or two of the higher lights of the dress—Stop, we must wash off the solution now, or we shall go too far.

Very thoroughly indeed must this washing be done, or our plate will become stained in the fixing process. And now, it is a picture certainly, but one of a very remarkable character. In the first place—as we look through it—we observe, that what should have been a white lace collar is decidedly the blackest part of the plate. Then we see that the black silk dress is in its darkest shadows represented by the lightest parts in our picture. And finally, to crown our work, our fair sitter is represented as having a slightly slate-coloured face, and white eyes. This does not look very promising at the first glance, but it is worth our while to stop here and consider for a moment what has been effected up to this point.

In the first place, when we dipped our plate in the nitrate of silver bath we formed the fine even film of cream-coloured iodide and bromide of silver; which, as we before stated, was capable of receiving an impression by the action of light. This action having been set up by the exposure in the camera, the plate has been brought to the dark room for development. At this point the picture really exists in the film, but it is what is termed latent, and invisible.

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THE CANARY.

HOME PETS.

BY W. A. BLACKFORD.

OLD AMUSEMENTS—BOYHOOD—PETS—THE CANARY—FIRST ATTEMPTS—THE STABILINGS.

WHAT a suggestive title! There is no place like home! depend upon that; and there are no pleasures so genuine, so enduring, so really enjoyable as those which belong to home. And is there not a heart-stirring ring in the word? Poets have sung its holy happy delights; painters have expended the richest treasures of their genius and the most skilful witching of their art in depicting fireside scenes; patriots, great and noble men, inspired by fervent love for the country which gave them birth, and undying affection for their own hearths, have bled in their defence; and men of all shades in all times have ever held dear the little spot they call home.

Sitting, as I do now, in my quiet study in my own quiet home surrounded by my own "home pets," how my mind wanders back through many a long year, to the home of my childhood, when I, like this little "home pet," climbing on my knee, stood
by the knee of my father long since gone to that home from which there is no returning. And I remember how he used to make my kite, rig my ships, fit pegs to my tops with some miraculous compound warranted to make them hum, construct me rabbit-hutches out of sixpenny tea-chests, and pigeon-houses out of old barrels, how he taught me to set up a brick trap, make horse-hair snares, and set limed twigs; how he gave me my first lesson in gardening with a sauce, moist flannel, and mustard and cress arrangement, and how when he planted some scarlet runner beans in a mignonette box, I steadfastly exhauled them day by day to see if they were sprouting.

I still think there are no bows such as he feathered, nor did I ever see so true a stock to a cross-bow, or such clever mechanism in the wheel and trigger as there was in mine, which was fashioned in the sanctum sanctorum where his joiners' tools lived.

To this day a fishing-tackle shop window, with the everlasting stuffed and well-varnished pike in a glass case, has strong attraction for me, but I see no apparatus so complete as the multum in parvo walking-stick rod my father gave me, no fishing lines, no arrangement of hooks so effective as those he used to fashion for me, with which I secured many a good basket of fish. And I could go on enumerating a thousand and one recollections of home pleasures and healthy amusements.

I say it again, there is no place like home. Stick to it, and when you are called on to fight the great battle of life let the memory of its happy hours, its holy lessons, nerve you to grapple with duty as good, noble, honest men should.

I have always been among boys; my whole life has been spent with them; and it is with a desire to furnish a fund of recreative enjoyment that I have undertaken to give a series of papers on home pets, how to breed and feed them.

I don't believe in boys, or girls either, work, work, working, all day long. The old saying is a wise one, "All work and no play"—you know the rest as well as I do, and say Amen to it.

A reasonable amount of work being done—honestly done, mind you—turn your back upon it to go in as heartily for recreation, every one to his own hobby; and in recreation, what you undertake to do, do it well. Never do things by halves.

Assuming, then, that your taste lies, as mine does, in keeping pets and, in particular, birds, let us begin with the most interesting of all, the bird which is found in nearly every home, gladdening many a heart by his lively sprightly ways and his cheery song. Need I say I mean the canary? Perhaps your idea of a canary is what mine once was, a hand some little chap in a handsome little cage, whose chief merit lay in his song. But I am going to tell you something more about him. I am going to tell you how to make his house and how to furnish it, how to find him a wife, and how to assist them to bring up their nests of young ones. When I was a schoolboy I was, as most schoolboys are, very fond of birds' nest ing; and, properly managed, it is a most interesting pursuit.

There is a lot of sentimental talk about the sin and cruelty of robbing birds' nests with which I have no sympathy. I know very well that the traditions of our old nursery lesson books teach that the cruel boy who robs a bird's nest must of necessity be a bad lad who plays truant or selects the hours of the Sabbath for the purpose. The woodcuts which illustrate his ill-doings always represent him perched in a tree, drawn with most painful disregard of perspective, from which he generally falls and suffers injuries greater or less according to his moral character; or else, in beating a retreat with his spoils, he is overtaken by the traditionary farmer with a horseshow, who inculcates powerful moral teachings with its aid. Failing the farmer there is always a dog handy, or he tears his clothes, or tumble in a pond, but he invariably comes to grief.

I think the Popular Reconstructor will teach something of a healthier tone than this. By birds' nesting I don't mean an indiscriminate wholesale robbery, going out early in the morning and returning late in the evening with a dozen or two of eggs of one variety, the spoils of a ravished home, ruthlessly torn from some quiet resting-place. That is not my idea of legitimate nesting.

Study the habits and habitats of the birds to be found in your own immediate district, learn the times of the arrival and departure of those which visit you only for a season, hunt up their nests and take from them a single egg, one here and another there; but, enough of this, for I am straying on to another's ground. You will hear enough of eggs from the papers devoted to them. Whatever you do, don't take any young birds.

This is what I wanted to be at when I said I was, as a boy, fond of nesting. The temptation of a nest of fluffy fledglings was sometimes too strong, and occasionally we would smuggle a nest contrary to the school law in such case made and provided.

Three or four young thrushes or blackbirds or starlings looked so tempting that we were not at all times proof against them, but the end was always the same—they died on our hands.

I remember one or two instances in particular. One was the case of a nest of starlings, which we had marked down in a hole, far up in an old ash tree. We—for schoolboys usually hunt in packs—had set our minds on the eggs, but never could find a favourable opportunity to get them, for our nesting was a pursuit of knowledge under difficulties. I was at boarding-school in a village not far from Dover, and it was usual for the Principal to take us for long rambles on half-holidays.

Playing at Indians, waylaying and scalping each other in the woods had "gone out," and had given place to the charms of nesting, which was forbidden, but winked at; and our chief concern was how, as soon as we were allowed to break from our long two-and-two string, to slip away. Our favourite walk was through a large park, the boundary fence of which was not many hundred yards from our playground.

We had to pass through a field, over a stile into a plantation, through another field, and through a second plantation, before getting in to the park proper.

If there had been any depredation or trespass committed there was no hope of an early "break," but if we had been circumspect in our walk and conversation, and the Principal was in a good humour, the rule was to "break" in the first field, in which case two or three of us were not long in reaching the second plantation, where we used to hide in the long grass and under cover till the whole troop had gone by, our Principal carefully bringing up the rear.

Once through the plantation, then up a gentle rise, and they were lost in the park, or, as we had it in Indian tongue, "swallowed up in the depths of the forest," and we had the afternoon to ourselves following in their track and falling in on the return.

On one of these occasions we took the starling's nest. She had sat so long that our eggs were hatched, and I suppose we thought we had a right to the produce.

We kept them in a basket and fed them on chewed bread, and for a while they did very well, but too much chewed bread did not suit them, and one by one they died.

This is what I want you to eschew, and in the place of this unsatisfactory sort of work, I will tell you how to breed your own birds, and then you will have the pleasure of seeing them brought up from the egg under your very eye, and will have the opportunity of observing every detail of bird life, which the instinct of your "home pets" will lead them to follow out as minutely as if they resided in some old Hawthorn bush instead of in your room.
WHIST.

BY R. B. WORMALL.

Hand the Second.

The following is an instructive hand, and affords a good illustration of the importance of observing the fall of the cards, and playing to the score.

A and C are partners against B and D, and sit round the table in the order indicated below.

The card led to each trick is denoted by a double rim.

C's Hand.

Spade—9, 8.
Club—Ace, 9, 8, 7.
Diamond—Knave, 3.
Heart—Ace, Knave, 10, 9, 8.

D's Hand.

Spade—Knave, 10.
Club—Ace, Queen, 5.
Diamond—Ace, Queen, 5.
Heart—9, 6, 5, 4.

Score, 2 all.
D turns up the king of hearts.

A's Hand.

Heart—6, 5, 4.
Diamond—Knave, 10.
Club—Ace, Queen.
Spade—Ace.

Trick 1.

A opens his strongest suit, and having king, knave, ten, and another, very properly leads the ten. This lead is an exception to the general rule of leading the lowest from a suit of four not headed by a sequence.

Inference:—It is clear to D that the two of spades is in A's hand, for if either B or C had it he would have played it in preference to a higher card. A also knows that the spade ace is against him.

Trick 2.

B returns the trump with the object of drawing two for one.

D knows that unless his partner holds an honour, with some strength in trumps, the game must be lost. He plays accordingly to strengthen his partner. The lead by the king of trumps is, however, open to question. Many players would prefer to tap the diamond suit.

Trick 3.

C being strong in trumps, returns the adversary's lead in the suit. From the fact of B being compelled to win the eight with his queen, it is clear to D that the opponents hold between them the three best trumps, and A of course knows that they must all be in his partner's hand. D's discard of the club informs his partner that his suit is diamonds.

Trick 4.

B returns the trump with the object of drawing two for one.

D by his partner's lead of a club, by his trump, by his throw of a heart, and by the lead of a diamond, win the trick. A has no other trump left but the jack of hearts, and must follow this, and so D, who has the king, queen, and jack of hearts, have won the trick.

Inference:—It is very clear to A that B must hold a trumps on A, and D must then, if B has not, hold the ace and knave of his suit.
A returns his partner’s lead. Having originally only three of the suit, he properly returns the higher of the two remaining. After this round A is in a position to place all the clubs.

Thus: B having dropped the knave to the king, can have no more of the suit; for he cannot hold the ace, otherwise he would not have allowed the queen to make in the previous trick. C’s original lead was the seven of clubs (see Trick 5), and as he subsequently played the eight to his partner’s king, it follows that the seven must have been the lowest of a suit of four at the least—consequently he must have in his hand two cards higher than the eight, i.e., the ace and nine (the ten being in A’s own hand). The remaining club, the six, is of course in D’s hand.

**TRICK 7.**

![Diagram](image)

Trick 7.—Won by B. Score, A C, 4; B D, 3.

The lead of the ten of clubs is open to criticism, as A knows that B has no more of the suit, and must hold the seven of spades (see Trick 4). At the same time A is very unpleasantly situated. He clearly cannot lead a diamond up to D, who has declared it to be his suit (Trick 3), and if he lead the king of spades, and finds the ace in D’s hand (which is an even chance, as C cannot have it), the latter will win the trick, and then lead the club, on the chance of his partner holding the seven of trumps, which will save the game.

After Trick 7 it is clear that the thirteenth club—the ace—is with C.

**TRICK 8.**

![Diagram](image)

Trick 8.—Won by B. Score, 4 all.

B on getting in plays to his partner’s discard (see Trick 4). Having only three diamonds, which D has clearly intimated to be his suit, B properly leads the highest.

**TRICK 9.**

![Diagram](image)

Trick 9.—Won by C. Score, A C, 5; B D, 4.

B continues with his next highest diamond (the eight), to which C plays the knave. D is now placed in a very critical position. The adversaries are two up (see score); they have made four tricks, and C has three certain tricks in his hand, viz., the two long trumps and the thirteenth club. In addition, it is clear that the tenace in diamonds (the king and ace) is against him, of which the ten at least must be in A’s hand (B cannot possibly have it, as the lead of the ace followed by the eight with the two declared in his hand, showed that he had only three of the suit). B and D consequently require one more trick to save the game.

The question is, What is D’s best chance of making it certain? He can expect no assistance from his partner B, whose hand obviously consists of the two of diamonds and three small spades. A holds, for certain, the king, knave, and two of spades, and ten of diamonds; his fifth card is doubtful, but it must be either the king of diamonds or a small spade. Similarly C has the two long trumps and the ace of clubs; his fourth card must be either the nine of spades (as he played the eight to his partner’s ten in Trick 1) or the king of diamonds. The probability is in favour of the spade, for two reasons:—In the first place, if he has the king of diamonds he could have had only one spade originally; and in the second place, the nine of spades must be either B’s or C’s hand, as, if A had held it, in addition to king, knave, ten, etc., he would have led it at Trick 1 in preference to the ten. Under these circumstances D is justified in “placing” the nine of spades in C’s hand and the king of diamonds in A’s, and on this assumption passes C’s diamond knave.

On reference to the “Hands” it will be seen that the two doubtful cards are in the positions assigned to them by D, and that he consequently adopted the only course by which it was possible to save the game. Had he covered the knave of diamonds with the queen, A would have won the trick with the king, and then led the ten of diamonds, to which C would have discarded his losing spade—and then won the three remaining tricks; whereas, by passing the knave, D prevents C from getting rid of the spade, which he is ultimately compelled to lead, and D makes his ace (see Trick 10).

**TRICK 10.**

![Diagram](image)

Trick 10.—Won by C. Score, A C, 4; B D, 4.

**TRICK 11.**

![Diagram](image)

Trick 11.—Won by C. Score, A C, 7; B D, 4.
ROWING

By LAMENTIO YOUNG


A rule the pair-oared outrigger is much the same as the sculling boat, but longer, wider, and generally with a keel. They are built much stronger and heavier than the ordinary sculling boat, from the strain not being evenly on the two sides, owing to the alternate fixing of the outriggers on each gunwale. Unless a boat is reasonably stiff in her length she will not row well, because at the moment she is being impelled by the oars she trembles and twists, changing for that instant her proper form, as well as taking a slightly serpentine course. The racing pair-oars are usually about thirty-four to thirty-six feet long, and from seventeen to nineteen inches wide; but they are always built in proportions suited to the weight of the men they have to carry. These boats are usually covered in at the bows and stern with canvas or deck, in place of mahogany or cedar, as in former days, in order to save the weight of the wood, and their skin is usually of yellow pine, though in some cases it is made of mahogany or cedar. The greater length in comparison with the sculling boat is placed in the middle, so as to give room for two men instead of one; and when steering is required, more room is given for the boy to sit when handling the yoke lines. But this addition is only allowed in winding rivers, where it is impossible to avoid running on shore without a coxswain. "On the Thames such a thing is never seen in a race, but boats do not always follow a straight course, and, as a consequence, lose some distance by overshooting the line to the right or left.

The two rowlocks are known as the after or "stroke rowlock," and "bow rowlock;" the former is generally bolted to the left side, in front of the "stroke" man's thwart; and between the two thwarts on the other side is bolted the bow-rowlock; the exception to this is when the stroke-oar cannot row on the stroke side, in which case the rowlocks are reversed, and he is said to row stroke on the bow side. The oars are in form merely enlarged sculls, being somewhat longer, and the square of the loom is gradually rounded off into it for about five or six inches, for the greater convenience of holding it with the inside hand. When all are on board, pair-oars are very little higher out of the water than sculling boats, being about four and a half inches between the water-line and edge of the gunwale. The strokes or skins are put on in breadth or sheets of the same size as the boat from keel to gunwale, and are generally in two lengths, scarfed together about four feet apart on the two sides, so that each side is divided into two unequal portions, one having the greater length of plank forward, the other the greater aft. The skin is of the same thickness or substance as the sculling boat, but the timbers or ribs are considerably stronger, and are carefully framed into the keel, which is now usually strengthened by what we may call a backbone, which is a piece of deal, or other light wood, running longitudinally fore and aft along its surface, and shaped so as to rise up to the under surface of the thwarts, which are securely nailed to it.

The four-oared outrigger of the present day is constructed just like the pair-oared; except being some eight feet longer. It is generally forty-two feet long, from twenty to twenty-two inches wide over all, and one foot deep amidships, seven and a half inches at the bow, and six and a half at the stern; the distance from the thwart to the throat of the outrigger one foot one inch. The midship oars are twelve feet five inches long, and the buttons are fixed on at a distance of three feet five inches from the end of the handle; the bow and stroke oars are twelve feet four inches long, and have the buttons put on three feet four inches from the end of the handle. The space between the coxswain's thwart and the stroke's stretcher is one foot, the breadth of coxswain's thwart being eighteen inches. Formerly these boats were built forty-eight feet in length, and only twenty-one inches in width, even for a heavy crew, but the present proportions are found to be a marked improvement, for when they were so very narrow and long they did not offer sufficient resistance to the burying power of the stroke, and were forced deep into the water while "on the hand," rising again in what is technically termed "the shoot," the consequence being that the boat made a succession of dips, causing a great loss in her speed. For many years the idea prevalent was, that the only limit to diminution of breadth and increase of length was the difficulty in making the boat of such stiffness as to stand up under the weight of her crew. These reasons, derived from experience, have been the chief cause of the length and breadth and depth now adopted, these proportions offering the right amount of resistance to the downfall when the rowers are in full swing. Up to the present time oadders have always been used in four-oared boats, a
thwart being fixed for the coxswain, who is usually chosen for his light weight; but in racing he generally sits on the floor of the boat, so as to give her greater steadiness. Within the last few years, however, the Americans have taught us to row four-oared races without coxswains, the stroke or other chosen man steering by means of an ingenious apparatus coming to his feet as they are on the stretcher, when he is rowing. This and the old method will be described at length further on.

The eight-oared outriggers are constructed in exactly the same manner as the pair-oared boat, except from requiring more space for extra men. They are much longer in form, being fifty-six feet in length, two feet two inches wide over all, and one foot one inch deep amidships. The old-fashioned boats were commonly sixty-five feet long, in some cases even seventy feet, and two feet three or four inches wide. The outriggers are placed four on each side, and must be suited to the men who are to row in her, as the position that will suit one will not do for another; the six amidship oars are twelve feet six inches long, the bow and stroke twelve feet five inches in length.

Twelve-oared outriggers have been built, but are not often used. They are simply elongated eight-oars, and need not be further described.

Before purchasing any of these boats, or taking them over if built to order, they must be carefully tested and examined, to see if they are sufficiently stiff to prevent their getting "screwed," i.e., getting out of shape when rested on either end. A crooked keel, resulting from a strain, is always an annoyance, as it causes the boat to bear more on one hand than the other, and, from requiring constant steering on the side affected, impedes her way. Of course no boats are mathematically correct, as a practised eye will detect some little deviation from an exact correspondence between the two halves of the boat when standing at head or stern, and looking down the centre line.

In the act of rowing men should be careful not to kick their stretchers, or row too much with their legs, but should as it were lift their bodies off their seats, so that all their weight may rest on the handles of the oars and stretchers. Whilst they are rowing the stroke through the water they should sit quite lightly on the seat, being careful not to kick, as that always leads to moving about on the seat, and dropping the knees too low, which is imical to a quick recovery, the great essential to good rowing. "Argonaut" says the oar should be brought straight home to the chest, the knuckles touching the body about an inch or less below the bottom of the breast-bone, where the ribs branch off, thus every inch of water is made use of; when there, the hands should be dropped straight down, and then be turned over and shot out again close along the legs, and the body should follow without the least pause. If this is not done, the oar will be feathered under water, and thus the boat will be buried, water will be thrown on the next oar, and the recovery will be impeded. To effect a quick recovery the back must be perfectly straight, the knees must not have been dropped down too low, and the oars must not be used too much, a light touch is all that is proper; the muscles of the body—in this case those that cross the stomach—must be used, and not the oar itself, of which the strap is a part. The body should be swung evenly forward from the hips, not with a jerk or a plunge, or quicker at one time than another, but freely and easily, as if the hip-joint worked well, and not stiffly. Much benefit may be derived from watching some of the best oarsmen that can be found, observing them carefully, forming an ideal model, and then endeavouring to copy it.

Two or three points should particularly be borne in mind: First, that when the hands are raised at the commencement of the stroke, and the oar ipso facto struck down below the surface, the whole of the power should be brought to bear at the moment of the oar's contact with the water, so as to create the greatest effect in the first or vital part of the stroke, one of the most important and too oft-broken laws of rowing; secondly, that the pull home to the chest should be in a perfectly straight line, thus causing a horizontal stroke through the water, which is another law frequently disregarded; thirdly, that the finish of the stroke should be as quiet and easy as it is possible to make it, but without lessening the force applied, which naturally diminishes, because at the first part of the stroke, before the rowlock, the oar is at an acute angle to the boat, and after that at an obtuse angle. Here it is that one so often sees the stroke wind up with a jerk, as if to make some use of the little strength remaining in the human frame, the oar flung out of the water, the elbows dug sharply back in an awkward and unsightly manner, and the body harshly and suddenly jolted forward.

The next in importance are the movements described by the oar itself, starting from a state of rest, i.e., feathered, and at right angles to the keel of the boat.

When the forward reach is taken, the blade of the oar should travel backwards in the air, horizontally, at the distance of a few inches from the surface of the water—of course, depending upon the state of the surface, whether smooth or rough—until dipped for the stroke. As regards this dip, it is imperative that the blade descend to the proper depth before any force is applied, otherwise the stroke will be out. To effect this, the hands must be raised sharply, and the stroke must be instantaneously commenced. In a word, the oar must be put into the water with energy, not suffered to drop in of its own weight. When on the feather, the oar, after passing the knees, should be gradually turned preparatory to immersion, the feather concluding and the stroke beginning at once, with no interval whatever. Hence it will be perceived that the line described by the end of the blade—about which there are numerous theories and a variety of opinions—will be nearly parallel with the water until entering it, when it will be immediately dipped with a powerful sweep.

The entry of the oar into the water cannot be too sudden or too decided, so that it be not a chop and a splash; and for this purpose the muscles of the arms should be gathering themselves together as the hands rush forward. It is a well-known and indisputable law that the greatest power can be applied in the first half of the stroke, that is to say, before the oar becomes level with the rowlock, and that the further aft it goes subsequently to passing that point the more that power decreases. Such being the case, it is only common sense to endeavour to do as much work as possible when it will tell most, and when it contributes to lift a boat lightly along the top of the water. On the other hand, if the application of the strength is deferred until the last part, it is brought to bear when it is of the least service, a great and useless expenditure of power ensues, and the boat, instead of being assisted over the water, is driven down and buried in it, the way being necessarily checked thereby. The same result ensues from letting the weight rest on the seat, and then giving a wrench, and feathering under water, instead of letting the weight rest on the stretcher and handle of the oar—in a word, from rowing with the arms rather than with the body, instead of using both.

We now come to the position in which the blade is immersed, and would observe that this is a most important point. It is said that the blade should descend at right angles to the water. In this opinion we cannot altogether coincide.
PAPER-FLOWER MAKING.

THE ROSE—PETALS—MOULDING—STEMS—THORNS—STEMS.

At last we approach the queen of flowers, the "fairest of the fair"—the Rose—and endeavour to learn how her beauteous robes are formed and donned. This floral beauty possesses such an infinitude of variety and withal each year adds some fresh fashion to her already extensive wardrobe, that it is indeed difficult to know which of her numberless styles of costumes is best worthy of our notice. And then, to add to the perplexity of choice, her family is an uncommonly numerous one. She has very many sons and daughters, all of whom vary considerably in form, feature, and apparel. Some are giants, and some are pigmies; some have a jovial countrified air; while others are "delicate exceedingly and wondrous fair."

Therefore, to attempt a minute description of all the roses—one beautiful in its way—would be futile, seeing that they all differ so materially. But indeed there is not the least necessity to enter into such lengthy details. Roses are always roses, and if we succeed in making our comparatively few instructions clear to our readers, they will doubtless feel themselves quite able to understand and cope with the many idiosyncrasies of that extensive family.

There is one kind of rose which looks particularly natural when made in paper, the full-petaled formal open flat flower, *Rosa gallica*, which grows in clusters. A description of this specimen will serve as a type for many others of the same class, which differ but in size or colour.

It will be seen by the patterns given that there are five rounds of petals of different sizes, and of these, two of each size are required for one flower. This rose may be made either a white or pink one, when of the latter colour, the two rounds of Fig. 5 should be of a lighter shade of pink than the others.

The process that each row of petals has to undergo is as follows:—The petals of Fig. 1 are pinched with finger and thumb down their several centres, half the petal being turned back, so that it resembles a folded leaf.

The petals of Fig. 2 are pinched twice, in this case both the edges of each petal being turned back to its centre. The pinching or creasing of these first four rounds is for the purpose of giving to the centre leaves of the flower that crumpled appearance which roses of this genus invariably present.

The petals of Fig. 3 are indented with the small ball tool. And here let us pause for a moment while we explain the meaning of the terms "indent" and "mould." To indent with the ball tool is simply to press the petal, which action produces that softness of texture possessed by the petals of the living flower.

To mould is to put the petal into the hollow of your hand, and then to press it with the ball until it has not only lost all its original stiffness, but until it has assumed a cup-shaped form.

Thus, the petals of Fig. 3 have the impression of the ball tool just in their centres, their edges being allowed free play.

The petals of Fig. 4 are in the first place treated like those of Fig. 3, after which each petal has the upper edge of its right side turned back with the pinchers. The petals of Fig. 5 are also indented with the ball tool, and then both portions of the edges of their petals are turned backwards, just to give them a slightly curled look. So much for the petals.

The stamen is formed of a little green fluff fastened on to a fine piece of wire, and then several tiny pistils are placed round it, such as were made for the primula (Fig. 6). A small globule of wax the colour required dropped on to the end of a bristle, makes a capital representation. Well, with some of these fixed in round the stamens, the centre of your rose is complete, there now only remains the calyx, which is made of stiffened green cambric, and cut out in the form and size given (Fig. 7). We must not forget to mention the calyx cup, a tiny object, hard and globular, and which consequently is better bought ready made. It cannot be necessary to repeat the directions for mounting the flower, suffice it to say that none of the rows of petals should be placed either immediately in front of or directly behind one another, every one of them should be seen. If, when finished, the flower looks too "stiff and starched" squeeze it gently in your hand, this will soften it, and also make the petals cling more to one another.

Such is the method for constructing what are termed "Cluster Roses." Let us now turn to what are called "Cupped Roses."

We have arrived at the most troublesome and difficult part of our ground. It will be observed that as yet we have only treated of flowers whose petals are not entirely divided from the corolla, or of that class which have their petals ranged round their stamens in such precise and mathematical order by Dame Nature as to allow her imitators the liberty to copy her regularity without giving themselves the extra trouble of making separate petals. We have an instance of this in the rose lately described. The living specimen would of course have each petal distinct, but the order in which they are placed being so exact, the effect is precisely the same if the petals are cut in "rounds." But in some classes of flowers the petals must be cut separately, and mounted separately, and this is the case with cupped roses.

Therefore, I say, we have now begun to climb the hill of Difficulty. And yet be not discouraged, when I tell you that nearly if not all the help and guidance to be afforded by words consists mostly of general hints. The living flower will best tell its own tale. Place before you your own special favourite, and carefully note its specialities—which of its petals curl this way and which that; how that some nestle one inside another, and others keep to themselves. Every little detail thus observed can be faithfully copied; but of course it is essential that you should possess the knowledge how to produce these different effects before you make the daring attempt to construct a rose of this sort.

Listen and learn. If the petals of the rose are cupped, and at the same time the edges of their leaves are curled, you first mould the living flower in your hand and then mould it with the ball tool or the end of your finger, and then take a paper-knife, and by the help of your thumb draw it carefully up the petal, which will then curl towards the knife. Sometimes this process is better done after the flower is mounted, namely, in those cases where the outer petals only require to be curled.

Again, the centre petals of some roses lie one inside another: when this is so, cut a pattern like Fig. 8, and then fold back one petal on to another, until they all rest one on the top of the other, as shown in Fig. 9. When in this position, crease them up the centre, and then indent them in the centre of petals with the ball tool. There should be four sets of these, and they should be placed next to the stamen. The remainder of the
petals of such a rose are cut and mounted separately. Sometimes roses have little imperfections—one of the petals in the centre is behind-hand, and has not yet unfolded itself. To imitate this will give your flower a more natural appearance, so flowers which are of cup-like shape, gradually place each row of petals lower and yet a little lower down the peduncle; this is one of the secrets of success in forming correctly flowers of this description.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 9.

The rose.

There is also a great diversity of stamens in this class of roses, both as regards colour, size, form, and what not, so that again reference must be made in each case to Nature. Some stamens are represented by green fluff, like the one before described, others have to be made smooth and round like the head of a jet pin, and others again are formed of a cluster of little knobs of wax.

If you wish your rose to have a thorn, cut a strip of green scribe on the bias and roll it round the peduncle. In fitting the petals which are separate, and more particularly of those take a square inch of paper, of the same colour as your rose, slightly crumple it between your fingers, and then screw up the four corners together, and place it close to the stamen when you mount your flower.
MAKE way for Robert Robinson, if you please, for he was an inventive genius, in the days when there was rather a dearth of invention. The instrument he used (see p. 109) in batting was made with a double handle, for his hand was burnt when a child, and to suit his stunted fingers he had an iron, which was fitted to his wrist and enabled him to grasp the upper handle.

I have said that he was an inventive genius, and so he was, for he was the first player who used to "cut" balls from the bails, and he not only introduced "spikes," but also created ridicule by the invention of leg guards, which consisted of two thin boards placed anglewise, off which the ball glanced with great sharpness and noise. All honour to him, say I, as a great inventor; though the respect is diminished by the admission that he was laughed out of this latter invention.

Up to this time every man had done that which was right in his own eyes, and there had been no restrictive measures to determine the size of the bat. But one White of Belgato went in with a bat as wide as the wicket, we are told, and the law interfered to discountenance such artifices.

I may be very wrong, but I fancy in these civilised days there are a few cricketers of both sections who are not beyond originating the addition of an extra inch of width of the bat. "Tis true, tis 'pity; pity 'tis tis true," I know, but it is sharp practice, to say the least of it, and you ought to be well ashamed of yourselves.

If there were a frame through which all suspected bats should be passed, as had the Hambledon club after the little hackes of White, I fear that many of you would have to invest in other instruments of the regulation size. You might not be so fortunate as "Three-fingered Jack" for one of his bats did not pass through the ordeal as it should, and summary reduction was made of its size by the aid of the knife.

He vowed vengeance, and fulfilled his vow. At least, "I'll pay you for spoiling my bat" was his answer, and so he did, history relates, by the achievement of one of the longest scores that he ever made. Still, though, non cuius contingit adire Corinthium; and if I mistake not any reduction of the forces would considerably reduce the average that some of you erect with so much pride.

It is difficult indeed to tell when bats commenced to assume their present shapely form. You have seen the old specimens in the illustration, and you can judge for yourself the principal stages through which they have passed. No one can doubt that in the old days, as they were used by the less skilful followers of cricket, they were clumsy, ill-shaped, manufactured no doubt by hands far from efficient, but it is open to doubt whether the more prominent professionals were not more favoured in the possession of fitting weapons.

Honest old John Bowyer, who lives and flourishes at Mitcham, in his eighty-fourth year, under the care of a right hearty supporter of cricket, says that the bats used by the players were much superior to those specimens of old bats which are
occasionally now found in country villages, but though they
were heavier and thicker than those now in use, the weight and
balance were carefully considered.

I place implicit reliance on the statement that emanates from
the old man eloquent. It is hereby to believe that in the brave
days of old, men who could play cricket under circumstances
very much unfavourable than we do now, when grounds were
rough, and not tended as now to reach the perfection of billiard
tables, when knee-breeches and stockings were worn without
the protection of leg guards, and when cricket flourished under
the patronage of the highest in the land, were careless about
the formation of the weapons on which their reputation had
chiefly to rest.

It was the creed of cricketers of the last century that John
Small "found out cricket," and old John once kept up his
wicket for three days, and was not out after all. He was the
last of the Hambledonians, and he played in all the great
matches till he was turned of seventy. I wonder how many of
the present order of cricketers would venture to hope to attain
such eminence. It is not your fault, you will say, poor Brown,
Jones, and Robinson, who represent the present generation of
professional cricketers. I know that well enough, and so does
every one who has had any chance of comparing the old with
the new dispensation of cricket. It is rather your misfortune
than your fault that you have to bear through the world at an
express pace in pursuit of your living. It is not your fault that
you have to play cricket six days in the week, until your feet
ache.

Nor is it precisely your own fault that you are exposed to
temptations that unfit many of you for a sober and steady life,
that you have to listen to the fulsome adulations of brainless
noodles whose only delight is to call you by your Christian name,
as Tom, or Dick, or Harry, and who worship the rising as much
as they try in their small way to stifle the setting sun. All
this is not your fault, grant you, and you would like well
enough to have the chance of doing as old John Small—there
were father and son, a pair of Smalls, and hence the adjective—
did of playing at seventy, instead of being considered stale and
effete at forty.

But old Small was in his way a wonder, or I should not have
spoken so much time over him. I have said that in the last
century he was known as "the founder of cricket," so that all
the honours must be paid that are due to a creative brain. Old
John was not only an excellent cricketer, but he could skate
right well too; and he was no mean musician, to add to his
other accomplishments. You can read for yourselves, in the
chronicles of Old Nyren, how the Duke of Dorset gave him a
fiddle, and how he soothed the savage breast of a wild bull by
his Orphean strains, when Taurus and John had the misfortune
to meet one another in the middle of a not very extensive field.

This is a true bill, though I should not advise any of you
ambitious cricketers to attempt a similar experiment unless
you are well insured, and the insurance is safe.

You must wait a moment though, if you please, for I have
not yet done with John Small. I devoted so much space to
bats that I had almost forgotten balls. And here too Small was
a public benefactor, for if all accounts be true, to him is
due the merit of having invented balls that would last,
in place of the half-streaked apologies that were previously
in vogue.

"He excelled," says an old authority, "in making bats and
balls," and it is not unlikely that he was the first genuine manu-
facturer who was connected with the active pursuit of cricket.
Indeed, in the matter of ball-making he was considered peerless,
for when he was eighty years of age he sold the last six balls he
ever made to Mr. E. H. Budd, and a guinea a-piece was after-
words offered for them by Mr. W. Ward, whose name still
remains fresh to fame as the batman who enjoys the honour
of the largest number of runs ever made in a single innings.

At first the balls in use were made of wood, but that was in
all likelihood in the incipient stages, when the game was known
under the title of "Cat and Dog," the ball being designated
by the canine appellation. Before the days of John Small,
so say the records, a ball would not last a match; the stitches
would give way. Now turn and look at the neat spheres
of leather, as they are made by the great makers who share
among them the principal manufacture of the thousands upon
thousands of balls that pass through England's every corner,
and cross the sea to every portion of the habitable globe.

In great matches it is true that a new ball may be called for,
and is usually at the end of each innings, but this is at the
best an expensive luxury, for balls are now manufactured with
such skill and care that they will stand any amount of rough
usage, and resist almost everything but wet weather.

It is not so easy to discover definitely any traces of what
composition the old balls used in the cricket of the last century
were formed. Bats are more easily followed through their
different stages, for they were not so likely to be lost or discarded,
from their superior size and substance. When, therefore, the
present style of ball was first introduced must remain in mystery.
Others interested equally with myself in the solution of the
difficulty, have failed in their efforts, and how shall I hope to
succeed?

A recent application was made by an old friend to a maker
whose name has been identified with the art of ball-making for
upwards of a century, but no antique relics were discovered
to reward his perseverance. The only result of the quest was the
discovery that the great-grandfather of the present head of the
firm had presented the first treble-sewn ball to the Prince of
Wales of that day.

The balls were said, too, to be by no means so good nor so well
made as at the present time, though the weight seems to have
continued the same—from 5½ to 5½ oz.—as it is now defined,
according to the laws made and provided. I have heard, too,
from another good authority, that the only difference between
the balls of the old and the new dispensations was, that they
were in the former oblong, while now they are as round as an
art and experience can make them.

In the olden times Kent was the county for their manufac-
ture; and one Clout, who hailed, I believe, from Southborough,
is said to be the first who brought them to their present
state of perfection. The demand for them now is so great that
one of the most celebrated manufacturers long identified with
the Surrey County Club, tells me that he alone makes and
distributes of as many as ten thousand every year.

Bats and balls! How essentially English is the combination!
and what happy hours has this strife between wood and leather
produced for thousands of every grade, from the prince to the
peasant! You do not want me to picture the animated scene
to be witnessed at every cricket match. You have marvelled,
some of you, I dare say—some of you who have not caught the
inspiration of the game, nor drank of its joys and its hearty
fellows—what the attractions of a sport that to the cynical
possesses so little charm.

You wonder, possibly, but you have not realized, what a glo-
rious sensation it is, as Miss Mitford says, to be "winning"
"winning!" "Who would think," she continues, "that a little
bit of leather and two pieces of wood had such a delightful
and delightful power!"

Who would think, I venture to add, that from such trifling
causes such great effects would spring? Who would think that
"this little bit of leather and these two pieces of wood" should
be worshipped all over the globe as passionately as the idol of Juggernaut, with much less detriment!

It is difficult, you say, to estimate the moral attributes of cricket. See how the senator, on whose every word the Commons of England hang in devout attention, aways calmly the feelings of an eager critical assemblage, and see how he trembles and turns pale when the field watches with steady gaze in awful silence his capacity of resisting the insidious movements of that little bit of leather.

See how men of every grade meet on equal terms. With a fair field and no favour, Giles Scroggins has as good a chance as the young stripling whom flatterers love to call "My Lord" or "Your Grace." Bats and balls! the very sternest moralist has failed to discover a flaw in your armour. It may be that at times the idolatry is too passionate, and that you do divert the attention of many from the stern realities of life, but your transgressions have never exceeded this charge, and the most prejudiced judge that ever sat did not do otherwise than treat you leniently on the score of a first offence! You would hardly accuse such a man as Richard Cobden of an intentional perversion of facts, and he was bold enough to describe cricket as "the most innocent of all out-door amusements." You can stand down, I think, old Sir Willow, for, with such testimony on your side, no indictment against you can be sustained.

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**ROUND GAMES.**

**THE SECOND EVENING (continued)—HOT COCKLE—THE WIZARD—CONVERSATION CARDS—YES AND NO—THROWING LIGHT—CONTRARY.**

All votes were now given for a romp, and Emily said nothing could be better than Hot Cockles.

"How did it get its name?" said Notes-and-Queries.

"I'm sure I don't know," answered she; "but if John will kneel down I'll blindfold him."

John knelt down, and little Emily tied a bandkerchief over his eyes, and told him to lay his head on a chair.

"Now place your hand upon your back with the palm uppermost."

John did as he was bid. Then Mary and Maggie and the Laughing Hyena advanced, one after the other, and gave a slap to the open hand. John tried in vain to guess who hit him. After the Laughing Hyena came Alice, and just then Notes-and-Queries, who had been fishing in his brain for a piece of useful information, said, "Gay, the poet, has an allusion to this game in one of his pieces:

"As at Hot Cockles I laid me down,
And felt the weighty hand of many a clown;
Buxoms gave a gentle tap, and I
Quick rose, and read soft mischief in her eye."

As he was speaking Tom gave John a great slap. "That is Tom!" cried he, so Tom had to take his place. Tom guessed for a long time quite unsuccessfully, but at last Alice was caught, and she looked so attractive, kneeling, with her long black hair hanging over her shoulders, that one might have done nothing else but look at her all the evening.

When Hot Cockles was played out, Tom, who had been whispering with the Laughing Hyena in a corner, asked if any of us had seen The Wizard. Some said "Yes," and some said "No." For the benefit of the ignorant, then, Tom agreed to play the Wizard. "I shall go out of the room," he said, "and on returning shall discover any article you choose to fix on." He went out, and we fixed on a paper-knife. Tom was then called in, and the Laughing Hyena began to question him.

"Is it a book?"—"No."

"Is it a carpet?"—"No."

"Is it a picture?"—"No."

"Is it a mirror?"—"No."

"Is it a book?"—"No."

"Is it a chair?"—"No."

"Is it a paper-knife?"—"Yes."

Tom might have kept his secret, and mystified people with the Wizard for a thousand and one nights, but he never was easy in his mind till he told us that the Laughing Hyena was his confederate, and that his confederate had engaged to name the article after an object having four legs.

Whilst the Wizard was entertaining the rest, John and Kate, who knew the secret well enough, got off into the background, and amused themselves with a pack of Conversation Cards. "I shall take the questions and you the answers," said John; "or will you have it the other way: will you take the questions?"

"Just as you like," said Kate. So John had his own way. They shuffled their cards, and read aloud to each other the questions and answers, one by one, just as they came to their hands: something in this way:


"Have you a will of your own?"—"Get out!"

"Is there any love lost between us?"—"Not to-day."

"Can you keep a secret?"—"For a week now and then."

"Are you fond of music?"—"Not if I know it."

"Should I despair?"—"When there is nothing else to do."

"Will you remember me?"—"It isn't likely."

"Does beauty know its own strength?"—"After dinner."

They went on thus for a while. "These are rather curious cards," said Kate; "I wonder if they are prepared on a regular plan." I think Maggie made them," answered John; "we'll ask her. Maggie," he said, turning to that young lady, "how did you make up these cards?" "It was no difficult matter; I just took a number of cards, and wrote a question on each of them. Then I took an equal number, and wrote a set of answers, managing so that each of the answers would fit in a sort of way any one of the questions. That's all."

"Some one must go out of the room for the next game," said David. "Who is it to be?"

"The best guesser," said Kate; "and I think that is Notes- and- Queries." Notes-and-Queries said he was a poor hand at Yes and No, but he would go out if it pleased the rest. So out he went, and Tom made quite sure that he did not station himself at the keyhole to overhear what passed.

"Now we must fix on a subject," David remarked.

"What sort?" said Emily.

"Oh, any well-known person, place, or thing, for instance. Can none of you suggest anything?"

Some made suggestions, and mentioned Dickens, Thackeray, Gladstone, James Watt, the Tower of London, Noah's Ark, the first steam engine, Mohammed's coffin, the lightning

"A happy thought strikes me," said the Laughing Hyena; "let us take Robert Burns. It is not too difficult a subject, and besides, it will tickle Notes-and-Queries' vanity, for he is a Scotchman, you know."

Agreed to by the company.

Notes-and-Queries was called in.

"I suppose," said David, "you are aware what you have to do. We have chosen a subject, and you have to try to discover what it is, by asking a question at each of us in turn. We are bound to return no other answer than "Yes" or "No"!"

"Yes," returned Notes-and-Queries, "I know my work well enough. I'll ask my first question at you. Is it a thing?"

"No."

And then the question went round the company.

"Is it a place?" "No."

"Is it a person?" "Yes."

"Is it a man?" "Yes."

"Is he living?" "No."

"Does he belong to the Christian era?" "Yes."

"Is it five hundred years since he died?" "No."

"Is it one hundred?" "Yes."

"Is it fifty?" "Yes."

This line of questioning he pursued till he got at the date 1796, which fortunately some one remembered, and then he went on:

"Was he a foreigner?" "No."

"Was he English?" "Yes."

"Was he Scotch?" "Yes."

"Is he celebrated?" "Yes."

"Was he celebrated in action?" "Yes."

"Was he celebrated in thought?" "Yes."

"Was he a poet?" "Yes."

Notes-and-Queries asked one or two questions more, and then, evidently with considerable confidence in the result, ventured on a guess at the subject. "It is Robert Burns—he who walked in glory and in joy, following his plough along the mountain side."

"Yes," said David, "you are right."

"I think," remarked John Ferguson, "that you have a knack of ferreting out information. I watched the order in which you put your questions, how you began with the most general, and by degrees came to the particular."

"To be sure," answered Notes-and-Queries; "that is the proper plan; one should narrow the field of inquiry with every question, till the answer is at last arrived at."

"And now who is to go out?" said the Reporter.

"The one at whom the last question was asked," said David. "That happened to be Alice. She went out, and we chose Alice herself, which subject she took longer to discover than you would think. Then the laughing Hyena went out. And then we thought we would have a new game, and Throwing Light was fixed upon.

"I don't know in the least what Throwing Light is!" said Maggie.

David undertook to explain. "It is a game," he told her, "in which two players fix on a subject, and hold a conversation about it before the rest of the company, discussing its appearance, its uses, its merits, and so on—throwing light on it, in fact. They never introduce its real name, and the business of the rest is to find that out."

"And if one should discover it," asked Maggie, "what should one do? proclaim the fact, I suppose?"

"Not at all," said David, "he must just join in the conversation held by the two, also taking care not to mention the name. So the fun goes on, till at last only one poor thick-headed player is left in the dark, wondering what all the talk is about."

John Ferguson and Notes-and-Queries were selected to puzzle the rest. They retired into a corner, and, thinking it was best to choose a word having two or three meanings, such as Pear (pair, pure), Flower (flour), and Ail (ail)—they selected Bells (bells). Then they came forward, and began to talk before the rest.

"They are put to different uses," said Notes-and-Queries.

"I have seen many with great power," said John.

"And very harsh voices too."

"How high they are sometimes."

"Yes, and how old some of them are."

"I think they should be courted."

"There should be at least two at a marriage."

"And one at a funeral."

At this early stage the Laughing Hyena, who had an old rhyme about magpies, and marriages, and funerals, running in his head, made up his mind that the word must be magpies. So he said, "They are black and mischievous, and have the central feathers of the tail nearly eleven inches long."

This showed at once that he was wrong. "A handkerchief must be thrown over your head," said David, "and it can only, according to the rules of the game, be removed on your arriving at the correct solution."

The two went on.

"What airs some of them give themselves," said Notes-and-Queries.

"And what frights they sometimes give other people," said his companion.

"They used to say they were good for thunderstorms."

This is an old superstition, and a scrap of Notes-and-Queries' antiquarian lore.

"There is some music in them."

"Not always, some have no taste for music."

"Some can dance."

"But they swing when they move."

Here our sharp-witted Alice chimed in with an observation which showed that she understood what the word was. "Whisper to Notes-and-Queries or to me," said John, "what your guess is." She whispered. "Yes, that's it;" and the black-haired beauty took her part in the conversation. Then one after another of the players made the discovery, and the Laughing Hyena had the handkerchief removed from his face, and we came to the conclusion that there was no necessity for throwing light any more.

After this there was an interval of talk, preparatory to breaking up the party for the evening.

"Maggie!" cried Emily, from one end of the room.

"Who wants me?"

"I do. Come and be the fourth in this Game of Contrary before we go."

There were Emily, and Tom, and John Ferguson, all holding the edges of a handkerchief. Maggie went and took hold too. Emily, who was playing the part of leading player, held the handkerchief with her left hand, and with the forefinger of her right traced mystic circles on the handkerchief, saying: "Here we go round by the rule of contrary" (she pronounced it "contrary" as is always done in this game): "When I say 'Hold fast,' let go, and when I say 'Let go,' hold fast."

She then cried out "Hold fast," or "Let go," just as she pleased. When Emily said "Let go," if any one of the three did not hold fast, he or she had to pay a forfeit, and those
had to pay them who did not let go when she said "Hold fast."

But it was too late to play long at this; so late indeed that the settling of the forfeits had to be left over till another occasion.

"It is a pity, it's a great pity," said David, as the company made ready to go, "that we have to break up so soon."

"We won't be long of coming back again, you may be sure," said Emily.

### ANGLING.

**By Greville Fennell.**

Heavy lines—gut—human hair—Nottingham lines—how to stain—floats for all waters.

Fig. 1. Fig. 2. Fig. 3. Fig. 4. Fig. 5. Fig. 6. Fig. 7. Fig. 8. Fig. 9. Fig. 10. Fig. 11.

**Varieties of the float.**

UR heavy lines for deep quick-running water for general float-fishing are fitted thus:—First a hook-length of hair or gut, with one small shot on, six inches from the hook, next a length of strong double hair (if hair has been used for the hook length) looped at each end, on which slide two or three small perforated shots, then one length of the best and strongest hair to be procured, then another short length of double hair, with

bream, or barbel abound, and take the bait in the same swim as the roach, it would be folly to use single hair.

The recommendations, however, of single hair are, that it is more elastic and yielding than gut, and, consequently, will kill a fish of greater weight than its actual strength would suggest, and from its more compact structure, and the absence of gum or resinous substance in it, it is not liable to swell in the water or

give off air bubbles, which gut does, and which bubbles, attaching to the side of the line, give it an appearance of undue thickness.

However, in these cases the gut ought to be stained. Many like it of a pale green, or sometimes an inky colour, but we, for our own use in Thames and general fishing, dye it of a dark brown. It should likewise be very fine and round; and these qualities have in modern days been acquired by "drawing" the gut, a process similar to that to which wire is subjected. The same precaution should be taken we have before recommended, of doubling and whipping over the gut wherever the shot are to be tipped on.

Gut may be purchased of almost any shade of ink diluted with water to the tone required, and let it remain until the tint is obtained, and a bluish hue is the result. For amber, take tea or coffee remains, and the outer walnut shells steeped will give a yet deeper colour, more or less brown. The

the remainder of the shots necessary, and, above all, about three feet of twisted human hair—German female hair being the best. This is laid up in three strands, each containing from six to nine hairs; the lengths are either looped together, as before described, or fastened in the manner gut lines are generally made, the ends being whipped down neatly. To this the running line is fixed, the latter being mostly made of fine silk either twisted or plaited.

The Nottingham make is unsurpassed; those lines principally manufactured for roach and dace fishing are very fine, and only weigh from one-eighth to one-sixth of an ounce avoirdupois per hundred yards. We have one which was made as long since as 1860, by John Morley, of Nottingham, and which even now would cut our fingers to the bone if we attempted to break it with our hands. Although, as we have said, we give the preference to hair, yet there are many occasions when gut will kill equally well. If the water be at all discoloured there is very little difference in their killing properties, but wherever large carp,
green is got by wrapping the gut in a piece of green baize, and a short or longer dip in warm water will suffice, according to the shade required. The knowledge here is most important to fly fishers, who may thus with facility obtain almost the exact hue of the water they are about to fish.

We always fish with a running line, but some are so accustomed to a tight line, more particularly the best Lea anglers, that they cannot fish in comfort with a reel, in consequence of the slackening of the line. This inconvenience may be avoided by tying a small piece of brass wire or wood, by two half hitches, at the proper distance above the float, and then drawing the running line tight; the stop will rest against the wire loop at the top of the rod, and all the advantages of a tight line will be obtained without losing the convenience of the reel.

Many good fishermen who use tight lines of all hair, loop at the top about eight inches of double thread, with which to loop it to the rod. By adopting this plan you will be able to throw your line out, and to strike your fish much better than you would if your hair or gut itself were fastened to the top ring.

A compromise is sometimes made between the use of the reel and a tight line by having only a few yards of extra spare line, to which a check is attached to prevent it running entirely through the rings of the rod. This we have found of essential service in streams in which large fish abound—the first dash of this fish when pricked by the hook being of a most formidable and tackle-trying character; but as his rush, however powerful, is seldom beyond a short distance, he is brought under command at once, after this trying ordeal for a single hair line is surmounted.

Let the angler bear in mind that, although he may kill fish with coarse tackle, he is the greatest sportsman who can do so by the simplest appliances and the finest tackle, without considering the thrill of gratification which is induced by mastering a heavy fish with an elastic hair line and light pliant rod.

Some anglers make their roach and other lines half single hair, and half two hairs twisted, or as much single hair from the hook as will nearly reach to the float, because if the line breaks, the single hair will go first, and, in that case having the float on the stronger part, you save it. There are other anglers who have gut lines with single hair bottoms; but we totally object to this arrangement, as the want of elasticity in the one has a tendency to bring about disruption in the other, which want of sympathy of action is proved by the breakage under such conditions almost invariably taking place at the junction of the two.

With regard to lines adapted to less general styles of fishing, it will be well to treat of them under the respective heads.

The tumbler or balance float (given in Fig. 1) is much, and almost exclusively used in the Trent. It is made by fixing a swan quill into the base of a pear-shaped piece of cork, and a short wooden peg into its apex by means of cement; but, previous to doing so a large shot pellet must be dropped into the end of the quill at A, and secured there in its place by a few drops of cement. The quill must project above the cork considerably more than the peg does below it; B is the cap, as in the ordinary float, and if this is made of metal, the shot pellet in the cap may be dispensed with. This float is intended to lie flat upon the water instead of upright, as is the ordinary kind; the line next the hook must not be weighted with sinkers so heavily as to cause it to cook vertically. Thus the cork will act as a fulcrum about c, and will be drawn upright when seized by a fish. A small one of this description, without sinkers at all, might be found of great service in ponds and clear water, where the fish are shy, as it could be thrown out without any reference to depth, and be seen when in action at a far greater distance than other floats. It ought to be kept very quiet in colour, and the cork either left without paint, or coloured of a sombre green.

The most primitive float is a quill unadorned, a piece of pith or phial cork allowed to lie without any weight but the line attached on the water.

Perhaps the next is a small portion of the stem of a goose-quill, fastened to the line by one ring of quill, and allowed to lie on the water; we have known the latter used with great success when the water is shallow and there is little or no stream, the bait being a natural fly of some description, which is permitted to sink or swim according to chance.

This simple float is used a good deal in the moats which surround the fortified towns in France and the still wooded waters of the Pas de Calais, a small shot occasionally being superadded to the weight of the bait.

Next in order may come the small porcupine quill, with half an inch cut off the thick end, or half a larger porcupine quill with the broad part upwards, or a small swan quill. Either of these is fit for still water from three to six feet deep; one small shot should be put on about a foot from the hook, and the remainder a foot to eighteen inches higher up (Figs. 2 and 3).

If deeper or gentle running water of moderate depth is to be essayed, a large porcupine quill or large swan quill shotted as last described will be found to answer well. Many prefer the patent taper quill floats (Figs. 4 and 5) for these purposes, but although we have often used them, and they are extremely expensive, we much prefer a float of rather larger section where it emerges from the water. We have tried many experiments with porcupine quill floats, using alternately the broad and narrow end upwards, but although we were prejudiced in favour of the fine tip, experience demonstrated that the stout one was far better suited to render visible the very slight depression caused by the bite of a heavy fish, which in still water does not exceed the sixteenth part of an inch.*

The subject of the method which various fish use while feeding is too interesting, more particularly to the float fisher, and is in no small degree a relationship to the subject of floats themselves, that we may be pardoned for recurring to the subject of their biting. Many persons are under the impression that, for instance, a roach bite is defined by the fish laying hold of the bait. But this is not what the fish does, but what he does not do.

We have passed many hours in watching the habits of different fish, sometimes sheltered behind a tree, sometimes from a bridge, or hanging over the end of a pont with our face nearly touching the water, and sometimes while prostrate peering from amidst a bunch of wild aquatic flowers, with our features screened from observation by green crape, and often in the quiet of our study by means of a large aquarium, and this is the result of our observation—minnows, dace, perch, trout, gudgeon, and some others, snap at a bait, and really seize hold of it, depressing the float more or less according to their size, but the roach generally takes it in a very different manner.

The roach swims up to the object, opens his mouth, and draws in a current of water, together with the subject he is experimenting on. Should it please Mr. Roach, it is immediately swallowed, and the water ejected through the gills. But the moment he finds a line attached, or should the flavour not suit his fastidious palate, it is instantly blown out with great force, along with the mouthful of water he has just taken in. The larger the fish are, as a rule, the more dainty they are, and the more cautiously they take the bait into their mouths.

It will therefore be conceded that our attention cannot be too scrupulously directed to the nicety and delicacy of the tell-tale

which indicates the presence of small fish, and gives but little
warning of the proximity of the larger.

It is a false notion, therefore, that what is termed a "good
bite" necessarily signifies the touch of a good fish.

It will be seen by this that touch seldom pull at the line as

FENCING.

By Major House.

THE VALUE OF FENCING—HEALTH AND STRENGTH—WHOLESALE EXERCISE—THE ATTACK—THREAT—QUARTER—TIERCE—
RAPIDITY—DESMONDMENT.

TILITARIANS must strong
in Great Britain, and every
one who invites attention to
and encouragement of any
exercise or sport is expected to
show some object to be ob-
tained by it, almost as rigo-
ously as though he were get-
ting up a company for laying
down a railway or digging a
canal.

The art, however, of show-
ing the advantages of learning
to fence is an easy one. The
most obvious objection to the
art is that most commonly heard: Why acquire the use of
a weapon which I shall probably never hold in my hand? I
might as well seek to become an adept in the management of
a boomerang as of a small sword.

Now with respect to men engaged in any military capacity,
this reasoning was shown to be fallacious in our last paper,
where it was pointed out that practice with the foil was the
grammar, as it were, to the use of cold steel in any form.

The principles of thrust and parry are always the same,
and should bayonet be opposed to bayonet, the enemy’s point
must be put aside in quarte, or in tierce, as when swords are
the weapons employed, so that the advantage would lie with
the best manipulator of the foil, though his light and delicate
tool were exchanged for a heavy and clumsy one wielded with
both hands.

Besides, the most pacific man may be placed in a position
where the knowledge of how to defend his person effectively
may be of the greatest service to him.

Some years ago a French teacher, resident at Clifton, near
Bristol, was engaged in the instruction of several of the nu-
merous schools in that neighbourhood; and as one of these was
situated at a village about three miles off, on the other side
of the Downs, where the road was lonely, and he often had to
return along it from his periodical visits late in the evening,
he adopted the habit of carrying a sword-stick.

The precaution proved to be not unnecessary, for he was
waylaid and attacked one winter night by four men, who had
contrived by some means to learn that he was that day to
receive his half-yearly salary, which the mistress of that parti-
cular school always paid in cash, and not by cheque. This sum
the rogue reckoned upon easily appropriating, together with
such little matters as his watch, a diamond breast-pin, etc., to
their own waste and pleasures, their proposed victim being an
old and apparently feeble little man.

But they reckoned without their host. Monsieur had been
the joy and pride of a famous maître d’armes in the days of his

many other fishes do, but deflect it a little when in slowly-
running waters, which sometimes causes a trifling retardation
of the float, but more generally a slight depression.

Figs. 6, 7, 8, 9, 10 and 11 are the traveller and specimens
of the ordinary cork and quill float, of which more in our next.

But, says the practical man, people rarely go about armed
with sword-sticks or any other concealed weapons. He is per-
fectly right, we are thankful to say; and it would be a very
great misfortune indeed if such a custom were to arise in this
country.

But we carry walking-sticks with or without fœrrilles at the
end; we carry umbrellas. Now an ordinary sixteenpenny oaken
stick would be a very insufficient weapon, we grant, in the
hands of a man who had never learned to fence; a blow from
it would merely irritate without stopping an assailant.

But used by one who knew how to manage the foil, a simple
walking-stick, if not too supple or fragile, or even the homely
gingham, would become formidable. A sudden longe, delivered
secundum artem, would stop the biggest ruffian that ever
adopted the stern profession of garrotting, or softened his lighter
moments by kicking his wife to death, even if it took effect in
the centre of his chest. Were you to choose the lower line,
your late apprehension for your windpipe and pocket-book, or
your chivalrous indignation against the man who had dared to
lay a hand (or foot) upon a woman, "save in way of kind
ness," might be converted into concern for the aggressor.

A naval officer once killed a man, who sought to rob him on
the stairs near London Bridge, with one thrust of his umbrella.

Or should you aim at your adversary’s face, the result might
be still more unpleasant to think: about afterwards, for the eye
would be the most probable place for your point, to strike,
either directly or glancing from the cheek.

But to be effective the longe must be correctly delivered; a
pouk, made by drawing the arm back and then thrusting, would
not be likely to disable your man, even if he failed to catch or
ward off your stick or umbrella—not a difficult thing to do in
that case, but almost impossible against the sudden irresistible
dart forwards of the straightened arm of a fencer.

If, then, it is useful to fling the man (supposing you catch him)
who robs you with violence, it must be still more useful to
learn an art which will give you a good chance of forestalling
his intentions by turning his violence upon himself, or there is
no truth in the proverb that prevention is better than cure.

But for the inhabitants of large towns, especially for those
who have but little leisure, fencing has a far higher value than
the acquisition of a means of defence which may remain a
hidden power, a sheathed weapon, all your days; for though we
insure our houses, we hope that the fire office will never be put
to the trouble of drawing us a cheque.
Fencing means health and strength; there is no other exer-
cise which brings every muscle of the human frame so com-
pletely and so impartially into play; which steadies the nerves,
opens the chest, and teaches the eye and hand to act together ra-
pidly and instinctively in an equal
degree.
It is also most salutary in an-
other important way. In a na-
tural state man
has to earn his
bread in the sweat
of his brow, and
those members of
a civilized com-
munity upon whom
this necessity still
presses are the
most hardy and
vigorous. But the
great majority of
those classes who
wear broadcloth
earn their living
by means which
do not open their
pores, and half the
headaches, indi-
gestions, and ca-
tarrhs from which
they suffer are
owing to this cause
alone.
Half did we say?
Two-thirds would
be nearer the
mark. The rich
suffer principally
from high living;
the poor from in-
sufficient food, bad
drainage and ven-
tilation, and adul-
terated drink; and
the middle classes
from a want of
wholesome exer-
cise. Many a man
who has to work
with his head has discovered this; and when
the article in question aches, and becomes temporarily useless, he
finds the Turkish bath a speedier and more effective remedy
than pill or potion.
But without undervaluing Turkish baths, we can assure him
that he will find a bout at fencing to be a more excellent
sudorific still. It is the recreation in which he can take the
strongest amount of exercise in the shortest possible time, and
an hour of it thrice or even twice a week will go far to counter-
act the ill effects of a too sedentary life.

We by no means undervalue the inestimable benefits of fresh
air, or wish to advance that any exercise in a room can compare
with that which is taken on the mountain, in the fields, or on
the river; the above remarks are addressed to those who are
debased for the greater part of the year from the sports of the
field; though, indeed, in this climate of ours, the advantages of
an exercise which can be taken under shelter address
themselves to all.
The uses of fencing are be-
coming better ap-
preciated than
they were, and
many a young man
who is nailed to
desk or counter
all day, spends in
the gymnasium
those evening
hours of recrea-
tion which would
otherwise be
passed in the un-
wholesome atmo-
sphere of a bil-
liard-room, spend-
ing more money
than he can pro-
perly afford, and
smoking more to-
bacco than is good
for him.
In our last pa-
per we treated of
the defence; we
now come to

THE ATTACK.
The thrusts are
dened, like the
parries, quarte,
tierce, etc. So also
are the engage-
ments: when the
foils are joined in
the inside high,
you are engaged
in quarte; on the
outside high, in
tierce; and these
two engagements
are almost uni-
versally adopted,
though there is no
rule to that effect; the position of quarte, indeed, is that into
which you naturally fall on coming on guard.
Suppose you are engaged in quarte, then while your
adversary's blade is in a true line it is evident that a very
slight movement of his hand to the left would turn aside a
direct thrust; or if he were to extend his arm at the moment
of your lunge, you would throw yourself upon his point. You
therefore seek, by pressing with the forte of your sword upon
the faible of his, to force it out of the line.
If he allow you to do this, his breast lies entirely exposed to
your attack, and a direct thrust will hit it without risk to yourself, his point not being directed towards your body; so that if he should thrust simultaneously it must go past you, and he will be the only one struck; and, as Molière’s fencing master explains to his pupil, the Bourgeois Gentilhomme, the art of fencing lies in two simple things—to hit, and not to be hit. (Fig. 1.)

But suppose your adversary obtains the advantage in the engagement, and that his sword commands yours, the direct thrust becomes impossible, and you must disengage to get an opening.

The more completely his inside line is guarded (you are engaged in quarte, remember) the more exposed must he be on the outside line.

Lower your point then under his hilt, straightening your arm as you shift to the outside line, and longe like lightning.

Rapidity is everything in the disengagement; so you must be careful not to draw your point back, instead of merely lowering it, and not to make a wide semicircle round your opponent’s blade. Your foil should slip, as it were, from quarte to tierce, close to his, acted on by the fingers only. (Fig. 2.)

Rapid as you are, your adversary is as quick; his eye is fixed on your wrist; his foil, touching yours, aids him to divine your intentions, and the moment you disengage he is ready with his parry in tierce or seconde before you long.

In this case you seek your opening by a second disengagement, and hit him in quarte after all.

This double disengagement is called the “one, two,” and is very hard to defeat with two simple consecutive parries; for the formation of the first leaves the breast so much exposed, that it is barely possible to form the second in time.

It is therefore met with the counter or round parry; how are you to deceive this? By a counter-disengagement—that is, by letting your point follow his blade round the circle it describes until the position of the first disengagement is resumed, and then longing.

The opponent seeks to defeat this attack by a combination of simple and counter parries, which is to be evaded by a similar combination of disengagements and counter-disengagements, unless arrested in their action by a beat, wrench, or pressure upon his blade.

Fig. 1.

WINDOW GARDENING.

BY J. C. LEAKE.

SHALLOW tray of zinc should be procured, which may serve to hold the earth in which the ferns are planted, and in the centre a short pipe should be inserted, to allow of the free escape of the waste water into a pan placed beneath. This will complete the case with the exception of the decoration of the base, which may be effected in any of the ways which we have already described.

A case such as we described in our last may be made at a cost of about seven shillings and sixpence. The glass, if of the ordinary glazing quality—which is usually quite good
enough—may be bought at fourpence per foot—this will be
about three shillings and sixpence; the wood for frame may
one and sixpence; the zinc tray, one and sixpence; and tape,
glue, etc., one shilling. We need hardly observe that no fern
case anything like this could be purchased for the money; and
besides the pleasurable la-
bour of construction, we
may rest assured that we
have one of a really
effective character, and in
which the most beautiful
plants may be successfully
cultivated.

The only precaution neces-
sary in a case of this de-
scription is that of keeping
the slips of tape and tin-foil
well varnished, in order to
protect the glue from the
action of the moisture which
rises from the earth and
plants.

Having given the simpler
forms of fern cases, we may
now proceed to consider
those which, while they are
somewhat more difficult of
construction, are yet of a
more lasting character, as
well as more elegant in
appearance.

The materials used for the
construction of the better
forms of fern cases are wood
or zinc, and, of course, glass.
And as both of these sub-
stances are capable of being
worked by the amateur, we
shall describe the method of
construction in both cases,
commencing with wood.

We will suppose that it
is desired to construct a
case similar in shape to that
shown in Fig. 1, which has
been found in practice to be
an excellent form.

The first proceeding will
be to provide a base board
of strong yellow deal of the
required dimensions, and
of the shape shown at
Fig. 2.

This should not be less
than one inch in thickness,
planed upon both sides, and
what is termed “ledged”
together by nailing across
its width strong pieces of wood of the same thickness, as
shown by the dotted lines in the Figure.

These ledges should be placed upon the underneath side, so
as not to interfere with the superstructure of the case.

The exact shape of the case should be carefully drawn upon
this board, and the corners cut to the required angle, as shown
in the Figure.

The boards which are to form the sides and ends of the case,
and to hide the zinc trough containing the earth, should next
be prepared.

These should be at least of one inch in thickness, and (for a
case of three feet in length) not less than five inches in width,
and planed upon both sides. These edge boards must be either
nailed or screwed very
strongly to the edges of the
base board, after being care-
fully fitted at the ends, as
shown in Fig. 3. The angles
must be secured together
by careful nailing; but the
nails must not be driven in
within two inches of the
top edge, or they will inter-
fer with the mortises re-
quired for the angle bars.

This will complete the
base of the case, which will
now be ready to receive the
upright bars.

These bars are intended
to receive the glass forming
the sides of the case, and for
this purpose they must be
grooved, as shown in Fig. 4.
Perhaps the best wood for
this purpose is clean and
straight-grained mahogany;
but good yellow deal free
from knots will answer very
well.

As it is unlikely that the
amateur may possess the
requisite tools and facilities
for making these grooves,
the better plan will be to
get the uprights made, as
he may for a few pence
at any joiner’s shop. They
should be about one inch
square, and grooved upon
two of their sides, as shown
at Fig. 4.

Of these bars there will
be required—for a case such
as we are now describing—
eight, one at each angle.
The lengths will of course
be determined by the height
of the case.

In order to secure these
bars to the base, as well
as to the upper frame—
indicated at A and B of
Fig. 1—they must be laid
together upon a bench and
carefully marked at eachend
with a fine pencil line about one inch from their extremity, as
shown by the dotted lines at Fig. 5. This is to indicate the spot
at which the shoulder of the tenons, A in Fig. 6, are to be cut.

After the exact length has thus been marked upon one side
of all the bars, each one should be marked all round. A centre-bit
capable of boring a circular hole of about five-eighths of an inch
in diameter should now be provided, and the pin being entered
into the end of each bar, as shown by the dotted line in Fig. 6.
a circle should be cut by turning the bit round a few times. This will mark out a circular pin, which has to be cut upon both ends of each bar, and which will, when cut out, form the tenons to secure the whole case together.

The lines marked upon the bars to indicate the shoulders must now be carefully cut all round, and the outer portions split away so as to form a circular pin or tenon at each end, as indicated at n in Fig. 6. In order to fix these uprights into the base, holes must be bored in the angles of the rim, as shown at A in Fig. 3. It will be observed that these bars, if driven into the holes, will assume the position of the angle bars in Fig. 1; and the sides of the case will be complete.

It is seldom, however, that these bars fit so well as to be sufficiently firmly fixed in their places. It is necessary, therefore, to secure them by wedging, which is best effected as shown in Fig. 7.

The tenon or pin should be cut longitudinally throughout its length, and before driving into the mortice, n, in the bottom of the case, a small wedge, c, should be inserted in the saw cut, so as to leave a small portion below the end of the pin, as shown in the Figure. It will readily be seen that when the end of this wedge reaches the bottom of the mortice, it will expand the end of the tenon, and fix the work most firmly together.

This is one of the best methods of securing the bars; but of course the wedging must not be too great, or it is likely to split the work.

Before fitting the glass into the grooves in the upright bars, the upper frame, u, in Fig. 1 must be put together.

It would be better if this was constructed before the upright bars were fitted in, as the base will in this case form an excellent guide as to the exact shape and size of the upper frame.

This frame should be made of wood about three-quarters of an inch in thickness, and one and a half inches wide, which must be used flat. A groove of the same width as those in the upright bars should be made along its bottom side, as shown in Fig. 8, which represents this frame in section.

Slips of the requisite length having been cut, the angles should be halved out, as shown in section in Fig. 9; half the thickness of the wood being taken out of the bottom of one piece and the top of the other; so that when fitted together they appear as shown in Fig. 10, which represents the parts as screwed together.

The angles will require cutting, as shown in Fig. 11, the pin of the upright bars being shown at A.

When these parts have been fitted accurately upon the base, and firmly screwed together, the glass, cut to the requisite size, should be carefully placed in the grooves in the upright bars, and, the upper frame having been bored at all its angles for the reception of the pins, should be gently tapped down into its place, securing the glass and binding the whole together.

This will complete the case as far as the lower part is concerned; and, if required, the top may be covered with a flat plate of glass, which would actually complete an efficient fern case; but as we wish to render it as ornamental as possible, it will be necessary to make a raised, or, as it is technically termed, a "hipped" roof or cover, as shown in Fig. 1.

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TOY-MAKING AND TOY-GAMES.


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His article begins with the description of a curious toy known as the Thaumatrope. It was invented by Dr. John Ayrton Paris, an eminent physician, author of "Philosophy in Sport Made Science in Earnest." The name Thaumatrope is derived from two Greek words, one of which means wonder and the other to turn; so that literally the Thaumatrope is the Wonder-turner.

It is founded on the well-known law in optics that an impression made on the retina of the eye does not immediately disappear, but lasts for a short time after the object which produced it has been removed.

The most familiar illustration of this is the twirling round of a lighted stick—a common amusement with boys—when the circle described appears an unbroken line of fire. This arises from the fact that the impression produced on the retina when the stick is at any one point continues till the stick returns to the same point, and this being the case for all parts of the circle, the eye sees the stick as it were at the same moment at every part, and the circle presents a continuous line of light.

The Thaumatrope is to be explained much in the same way. It consists of a picture in two parts, one part being represented on one side of a piece of cardboard, the other being drawn on the other side; and the two parts it is requisite to notice, must be drawn upside down in relation to each other, or the required effect will not be produced. The card is rapidly twirled round by means of strings attached to the margin; the picture is then seen not in two parts but complete. The impression, you observe, made by the one half of the picture is retained by the eye till it receives the other half; the two are not united on the card, but they are united in the eye.

For example, take a piece of cardboard, say five inches by three, and on one side draw a horse, as in Fig. 1 (a); and paint it black with Indian ink. On the other side, but upside down, draw a warrior with a spear in his hand, and in the attitude of a man on horseback, see Fig. 1 (b). To the margin of the card attach two thin strings, as shown in the Figures. Now, holding the strings between the forefinger and thumb of each hand, twirl the card round. The warrior will be seen riding on the horse's back. A great variety of subjects may be treated in the same way. A bird may be placed on one side of the card and a cage on the other, or a juggler throwing up two balls on one side, and two balls only on the other; or a mouse on one side and a trap on the other; or—these examples are enough.

An improvement on the card is to be effected by adding four additional strings, one on either side of the two strings represented in the Figures. Twirl the card round by means of different pairs of strings, and most curious changes will be found to take place in the positions assumed by the figures.

A less scientific toy than this is to be found in the Skip-jack.

How is it made? That, inquiring reader, I am just about to tell you. It is manufactured of hard wood, or, better still, of the
forked bone popularly called the "merry-thought" in a fowl. Everyone knows this bone, and how common it is for a lad and lass to take hold of the two ends of it and pull it till it breaks, when the one who gets the longest end is held as certain to be first married.

One must, however, resist the temptation to conjure with it, if a skip-jack is to be made. The merry-thought is to be preserved whole, and a piece of catgut or of string is to be tied round its two arms and a thin piece of stick is to be inserted between the two sides of the string; the stick must just be long enough to extend a little beyond the arch of the bone. When that is done, twist the string or catgut by means of the stick, till it begins to act as a spring. Push the stick up, so that its free end may rest under the merry-thought. Just where the stick touches the bone apply a morsel of cobbler's wax, so that the end of the stick may adhere to the bone. Place the toy on the ground, in a few seconds the spring of the stick will overcome the adhesion of the wax, it will get free, and the skip-jack will skip to a considerable height. In some parts of the country just before it springs the boys are in the habit of calling out "Up, Jack!" or "Jump, Jack!" According to the dictionaries a skip-jack is "an up-start." Whether the toy got its name from the up-start, or the up-start from the toy would make a curious speculation, but we will leave it to the philologers, and pass on, only remarking by the way that the principle of the skip-jack has been applied with good effect to little wooden figures of animals, as mice, frogs, etc. Frogs it suits particularly well.

The Magic Flute—not equal certainly in its effects to the magic flute of Mozart's famous opera, but for all that, very excellent in its way—is to be made out of a good sound cork. It must have as few holes and cracks in it as possible. Place it against the teeth, hold it tightly between the lips, and play upon it with the handles of two forks or the bowls of two spoons. You will produce a singular imitation of a piccolo or small flute. Any tune may be chosen, but a quick one is most effective.

The Mocking Call, a little instrument by which one may imitate the songs of birds and various other sounds of the country, is to be made in the following way. Take a common leek, and from the green leaf cut cleanly a small square piece. Lay it on the table, and with great care scrape away a piece of the green pulpy substance of the leaf; you must on no account injure the fine outer skin. Place this instrument in the roof of the mouth, with the side on which the outer skin is downwards. Press it gently into its place with the tongue, and then blow between the tongue and the upper teeth. At first you will probably do no better than make a sound like a mild grunt, but, by patient practice you may be able to imitate most naturally the barking of a dog the neighing of a horse, and the notes of most of our song birds.

When the mocking call is not in use it should be kept in a glass of water, to prevent its drying.

The following variety of this toy is given by Mr. Cremer—
"Take the leaf of a pear tree, an inch long and half an inch broad. Dig a semicircular piece out of the middle with the thumbnail, leaving only the white inside, extremely thin, protected on the under side by the outer skin. This opening will be in the shape of a half three-penny piece; if you have not cut it clean out, you will only be able to draw from it the croaking of a raven.

"Double up the leaf and apply it to the palate, the bared part to the swell at the back of and above the roof of the tongue, not towards the hollow, and try to pronounce the following syllables to imitate the nightingale, "Eu-oo, eu-oo, eu-oo, eu, cu, eu, eu, tehee, tahoo, tehee, tahoo, tehee, roo, roo, eu, eu, eu, roo shee!"

There are some things which once upon a time held only the
place of toys, and now are advanced, to play a part in the serious business of life; there are others again which once held an important and useful position, and now are but to be spoken of as articles of diversion.

Amongst the latter stands the Sling.

The art of slinging is of the highest antiquity, and was principally cultivated for purposes of warfare. It gradually gave way, however, before that of shooting with the bow, as the bow itself sank into comparative obscurity on the invention of fire-arms.

The inhabitants of the Balearic Islands were famous in antiquity for their dexterous management of the sling. It is said that they used three kinds, some longer and others shorter; these they employed according as their enemies were near or at a considerable distance.

In our own country it was used by the Romans for the defence of their camps and stations, and likely enough our British ancestors learned from them how to fight with it, if they were ignorant before. About its last appearance as a weapon of defence was in 1066 at the Battle of Hastings.

Its construction is exceedingly simple. Cut out an oval piece of leather, at the broadest part do not let it be more than about two inches wide, and cut a small hole—though this is not essential—in the centre, to fix the stone upon. At each of the ends fasten a piece of string or a thong of leather. One of these strings or thongs should be longer than the other. Now the sling is complete. (Fig. 2.)

To use it place a stone in the centre of the leather, twist the longest cord twice or three times round your hand, and hold the end of the shorter cord between the forefinger and thumb. Whirl the stone several times round your head, then let go the short cord, and off the stone will fly to a great distance and with extraordinary speed.

The reason for this is, that whilst the thong which contains the stone is swinging round the head of the slinger, the force of the hand is continually accumulating in the revolving stone, and it is thus discharged, when the loose cord is let free, with a velocity which it could never have received from the hand alone.

It is to be remarked that sometimes the string to be detained is not twisted round the hand but has a loop at the end which is put on the middle finger of the right hand.

Surprising results in the way of throwing may be obtained by practice from the sling. Lead bullets and baked clay balls may be used instead of stones, but the slinger should stick fast by one kind of ammunition if he desires to become a good shot; and perhaps stones are best, at any rate they are handiest and cheapest.

The making of Fire-Balloons is next to engage our attention; and I shall begin at once by telling how to manufacture one.

Take some tissue paper, white or coloured, or both white and coloured, and out of it cut the gores, fourteen in all, in the shape of Fig. 3. Paste them carefully together to make a balloon in the style of Fig. 4, leaving no slit or hole by which any air may escape: the only opening is to be at the mouth of the balloon.

Now take a piece of thin wire and make a ring the size of the mouth. Across this wire-ring fasten two other wires in the shape of the letter x—you see them in Fig. 4—and these wires should be a little depressed where they cross each other.

Fix the wire-ring to the balloon by turning up and pasting the margin of the paper round it. When dry, the balloon is ready for flight.

To set it off, get some one to hold it by the top; then dip a piece of cotton wool in spirits of wine, and when it is thoroughly soaked place the cotton in the depressed centre of the crossed wires. Whenever the air inside the balloon becomes heated, the balloon will ascend, and, if properly made, it may rise to a great height. When, however, it reaches at last a very rarified atmosphere,
the air inside will expand rapidly, and will burst the paper which confines it, and the wreck of the balloon will fall to the earth.

The reason for the ascent of the fire-balloon is simple enough. The air contained in it being heated, expands, it is therefore lighter, bulk for bulk, than the surrounding air at the surface of the earth, so up it goes, and carries its paper prison along with it.

The first of balloons was a fire balloon, something like the above, but on a grand scale. It was in 1783 that the celebrated brothers Montgolfier made a balloon of a spherical form, thirty-five feet in diameter, the material of which it was constructed being pack cloth covered with paper. The air in it was kept heated by a fire lighted below the mouth of the balloon. It rose to a height of 1,500 feet.

To make a toy Parachute take a square piece of light paper, and fold it from corner to corner so as to be of a triangular shape; fold it again from corner to corner, fold it a third time from corner to corner; then double it so as to look like Fig. 5. With a sharp penknife cut as shown by the dotted line, through all the folds of paper; pierce a hole through and through at A; then open out, the paper will be found as in Fig. 6. Fasten threads, all of the same length, through each hole; bring the loose ends of the threads to a point, and to the point attach a piece of cork or paper by way of ballast. (See Fig. 7.)

Take the parachute now into the open air; let the breeze get under it, and it will be carried to a considerable elevation. It may be added, however, that it requires some dexterity to set it off successfully. Some have the art of shooting it up with a common bow, by inserting an arrow between the points. (See Fig. 8.) A small hole is cut in the top of the paper in which the end of the arrow is inserted and fixed by the aid of a little gum or paste. The ends of the thread are tied about half way up the shaft of the arrow, and when complete it looks like a closed parasol.

When shot into the air it will go to a great height, and in coming down will open out and sail away most gracefully. This is a good imitation of the parachutes used by aeronauts to enable them to descend.

These are described as like an enormous umbrella, to the handle of which a light basket is fastened. The aeronaut sits in the basket. When it is disengaged from the balloon it is folded up, and looks something like our Figure, with a basket in the place of the arrow.

But the air soon enters the folds, the parachute opens out and takes the appearance of an open umbrella. Its descent is rapidly retarded, and grows slower and slower as it comes nearer the earth, owing to the increased density of the air.

It will make a pleasant conclusion to this article if I mention an amusing little toy known as the Magic Figure. Its peculiarity is, that however it may be knocked about, it always rises to its feet, like those refreshing persons one sometimes meet, who, though they receive many a knock-down blow from Fortune, invariably come up again smiling.

The Magic Figure is made very easily, of pitch. It should be clothed by gumming on to it silk floss or some other light stuff. To its base glue half a leaden bullet, with the semi-circular side underneath.

The figure may be that of a soldier, or a sailor, or a clown, or, in fact, any one you please, and the more comical it is of course the better. You see an example in Fig. 9.

SWIMMING.

By the Secretary of the Royal Humane Society.

SWIMMING UNDER WATER—DIVING—TAKing HEADERS—THE PLUNGE—THE SHoot—LEApING From A HEIGHT.

It is as well to acquire the power of swimming under water before learning the side stroke. This is practised by drawing as much air into the lungs as possible, and then with a spring forcing yourself under water and striking out in the same manner as on the surface, holding the breath; the learner will find a great difficulty in keeping under water, the tendency of the body being to come to the surface, in spite of the effort made to keep beneath. The length of time one can remain under water is greatly dependent on the formation of the chest, but the average time is about forty seconds; some swimmers can remain much longer than others; and Johnson of Leeds, a celebrity in swimming and diving, is said to be able to remain under water for three minutes and ten seconds. This seems almost impossible, but it is well known to be a fact.

People can swim under water much faster than above. Gurr, in his races, holds his head more under water than above, well knowing that the less there is of the body out of water the less there is to carry.

After becoming an adept at swimming under water, you should learn to swim with your clothes on, and with your eyes open—they must be kept open in the act of diving or entering the water, as it is very difficult to open them after the head is once under water. In commencing to swim with your clothes on, begin at first with trousers and stockings on, then with your waistcoat, next the coat, etc., until you put on all your ordinary clothing. By proceeding in this manner you will, by imperceptible degrees, become able to swim easily in all your clothes, and, in cases of necessity, be of infinite use in saving the lives of others when in danger of drowning. The least foreseen occasions of testing these powers may happen, wherefore you should be ready.

Diving, or taking a header, should be carefully practised by all learners of swimming; a graceful and proper manner of entering the water being cultivated assiduously, it is just as easy to learn this accomplishment gracefully as clumsily, common care being all that is necessary at first. Headers may be taken from a boat, from the bank with a good run, or from any platform or other height, such as a spring-board, or off a ladder step by step; but jumping off any height should not be attempted till after great practice at the jumps off boats or other slight elevations.

Beginners are generally much alarmed when first told to jump into the water, fancying instinctively that their heads will come in contact with something; therefore, when trying the "header" they come flat on the water with a regular flop, and make a splash, sometimes hurting themselves very much, the act of striking the water having almost as stinging an effect as a smart stroke from a schoolboy's birch. The learner may go to the river bank at a spot where it is not too shallow, and then, stooping down until he is nearly double, he must place his hands together over his head, lean over till they nearly touch the surface, and so quietly glide, rather than fall, into the water. He will not at first acquire the proper position, but after a while he will take his header without any hesitation. He must practise headers over and over again, taking care each time to increase the height from which he jumps. After be-
coming a proficient in this exercise, he should practise taking
short runs, and leap head first into the water from the place
where he took his first lessons in plunging, as he will have
much more confidence in a place he is accustomed to. Leaping-
boards are very good things to practise from.

In taking headers properly, raise the arms over the head
several times, stretch as to expand the lungs; then the hands
must be joined over the head, fingers and thumbs together, the back
knee hollow, and the body stiff, straight, and still, the legs
being stretched out firmly, the feet pressed together, and the
toes pointing in a line with the body and legs. Enter the
water like an arrow, without making any splash, this being the
test of a good "header;" gliding down into deep water as far
as your impetus will carry you, at about the angle forty-five:
there should not be a bubble to mark the spot at which you
entered.

Usually any one who can jump from a height of ten feet will
not hesitate at jumping from thirty to forty; care must be
taken, however, to enter the water head first, or you may fall
on your chest or stomach, injuring yourself very much, or, at
the least, knocking the breath out of your body, and, if alone,
risky the risk of being drowned before recovering yourself.

If the plunge is taken properly, the "shunt," as it is termed,
will be from twelve to fifteen yards. If you wish to swim near
the bottom, place your hands back to back, and take a down-
ward stroke till you reach the bottom, and then practise
swimming under water as long as you can—this being a very
important part of a good swimmer's education. By entering
the water with the eyes open, with the view to fetch some
object from the bottom, you will soon become a thorough good
diver, without noticing the progress you are making. A lump
of chalk, a small plate, or piece of tin, are very good things
to throw in and then search for till you find them, com-
missioning a few feet from you, and then increasing the distance
gradually till the object is some twenty yards off.

The natives of warm climates are very good at this exercise.
At Suez and Aden the Arabs will jump off the Pemulwar and
Oriental steamer from a shilling thrown in by the passengers,
and, catching it before it reaches the bottom, swim
under the immense vessel, and come up on the other side; and
this is done with as much ease as the street "Arabs" of
London turn somersaults and make stars by the sides of the omnibuses, being the result of practice. They seem to have
a total immunity from the attacks of sharks, which are very
numerous in these places, but let their living friends alone in
the water.

A gentleman at Brighton is a very good diver, and frequently
amuses himself by throwing half-a-crown from the top of the
New Pier some thirty or forty yards off, and then diving in
after it, generally bringing it up at the first attempt: the
water is about twenty feet deep at that place. This is simply
the result of continued practice. Many a life has been saved by
divers after a person has sunk, as will be seen by the follow-
ing cases of rescue by diving, for which the silver medal of the
Royal Humane Society was granted.

On the night of the 17th of February, 1860, the butler of Mr.
Heygate, of Brent Pelham Hall, was crossing the yard, when,
through the darkness of the night, he missed his way, and
accidentally fell into a large reservoir of water, fifteen feet deep
and partially covered with ice. His screams were heard by the
servants in the hall, and Mr. Heygate, on hearing the alarm,
immediately ran out, taking off his coat and waistcoat as he ran.
When he reached the edge of the reservoir, the drowning
man had sunk. Mr. Heygate immediately jumped into the water
to his relief, dived once, but without success, and notwithstanding
the excessive coldness of the water, persevered until he
found the body, and on raising it to the surface brought it to
the side of the reservoir, when, with assistance, he succeeded
with great difficulty in raising the body of the man until it was
drawn up to an insensible state. Mr. Heygate himself being
exhausted and nearly stupified with the cold.

Whilst Her Majesty's ship "Impétueux" was steaming at
the rate of seven knots an hour through the Rhine Straits, on
the morning of the 11th of January, 1860, a marine named
Boyes fell overboard from a main-deck port. Mr. E. H. Seymour,
mate (although the accident was not then known on deck),
instantly jumped after him, and persisted in his attempt to
save the man, by diving several times. When it is considered
that it was a region known to be infested with sharks, much
praise is due to Mr. Seymour for his perseverance in remaining
near the spot where the man sank, and diving for him until all
hopes of success were over, instead of resorting to the life-buoy
for his own safety.

At Abergavenny is a joint county pauper asylum, in which
are about 800 female patients, and on the 19th of April, 1860,
and large number of them were brought out for a walk by
the side of the river opposite to the race-course, from where
they could see something of the sport going on on the other
side. Suddenly one of the patients—a fine middle-aged
woman—saw, among the crowd on the opposite bank, her
husband, who is a confectioner at Newport, and was hawking
his wares among the people. With a wild scream she ran
down the bank and precipitated herself into the foaming tor-
rent, and attention was drawn to her just as the horses were
about to start for the Club Stakes. A scene of terror ensued
such as cannot be described. The poor woman was carried
rapidly down the stream, shrieking for aid when her head
came above water.

The assembled crowd deserted the racing to rush to the
river's bank; and shouted with dismay and excitement as each
plunge seemed to be the last the victim would give. Suddenly,
a man named Josiah Morgan threw off his overclothing and dashed
straight towards her, amid tremendous cheers; but when he
reached the middle of the stream the strength of the current
bore him away for some distance. In vain he turned and tried
to ascend, he too became visibly exhausted, and it now seemed
imminent that two human beings must perish untimely in the
sight of a frantic crowd, who were utterly powerless to save them.
The man, however, managed to gain the side, and held on to
some overhanging bushes, while the body of the woman, who
had ceased struggling, and was now supposed to be dead, floated
towards him. At this juncture she sank, and the man, with a
last effort, dived after her. The brief space while they were
submerged appeared an age, but the brave fellow had grasped
the drowning woman's hair, and pulled her in towards the
shore. The bank was steep; but they were both got out more
dead than alive. The usual restoratives were applied to them,
after having been thus almost miraculously saved from death,
and they both recovered. Beyond a doubt these lives would
have been sacrificed had not the brave man known how to
dive.

At first, in diving, the sensation is as if all the internal
machinery of the body were left in the air, but after a time
this feeling is lost, and the diver experiences a feeling of enjoy-
ment in his rapid rush through the air. The sensation when
diving is not that of falling, but just as if the water was rising
up to meet you.

It is useful to practise leaping into the water at a distance
from the bank, and to leap over various obstacles, such as the
usual vegetation of the river's bank; masses of rushes, branches
of trees, and the low crowns of willows so often meet with; and
some people recommend two sticks being fixed in the ground
in an upright position, with a string across them, and then with a run and jump going head foremost over. The string is set low at first, and the height is gradually increased. By steadily practicing this way of entering the water, ultimately the height that can be cleared is quite astonishing. One difficulty is to avoid catching the string with the knees or toes.

Again I give the main points to be observed in diving—
"KEEP THE BODY, ARMS, AND LEGS PERFECTLY STIFF, AND ALL IN THE SAME RIGHT LINE."

Those who will follow this rule will be able to leap from extraordinary heights without danger. The hands placed together over the head, form a kind of wedge, which cuts its way into the water and opens a passage into which the body passes. The diver must bend his head so over the chest that even the slightest shock which is sure to ensue on reaching the water only affects the crown of the head, which is the very part best able to bear it.

The exact position can best be learned by watching good swimmers taking headers (Fig. 1). Their bodies are quite stiff, and on reaching the water there is not the least alteration of attitude, the body shooting through the water like a fish, and passing through a wonderful space by the impetus of the spring. Some teachers are advocates for jumping into the water from a height first, the legs and feet being kept close together with the arms against the sides, entering the water quite perpendicularly, as shown in Fig. 2.

One recommendation of this way of entering the water is that there is no fear of accident with it, and though it is not so graceful in appearance as the header, yet in jumping from a height it is just as effective, and more to be used in jumping into strange places, where, from not knowing the depth of the water or the nature of the bottom, an accident might arise from going in head first, by which many excellent swimmers have been killed. Worthington, a diving celebrity, who was killed some years since, used to jump from a height of forty feet and turn three somersaults in his descent before reaching the water. He was applauded by the crowd of onlookers, but the wonder was that he was not killed, as a severe blow either on the chest, stomach, or back, is the consequence of the slightest deviation from the proper angle.

In jumping out of a boat, the best way is to go to the stern and leap over, as there is much more resistance to the feet than is obtained by leaping over the side; and in getting into the boat again always come to the stern, never the side. In approaching the boat, swim with the feet high, grasp the transom with both hands, and kick the feet on the surface of the water, so as to keep them up.

If you do not mind this, the legs will be sucked under the boat, then, with a vigorous kick of the feet, and spring and pull of the hands combined, you rise up out of the water, and find yourself with your breast lying over the stern, so that you are able to crawl easily into the boat, but there is great exertion required to perform this exercise properly, and almost every one gets many hard knocks on the shins, however careful he may be.

For these reasons a short broad ladder, with four or five steps, or a roller across the transom to be pulled in over, are far more pleasant ways of regaining the boat and your clothes than climbing over the stern at the risk of your skin and bones.

To make the Mill, Catherine Wheel, or Washing Tub, the swimmer must lie on his back with his knees up to his chin, then, whilst one hand is kept close to the body, and paddled with to sustain the swimmer, the other is moved with very powerful sweeps, so as to rotate the body on its centre at a rapid pace.
If possible the young naturalist should commence the
pursuit of which we treat when gentle Spring is upon
us, filling our hearts with gladness, and with it
memories of bygone pleasures, associated with this genial
dream we seem to awake like giants refreshed, to gaze on
and charming scenery; to find our pulses throbbing with renewed
life, our brains fired with fresh vigour; we pant for freedom, and
are eager for the chase. It is thus that naturalists generally

season, flooding back upon us, as in a vision; for though
the reality of past occurrences is lost to us for ever,
the vivid impressions they have left upon our minds can
never be effaced. The enjoyment of this feeling may be
selfish, since we cannot share it with others, but it is on
that account none the less delightful. After our winter's
commence their career; inspired, by Nature's promptings,
with an ardent desire to roam abroad, towns are too small to
hold them, and they soon fall in with one or other of Creation's
myriad wonders. Forthwith their course is shaped, the more
they see the more they want to see, and knowledge thus
acquired grows and grows until the pastime of the hour ripens
into a fixed pursuit. Who, for instance, could calmly look for the first time on the beautiful living creature depicted in our illustration, without feeling a desire to acquaint himself with its marvellous natural history and habits.

The Swallow-tailed Butterfly (Papilio machaon) is here depicted, flying in its native fen, settling sometimes on the flowers of the "marsh hog's fennel" (Peucedanum palustre) the favourite food of its caterpillar, which may be observed hard by plying its jaws, while the dormant chrysalis slumbers, clasped by a silken girdle to a neighbouring stem.

By-and-by, in our series of articles, we shall have much more to say concerning these and other treasures of Nature, but before doing so we would first point out some of the advantages to be reapèd from collecting, and then instruct our readers how to prepare themselves for the delightful work before them, for in being ready for the emergency lies their future chances of success and consequent enjoyment.

There is perhaps no recreation better adapted to promote the health of the body and vigour of mind than the collecting and observation of butterflies and moths. As a pastime for leisure hours it brings its rotary face to face with Nature, and leads him, with a fixed object always in view, to ever-varying scenes of rural beauty; along enchanting country lanes, through glorious woods and forests teeming with insect life, over heath and moor, up hill and down dale, amongst the luxuriant vegetation of the fens; or it launches him on a voyage of discovery to hitherto unexplored wilds, and rarely in his rambles does it happen that some obstacle has not to be surmounted. He may have to climb the rugged rock, to jump the brook, to leap the five-barred gate, to tramp the stubble field, to scramble through the tangled sedge, or to swarm the smooth-barked tree or the fluted lamp-post of modern ingenuity—accomplishments, all of which are calculated to bring into play the various muscles of the human frame, and to strengthen the powers of endurance, at the same time that the senses, particularly those of sight and touch, are marvellously quickened.

Collecting fully bears out the force of the terse maxim "knowledge is power," for without knowledge, whether gained by study, or bought by experience, success is hopeless. It offers full scope for the exercise of the wits; and to have earned his spurs the expert insect hunter must have acquired habits of punctuality, patience, perseverance, wariness, and watchfulness, and have improved such mental qualities as thought, memory, reasoning powers, discrimination, serenity under disappointment, and a train of other advantages likely to be serviceable to him in after life.

But although the acquisition of a good memory is invaluable, it is not, as a rule, advisable to be entirely dependent upon it, the safer plan is to trust principally to notes registered in our diaries, and it is, therefore, most desirable that the young collector should accustom himself to keep a record of every fact which may come under his notice, however trivial it may appear to him at the time. The following is as good and compact a form as any which has yet been recommended.

<table>
<thead>
<tr>
<th>No</th>
<th>Name of Species</th>
<th>Date</th>
<th>Locality</th>
<th>Time</th>
<th>Plant</th>
<th>Weather</th>
<th>Description</th>
<th>Remarks</th>
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</tr>
</tbody>
</table>

In the first column consecutive numbers 1, 2, 3, 4, and so on, have to be entered, in order that a ticket bearing the corresponding number, affixed to the specimen, may render reference easy and mistakes impossible. These little labels, made of stiff writing paper, may be readily stuck off, several at a time if necessary, by means of a pencil of suitable size and shape, circular or otherwise. Then, having carefully written the number upon one of them, it should be turned writing side downwards, and the pin with which the insect is impaled driven through the centre of it, so that, by simply turning up the specimen, we can see the figures at a glance.

In the case of caterpillars and chrysalides the tickets must be applied to the cages containing them, and in that of eggs to the glass-topped boxes in which they are kept. Afterwards, when the species to which each belongs has been ascertained, its name should be entered in the appropriate space.

Note.—When the numbers have reached 999, it is better to recommence with A 1 up to A 999, B 1 to B 999, until all the letters of the alphabet have been exhausted, than to be encumbered with an indefinite number of figures; and, of course, if there were even fifty examples of the same species captured under similar circumstances, they should all bear the same number.

By "Date" is intended the day of the year; by "Time" the hour of the day or night; "Locality" speaks for itself.

In the sixth column the plants which we, at the time, suppose to be connected with the history of the insect, should be noted by such entries as "Flying amongst catchfly," "Feeding on periwinkle," "Resting on bed-straw," etc.

The state of the weather can be briefly summed up in a word, as, for instance, "sultry," "fine," "cloudy," "rainy," "stormy," or "tempestuous," and the direction of the wind may be indicated by the usual initials.

The column devoted to "Description" is very necessary to assist us in identifying species unknown to us, especially those we may have secured during their earlier stages.

Under "Remarks" any facts not included under the foregoing heads should be registered.

Thus treated, a good collection is like a valuable library, for every specimen contained in it is not only a marvel of wonder and perfection in itself, but reveals its own little history, and in many cases brings to mind some pleasing association.

Stolid indeed must be the collector who cannot recall with pleasure a hundred enjoyable excursions, the incidents of which are still fresh in his memory, and the recollections of whose very disappointments, dilemmas, and even dangers and hardships, now that they have passed, are not endeared to him.

The genuine naturalist treads a world wherein he is constantly reminded of the presence of the Creator, and inspired with noble thoughts; he enjoys with a zest, which none but those who have experienced it can appreciate, the past and the present, and anticipates with hope the future. He is rapt in admiration of those wondrous organisms which God in His wisdom has created, and which it ill becomes man to despise.

Time was when "the fly-catcher" was so anoreted at by the worldly wise, and jeered at by the vulgar herd, that it was found advisable, not to say absolutely necessary, to invent the umbrella net (of which more anon), in order that he might at least perambulate the streets in peace and safety.

Now-a-days wills are not contested on the ground that the testator collected insects, and was therefore a person of unsound mind, as was the case in the so-called "good old times." The entomologist of the present day, if not regarded with actual respect, is at any rate tolerated, and allowed to roam the country in little fear of molestation, always provided that he steem clear of the gamekeepers' preserves, for in the present year of grace the law of trespass is strictly enforced, and not even the fact of one's being "a lawyer and a gentleman" will
BUTTERFLY AND MOTH COLLECTING.

protect a body from at least summary ejectment, as a certain limb of that learned profession, who had thus proclaimed his status in society, once discovered; for the obtuse keeper, without any regard to the feelings of his visitor, remarked that he had never heard of such a combination, and his arguments were so irresistible, that several important legal cases were neglected during the ensuing week. And thus we see that here, at any rate, the attempt to carry matters with a high hand was unavailing.

Let it be distinctly understood that we discountenance the slightest infringement of the law, but, at the same time, should any of our readers find that they have unwittingly transgressed, the wiser course to pursue is to return a mild answer and to depart peaceably when requested to do so. All keepers' hearts are not made of stone, as the following episode in the life of the late Peter Bouchard will testify:—Whilst diligently working for an exceedingly local butterfly (Thecla prusa) in Monk's Wood, Hunts, Bouchard was repeatedly turned off his working-ground in the most peremptory manner, until at last the keeper, waxing wrathful, threatened that if he ever caught him there again he would do something dreadful; upon which Peter blandly remarked that he had always cleared off when ordered to do so, but that up to the present time he had never been told not to come back again. Somehow, after this occurrence, his former persecutor became very friendly with Bouchard, who, for the rest of his sojourn, pursued his innocent occupation in peace.

The moral is obvious.

Before proceeding further we should like to impress upon parents and guardians the desirability of fostering any youthful inclination towards this most attractive pursuit, one of the greatest merits of which consists in its power to withdraw him who heartily follows it from the paths of temptation.

Owing to the accessibility of their earlier stages of existence there is a greater charm derivable from the observation of moths and butterflies than it is to be met with in any branch of natural history, excepting the other orders of the insect world.

Just as the parent delights to see his young offspring thrive and prosper in body and mind, as the reward of anxious care; as the artist watches, with pardonable pride, the canvass upon which his ideas are gradually becoming realised; or as the florist's care in selection and patient watchfulness are at length crowned with success—so it is with the collector who diligently rears his specimens from egg to caterpillar, from caterpillar to chrysalis, from chrysalis to perfect insect, until the consummation of his wishes is attained, namely, a complete knowledge of the natural history of each individual species.

With respect to the places in which moths and butterflies are to be met with, a few preliminary remarks are necessary. Many of the species are widely distributed over the country, but are not necessarily abundant; others are confined to more or less restricted areas, though they are sometimes plentiful where they occur.

Some species are only to be found in the low-lands; others at a very considerable elevation above the sea level; some inhabit woods, others lanes and open meadows; some again are attached to particular forests, moors, sand-hills, coasts, or fens; while several are so excessively local, that unless the exact spot which they frequent can be ascertained, there is little hope of securing them.

At times it is no easy job to find out the locality in which a rarity has been taken, for the fortunate captor is usually sufficiently alive to his own interests to preserve a discreet silence in the matter. A reference to the works of Continental authors will frequently assist us in forming an opinion as to the kind of locality, nature of the soil, time of appearance, and above all, the food plant, which probably, in the case of a rare species, would be local. We may then, by referring to works on the geographical distribution of plants, such as Withers's, or Watson's "Cybola," occasionally hit upon the locality. This kind of information, coupled with a knowledge of the haunts known to have been frequented by the lucky finder, may sometimes enable us to solve the enigma. Mind, we don't advocate the amateur detective system; and it affords us considerable amusement to find that those who indulge in it frequently go upon a wild-goose chase. We once knew a collector who, "from information received," went six miles out of his way, or thereof which is a common female Ghost Sw. which had pretty accurately answered the description of a rare Tinea in every respect but one, namely, size, and on that point he had omitted to make inquiries.

In connection with this subject we are reminded of the manner in which the head-quarters of a rare insect, which had been artfully concealed, was once accidentally discovered by two entomologists of our acquaintance.

Mr. "Fox" used invariably to give his fellow-collectors the slip at a certain point, and nothing more would be seen of him till the time for working was over, when his practices was to retire to his bed-room, and stuff the key-hole with cotton wool in order that no one should, by any chance, see the result of his day's doings.

One sultry afternoon, however, these two friends of the collector were taking a dip in the sea at a spot where, from the nature of the shore, it was necessary to wade out a few hundred yards before sufficient depth of water could be obtained, for their purpose. Whilst thus engaged, parts of the coast which were not previously in view from the land, now became visible. It was not long before one of them espied afar a moving object glittering in the sunshine, and it excited his curiosity. It did not take long to fetch a field-glass which one of them was in the habit of carrying, and to bring it to bear upon the mysterious apparition, which proved to be the familiar head-gear of the sly collector.

Mr. "Fox" was, of course, run to earth, and our two friends, for the next week, enjoyed their sport amazingly.

A point relating to the exploration of fresh hunting grounds requiring to be well borne in mind is that it is very necessary to be provided with a pocket compass, for, without this useful companion in his travels, the stranger is but too apt to lose his way in unknown parts, more especially in woods, even though they be of limited extent, and on plains of vast extent where there are no landmarks, such as conspicuous trees, to guide him.

It has been remarked, by those who have often had ample opportunities of testing the truth of it, that the tendency of the lost traveller is to be bear right or left in a curved line approaching more or less to a circle, in which direction he seems bound to persist, unless he is sufficiently experienced to break off the twigs, or, better still, strew paper at intervals (if he has the material about him) as he goes, in order that he may preserve the right line, or retrace his steps with a view of making a new start in another direction, always taking care to keep, to the best of his ability, some distant object in view.

At all times moths and butterflies may be obtained in one or other of their stages, provided that we know how to find them; but, inasmuch as there are seasons at which collecting is not only pursued with difficulty, but is neither enjoyable nor profitable, it is hardly worth our while to walk abroad when our services are so necessary at home; for it is at these times that opportunities occur for re-arranging our collections and for concocting plans for the coming campaigns.
DO not know that I can give you any better advice at the outset than is embodied in that famous culinary axiom of Mrs. Glasse, that "you must first catch your hare." For this is the secret of the pastime, just the same as if the hounds were of the canine order, and the object was the quadruped known in the sporting world as "curate jelly pass," obviously, as you can imagine, from the mysteries in its cooked state.

Indeed you must first procure your hare before he can be placed in a position that renders him liable to be caught.

You will readily conceive that Hare and Hounds, as it is practised in the form of an athletic pastime, is merely a mimic representation of the genuine sport, though now, so exact is the imitation in point of the terms applied, that we hear of the human packs as the "metropolitan harriers," with other appellations derived from the original vocabulary.

To us, however, the pastime is one of recreation alone, and the aim is to afford exercise that shall prevent the blood from stagnating, and diffuse the caloric through every vein of the body.

First, then, as I have already said, you must procure your hare, or hares, if you prefer the plural, and your numbers allow you to spare another player to accompany and act in concert with your first selection.

Do not, let me advise you, choose your hare simply because he is the fastest of foot; for if you act on this principle you will reduce the pursuit to a stern chase, and that is, as you know, proverbially a long chase. You do not require the best runner to act as hare, but rather some one among you, if less speedy in his movements, capable of enduring a lengthy run, of affording the hounds a sport that shall be interesting without becoming monotonous, as well of providing an excursion that shall insure his pursuers to endure fatigue, and establish an exercise where naught but good honest British pluck can possibly prevail.

You must be cautious, too, my dear young friend who acts as hare, even if you are daring in your ventures and aspirations, and be careful how you wend your steps with that irrepressible notice before you that "trespassers will be prosecuted with the utmost rigour of the law." You will find plenty of opportunities for displaying your prowess without exposing yourself to the mercy of Giles Scroggins, the farmer militant, or that wide-mouthed ally of his who waits with outstretched fork (i.e., pitchfork), the advent of the trespassers—not a nice reception, as you have just gallantly cleared that obstructive "bullfinch" on your descent into the adjacent field.

I admonish you to be cautious, and to respect the right of property on the broad principle of justice, regardless whether there be risk or not in the experiment.

But now that you have procured your hare, you can complete the other arrangements necessary to the commencement of the game. You have got your hare, and now you will have to make your preparations for the pursuit. You will find here too that method will assist you more than you would possibly imagine. I mean that by having some one as the recognised leader, and a well-regulated recognition of discipline, you will soon discover that your movements are greatly expedited.

According to the old dispensation of the game the hounds were kept in check by a huntsman, as well as duly held together by another official known as a whipper-in: and this is an arrangement that will be found most beneficial in practice.

It would be well, too, if both these worthies were players of the highest order, for on them depends the success or ill success of the pursuit.

We have by this time got all ready for the start, so that you can picture yourselves as present at the most duly accoutred and prepared for the trip. The hare will have meanwhile furnished himself with a large bag, which has been previously filled with pieces of white paper, torn so as to represent small squares, for the purpose of shewing the track and representing the mysteries of scent, and immediately he has received the order to go he is away in good earnest.

You can now yourselves prepare for your journey, for ten minutes will elapse before you can start, as the hare has this period of grace conceded as the privilege of his position. The huntsman has meanwhile provided himself with a white flag, and his subordinate with one red in colour, for purposes which I shall explain presently.

At last the time comes for a start, and the signal has been given that we are "off." At once the pursuit commences merrily, if the pace is not yet of the best, for we have to husband our strength, and it would be unwise policy to overtax our capacity at the first dash. We must go on steadily, acquiring fresh strength as we go, or we shall soon drop away from the rest, and collapse ignominiously. Still we go on, following the scent, and closely adhering to the trail of paper, with the huntsman in front, and the whipper-in judiciously ending the line of stragglers in the rear. So far we have had a straight course, if the fields have been heavy and the jumps unpleasantly awkward, but at last we have met with a check.

It may be that accident has momentarily caused the sight of the scent to be lost, that it has been obscured, or that with cunning contrivance the hare has counterfeited a course so as to baffle the hounds, and gain additional time for breathing. In any case the pursuit has been checked, and the huntsman has not only sounded his horn to signify that the trail has been broken, but has also planted his flag on the spot where lies the last trace of the scent, so that no time should be wasted by a misconception of the precise place, and the necessity for another search to recover the lost ground.

The delay depends of course on the artifices employed by the hare, for there is any number of expedients to be practiced, and the feats of an expert hare are innumerable, by retracing his steps, by improving a false scent, and in fact, by the employment of any device that can dismay or impede his pursuers.

The hounds, though, have not been idle in their quest, for speedily the trail has been regained, and the cry of "Tally ho!" from the huntsman, with another note from the horn, signify that once more the hounds are on the track.

So the chase is maintained, either unobstructed, or varied by frequent checks, until either the hare has been captured, or the hounds themselves have been exhausted, and abandoned pursuit.

Still you have seen what are the objects as well as the requirements of the game. You will learn when you try the
experiment that it is difficult enough to keep up with the rest, even if the pace be of the most moderate, but you will soon gain the use of your limbs, and enjoy the sport the more frequently you indulge in it.

If you are ambitious, and want to become a hare, you will have to fortify yourself to a certain extent by the relinquishment of such expensive fare as you have before affected. Eschew tarts, and for ever abandon such luxuries as pastry of the inflated sort, or you will never achieve greatness.

If we are to believe certain authorities, it was the disagreement of underdone steak that settled Napoleon and Waterloo; so choose your viands well, and reject the unpalatable, if you aim at success among athletes.

You will soon become accustomed to the game if you practice increasing distances at an easy pace, and you will find that the rest will follow. If you want healthy exercise that shall open your lungs as well as improve your digestion, take comfort in the sport, and use it in moderation.

If you feel it irksome at any time, be sure that the distance has been too long, or that there is some defect in your bodily condition, and do not tempt Nature beyond her powers.

You will find that a run of ten miles will be as much as you can cover with satisfaction at any time, and do not be advised to exceed this limit. It is an easy and pleasant exercise that you seek, not one that will appear an infraction.

For this reason let me advise you to see that you are properly clad as to your feet. Do not be misled by the idea that light boots are the most convenient, for it is on this supposition that much mischief is done. You will have possibly to traverse heavy country, so that boots that will not prevent the inlet of water are of no use, and will do you more harm than good. Boots that will lace tightly, and that are thick-soled, as well as fairly waterproof, will help you most, and suits reasonably thick, if not a double pair, will be of more use to you than you may imagine.

You are now ready for the chase, and it will be your own fault if you fail. "Tally ho!" I think I hear the sound now, but the horn gives not the deep note as of old, and the responsive music of the hounds is less ringing than it was! Is it that time flies, that the seasons change, or that I am growing old?

SPANISH FLY.

Why Iberia was selected to furnish a title for this special pastime I am at a loss to conceive. One cannot trace, indeed, the slightest clue to the reason that must have induced its founders to connect it with the land of dark-eyed beauties, of mantillas, of flirtations, jealousies, and rapier, unless it be one that I prefer not to accept. Surely the lofty hidalgo, proud of his descent from the Cid, and a rare old stinker for the genealogical tree, could hardly have demeaned himself so far as to go through the indignity of giving a back. I fear not, or he would surely have expired in the attempt. Why then Spanish fly? I can only advise you, after the manner of the showman, to pay your money and take your choice. Perhaps, like Lord Dunmorely, it is one of those things that no fellow can understand.

But whatever the origin or groundwork of its title, Spanish fly, in the light of a variation, is a game that will amuse you well enough if you are in the vein to be amused.

It is a species of leap-frog, in the main, but with a little of the comic element, after the fashion of follow-my-leader. From this you will understand that you will have to imitate the doings of the player whom you select as leader, under pain of forfeit or disgrace. You had consequently better choose him by lot rather than from any personal superiority, as you will then have a better chance. Next you must find another of your number to give the first back. Of course he takes the same position as in giving a back at leap-frog, bending down with his hands on his knees, his head lowered, and his shoulders elevated.

It is not always a pleasant duty, believe me, for in attempting the most brilliant exploit, it sometimes happens that either the leader or some other of his followers fail, and first back does not always go scot-free in having to provide a stage for the general performance. Whatever is done by the leader must be done also by all the rest, even to the very smallest detail. If he be a fellow of infinite wit and humour he will surely introduce much fun and amusement during the pursuit of his high calling.

There is certainly a fine field for his talents; and the first player who fails to follow his feats to the letter is under the penalty of forming "back" himself until another unfortunate be able to relieve him by another failure.

In what is technically known as "overing" or flying over the back, the leader has a chance of introducing many clever tricks, which are sure to cause the rest no little trouble. In these the cap of every school-boy will, or used to at least, form a very useful accessory.

The great feat used to be in forming the highest possible pile of caps; and to clear this pile without interfering with the structure, or at least disarranging one of the upper stories, was deemed a great exploit.

But this was only one of many recognised possibilities, and is merely instanced as one of the stock articles in the programme of the game.

There was also another feat that was not imitated without some little difficulty, and in this too the cap was the principal accompaniment.

It consisted in the leader, while in the act of flying or overing the back taking up one cap that he had placed thereon with the one hand, and leaving his own cap in its stead with the other.

It would be superfluous to suggest other novelties that may be introduced into this sport with success.

Any boy gifted with none, will be able to picture to himself the numberless plans and variations that can be adopted in this game, if he only be fearless and daring.

The more the peril of the exploit the greater the glory; and boys, you must remember, are great hero worshippers. Not that I want you to risk damage to wind or limb, but do not over-estimate a task because it seems impossible.

FOX.

In this game, as in the chase itself, it is chiefly Reynard himself who has to undergo the greatest suffering. The only improvement in the copy in comparison with the original is that the Fox has almost as good a chance as his pursuers, and that he is at least able to take his own part with a certain show of resistance. He is armed too, as well as his enemies, for each and all are provided with knotted handkerchiefs. Indeed, if he be cunning, he will have a certain advantage, for the force of the blows showered depends chiefly on the manner in which these knots are twisted, and he may thus be able to repay whatever castigation he receives with interest. Granted that you have chosen your Fox, you will have to find him a den, and this is easily provided by merely marking out a certain space to represent his home. It is not very unlike Basta the Bear, in so far that the penalties are the same in each case. You will find that this den will be a welcome retreat, my young friend, when you are Fox, so do undervalue its shelter! You will find that in the chase you will not have much the best of your enemies, and then you will be glad enough of a rest for a while.

When you are quite ready you will have to leave your den, but one leg will be lost to you, as it is one of the chief provisions.
that you "hop" while your pursuers have the full use of both those limbs. You will soon find the disadvantages incidental to your position, for the process of "basting," as in Baste the Bear, will begin soon enough, you may be sure, for your comfort. It is the object of your enemies to use their handkerchiefs as freely as possible on your person, while your chance of retaliation, as well as freedom, lies in your ability to use yours in the same way. If you can strike one of your pursuers without putting down your other foot to the ground, you are safe, and the player so struck has to undertake the duties of Fox in your place. If on the other hand you should find that numbers overpower you, and that the chase is one more difficult than it appears at first sight, you will have to manœuvre so that your retreat is not cut off from your den.

You will have to be wary indeed in this respect, or you will suffer severely, as you will soon discover, otherwise you will be transfixed on the horns of a dangerous dilemma.

Supposing that you have struck one of your assailants without putting your foot to the ground, I have already stated that your freedom is secured and your victim is basted until he is able to reach the den, in his turn to act the part of Fox.

There is the reverse side of the shield though, and should you, either from sheer exhaustion or from forgetfulness, fail to maintain your perpendicular, and so infringe the laws by putting both feet to the ground, you will suffer yourself in a similar manner, and had better make hot haste for the den, for you will be basted mercilessly until you reach its shelter, without being permitted a chance of retaliatory measures.

JOINERY AS A RECREATION.

By Ellis A. Davidson, Author of "Drawing for Carpenters and Joiners," "Drawing for Cabinet-Makers," "Happy Nursery," etc.

HOW TO MAKE A CABINET FOR MICROSCOPE SLIDES.

OUTLINES you will agree that the microscope is a source of everlasting recreation; its revelations afford an insight into the wonderful organisation of things, "infinitely small" in themselves, yet "marvellously great" in the purposes they serve in the world; and by means of this instrument we are able to appreciate beauties which would be otherwise hidden.

So by all means get a microscope—you need not necessarily buy an expensive one, but get a microscope—and you will obtain the means of unending amusement and instruction. To describe the instrument and its uses would be beyond the scope of this paper, but you will find it treated of in other articles in the Popular Recreator.

My purpose is to speak of the mounted objects called microscope slides. How to mount the objects will be described in another paper; but the mere possession of them, whether bought or prepared by yourself, does not imply that they will be fit for use just when you want them, for unless they are properly cared for they are easily injured; they are liable, in fact, to become damaged by the mere position in which they are kept, and therefore I advise you not to adopt the small flat boxes in which the slides stand upright on their edges (Fig. 1), as in these the liquid used in the preparation of the subjects often exudes, or some minute particle, such as a grain of sand, may slip from its place—a particle, which to the naked eye, is "only a grain of sand," but which, under the microscope, is shown to be a wonderful pearly shell, or the shell of (now for a difficult word!) a "pollycentina" or "many boxes," a ball, carved as it were out of ivory.

The best cabinets—made of mahogany, French polished, with glass-panelled door to look in front of the drawers, and the drawers beautifully divided and labelled, are very expensive. But, practically, one like that here illustrated will answer every purpose. "A penny saved is a penny earned," and all the money saved by making this little cabinet for yourself can be put by towards the purchase of more slides or additional apparatus for your microscope.

Now, let me in the first place describe the cabinet as a whole before proceeding to give instructions for making it.

Well, then, it is simply an oblong box; but when you have unlocked it, the lid, on being raised, releases the front, which falls forward (Fig. 2).

In the box are placed several trays resting on each other, the slides being protected by the surrounding edge of the tray, which is sufficiently high to prevent the bottom of the tray above touching them. These are made exactly of the same length and width as the inside of the box, and their united height must be precisely equal to the inside height of it; by this means when the lid is closed and locked down all shaking is avoided.

It is best, therefore, to decide at starting how many slides each tray is to contain, and then, having calculated the size of the trays, make the box to correspond.

In the case sketched in the illustration each tray is designed to take eight slides, and there are to be eight trays.

The thickness of the wood of which the sides of the trays are to be made should be 1 inch, and the height 1 1/2 inch, and the strips forming the divisions should be 1 inch square; the size of the slides is uniformly three inches long by one inch wide. You will thus, without any very great stretch of your arithmetical powers, be able to arrive at the conclusion that the length of the tray is made up of the left and right wall (i.e., the short sides) 1 in. each, eight slides of one inch each, and seven ledges dividing the tray into spaces, total 9 inches; but as the slides should just move freely out of their compartments, you had better make your tray 9 1/2, which will, if you work accurately (and this is easy in such a small object), allow for clearance. By the same method of calculation the width of the trays would be 3 1/2 inches, viz., 3 inches for the length of the slide, and 1 1/2 inch for the thickness of the front and back walls.

Now there are various ways of joining wood so as to form angles. The most simple is to place end to end, at right angles to each other, and unite the pieces by thin nails or "sprigs." If you adopt this plan, which is shown in the drawing annexed (Fig. 3), you must be very careful to bore holes with your bradawl of very nearly the size corresponding with the thickness of the sprigs, and the distance of these holes from the end must be exactly equal to half the thickness of the piece into which they arc to enter; you must be careful to drive them in quite straight—so that their points do not come through on the inner or outer side of the wood. In joining wood in this way you must be careful that the ends are truly squared, or
you will not get a good joint, and the whole article will be irregular, besides which, if the end of the side into which the nails are driven is not quite square and smooth, the bearing will be unequal, and the chances are that some of the sides will be split in the operation of nailing.

Another method of joining is the “mitre” (Fig. 4). Here the two pieces which are to be joined are cut off slantingly, in such a degree that, when brought together, they may form a right angle; cuts are then made slantingly through both, and into these strips of a harder wood are glued; they are left projecting until the glue is quite hard, and then they are shaved off level with the surfaces.

The best system, however, of forming angles is that termed “dovetailing,” shown in Fig. 10, which though it may cost you some little trouble to accomplish, is quite worth your while to learn. You will have an opportunity, in the trys, of practising the work in a very simple manner, and on a very small scale.

In the first place as to wood. You can get mahogany of the required thickness at a few pence per foot, and pine at even less: we shall be able to arrive at the quantity required presently. But as a matter of course it is very easy to go to a timber-yard and say, “Just let me have so and so many feet of mahogany,” and to pay its usual price for it; but there is a better way than that, namely, use up what materials you have. You may perhaps have by you two or three empty cigar-boxes—these would come in well in making the trys—and you can go to one of the larger cigar-shops and buy one of the large boxes for a mere trifle, and this will answer every purpose. The wood is nicely planed, is very light and easy to work, so you have only to pull it to pieces without splitting the boards, to have the material ready to your hand.

Now we will assume that you have your wood. Plane one edge of it, and fix your gauge (which was mentioned in a former article), at a very little more than half an inch, run it along the edge, in the manner already described, then turn the wood, and do the same on the other side. When the line is just indented, strike the steel point of your gauge with the hammer, so that it may project a little further than it did before, repeat your marking process on each side, pressing a little more heavily, and by this means you will cut nearly through the board. You can easily then either break off the strip, or separate it by running your knife down the groove.

You will remember, I told you to set your gauge at a little more than half an inch, this was to allow for your running your plane along the edge just cut, or you may place a sheet of sand-paper on a flat board, and rub the edge of the strip held perfectly upright upon it. Now cut two long and two short pieces, the former to be 9½ inches long, and the latter 3½ inches.

You had better follow up one operation throughout, instead of doing each singly. You will find this method economical in regard to time, and will also ensure greater accuracy in work. Thus, when you have cut out and smoothed the edges of your sixteen pieces for the longer sides of the tray, you can hold them all on end together, and you will soon see whether any two or three of them are longer or shorter than the others; and by thus checking them you will save no end of subsequent annoyance, for you must bear in mind that these trays are to stand on each other and form a compact block; their perfect equality in size must therefore be ensured.

Now cut both ends of all the short pieces in the form of Fig. 5, making them all exactly equal and quite sharp and straight.

Next take the longer pieces and cut recesses out of them precisely the same shape as the projecting dovetail of the longer pieces (Fig. 6). To do this, the oblique cuts at A B C D must be done with the tenon saw, and the piece between the cuts must be removed with a small-sized chisel.

The pieces will then look into each other as shown in Fig. 7. They ought not to require any nailing, a very little glue should be sufficient to make them quite secure.

Thus, then, you will complete the frames of the trays, and you will require a bottom to them. This may be made of wood an eighth of an inch thick, which must be made half an inch shorter and half an inch narrower than the frame, so that it may fit exactly inside it, being fixed in its place by glue or a few fine sprigs or pins (a very nice sprig for this purpose may be made by cutting common pins in halves and using the lower half; these do not split the wood, and may be pressed in as not to project beyond the surface.

The best material, however, for the bottom of the trays is good strong cartridge paper—glued on to the lower edges of the sides—this should be slightly moistened before gluing, and it will then, when dry, be tightly stretched and perfectly flat.

Now divide the interior surface of the bottom into eight equal parts, and across each division glue strips ¼ of an inch thick—which will complete the trays—the compartments may, of course, have little carpets laid down in each, in the shape of pieces of velvet, which will not only make the tray look very nice, but will add to the safety of the slides. A piece of ribbon glued on by one end in each compartment (as shown in one of them in Fig. 8), and projecting beyond the edge, will assist you in lifting up the slides.

Now let us proceed with the box itself; in fact, as a rule this would be made first, but I preferred the course I have adopted, in order to show the necessity for accurate construction.

Fig. 9 is an end view of the box. The inside measurement of this is, as you know, 3½ inches, and assuming that the wood of which you are making the box is ¼ inch thick, the external width would be 4½ inches, and this is therefore the width of the bottom and top. The back and front are 4 inches, corresponding with the height of eight trays of ¼ inch each resting on the other.

The sides are to be dovetailed into the back at the angles, as in Fig. 10, but are cut off straight in the front, which is made to fall down. The sides, therefore are 4 inches wide and 4 inches high, so that when the front, c, stands up against them the width becomes 4½ inches. You will of course understand that as the trays are 9½ inches long, the box will be 10½ inches. All these measurements are given with the assumption that you are using wood ¼ inch thick, but this is not absolutely necessary—it may be ½ or even ¾ inch—either according to the number of trays you wish to have or the material at your disposal.

Fig. 11 shows an end view of the box when opened. The hinges can be obtained at any ironmonger’s at about 4d. per pair. They should be countersunk, that is, the wood should be cut away so as to let the hinges sink into it. The hinges for the back should be such as only open to a certain distance, otherwise you would require cords to prevent the lid falling backward and breaking the hinges, but for the front the hinges should be of the kind which open to any width.

The whole object may thus be said to be completed. The outer case may be simply oiled and rubbed—by which means oak or mahogany will attain a very high polish—or if pine it may be stained and varnished.

The lock may be purchased for a shilling, or very little more. In fixing it on, cut away the wood, so that the body and plate may sink into it, for the back plate must be perfectly level with the wood, or it will prevent the proper closing of the box. When the lock is fixed, put the loop in it, and close the box; you will then be able to see the exact spot at which the loop is to be fastened.
The examples of portrait backgrounds given in my last paper are but few of the many which a tasteful colourist finds within his reach; although, owing to the peculiar nature of the collodion surface and that of the dry pigments employed, the range of such effects is limited.

Painters. We give an illustration of their use in Fig. 1, the background of which, if thoughtfully examined, will serve to convey some useful hints.

The head may be well relieved either with a background of dark foliage, the colour of which will give brilliancy to

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Pillars rounding away to and from the light are very useful in giving pictorial effect and in expressing space, and you will find them serving these purposes in the backgrounds of some of the most celebrated works of our more eminent portrait the flesh colours, or against sky and cloud, which of all things best convey the idea of space, and consequently most forcibly relieve the object in front. The pillar serves by its position to give relief to the figure, and strengthens
the idea of space existing behind the head, and between it and the foliage.

The “put in” background of this kind, proceed in the way described in my last paper, beginning with the lighter parts, and always allowing the dark photographic surface to play its part in the darkest shadows.

Another way of treating a background effectively with powder-colours is suggested by Gainsborough’s most famous portrait, popularly known as “The Blue Boy,” of which we give a sketch in Fig. 2. This is made up of warm, rich, quiet colours, in the original, to counteract the effect of the blue drapery, which might otherwise give the work a cold and poor effect; but in adopting it you will of course modify its general tone of colour to accord with the necessities of your special case.

In Fig. 3 you will find yet another effect, which may be advantageously adopted. It is a sketch suggested by a photograph taken by Mr. J. Hubbard; as is also Fig. 4, which may be copied, and will be found to give a good idea for a quiet plea effect, very simple, but, when well managed, none the less effective. The toilet table and glass were, as they should be in the photograph, and not put in by the colourist.

All these backgrounds are within the scope of powder-colouring, and require only a little care and thought on the part of the colourist to be productive of very pleasing results; and we cannot do better than recommend our pupil to copy these, and when they are mastered, to try modifications of them before attempting anything original.

Indeed, it would not be a bad plan, if the reader is also a student of the articles on Photography in these pages, to place some of the subjects we have given before his camera and obtain positives on glass from them, which could then be coloured in more exact accordance with the instructions contained in the last paper of this series.

And now, having coloured flesh, drapery, and background, our positive is ready for varnishing. A good varnish is not too hard and glossy, and will not very materially alter the effect of the colouring. It should enrich the blacks of your picture without destroying the purity of its whites. Such a varnish may be procured from most of the dealers in photographic materials. It presents without roughness what is called a “tooth,” to which the powder colours will adhere far more readily than they did to the surface of the collodion on which you put the first colouring. In applying this varnish, hold the plate horizontally by the corner marked a, and pour the varnish on it from the bottle at the corner marked b. Tilt the plate gently, so that the varnish may flow across it to c, again so that it flows to a, and again to make it flow to d. Pour off at the last corner any superfluous varnish into the bottle, and warm the plate slightly before a gentle fire. While varnishing, carefully shun a dusty atmosphere and cold draughts of air.

Varnishes that have been made with benzoil or chloroform solvents are best. The varnish being quite dry, proceed to repeat the process of colouring, remembering to apply the colours with great care, and confining all the thinner applications of colour to the lighter passages, in order that you may not, by obscuring the shadows, lose the drawing.

In finishing, a little water colour is sometimes used for giving minute touches of pure white to lace or jewellery, for colouring gold chains, brooches, or rings (see page 18) and occasionally for putting in such small objects as flowers, touches of foliage, etc. but we advise the beginner to do as little as possible to his picture with water colours, as on such a surface they are very difficult to manage.

We omitted to point out that, should any of the powder colour applied before varnishing accidentally obscure the shadow, or be otherwise wrongly applied, a clean brush will aid in its removal. After varnishing it is not so easy to remove the colour.

To colour photographs on paper with dry colours is a little more difficult than the process we have described; but it is not likely to reduce us to despair any person with average patience and perseverance.

For this purpose you must first select a print in which the forms are well and clearly defined. This must be on albumenised paper (see the articles on Photography), it should be mounted on cardboard with starch, and, when dry, hot-pressed. Any of the paper-makers in your neighbourhood will hot-press some prints for a few pence.

Proceed to colour on this print in the way already described. In addition to brushes the paper and leather “stumps,” sometimes used for drawing with soft crayons, are made use of in applying dry colours to prints on paper.

WATER COLOURS.

Although painting with pigments prepared for use with water is an art of great antiquity, the state of perfection it has acquired in our own time is a thing of quite recent growth. We see water-colour paintings on the walls of our picture exhibitions which, possessing their own special qualities of lightness, clearness, delicacy, and purity of colour, rival oil pictures in those qualities which were once thought to be special to the latter medium—namely, in depth, richness, and power of colour.

Regarded from the amateur’s point of view, colouring with water colours has many peculiar attractions.

The process is one which can be taken up or laid aside at once without any very elaborate preparation in the one case or any loss of time in cleaning and putting away brushes and palette in the other, or any necessity of finishing this or that particular bit of manipulation before the pigments dry. Nor is there any waiting for the drying of a first painting before a second can be proceeded with, as there is in oil-painting. It is also specially suitable for amateurs who colour photographs, because there is far less chance of obscuring the forms of the subjects, or the application of transparent washes of water colours, and the processes of strengthening and graduating called washing, hatching, and stippling, than there would be in the use of oil colours, which consequently make greater demands upon the artistic knowledge and skill of the colourist.

Colours are prepared for water in two conditions—namely, in the state of dry cakes, and moist, in small earthenware pans or collapsible tubes. Those you will require are—

Chinese white, light or Venetian red, pink madder, madder lake, vermiculine, carmine, Indian red, orange vermilion, French blue, Naples yellow, Indian yellow, yellow ochre, chrome yellows (Nos. 2 and 3), cadmium, orange chrome, Mars orange, cobalt, French ultramarine, indigo, Prussian blue, sapin (warm and cold), Vandyke brown, brown madder, burnt sienna, raw amber, burnt umber, purple madder, emerald green, terre verte.

The above pigments can most of them be obtained in whole cakes for one shilling each, or in half cakes at sixpence each; but some of the colours are more expensive. French blue, pink madder, and madder lake will cost 2s. 6d. the half-cake each, and half a cake of carmine will cost half-a-crown, as will also half-cakes of Mars orange, cadmium, orange vermilion, purple madder, and ivory black. If these pigments you add
half a cake of the genuine ultramarine—a very useful pigment—it will cost you half-a-guineas.

If you find the above pigments somewhat too expensive for the present state of the funds you devote to your recreative studies, we can assure you that one of the best of our photographic colourists, whose work is well known and generally admired, purchases all his pigments, with the exceptions of Carmine, French blue, and the madders, at a penny and twopenny each. We do not commend his economy, because we think with better pigments his work, good as it is, would be better; but we mention the fact to show that a want of money need not deter you from amusing yourself by painting photographs in water colours.

The brushes wanted are those known as sable brushes, of which it will be well to procure three of different sizes in the brown sable, and one of a small size in red sable, which retains its point better and is rather more stiff than the former. The smallest of the brown sable pencils should be the “duck-quill,” or that which, mounted in a tin or German silver ferrule, is usually called No. 2. The red sable may be the smaller, or crow-quill size, called, in tin or German silver, No. 1. This is only required for minute touches of colour, generally of white, and should not be used for stippling.

The prices of these brushes range from sevenpence upwards. As a good brush is a matter of the greatest importance, it should be obtained from some dealer of established reputation, for economy would here be very false, and the cheap brushes are always the most expensive. A good sable points well with a very little moisture, does not froth or divide when nearly dry, and when pressed lightly on the thumb-nail displays a degree of elasticity enabling it at once to recover its point.

A slab palette, with one or two saucers of white earthenware, and a small light palette of the same for the thumb, will complete the list of implements and materials required.

We must now select our photograph. Let it be the portrait of some one you know, and, if possible, of some one who will be kind enough to give you a sitting.

Here is a capital chance for a bashful young man of looking long and earnestly into the face of some damsel whom he adores, and would otherwise hardly dare to glance at. The process will have a wonderful effect in restoring his confidence, and enabling him to use his tongue as freely as his eyes. It will be difficult at first for both parties. The lady will blush until she remembers that it is but a matter of business, and the gentleman will look more to admire than to study, until he finds that his work stands still; but ultimately the one who endures the glance of those earnest eyes quite placidly and unmoved, while the other will look into the face of his sitter as if it were a curious piece of beautiful mechanism which it was his business to take to pieces in theory, and put together in art.

But with regard to the photograph itself something must now be said.

This may have been printed either on the plain salted paper sometimes used by photographers, or on the more commonly used albumenised paper. It must clearly define the features and indicate the varying half-tints (see page 18) accurately but very faintly. If the head in the photograph indicates that the model was not properly lighted by the photographer, no skill on the part of the colourist can ever render it either attractive or pictorial. If it is deficient in half-tint, it will look raw and flat when coloured. If it has no strong darks, it will look feeble. If it is too black, it will look dirty and coarse.

The photograph should be carefully and smoothly mounted on a piece of Bristol board, and afterwards rolled—that is, passed between steel cylinders, such as nearly every printer, stationer, and photographer possesses.

But before commencing work it will help you to understand what constitutes success in artistic and harmonious colouring if you give a little attention to the scientific principles on which its results depend; but as these will occupy some little space, we postpone their consideration for future papers, in which we shall have room for some necessary diagrams.

THE AQUARIUM.

BY W. A. LLOYD.

ANIMALS AND PLANTS—OXYGEN—ONE OF MY FAILURES.

Now the principle, which I hit upon by a kind of intuition, yet without seeing its full force, twenty years ago in an obscure room in Clerkenwell, is precisely and identically the same as that upon which depends the success of the Crystal Palace Aquarium (the most successful one in existence), only, instead of a foot-pan there is an immense reservoir, and instead of bottles there are tanks of glass and brick and slate, and instead of filling the latter by hand, they are pumped into by a steam-engine. And I was just as fortunate then as now, comparing means with means, and size with size, in keeping my animals alive. In fact no sea-anemones I have ever seen since flourished better than did mine in those strange old times.

A year or two later, in another part of the same neighbourhood, but close by, I find, on referring to the Microscopical Journal for July, 1855, that I had so far increased my collection as to keep forty species of living marine animals, and that some of my vessels held as much as three gallons of sea-water.

But I remember, that as the summer wore on I was not so lucky with my collection as at first, and I have since ascertained, though I did not perceive it then, that this was because it had no sufficiently great reservoir into which it could sometimes, at periods of disturbance, empty, wholly or in part, the vessels which contained my animals. I was just beginning a system of purification analogous to that which is carried out everywhere, of purifying the vitiated air of a small room by bringing it into contact with the boundless atmosphere without.

But I was too inexperienced in reasoning to see it as I now do, and too timid to apply the idea universally as I have done, and I had too many other and more pressing cares to be able to give the matter generally more attention, as I now do.

So, in consequence, I had many after failures, which then
seemed mysterious, as they do not now seem. Worse than that, I hopefully undertook to be successful for other people, at their cost, and failed. Sometimes the fault rested with my customers, who cared nothing for natural history, but only for the “fashion” of having an aquarium, which, for some years, was “the thing to do.” But often the fault was my own, in being too sanguine.” In fact, I had insufficient knowledge, and got out of my depth, as I did not get when in earlier times I attempted little with little means.

I should like to say something about the use of the words “animal” and “plants.” In England most persons, even if they are well educated, never think of applying “animal” to any creature but a quadraped, and would deny the propriety of using it to a bird, reptile, or fish, much less than to the vast numbers of creatures below fishes, which are those usually kept in aquaria. This, however, is assuredly wrong and vulgar, and seems to be a remainder of the very vague kind of natural-history knowledge which prevailed in England so late as the seventeenth and eighteenth centuries, and even up to the commencement of the present one. It must be understood, therefore, that the word “animal” or its equivalent, “creature,” is here employed to denote all and every kind of living organism which is not a plant, even of the very lowest kind, as sponges.

And similarly the word “plant,” or its equivalent, “vegetation,” is here used to signify all forms of organism which are not animals, even when such organisms are not what are popularly known as plants or vegetation possessing roots, branches, and leaves, but are so low in the scale of Nature as to possess none of these, and appear merely as threads or cells.

Having thus defined the meaning of “aquarium,” “animal,” and “plant,” and given a clear notion of what is to be done, I shall go on to the practical application of principles, explaining the why and the wherefore of everything as we travel along pleasantly in the order of the time when my “experiences” occurred, taking nothing for granted, and assuming that my readers know nothing beforehand.

Though I have incidentally mentioned my little marine aquaria in wide-mouthed glass bottles, yet my very first aquarium—like the first aquarium of most people living inland—was a freshwater one. At that time the most usual vessel to contain fish was the ordinary fish globe, used from time immemorial, mentioned by Gilbert White in his “Natural History of Selborne” in 1781. In my first paper I mentioned that in the month of November, 1852, when I beheld an aquarium for the first time I saw in it some growing plants (Valisneria), a vegetation like long green grass, found in the south of Europe, and so named after Valisneri, an Italian botanist. The plant has long been cultivated in English hot-houses—chiefly perhaps because it is a favourite one for showing the circulation of its sap under the microscope—and persons having no hot-house grow it in dwelling-rooms in glass jars for this purpose. Therefore, when aquaria began to get introduced, this plant was the one naturally selected for cultivation in them—not, however, for amusement or curiosity, but for a definite purpose, as will now be explained.

Dr. Priestley discovered oxygen—the invisible aerial fluid which in combination with some other gases, supports animal life, and keeps everything in Nature pure. Priestley did more—he ascertained that plants under the influence of light, both water-plants and terrestrial plants, emitted this gas, and he therefore was the first to enunciate the abstract law upon the existence of which aquaria depends. Another philosopher, Ingenhouz, confirmed him, and the fact was established. We meet with no practical application of this law—or no hint that it might be so applied, till the year 1838, when the late Professor Daubeney, at the Cambridge meeting of the British Association, communicated a notice of certain researches he was then making on the subject, in which he experimentally determined that it was the illuminating power of the sun’s rays which caused the evolution of oxygen from plants, and not the heating or other rays. He then went on to say that the plants not only evolved oxygen, but assimilated carbon, from the poisonous carbolic acid gas which results from the respiration of animals, decomposing it, and rendering it harmless. Finally, he asserted boldly “that the influence of the vegetable might serve as a complete compensation for that of the animal kingdom.”

Here then, is the entire aquarium theory stated in eighteen words. It is remarkable, however, that though Daubeney applied this theory to aquatic forms of life, both vegetable and animal, as well as to terrestrial forms, yet, when in Oxford in 1838–40, he failed in keeping the most simple aquarium in good order in the most complete and signal manner, and that repeatedly, as many learned men since him have failed.

In 1837 the late Mr. N. B. Ward also made a report to the British Association on a subject which was a favourite one with him—“the growth of plants in closely glazed cases,” that is to say in cases which were almost hermetically sealed, and in which a continuous round of unchanged vegetable life was supported with a limited and unchanged quantity of earth and moisture, and though he was a botanist and not a zoologist, he stated that he was “quite certain that a great number of animals would live and thrive under this treatment.”

It may be here mentioned that this principle as regards terrestrial vegetation and animals is endeavoured to be carried out in the monkey house of the Regent’s Park Zoological Gardens.

In a book which Mr. N. B. Ward published in 1843 in furtherance of the same subject, he, as a medical man, dwelt on the mode in which the growth of plants might be used in great towns to neutralise the carbolic acid gas given forth by animals, “so that the animal and vegetable respirations might counter-balance each other”—these being his own words. It will be seen how, from about this time, what a favourite idea this kind of microcosm, or world in little, became. It got to be accepted as quite a charming notion, did this maintenance of a small growth or colony of something alive in an inner and self-sustaining manner with as little help as possible from without. So, in 1841, Mr. Ward must have his aquarium (the first fresh-water one on record, arranged with the deliberate intention of making it on the compensating principle), in Welleless Square, in the grimy East-end of London. It consisted of a large earthenware vessel containing twenty gallons of water, in which aquatic plants grew, and in which gold and silver fishes lived healthily in the water, which being kept pure by the action of the vegetation, was not changed for years. Mr. Ward afterwards lived at Clapham, where his ferns and other terrestrial plants were more successful when not in cases, and where his aquaria were less lucky, from causes I shall afterwards have to advert to.

In the year following (1842) the late Dr. George Johnstone, of Berwick-on-Tweed, set up a little glass jar containing six ounces of sea-water, which in effect was a small marine aquarium, and perhaps the first one recorded to have been made in which plants and animals were employed for their reciprocal action on each other. Only, the intention must ever be taken into account; and thus Johnstone’s purpose was not to make an aquarium, but to prove the vegetableity of a certain calcareous seaweed, Corallina officinalis. He certainly kept the sea-water unchanged and pure for many weeks, and it was so maintained by the action of growing plants; and if the plants had not been present, the animals associated with them would have all died, instead of only some of them having died, and the amiable Doctor (who
watched my early aquarium experiments with much interest, though he and I never saw each other fairly notices and records the principle.

Yet the experiment was no proof of the vegetableity of *Corallina*, because about three or four other kinds of vegetation are recorded to have been present, besides other unnoticed ones; and though the whole thing was a veritable aquarium, it was not set up with the intention of being that, and that only: that, as far as a marine aquarium was concerned, was reserved for a lady, one Mrs. Thynne, who, in 1846, brought some living madreporae from Torquay to London, and after keeping them alive by agitating the sea-water and by sending for further supplies, conceived, in the spring of 1847, the idea of saving herself so much trouble, by getting from the sea some living seaweed, and by afterwards depending on these plants for the purification of the water. Mrs. Thynne, unlike Dr. Johnston, did not wish to prove the vegetableity of a seaweed which she already knew to be a plant; and she did not desire to find out whether madreporae were animals, as she was already aware of their being so. She was perfectly well conscious of the nature of both organisms, and of their influence upon each other, and she also knew that by putting both of them together she would realise a certain result—which result she realised—and so she was the first person who kept, in London, a marine aquarium for itself alone and not as an incident to something else.

In the spring of 1849 the late Mr. Robert Warington, in Apothecaries' Hall, close by where this sheet is published, made his first aquarium, a fresh-water one, and he published his results in the spring of 1850, telling how he procured a glass vessel, "a receiver," of twelve gallons capacity, half-full of water, and covered with "thin muslin to exclude dust and sleet," with a bottom of sand and mud, and some small blocks of stone, and a plant of the inevitable *Valisneria spiralis*, with two small gold-fish. The plants grew, decayed, and caused turbidity in the water and a quasi-spontaneous growth of a minute green plant (*Conversa*) on the sides of the vessel and the surface of the water. To remedy this Warington introduced some phytogeicous snails, *Limea* and *Planorbis*, which consumed the dead *Valisneria*, and kept the *Conversa* within bounds. They did their work, and deposited many eggs, on which the fish fed, and all was kept quite healthily, without change of water, for some years.

In January, 1852, Warington began making a sea-water aquarium at the same place, Apothecaries' Hall, and in November, 1853, he narrated his experiments in print. He obtained his sea-water from a Billingsgate oyster-boat; and on the best kind of plants to use for purifying purposes he consulted his friends, who in turn advised him to use all three of those into which sea-woods are divided, namely the olive kinds, or *Melanospermum*, as *Tang* (*Fucus*); or the red species, or *Rhodospermum*, as *Delesseria* and others; or the green species, *Chlorospermum*, as *Ulva* or *Laver*; and so on. After many experiments and many failures, he decided in favour of the green *Ulva* and *Enteromorpha*, with the Periwinkle (*Littorina*) as a vegetable scavenger.

Warington was a professional chemist of repute, and his knowledge led him to be aware that the water he made foul and gelatinous by the decay of the seaweeds, would become quite clear if subjected long enough to the influence of the atmosphere so as to be oxidised. He knew that water cannot be readily decomposed; that it is merely a vehicle for the presentation of certain things; that anything it contains in a decomposing state is only temporarily contained in it, and that if such things be animal or vegetable, or both, separately or together, they are quickly made harmless by being acted upon by the oxygen of the atmosphere around us; in short, that the water does not need to be changed.

Warington's first aquarium, with his original sea-water, thus continued to be successful for years, in fact, till his death, in 1888.

Mr. Gosse's experiments with marine aquaria began independently at Torquay, Devonshire, in February, 1852, though he had, as most of us have, begun earlier, in London, with fresh-water aquaria. Yet he says, "The subject of growing the marine Algae had become a favourite musing," while he lived in the metropolis. In his "Devonshire Coast," pp. 228—234, he narrates his trials, in which, contrary to Warington, he prefers the *Rhodospermum* (Delesseria, Rhodymenia, Phylota, and Chondrus) as the vegetable purifiers of the water for a large number of animals. The last date (in the form of a diary) in the "Devonshire Coast," is October 16th, 1853, soon after which Mr. Gosse returned to London, and after keeping his specimens there for nearly two months, he deposited the animals (in his own words "the individual specimens") in the Regent's Park aquarium early in December, a fortnight after I first saw it.
The reason why that aquarium was erected was as follows:—

The late Mr. D. W. Mitchell, the then secretary of the Zoological Society, London, was at the house of Mr. (now Dr.) Bowerbank, at Highbury, near London, pondering over a little fresh-water aquarium containing Valisneria, and sticklebacks one Monday evening in April, 1851. Mitchell's mind was always pre-casting something for his Gardens. In 1847 when he entered on this office, he found the society at a low ebb. He worked hard, and in 1849 established a collection of living reptiles.

In 1850, just in time for the London season, he obtained the first hippopotamus, the old one still there. In the beginning of 1851 he felt safe, for the "Great Exhibition of All Nations" was to take place in the following summer, and would be sure to vastly aid his treasury, and carry things well over 1852.

So, for 1853, commencing with the London season (May), he determined to have an aquarium, and this little glass jar at Bowerbank's led to that resolve, and the building was begun in the spring of 1852. Experiments in it were made all the autumn of that year, and all the winter of 1852-53. In April, 1853, Mr. Goss went to Weymouth to collect animals for this aquarium, which was opened to the public at eleven o'clock on a Saturday morning, the 21st of May, 1853.

He remained at Weymouth for the same purpose during May, June, and July, of that year, and there wrote his "Aquarium," issued, as before stated, in April, 1854; and I devoured the book at one sitting under a tent in the Gardens on a Sunday afternoon in July, 1854.

Having given this narrative of principles and historical matter, I will go on with my own experiments.

The fish-globe (see p. 189), of about three gallons capacity was set up at 56, St. John's Square, second floor, second window from Red Lion Street, in August 1853, as nearly as I can remember. I put some washed pebbles or shingle and sand in the bottom, and planted in that some Valisneria spiralis the inevitable—of course it must have been that or nothing in those days. I got the recommendation to use it from Dr. Lankester's article "Aqua vivarium" in the "English Cyclopaedia" published June, 1853, and begged a couple of the plants themselves from a microscopist.

I purposely chose the globe of a tall form and narrow towards the mouth, because St. John's Square was a terribly smoky hole, and none of Warington's "thin sussul" would prevent the London blacks from getting through it, and into the water, so I resolved to cover the mouth with a disc of glass (kept a little space from the globe to admit air) and of course the smaller the mouth the less expensive the glass disc and the smaller the chances of blacks entering.

Then I did not know, that though Warington used a vessel of about the same proportions as mine, he only half filled it—perhaps by chance—whereas I, to gain all the water space I could, almost quite filled mine, as shown. I left the water to settle clear for a few days, and then got my live stocks—six small minnows, price threepence for the lot—at a fishing-tackle shop in St. John Street Road, at the corner by Sudler's Wells Theatre. An old print, date 1819, of the very spot hangs up beside me in the Crystal Palace as a reminder of this period.

All being perfectly translucent, I put in my half dozen fish, and for a few hours they swam about happily enough. Gradually, however, they rose to the surface, and there remained with their noses at the top of the water, gulping in air. I could not understand it. I took out some of the water and put in more, and yet the fishes died, I then let all be for a few days, and got more minions, and they behaved like the first. I thought the fault lay with the fish, so I took them, and, to save their lives, dropped them into the New River, opposite the theatre. [Contrary to what I said in my second paper (Recreator No. 8, page 126, col. 1), I find that the word "Aquarium" is used once, and, I believe, for the first time, in Mr. Goss's "Devonshire Coast." The date is October or November, 1852.]

DRAUGHTS.

By George Frederick Parson.

INTRODUCTORY.—THE BOARD.—THE MEN—MOVES.—NOTATION.—OPENINGS.—A MATCH IN A DREAM.

LIKE its cousin-german, chess, this scientific and interesting game depends entirely upon calculation. Chance is an element altogether foreign to both chess and draughts. Both demand the strictest attention of the players, and both are worthy, from their purely intellectual character, of taking the lead of all other mental recreations. Each game has its ardent and devoted advocates, and each a distinct and voluminous literature.

Chess is generally considered the more scientific, but by many draughts is reckoned more entertaining. Mr. Wyllie, of Efo, a great player and analyst, considers that "there are more intricacies in this game than a man could learn in a hundred years;" and Edgar Allan Poe, the well-known author of "The Raven," upholds the "ancient and honourable game of checkers" as superior, in many important respects, to its aristocratic rival. "I assert," he remarks, "that the higher powers of the reflective intellect are more decidedly and more usefully tasked by the unostentatious game of draughts than by all the elaborate frivolity of chess. In the latter, where the pieces have different and bizarre motions, with variable values, what is only complex is mistaken (a not unusual error) for what is profound. Here the attention is called powerfully into play. If it flag for an instant, an oversight may be committed, resulting in injury or defeat. The possible moves being inviolate, the chances of oversight are multitudinous, and, in nine cases out of ten, it is the more concentrative, rather than the acute player, who conquers. In draughts, on the contrary, where the moves are unique and have but little variation, the probabilities of inadvertence are diminished, and the mere attention being left unemployed, what advantages are obtained by either party are gained by superior assessment."

Without further discoursing a point on which writers have mutually agreed to differ, it may not be uninteresting to remark that eminent players of the one game are seldom distinguished for their great skill in the other, though it is in the power of all to become tolerably expert in both, and so to double the means of agreeable pastime.

Of the history of draughts it is not necessary just now to speak, though we may by-and-by have something to say of its literature. As to its origin, the utmost latitude of speculation may be allowed, for—withstanding the researches of the learned and the hypotheses of the antiquarian—in spite of the testimony of Egyptian monuments and the evidence of documentary witnesses, the genesis of draughts may be said to be absolutely unknown. No record of its introduction into Europe exists earlier than the middle of the sixteenth century; and
whether it came from India, Greece, or Scandinavia, or whether, indeed, it was known to the inhabitants of these lands, it is now impossible certainly to determine.

But that the game itself is very old—many say older than chess, which dates back, according to Sir William Jones, four thousand years—there seems little reason to doubt.

In common with other amusements, draughts seem to have been practised in many countries; and Mr. Angus, in his "Savage Life and Scenes," tells us that the New Zealanders, on their discovery by Captain Cook, were found to be familiar with all its peculiarities, though they possessed little knowledge of anything else belonging to civilisation. This bewildering uncertainty invests our game, therefore, with an air of mystery which, to some at least, may be thought its most delightful recommendation.

**THE BOARD AND THE MEN.**

The game of draughts is played by two persons on a board of sixty-four squares, with twenty-four discs of wood or ivory, of opposite colours—generally black and white—each player having twelve men. The squares on the board are of alternate tints, though this, in fact, is of little consequence. The board is so placed that each player has a lower black corner square at his right hand. We presume that our readers are not unfamiliar with the game; but, as it is as well to begin at the beginning, we present them with a diagram of

![Diagram of draughts board](image)

**THE MOVES OF THE MEN.**

The moves of all the pieces are alike and determined, diagonally from square to square, either to the right or left, and never laterally or straightforward. The men move forward one square at a time, each player alternately.

They take, in the direction of their moves, by passing over the opposing man into a vacant square beyond, and not, as in chess, occupying the place of the captured piece. The man taken is removed from the board. One, two, or more men may be captured at a single move, provided always that each man so taken has a vacant square behind. Except, however, when an opportunity occurs of taking a man or men, the pieces move only one square at each step.

Immediately a man arrives at either of the four squares in the last opposite row, he is crowned, and becomes a king. The crowning ceremony is simple, merely placing another man on the top of the advanced piece. The king has the privilege of moving either backward or forward, still, only one square at a time.

The object of the game is to capture the enemy's men, or to so block them in that they cannot move; and the player who first accomplishes one of these objects, wins.

There are very few technical terms in draughts. The principal are the huff; the coup de repos, or optional move; the coup sprints, or skillful move; and the reprendre, or taking of the capturing man. In ordinary play the huff only is employed. The meaning of this term is that when a player overlooks a move by which he could take an offered man, his opponent may remove the offending man, or insist on its taking instead.

Standing the huff is the purposely playing another man instead of taking the one en prise, or liable to be taken. We shall presently see more of this move.

In draughts—just the reverse of chess—the player has no option, but must always take a man or men en prise, irrespective of the consequences. We now come to the

**NOTATION OF DRAUGHTS,**

by means of which the moves of a game or problem may be recorded. This is a diagram of

![Numbered board](image)

A very little practice will render the young player so familiar with the relative positions of the squares as to enable him to readily follow the moves of a game, and even to play a game without seeing the board.

By referring to the diagram it will be seen that either side moving first has the choice of seven moves. Thus Black, occupying the upper half of the board, may move 12 to 16, 11 to 16 or 15, 10 to 15 or 14, and 9 to 14 or 13. Suppose Black to move from square 11 to 15, and White to reply by moving from 22 to 18. Black must jump over to 22 and take the offered man; for if, by mistake, he move to 19, or move any other piece, he is liable to be huffed.

The importance of the rule which obliges the taking of a man, instead of "standing the huff," will be readily understood if you examine this position.—Suppose white men on squares 26, 24, and 23; and black men on squares 15, 16, and 8; White to move from 24 to 10; then Black would take the offered man, and pass into square 24, when White would go from 26 to 19.
and thence to the vacant squares 12 and 3, taking three men for one. Whereas, had Black been allowed to "stand the stuff," he would have lost one man only instead of three.

Suppose, further, that White omitted to take the man on square 8 (a not uncommon mistake), then Black would be allowed to use the man on 12 and move into the vacant square, or make any other legal move.

Various methods of recording the moves are adopted, but the following is the most simple:

**BLACK**

11 to 15
15 to 22
8 to 11, A

**WHITE**

22 to 18
25 to 18
22 to 25, etc.

The variations being marked A, B, and so on, as often as they occur. All this will be plain enough after a few games have been noted and played.

In marking a board for reference, it is well to place the

![Diagram of a chess board showing moves (1)](image1)

**Fig. 1.**—**WHITE TO PLAY AND WIN IN EIGHT MOVES.**

figures in the corners of the squares, so that they may be seen without moving the men.

The three games usually played are the Winning Game, the Losing Game, and Polish Draughts.

For the benefit, however, of those of my readers who have made some progress in this delightful game, I will tell them a story with a couple of problems in it.

**A MATCH IN A DREAM.**

I had just concluded my great match with Black, and was going home by the night express to Scotland. I was alone in a first-class carriage, and my thoughts naturally turned to the contest in which I had lately taken part, and been unfortunately beaten by a false move and a single game. I fell asleep, and my mind, filled with memories of my defeat, began to work in a dream which took this form:—I perceived a stranger on the opposite seat. It was very curious. I did not remember that we had stopped at any station, nor that any pause had taken place in our rapid journey. But, sure enough, there was the stranger—a tall, grey, grizzled old man. Suddenly, without a word of preamble, he produced a draught-board, with the men already set upon the squares, and placing it upon his knees, uttered the single word "Play!" Irresistibly impelled to compliance I moved a draught-man from 11 to 15, and the struggle commenced. Silently we made move after move, apparently without an instant's deliberation, till at length the above position was attained (Fig. 1).

Here, it being my antagonist's turn to move, he uttered a low, musical laugh, and said, gravely, "Sir, you have played with great skill, but you will now lose your game in exactly eight moves!"

He played and I lost.

Instantly the men were re-arranged for another game.

I was amazed; but again I played. With beating heart I determined to do my best; but each move of mine was answered with lightning rapidity, and in a few minutes the game had taken the following curious form (Fig. 2). This time, of course, I played with the white men. Now, considering my superiority in kings, I made sure of winning, but my antagonist remorselessly whispered, "Sir, you will lose all your men in exactly nine moves. I have to play!"

He played and I lost. I looked up, and the stranger had vanished.

My thoughts next day were all of my midnight games. I

![Diagram of a chess board showing moves (2)](image2)

**Fig. 2.**—**BLACK TO PLAY AND WIN IN NINE MOVES.**

could make nothing of them; but finally, after many hours' cogitation, I recollected the solutions to the strange problems—and here they are:

**SOLUTION TO THE EIGHT-MOVE POSITION.**

**WHITE**

10 to 6
18 to 14
15 to 22
22 to 13
13 to 17
17 to 22
22 to 29
11 to 4, and wins.

**BLACK**

2 to 9
9 to 18
13 to 17
29 to 25
25 to 30
30 to 25
4 to 8

**SOLUTION TO THE NINE-MOVE POSITION.**

**BLACK**

23 to 25
23 to 29
25 to 29
26 to 17
6 to 9
15 to 11
3 to 19
19 to 16
16 to 11
11 to 4, and wins.

**WHITE**

29 to 22
32 to 23...
13 to 22
5 to 14
16 to 7
12 to 8
8 to 3
3 to 8

It was very remarkable—very!
At the termination of the last board, it can be seen by measuring the three lines of our zig-zag route that we have passed over three-quarters of a mile of ground, but that our direct progress against the wind is only a trifle advantage of the flowing tide following us in a diagonal direction from the harbour's mouth, and, therefore, putting the helm down, we lay across towards the south-west shore.

Our friend is now becoming accustomed to the working of

over a half a mile. This progress, however, may be considered very satisfactory for a small boat, but could not have been accomplished without the aid of the favouring tide.

Under present circumstances we have, on account of the adverse wind, been compelled to traverse one-third more than the actual distance between two given points.

We do not stand more than a little beyond half across the estuary on this board, in order that we may have the full the boat, and does not forget to ease the helm down, and consequently the boat comes round without any difficulty, being as before mentioned sailed round until the canvas fills on the other tack.

The boat looks up or points to south-west by south, as on the second board, and, the tide still helping her, she makes good her south-west course, for it is sufficiently strong not only to overcome the side-drift or leeway, but also to continue to carry her
bodily to windward to the amount of one point, so that she passes over the ground on a south-west bearing.

We continue our board to the south-west until we approach the shore to a little less than a quarter of a mile, when we again tack to the north-westward.

Here we get a change of wind drawing off the south-west shore from the direction of west-south-west, and as the current is now setting almost due west, and helps us considerably, we are enabled to make good a course of north-west half north.

This course being a better one than either preceding it, we continue it nearly a mile, and find that when ready to go about we have gained about a mile and a half to windward, and that we are almost half way to our destination.

At about one-third the length of this board we pass from the shallow into the deep water of one of the channels which divide the shoals from each other.

Here the water, running in a strong stream over the edge of the bank, forms what is termed by sailors an "overfall," which is a violent disturbance caused by the descending fluid striking the bottom, and recoiling angrily as it were to the surface.

This disturbance being much increased by the wind blowing in opposition to it, a considerable wash is the result, and some spray comes on board.

In very large estuaries, such as the Humber or the Mersey, where the tides are rapid, these overfalls become a short and dangerous sea for open boats, and if they cannot be avoided, the boat must be handled carefully in passing through them. Only a moderate amount of sail would of course be carried, and no more speed given to the boat than will suffice to keep her well under command. Regarding this, much depends on the discretion of the helmsman.

Thus, in the present instance, we ease the boat by yielding the helm a little, so that her head comes up more nearly to the wind, the luff of the sail then begins to shake, and some of the spray coming over the canvas is taken off the boat, the effect of which is that instead of being forced into the waves, she rides lightly over them, and passes with nothing more than a sprinkling through the space of troubled water.

In passing such places in the open sea, the waters rage most violently, and are termed races, where they pour over uneven ground by a very prominent point or headland; such are the races of Portland, of St. Albans, and Alderney, which have engulfed vessels forced into them in bad weather, or which could not avoid them for want of wind, for even in calms the sea is very turbulent in such places at spring tides, as long as the current runs in its greatest strength.

But to return to our cruise. Having now approached the shore to within the distance of a furlong we make another tack, being clear of the lumpy water, which will often prevent a small boat coming about if of a flat form of floor, and stand again to the south-westward, but as the wind is not as favourable for this board as the last, and has besides been somewhat more off the south-western land, we cannot make good a better course than south-west by south, and on this, which is the starboard tack, we reach over to within a quarter of a mile of the land, when, as we begin again to find the wind variable, we tack again to the north-westward.

The wind varies very much in river sailing, as each shore in turn exercises great influence over it, but as rivers become narrower, complications arise, and we are now experiencing them. We are thus baffled again, and instead of being able to make good a course of north-west half north, on the port tack, as before, we can only reach that of north-north-west half west, however, we are still gaining ground, although not so rapidly as we might desire. This makes our seventh board.

On our eighth board we make good a course of only south-south-

west, on our ninth of north-west by north, but whilst on this board we are caught in a sudden shower, which causes a change of wind to north-west; this is so much more favourable that we are enabled to lay our course for the intended anchorage, which we fetch in our tenth board of three-quarters of a mile. As we have here a convenient beach of gravel, steep enough for landing, we run the boat on to it, lowering our sails just before she strikes the ground. As an aid to landing, we have a board seven feet six inches long, ten inches wide, and an inch and an eighth thick. At intervals of a foot slips of wood an inch wide and three-quarters high are nailed across it to give secure foothold, and as one end of it is fitted with a loop or becket of strong rope, we drop this over the stem, and disembark without trouble. On beaches of greater declivity, it is not necessary to use a landing-board, as one can step out dryshod, or at most leap on shore; but for ladies it is a great convenience. At the end of the board to which the loop of rope or becket is attached a deep notch is cut, into which the stem of the boat enters when the drop is dropped over the stem head. This prevents any side-way motion of the board when stepped on to walk on shore.

The end of the board into which the notch is cut, is usually strengthened by a doubling piece of elm, half an inch thick, which prevents the splitting of the board at the holes made to receive the ends of the becket, which are put through, and knotted on the under side. Having remained on shore a few minutes, we re-embark easily by the aid of the board, and find the tide beginning to ebb. The wind has returned to its old quarter, west, and as it blows diagonally down the river, we shall probably make a rapid passage. We accordingly lower the boat from the beach, and putting the boat's head to the east by aid of the oars, hoist the fore-log on the port or left side of the mast, which is the lee side, because the wind draws off the south-western shore. It is easily hoisted, the wind preventing any pressure of the canvas against the mast, and when well set, the sheet is eased off until the boom and yard stand nearly at a right angle, but not quite, to the keel of the boat, as the wind will cross the boat diagonally at the right-hand side of the stern, or be, as sailors would say, on the starboard quarter. We run the boat gradually towards the middle of the estuary, because the wind is more steady than under the shore, the high land giving it a fitful character; and having also set the mizzen, we make good speed on our return. The mizzen sheet is also well eased off, in order that it may take the wind to the best advantage, and unite its action with that of the fore-log.

Another squall is evidently brewing behind us, and after we have run about half-way homewards, we see its effects on the water some distance astern. As the mizzen often renders a boat uneasy when running before a strong wind, we lower that sail, unhook, and furl it out of the way, knowing that if we have much accession to our present breeze we shall have quite as much wind as we require, and possibly rather more. By the time we have taken in the mizzen, the squall is upon us, and as it is desirable, and in fact necessary, for safety, that a boat should be steered steadily under these circumstances, the writer takes the helm, and our friend seats himself in front of him, but on the opposite side, to equalise as much as possible the position of the weight. This is more prudent than for two or three people to sit on the weather side, or that opposite the sail when running before the wind, because in squalls it sometimes shifts suddenly one or two points, causing the sail to swing across to the other side, and thus throwing the pressure of the wind on the same side as that of the passengers, which in many cases brings about a capsize. This change of the sail from one side of the boat to the other is termed "jibing," and the process in anything like a fresh breeze always requires caution, for the reasons above-mentioned. When the wind coincides exactly
with the desired course of the boat, steering is difficult, as the sail has a constant tendency to jibe; steering on such a course is termed by sailors running by the lee, and as it is decidedly risky, should be avoided if possible. This is to be managed by altering the course a little, if there be no obstacles in the way, so as to bring the wind on the quarter of the boat or vessel, which will keep the sail quiet, so that there need be no fear of jibing. After running some distance, the sail should be again jibed, which will bring the wind on the other quarter of the boat, the sail will still remain quiet, and the destination of the boat will be reached.

By this method, although two courses will be steered instead of one, and a greater distance traversed, it will be performed in less time than if one direct course were attempted, because the wind will exercise a fair pressure on every part of the sail, which would not be the case if it were constantly making efforts to get on the other side of the after leech, or hinder part of it. If there be any difficulty in a beginner understanding these last observations, the first essay at sailing before the wind will render them perfectly plain.

During the squall, the wind has again changed to north, and it consequently becomes necessary to jibe the sail, and to observe caution in doing so, as the wind is very fresh. We manage it in the following manner:—The wind is on the right hand side of the boat, and the sail on the left, we are therefore on the starboard tack, which we desire to change to the port. Our friend having first been instructed to sit on the middle of the after thwart, the writer puts the helm a little over to port, keeping it so whilst he gathers in the main sheet with both hands, and as soon as the sail is amidships, or in a line with the keel of the boat, and begins to take the wind on its other side, he eases out the sheet, to prevent as far as possible the violent jerk which is often felt in jibing, at the same time sliding himself up to windward, and steadying the boat by keeping the helm a little up.

This last process is termed by sailors, "meeting her with the helm," and must always be attended to, to prevent the boat coming round suddenly, with the wind on her broadside, which has often brought about a capsiz. In running before a heavy sea this has sometimes occurred; and when the course of a boat or vessel cannot be maintained under these conditions, it is termed "breaking-to." This can, however, except in extreme cases, be prevented by reducing the after canvas, and, in addition, by bringing some of the ballast a little nearer the stern when such a tendency discovers itself. With the fresh breeze now following us, we make rapid way down the river, appearing almost to fly over the water, and having hauled down our sail, the impetus we have already acquired, joined with the fresh breeze astern, carries us on to the beach close to the buoy of our moorings, which we pick up, and hauling up the bridle, pass the eye of it over the stern head, securing it by a lashing to the ring-bolt inside. We strike both our masts, and lay them along the thwart, spreading the sails on them to dry, as they are yet somewhat damp, owing to the rain we met with, and it is wise to furl them in this condition, for mildew is sure to follow, if due attention be not paid to them. Having now finished with our boat for the day, we haul her off to her mooring by aid of the endless rope, and thus complete our first cruise. The wind and tide being both in our favour, we have only occupied half an hour on our return.

CHESS.

By John Winzer, the English Champion.

CHECKMATES—SMOTHERED MATE—CASTLING—PROBLEMS.

Continuing the series of checkmates, I give another easy example. In the subjoined situation (Fig. 1), White gives mate in three moves.

White.
A waiting move to compel Black to play to Kt sq., where he may be checked by the knight.
Black.
1. K to Kt sq.
2. Kt to Q R 6 (check).
3. B to Q 5 (mate).

In the subjoined situation (Fig. 2), White, though so far inferior in force, can win easily with the move—

White.
1. Q to K 6 (check).
If he go to K B 8, he is mated by the queen on K B 7.
2. Kt to K B 7 (check).
A "discovered check" is when a piece by removal opens upon the adverse king the attack of another piece, as the knight in this case does that of the queen. At the same time the knight itself checks at K R 6, thus making not only "discovered check," but also "double check." It is obvious that there is but one way of escape from double check, and it is for the king to move. In the present position, the knight at K R 6 could be taken, but the capture of that piece would not release the king from the check of the white queen. Accordingly Black is constrained to play

White.
3. K to K sq.
4. Q to K Kt 8 (check).
A beautiful move.

Black.
4. K takes Q.

He has obviously no other move; the king cannot take the queen on account of the knight.
5. Kt to K B 7 (mate).

This is the "smothered mate" given in Fig. 3, page 146. I will now proceed to a more complicated example of checkmate. The following position occurred a great many years ago between Masses, Horwitz and Schnellen (Fig. 3).

The game had lasted only fifteen moves when the situation given in the figure was brought about. Black had to play, and he astonished his adversary thus:

White.
15. Q to K B 8 (check).
16. K takes Q (he must).
17. B to Q 6 (discovered check).

Another example of discovered check and double check. The bishop checks himself and uncovers the check of the rook. The king accordingly must move.

17. K to K sq.
17. B to K B 8 (mate).
This is an excellent example of the power of a discovered and double check.

The Great Napoleon was very fond of chess, and played in a style which left no doubt of his power to attain the highest eminence in the game, had not his mind been so much occupied with strategy of a more important order. At St. Helens, his time was chiefly spent in reading, writing, chess, and billiards. In chess he always preferred the attack. Indeed, his conduct of the chess men closely resembled his management of troops. He relinquished the defense at any cost, and threw his forces rapidly upon the hostile entrenchments, sacrificing pieces and pawns with a view to mate. Some specimens of his play remain on record. The above situation (Fig. 4) occurred at the thirteenth move of a game between Napoleon and Count Bertrand. Napoleon had been playing the "high game" all through, and having sacrificed the exchange and a pawn, has a situation in which he forces mate in five moves:—

14. B to K B 8 (check).
15. B takes K.
17. Q to K B 7 (check).
18. Q to K B 3 (mate).

These examples will suffice for the present to give the learner a notion of the great object of checkmate, and of the devices which are sometimes resorted to in order to attain it. Extraordinary and complicated, indeed, are the methods by which mate may be forced in certain positions. Instances have been known of a problem to checkmate in three or four moves, baffling all the chess players of the kingdom for a month. But of these subtleties more anon. They are not required for ordinary play.

The beginner is now in possession of all the essential elements of the game except one, which I proceed to explain. A few technical terms must be understood, but these may be better explained as we proceed. The one remaining fundamental principle is the operation of "castling." Once in a game, the king of each player is allowed the peculiar privilege which is called by this name. As a rule, as we have seen, the king can move only one square at a time; but when he "castles" he not only moves two squares, but another piece—the rook—is allowed to move at the same time. The king and the rook, in fact, are allowed at one move to cross each other, so that the king stands on the side of the rook, and the rook on the side of the king.

Examine the diagram Fig. 5.—

The situation represents the appearance of the forces at the
opening of a game. The pieces on both sides have been brought into action, and only the co-operation of the two rooks is required to render the development complete. In this position, White can castle on either side. If he elect to castle with the king’s rook, he moves king to K Kt sq., and rook to K B sq. If he castle with the queen’s rook, he moves K to Q B sq., and R to Q sq. In each case the king moves two squares.

The diagram, Fig. 6, shows the position if White castles on the king’s side:

Figure 7 shows the position after castling on the queen’s side:

**Black.**

![Fig. 6. Black.](image1)

**White.**

![Fig. 7. White.](image2)

**Black.**

![Fig. 5. Black.](image3)

**White.**

![Fig. 8. Black—M. Kieseritzky.](image4)

**White—M. Kieseritzky.**

The conditions of castling are these:

1. The king must not have been moved.
2. The rook with which it is proposed to castle must not have been moved.
3. There must be no piece intervening between the king and the rook.
4. The king must not pass over a square commanded by a hostile piece.
5. The king must not be in check at the time of castling.

I now present the third of the series of positions designed for the information of players who have acquired some knowledge of the game. The following fine finish occurred many years ago between MM. Kieseritzky and Calvi. The game opened as an Allgaier, and at the twenty-eighth move the situation stood as in Fig. 8, White to play.

**M. Kieseritzky continued:**

28. R takes Kt.

This move, and indeed all the subsequent play of White, admirably exemplify the importance of gaining time at chess, and of concentrating all the available forces upon the adverse king. Black’s rooks are both out of play, and it is therefore safe for White to give up one of his for the adverse knight, as he thereby diminishes the black force actually available.

28. Q takes R.
29. R to K sq.
29. Q to K B 3.

Black moves to this square with the view of attacking the white queen with his bishop. He does so attack the queen, with what results will speedily be seen.

30. R to K 8 (check).
31. Kt to K 6.
32. Q takes B.

Thinking he had a fine opportunity,

32. Q takes B.
32. Q takes Q.
33. K to K 2.
34. K takes Q (check).
35. K to B 3 (check).

Forcing him to take the knight, a capture which leads the black king into a hopeless situation.

32. Q to Kt sq.
32. K takes Kt.

The force of White’s last sacrifice is now apparent. Do what Black may, he cannot avoid the discovered mate by the advance of the white Q B P.
O take a sample of the ludicrous, what could be more absurd than the duel between the Marquis de B— and the Count de M—? These two friends uttered some warm words in the course of an argument, and as, unfortunately, witnesses were present, public opinion demanded that they should fight. They met, but as the thing which each dreaded most, next to being injured himself, was hurting his friend, they kept at such a respectful distance from each other, and made such feeble pretences of attack, that the affair seemed likely to last all day, and the seconds grew so tired and hungry, that they declared they would go home to breakfast, and leave their principals to fight it out at their leisure if they did not show a little more energy.

Roused by these remonstrances they got within distance, and longed simultaneously, each however seeking to give the other a slight flesh wound, avoiding a dangerous centre thrust. The consequence was that each man ran his adversary through the dress.

The seconds immediately rushed in, and hurried them off to their respective carriages, in despair lest they should have hurt one another seriously. And that evening the valet of the Marquis, sent to inquire after the state of the Count, met the valet of the Count, who was bound on a similar errand.

We could multiply illustrations of the fact that the French are by no means altogether blinded to the absurdity of a custom which dictates that civilised Europeans should settle their differences after the manner of the braves of the Middle Ages; but we will select but one more, chosen for its quaintness.

Messieurs de Langerie and de Montandre, two very plain men, quarrelled about some trifling matter, and a challenge was given and accepted. When they were about to cross swords, however, Monsieur de Langerie looked his adversary straight in the face, dropped his point, and said:—

"Upon reflection, sir, I will not fight with you."

"What, sir?" cried the other, in astonishment.  "I repeat, I will not fight!"

"How! You insult me, and then refuse me the usual satisfaction!" exclaimed Monsieur de Montandre.

"If I have insulted you," said Monsieur de Langerie, "I beg you a thousand pardons; but cross swords with you I cannot. I have an insurmountable objection to it."

"May I know what it is?"

"No, you would be hurt if I told you."

"Not at all."

"You would take fresh offence."

"I promise not to do that."

"Well, then," said Monsieur de Langerie, "I will tell you. I am a very good fencer, and am informed that skill with the small sword is not your strong point. Therefore, if we fought, I should kill you, and then I should be the ugliest man in the world."

Monsieur de Montandre could not help laughing at this unexpected assertion, and the two shook hands.

Fashionable maîtres d'armes are accustomed to impart to their favourite pupils certain secrets calculated to give them an advantage in these hostile encounters. The late Alexandre Dumas has left it on record that Grisier, perhaps the best fencing master of modern times, gave, from 1830 to 1846, more than a hundred lessons in duelling, and that not one of those who came to him for advice was wounded.

Probably this assertion is to be taken with a grain of salt; but still, if it is half true, his pupils had no right to complain.

But this same Grisier was no advocate for duelling; on the contrary, in his excellent work on fencing he condemns it, animadverting strongly on the general conduct of seconds, who could prevent nine out of every ten duels, if they chose. At the same time, he thinks that if men must fight, they had better do so with the sword than with the pistol, the latter being infinitely the more fatal weapon. Yet one of his reasons (a very characteristic one) for disliking duelling is that it encourages a habit of leaning forward in fencing, so that the arm or shoulder may get a scratch which will terminate the affair, and this is ruinous to good swordsmanship.

In the duels which are common between privates in the French army great precaution is taken to prevent a result which would lose the regiment a good soldier. Leave for the affair to come off having been obtained, the two men, accompanied by the maître d'armes of the corps (seconds are not considered necessary), go to the ground, where the latter produces a couple of foils with the buttons broken off and the points sharpened, and the combatants, having each taken one, cross their swords, the maître d'armes standing between them with a light stick in his hand. At the word "Allez, messieurs!" from him, they begin; but if they get too close, and attack each other dangerously, he interposes, and they start afresh. The moment blood is drawn, from however slight a wound, he stops the combat.

"Honour is satisfied!" he cries. Whereupon the late adversaries rush into one another's arms and weep!!

Binding.—In a counter-disengagement your foil follows and avoids that of the adversary; when, on the contrary, your blade clings to his as it turns with it, in conjunction with the delivery of your thrust, it is termed binding his blade.

The favourite attack formed on this principle is termed the flancade, and directions for the conduct of it will best explain the principle.

Draw your wrist sufficiently in towards your body to enable you to oppose the forte of your blade to your antagonist's faible; then suddenly from that position bind your sword over his, and without quitting it, bring your point in a line with his body under his arm, and immediately long, strictly in opposition; which will here be in octave.

This direction is Roland's, and he adds that the attack is most useful against an adversary who, being taller than yourself, depends upon his own superior length of reach, and stands with his arm extended, intending to oppose a straight thrust to
FENCING.

any longer you may make; which, though bad fencing, might succeed if you quitted his blade to make an attack.

The Opposition mentioned above is that of the one blade against the other. If the swords are not in opposition, you cannot press an attack, and are therefore unable to ensure against mutual hits.

The Change of Engagement differs from a disengagement, inasmuch as it is a mere shifting of your foil from one side of your adversary's to the other without straightening the arm; it is an attack upon his blade only.

In the high lines it is performed by a circular movement which carries the point of your sword under that of your adversary. In the low lines, by passing over the forte of his blade into the opposite line.

When an adversary changes his engagement, follow him, so as to prevent his gaining the command of your blade; if he beats, do not change engagement, but disengage.

During a succession of changes of engagement, remain always on the qui vive to parry; for your adversary will convert his change into a disengagement in a moment if he catches you napping.

Points are used to bring an adversary, who seeks an advantage by refusing his blade, to an engagement, or to draw him from his line of defence. They may either be offers of direct thrusts or disengagements without longing.

A Beat is a sharp blow on the opponent's blade with the purpose of confusing him, or throwing his weapon off the line preparatory to a feint or attack. But a frequent extension of the right arm without longing is to be avoided.

Cut over Point.—The attacks which have been hitherto mentioned are directed either below the adversary's hilt or to one side or the other of his blade; there is another in which you seek to reach the adversary's breast by a whip over his weapon; raising your point, clearing his, extending your arm as your point descends again, and longing when it is extended; these motions, of course, being simultaneous, when you have learned to perform them with accuracy.

The action may be exemplified by taking a cricket stump and fixing it in the ground by a downward throw. The action is that of striking or cutting, but the result is to fix the point in the spot aimed at.

Never attempt the cut over in loose play until you are perfect at it, or you will slash your unfortunate opponent over the arms and shoulders, instead of striking your point upon his breast; and a cut from a foil is no joke, even through sleeves of stout leather.

You would naturally imagine that the most dangerous moment for a fencer must be that following an unsuccessful attack, and this is indeed the case. The return thrust is called

The Ripost, and more hits are made by it than by any other form of attack. Nothing pays better than the constant practice of the direct ripost with the instructor, or an opponent acting in that capacity.

Commence carefully, paying great attention to the proper and strong formation of the parry, that the attacking blade may be thrown out of line, and then, from the position of the parry, without longing (the adversary's body being brought within distance by his longs), without any movement but that of the sword-arm, thrust in return.

Then, as you acquire precision, make the ripost more and more rapidly until that and the preceding parry become almost one movement to the eye of a bystander.

Rapidity is the great thing, the formidable element in the ripost; give the adversary too large a fraction of a second and he will have recovered; the opportunity has gone.

Some men who never attain to any great proficiency in the higher branches of fencing—who never learn, that is, to fence with their heads, carrying out a combination of attacks studied beforehand, are, for all that, extremely dangerous opponents from the lightning rapidity they have acquired in the ripost, with and without longing.

The ripost is generally delivered with the hand in supeneration (Fig. 1); but sometimes, when executed from a parry in which the nails are turned down, as from prime or seconds, there is advantage in keeping the hand in pronation (Fig. 2) during the return thrusts.

But the ripost with the mere extension of the arm is not always feasible; the adversary, feeling his thrust parried very early, may recover in time, and yet leave an opening; then the ripost must be accompanied by the longe.

These riposts, so deadly from their rapidity, are called direct, but if you are not quick enough to seize the opening afforded by the adversary's attack, and find the line of direct return closed, you must make your ripost by disengaging, cutting over the point, or passing under the hilt, either with or without the longe.
The Remise.—When the original attack is yours, and your adversary delays the ripost after having parried, especially if the parry has been widely formed, so as to afford a good opening, you may repeat your attack while on the longe, without springing up to the guard again in the ordinary way. This is called the **remise**; and being made in consequence of an error in your opponent’s play, and therefore with a more than average prospect of success, is to be carefully distinguished from

*The Reprise*, which is also a redoubling of the attack while on the longe, but made without reference to the opponent’s play.

To attack originally with the foregone intention of making a second thrust (should the first be unsuccessful) while on the longe, whether the attack is met skilfully or the reverse, that is the reprise, and it had better be avoided by those who wish to acquire good form and steadiness, as it is apt to induce a rough, scrambling, haphazard style of fencing.

There is another sort of *reprise*, however, which is legitimate enough, and that is a sudden repetition of the attack made, not upon the longe, but after recovery to the position of defence.

*Time Thrusts* are so called because their success depends entirely upon their being timed exactly as your adversary is planning or executing an attack on you. You trust in fore-stalling it, instead of turning it with a parry.

When they are made correctly they are highly scientific movements, requiring great judgment in planning them, and great accuracy and precision in their execution. The adversary must either be led by a carefully thought-out stratagem to make the attack you wish, or else you must be able to discover that which he is intending to make, and have sufficient quickness and decision to time him as he com-

![Fig. 3.—TIME OVER THE ARM.](image1)

Fig. 4.—TIME IN OCTAVE.

![Fig. 4.—TIME IN OCTAVE.](image2)
the loose is made on the outside. Time in octave (Fig. 4) is employed when the loose is directed to the inside of the body or under the arm.

Time thrusts out of opposition are only to be employed where the adversary exposes himself, either by exceeding swiftness in attack, drawing back his arm to thrust, or longing without straightening it. In short, they are not to be thought of if your opponent fences in any form whatever. Even the legitimate time thrust, made with the swords in opposition, is much to be compared to a deep finesse in whist—a thing to be avoided unless you are quite sure what you are about; for if you make the slightest mistake a mutual hit is hardly to be avoided.

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**ELECTROTYPING.**

By Charles Hibs.

**ELECTRICITY—ZINC—COPPER—CIRCUITS—OUR EXPERIMENT—POSITIVE—NEGATIVE.**

What is electricity? No one knows. So potent and all-pervading is it, that men have variously supposed it to be the source of light, heat, and even of life itself. We know, ever since they have known of its existence. As it will pass from one substance to another, or flow through suitable conductors, it has been thought to be a fluid—exquisitely thin and subtle, or at least we have reasonable grounds for believing, that it exists in every conceivable form of matter; but though it is all around us, and within us, we have penetrated but a very little way into its secrets. Of its laws we know something; of its purpose or office in creation we may permit ourselves to conjecture somewhat; but of its nature we know nothing. Whether it is a principle apart from matter, or whether it is only a state or quality of matter itself, is a question that has puzzled the scientists fact concerning the waves of the sea, which travel on and dash with great force against an object intercepting them, while at the same time every particle of water rises and falls in the same place. The passage of electricity is supposed by these to
be a similar disturbance of the particles of matter. But though each of these views has been upheld with learned pertinacity, and fortified by numerous experiments, we have not yet approached to a conclusion as to which of them is true. Perhaps neither. Electricity may be something so utterly distinct from all other things of which we have knowledge, that our ordinary experience cannot be made to apply to it. We only know that we can produce it, or excite it, in some few substances by certain means; that we can detect its presence by delicate instruments, or by actual sensible experience of its effects; that we can collect it and conduct it by suitable apparatus; and that we can produce certain results with it if we use the methods which experience has pointed out. Beyond this all is conjecture.

One of the few things we know about it is, that it is of two kinds, to which science has given the names of positive and negative. These terms are arbitrarily chosen, and must not be taken in their usual meaning. It is not to be inferred, for instance, that negative electricity means the absence or negation of electricity; it simply means electricity of an opposite kind to positive. How these act and react upon each other we shall presently see.

Another thing we know is, that electricity requires a circuit to travel in. It may be transmitted from one body to another, either by contact or by some intervening conducting medium; but unless there is also a conducting medium to carry it round again to the place from which it started, no action will take place. There is, however, an apparent exception to this rule. If a body highly charged be brought only into proximity to one lightly charged, the electricity, making a powerful effort, will leap space and complete the circuit itself, the distance it is able to clear being proportioned to the strength of the one charge and the weakness of the other. But in its normal condition, a circuit must be established in order to give motion to it, and the slightest break in the continuity will stop the action. This fact, and the preceding one, must be constantly borne in mind.

There are many ways in which electricity can be produced, or excited, whichever may be the proper term to use; but at present we have only to do with one; the others will come by-and-by. We are now producing it by decomposition. There is reason to believe that electricity is evolved whenever the chemistry of Nature resolves matter into its original elements; we know that it attends the decomposition of animal and vegetable substances; but it is in the decomposition of metals that its presence becomes most apparent. The zinc plating is being decomposed by the acid, and in the process is giving off a quantity of electricity. The solution in the outer vessel is highly charged with copper, being, as we know, sulphate of copper crystals dissolved in water; these same crystals having been formed by the dissolution of copper oxide by sulphuric acid. Thus there is real metallic copper held in solution in the liquid, though in particles so infinitesimal that no human observation could detect them; and so intimately mingled with the other substances that scarcely any human means can separate them. Electricity is doing it in this instance. Copper is one of the best conductors known, and thus the particles of copper in the solution, having a high affinity for electricity, attract it through the walls of the porous cell, and as it passes through the solution, transmitted from one particle to another, it disengages them from the liquid, and carries them to the prepared plate or mould, which is the chief attractor. Then it passes up the wire, and back again to the zinc, completing the circuit which it requires to travel in. Strange to say, no electricity would pass if the zinc and the copper were hung separately in the two liquids. That which was generated by the dissolution of the zinc, would probably pass off into the atmosphere through the bubbles of hydrogen which rise to the surface of the acid, and cause the effervescence which will be perceived, but none would pass towards the copper, notwithstanding its high affinity. But directly the circuit is completed by the conducting wire, the current sets in motion, starting from the zinc generator, through the acid, which is charged with metallic particles from the zinc, and so conducts it through the porous walls of the inner cell, which is charged with conducting particles from both sides; through the copper solution to the prime conductor, towards which it finds its way in as direct a line as possible; and so on round by the wire to the zinc again. This little explanation will suffice for the present; further experiments will lead us more deeply into the subject.

While the single-cell arrangement described in our last paper will do very well for first experiments, the rotatory electrical recreation will soon desire to push his researches farther, and for this purpose he will require a more extensive apparatus.

It is possible, however, that he may have encountered some little disappointment at the outset, from failure arising from some cause to him unknown, and which we have hitherto omitted to notice. In such a case, we have only to repeat the advice formerly given. Be not discouraged; go carefully over the details of the work already done and, if necessary, retrace every step.

Such a process will be of infinitely greater advantage in the long run, and be even productive of more amusement, than the best series of successful experiments conducted according to rule. It is impossible to forewarn the beginner against all the causes of failure that may arise. Some may have their origin in defective materials, others may depend upon the weather, the temperature of the room, and even the electrical condition of the atmosphere, the last being a contingency against which there is no guarding. A sharp frost will stop the action, if the vessel be left in a position exposed to it, and in a room of varying temperature the process will go on faster or slower, and in general will not be satisfactory.

Much depends on the relative dimensions of the vessels, and on the size of the zinc generator, in connection with the strength of the solution, all of which can only be determined by actual trial.

The writer remembers that his first experiment came to grief through the non-observance of some of these conditions. The depositing went on Merrily for two or three hours, first coating the copper wire, then the top part of the mould, and then gradually spreading downwards over the prominent rim, till it almost met on the lower edge, when it unaccountably stopped (Fig. 1). As it was given over for a bad job, the cell was left undisturbed for some days, and then the zinc plug on being lifted out showed a beautiful incrustation of crystals covering the entire surface that had been immersed (Fig. 2). These were crystals of sulphate of zinc, which had been formed by the over-dissolution of the metal in the acid, the plug having been too large.

The solution had become surcharged with the sulphate, and had begun to re-discharge it in the form of crystals, both on the zinc itself and on the walls of the cell, the pores of which it had effectually stopped.

In due time the incrustation would have grown so as to fill up the cell, and render the plug difficult of removal. This would not have happened if the zinc had been amalgamated; and again let us repeat that this preliminary should never be
dispensed with, if good results are to be insured. Now we will go on to our more elaborate experiments.

For quickness and certainty of operation, it is necessary to have a separate cell and depositing trough. Let the reader take the earthenware jar which contained his copper solution, and having nearly filled it with dilute sulphuric acid, place therein at opposite sides a plate of amalgamated zinc and one of clean bright copper. Let a copper wire be attached to each, and bent over so as to form an arch, as shown in Fig. 3. While the wires are disconnected, no action will take place; but directly they are made to touch, a multitude of bubbles of gas will be seen to issue from the copper plate, and escape at the surface of the liquid, causing a slight effervescence, similar to that which took place on the immersion of the unamalgamated zinc in the acid of the porous cell.

This shows that electrical action is going on; a current is setting in from the zinc to the copper, through the liquid, and traversing the wire back again to the zinc, completing the circuit. The same thing would happen if the two plates were simply leaned against each other by their upper edges, but the conducting wires would be found useful for further illustrations. The reader is now requested to remember what was said about positive and negative electricity.

Before a current can be set in motion, the body from which it proceeds and the body to which it is conducted must be in opposite states of electricity, the one positive and the other negative. The current flows from the positive to the negative body; or perhaps it would be more correct to say, is strongly attracted by the negative body.

We shall know more of this as we go on; at present it is only necessary to remark, that it is the zinc plate which is giving off positive electricity, while the copper plate, being negative, is receiving it; and it is that fact which determines the direction of the current. (The arrows in the diagram show this direction). Nevertheless, the wire which proceeds from the negative copper plate is called the positive pole, or electrode, of the apparatus, because, outside of the liquid, the current flows in the direction of the zinc, and the wire attached to the zinc plate thereby becomes the negative electrode. These two wires carried into a separate vessel, containing a solution of sulphate of copper, will set up electrical action therein; and if a second plate of copper be hung to the positive electrode, and a moist or other article suitable for deposition be hung to the negative electrode, both being immersed in the solution without touching each other, these two articles will now become the positive and negative electrodes, and the current will set in from the one to the other, completing the circuit through the liquid, and in its course decomposing the liquid, and carrying the copper particles to the prepared surface of the mould (Fig. 4).

BICYCLING.

By CHARLES E. INNES.

A FRESH START—OUR JOURNEY CONTINUED—EARLY BREAKFAST—A STOP—OILING THE HORSES—TO WINCHESTER—HOMeward—A SEVENTY-FOUR MILES’ RUN.

HERE is nothing like exercise to ensure a good night’s rest, and we accordingly sleep soundly, and get up almost as soon as it is light, thoroughly refreshed. An all-important point now is the weather. Looking out we see nothing but a grey mist, clothing trees and houses in a spectral garb; but the saying, “evening red and morning grey are the sure signs of a fine day,” comes to our minds, and though we had detected no blushes on the face of the former, the latter was bearing out the old proverb with a vengeance. However hotly the sun may shine later in the day, it is now raw and chilly; so we will go out warmly clad, and make any alterations necessary at our next halting-place.

Before starting, however, the machines must be looked to, the preceding thirty miles’ dust cleaned out and the bearings oiled, so that the wheels revolve freely. This having been done, and our luggage strapped on, we bid adieu to Godalming, and are glad enough to bowl along at a brisk pace, for after leaving the town the road is good and the morning air still chill.

At Milford, a mile and a half on our way, the road divides, and as we do not wish to present to visit either Haslemere or Petworth, we keep to our right past Mõusellí, mounting higher and higher on to Willey Common, where, as the sun is shining and the mists driving off the surrounding hills, we will dismount and make an early breakfast.

The “Eton” is unpacked, the tea poured into it, the spirits lighted, and in a couple of minutes we are discussing our light repast, and enjoying the picturesque scenery around us; while the blue mist still hovering over Hindhead, Kettlebury Hill, and their adjacent heights, allows our imagination to have full play by suggesting yet unseen hills beyond.

Here there is a temptation to linger, but we are yet only a few miles on our way; so packing up the “Eton,” we mount once more, and make our way through sand-hills and heather, with a well-wooded valley on our left, here and there descending slightly, but for the most part sitting well forward in the saddle and working steadily upwards, each successive rise that is surmounted being but the counterpart of another some little distance farther on. The hill is steep and the sun is hot; but the road is admirable, and sure enough here we are at the top, with Hackam Bottom lying low on our right hand. The high road to Portsmouth, which in former years skirted the edge of the semi-circular hollow known as the Devil’s Punch-bowl, now winds round it some sixty feet lower down, a boon we owe to our old mail-coach service.

It is a terribly wild district, and we are just suggesting that it would be nothing but a pleasant place to get bemighted in, when we come on a stone by the road-side, “Erected in detestation of a barbarous murder committed here on an unknown sailor, on September 24th, 1756,” which inscription is followed by the names of the murderers, and an account of the speedy vengeance that followed them.

Another two miles and we enter Hampshire, and pull up at the “Seven Thorns” Inn, where we are not sorry to have a little refreshment before pushing on ten miles farther through Lithehouse and Rake to Petersfield, where we stop at one of its two good hotels and order a substantial breakfast, which, after a run of twenty miles, we are able thoroughly to enjoy.

Before leaving we must not forget to “oil the horses,” both
for their sake and ours, and to see that everything is in working order, especially the break, as it may have to be relied on in a sudden emergency.

Having satisfied ourselves on those points, we leave Petersfield, and in less than three miles are toiling up to the famous cutting through Butser Hill, from the summit of which on a clear day Salisbury Cathedral can be seen, forty miles off.

The remains of the old coach road can still be plainly seen on the left; and on contemplating it we can only be thankful for the present gradual incline that has been substituted.

Once through the cutting we have plenty of down-hill over Oxenbourne Downs, and charmingly peaceful they look after the wild scenery of Hindhead.

The sheep on either side of the road gaze wistfully at us, hardly knowing whether we are friends or foes; but long before they have made up their minds we glide noiselessly by them, and they are left undisturbed in their grassy solitude.

Another half-hour, and, with our feet on the rests, we are running down the hill into Horsham, where the road divides again, that on the left leading to Havant, this one on the right to Cogham and Portsmouth; so up the the hill we go, through the Forest of Bere to the little village of Waterlooe.

When the latter was named the forest might as well have had its name changed to Soignies, as its relative position to the village is very similar to that of the forest in Belgium.

Passing through Waterlooe, we soon commence climbing Portsdown Hill, and cross this magnificent range at Purbrook. As the road down into Cogham is steep and loose, we must drive carefully, checking the speed of our machines with our feet as the treadles rise.

We have now travelled thirty-four miles, and feel inclined for some bread-and-cheese and beer, so we rest half an hour for this purpose ere we once more mount, and, turning westwards, run parallel to the line of forts on Portsdown Hill, along a flat uninteresting road to Fareham.

Here, instead of continuing our present course, we turn to the right through the town in a northerly direction, and pass through Wootton (or Wykeham), a village prettily situate on the river Arle, and famous as the birthplace of the founder of Winchester School and New College, Oxford. Then, traversing a corner of Waltham Chase, we arrive at Bishop's Waltham.

We skirt the ruins of the old castle founded by Henry de Blois, where for four hundred years the bishops of Winchester held regal sway, and where William of Wykeham lived and died.

Crossing the railway at the station, we choose the route via Twyford to Winchester in preference to the more northerly one through Morestead, the former being the less hilly of the two, though rather longer.

It is now nearly five o'clock in the afternoon, so we pull up at the old cathedral city of Winchester, and order some cold meat, etc., and whilst it is being prepared we are very glad to have a rub down and put on dry jerseys. After this we stroll about the town for a short time, paying a visit to the cathedral, so that it is nearly half-past six before we start again on our way to Basingstoke. It is too late in the day to make a détour through Tichborne, lying about six miles to the east, and which will in future be celebrated as the subject of the most lengthy litigation ever known; so we must needs follow the London road through Kingworthy, thus named from having belonged to William the Conqueror when the Domesday Book was compiled.

The road is good, and though there are plenty of hills, they are not very steep. The country on either side calls for no special comment.

Six miles short of our destination, just before reaching the "Wheatsheaf" Inn, we join the Stockbridge road, and in little more than half an hour we arrive at Basingstoke, having made a pleasant run of seventy-four miles; and though it is a great temptation to continue our journey to town, yet as it would have to be accomplished in the dark, we allow the prospect of a good dinner and an early turn-in to outweigh other considerations, and put up here for the night, an early train next morning taking us and our machines home.

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PAPER-FLOWER MAKING.

By Eliza Crease.

THE DOG ROSE—SULPHUR ROSE—GERANIUM—HYACINTH.

On the hope that you have thoroughly digested the foregoing hints, I shall now give directions for the construction of two or three roses which require distinct petals; so that should you not be able just at the time to secure any models of Flora's own productions, these may serve you as substitutes.

As you are as yet unaccustomed to the handling of single petals, we will not begin with any very elaborate specimen.

What say you to the Rosa arvensis or the Rosa canina? Well-known friends, although perhaps not immediately recognised under their proper titles—in familiar parlance they are the wild dog-roses—the former a pure white flower, which has the repute of being the famed emblem chosen by the Yorkists; the latter differing from it but in the faint blush it bears in its face. These little flowers have large hearts, which are better bought; but if you prefer your own handiwork, get a very small flat linen button, fix it on to the peduncle, brush over its top with cement, and then shake green fluff on to it. Surround it with a crowd of diminutive yellow pistils, with long thin thread-like necks and disorderly irregular-looking heads.

Cut out five petals like the pattern, indent each one and also slightly curl back their outer edges; fix them respectively on to the peduncle with the liquid cement, remembering former instructions, never to put the cement on the petal you are mounting; the edge of each petal just overlaps that of its next neighbour. The star-shaped calyx of green cambric is next affixed, and finally the calyx cup.

The manufacture of this latter organ in all roses will, I fancy, be beyond your skill, they being invariably small and hard.

Sprays of these flowers, simple though they be, are very effective. The smaller flowers should be nearest the top of the branch; and as in real life their petals fly before the most gentle zephyr, your imitations will be more deceptive if you leave one or both of the roses minus a petal.

We will pass on to another rose, one which seemingly shrinks from laying bare its heart; a rose of a very reserved and retiring disposition, to judge from the way in which it folds its robes tightly around it, and as if not even satisfied with this privacy, seeks to veil itself in moss.

Its hidden heart (for you must represent it although it be not visible) is of the softest description, being made of nothing more or less than a ball formed of downy cotton-wool.

Twenty petals are required, and of these, eight should be of the smallest size, and the remainder of the largest size. They are all
PETALS OF SULPHUR ROSE, GERANIUM, AND HYACINTHS.
of them moulded. Having attached the wool to the peduncle, take one of the smallest petals and gum it on to the wool, near to the top, then turn the petal over the wool and fasten its tip on to the other side, pinch it into a conical form, so that it gives the idea of two or three unopened petals tightly folded round one another, then gum three round this centre, and then the remaining four; after which the larger petals round and round, each petal closing round the centre and each a little lower down the wool than the last one, until the petals are exhausted and the peduncle is reached.

Then the mossy covering is fixed on, delicate fibres creeping up the outer petals, and sending their spirals a little beyond them.

The noisette or sulphur rose (Rosa indica) is much more complicated in its arrangements than either of the two already mentioned, nearly fifty petals being needed.

By a glance at the diagram it will be seen that there are five different sizes of petals for this flower. Cut out five petals like No. 1, mould them and curl their edges; the position these occupy is immediately next to the stamen. Fifteen petals like No. 2. These are cut together in threes and put one inside another in the manner lately described, and then indented with the ball tool; they have their upper edges curled back, and are placed in sets of three outside No. 1.

Five petals of No. 3. These require moulding, and then to have their edges curled back; the whole petal should be more open than those of No. 2.

Fifteen of No. 4. Mould them, curl back their edges, and place them in rows of five deep, next Nos. 3.

When several petals of the same size are placed together, as in this case, some persons gum them one on to another, instead of fixing each separately on the peduncle, but the effect must be somewhat marred by this proceeding.

Four of No. 5. These are the outer petals, and should be of a deeper shade of colour than the others. They require to be moulded, but it must be done the reverse way of the others; these are concave, while these are convex in form. An ordinary calyx and its cup completes the flower.

For the bud two patterns are requisite. Three petals of No. 1, which are moulded. Six of No. 2. Of these six, three are cupped only; the remaining three, in addition to being moulded, have their outer edges curled.

There are patterns of two flowers shown in the diagram which I must not forget to mention. One is the geranium, 14, of which each circle forms a flower; it is to be cut out in thick bright scarlet paper, and each petal must be veined with the pinnacles.

Then there are the “shade loving hyacinths,” which can be represented in a variety of tints, dark blue or pale azure, pink, amethyst, white, or primrose, and can be either single or double blossoms.

Hyacinths are, as you know full well, of pyramidal growth; therefore flowers of various sizes are required for one stalk. In order to form the single hyacinth, two of these patterns (2 to 5a) are required, one to be rather larger than the other.

Pinch each division lengthwise with your finger, and then take a paper knife and curl them backwards. Place the smaller within the larger, and see that the extremities of the latter are between those of the former, then form and cement them into a tube. Fasten the green stamen (which you had better buy) on to a short piece of fine wire, fasten on with silk the bell and its calyx, which is of the same colour as the stalk.

The making of this said stalk is the greatest difficulty connected with this flower. Cut a narrow band of green gauze, and gum it on to a strip of green paper the same width, then roll it round so as to form a long hollow tube. Make two holes in it with a pin at regular intervals, and attach the flowers, placing the smallest nearest the top of the stalk.

At a future time I hope to appear again with some more diagrams and instructions thereupon.

A N G L I N G.  
by Greville Fennel.

FLOATS—THE TRAVELLER—CAPS—SHOT—THE IMPROVED TRAVELLER—CLEARING RING—SWIVELS—PLUMMETS.

T is granted that every float requires an amount of surplus ballast proportionate to its buoyancy, varying from one small shot in still waters, to two or three large ones in deep heavy waters. Without this, that is supposing it were shotted to the greatest nicety, the most trifling ripple or breeze or the weight of the wetted line above, would send it under, and render the indications worthless, as all must know when a shot too much has been on.**

We have taken a favourite Thames float made of a large porcupine quill with about one inch cut off the thick end, and the middle covered with a thin layer of cork. This was loaded until about a sixth of an inch was out of water, but when the pointed end was placed upwards it was nearly one inch out of water.

It showed in the former case an extremely small depression, and was very sensitive, in the latter the actual depression being nearly the same, was imperceptible, and the wind and current caused oscillations far greater than any produced by a bite.

The float just mentioned, carrying from a quarter of an ounce to three eighths of an ounce of lead, is used for the heaviest and deepest waters frequented by the roach fisher.

We generally place one shot about six inches from the hook, about nine inches higher two or three small lead pellets of the shape of grains of oats, and about three feet above these as many larger pellets of the same shape as are necessary to complete the loading. These pellets are cast with perforations, and we prefer them to the large number of shot necessary when heavy floats are used. No more than one shot should ever be placed on the hook length, as it so often requires renewal.

The travelling float is a most useful contrivance (see p. 165). It is fitted with two small loops of brass wire, and is almost indispensable when the depth of water exceeds the length of the rod. A small piece of India-rubber thread is tied into the line at the proper depth by means of two half hitches. This will easily pass through the rings on the rod, and yet rest on the

* "The Book of the Roach."
small brass loop fixed to the float, so that there is no hindrance to the latter working properly at any required depth, and yet it never interferes with the killing of a heavy fish. Sometimes a second piece of india-rubber is tied into the line underneath the float, to prevent its falling unnecessarily low. There is a great advantage when striking with a float fitted in this manner at the end of a long swim, as the line slips through the loops without dragging the float along, consequently the blow is sharper and quicker.

For heavy floats, which are usually placed on the silk running line, nothing answers better than these two loops of brass wire, one near each end of the float, through which the silk line passes. To prevent the float from slipping it is only necessary to make one or two half hitches sailor fashion on either end.

The general method, however, of attaching floats to lines is by small slices of quill termed "caps" at one or both ends, these caps are whipped round with wax silk to prevent their swelling or splitting, and should have their inner edges filled smooth to remove all burr or sharpness, which otherwise might fret the line.

Caps of india-rubber are likewise used, but these should not be handled with greasy fingers, or they will last but a short time, and perhaps fail the angler when most needed.

We Oswieh as much as possible all gaudy or flaunting floats, as the colours are likely to scare the fish; that the fish do observe these vivdly-coloured objects is best evidenced by the fact that pike and trout have been known to seize them as some boose bushes of insect life floating on the surface of the water, and as most fish have no such temptation to make prey of them, it has been inferred that they rather distract the attention from the bait than otherwise.

The tip, or that part out of the water, should be painted of a yellow ochre, as that quiet colour contrasts most with the surrounding element, and is discernible in the later evening twilight.

As far as our judgment is concerned it beats scarlet, black, white, or any other colour, and gives to us full a quarter to twenty minutes later fishing than by any other arrangement.

An excellent float for light bottom fishing can be thus easily and cheaply made:—For the bottoms take old quill pens, and for the tops common wing-feathers of the turkey. Dip the tops in a boiling solution of Judson’s dyes, and then plug with cotton-wool. Previsions when whipping the joint, lap it round with a strip of silk, well glued, so that it is almost impossible for them to draw or come apart, a very common and annoying occurrence. A float thus made only eight inches long will carry eighteen swan shot.

In using them, Mr. Morrison, their inventor, says he always found the red tops much the best in the day, but as evening approaches the yellow is less trying to the eyes, especially if the water is overhung with trees or bushes. When the water is not near any trees its surface looks always white in the twilight; the black top is then the best.

We here suggest that loose coloured quill tips to cover the whole of the top of the float of the colours named might be adapted to the float, according to circumstances, and thus save the time and trouble of changing the float.

The Nottingham float is, however, the most simple of all. It is merely a swan quill, a portion of the feathered end cut short, to which a small brass ring is lashed, the top dipped in waterproof paint and without any cap, the line being fastened to it when the required depth is ascertained, by two half hitches.

These floats will bear almost any wear, and their slight curve, instead of being a defect, as presumed by some, is a positive advantage in river-fishing, this form of float invariably going down stream convex side foremost, never waggling or turning in the wind—a great nuisance in ordinary floats, whereby the line is twisted to the detriment of its free passage through the rings and rod, such kinking checking the power to strike with exactitude.

The best plan of cutting shot is to use a block of hard wood, with two or three small cavities in which the shot will lie without rolling. The knife should be sharp for about two-thirds of the length, but the part nearest the handle should be ground to a thick rounded edge.

The shot should be first cut about half way through with the sharp part of the knife, using a light hammer to give the necessary blow, the thick part of the knife should then be placed in the cut, and another slight blow struck. This makes a sort of groove at the bottom of the cut, and prevents the shot when pinched together from crushing the hair or gut. A very little grease of any sort may be used, to prevent the shot adhering to the knife.

The tackle makers have an instrument for this purpose, the knife being fixed over a groove by a hinge at one end of the board, a depression of the handle of the knife cutting many at one blow.

But the shots thus cut are not so perfect as those made by the mode first described, and are liable to cut the lines. A pair of pliers is the best appliance for shooting the lines. Avoid the use of teeth for this purpose.

The best varnish for tackle, silk-whipping, etc., is made with small pieces of shellac dissolved in a bottle with strong spirits of wine. Paint the object over with it, and hang it in a dry place free from dust for a short time to dry. The bottle will required to be shaken every time the varnish is used.

Rods should be varnished at least once a year, and the best time is at the finish of the season when the coat will be hard and ready for the next. One coat of the best coachmakers’ varnish will be generally sufficient; but if two, take care that the first is thoroughly dry before applying it.

Lines are dressed with equal parts of linseed oil and copal varnish. Steep the line in this till well soaked, and then hang it out in the open air to dry, clearing off all the refuse dressing with a piece of rag. If you wish to spare your dressing, draw the line through a small piece of tobacco pipe, and the refuse will fall back into the receiver. When the line is dry give it a second dressing.

Many complain that this varnish is too brittle, using a spoonful of gold size instead, for which they likewise claim the advantage of more rapid drying. Powdered resin and boiled oil makes another dressing; it dries quickly, but remains sticky, a fatal objection for many reasons.

India-rubber dressing is much praised by some anglers, but it being effected by grease involves the line in its own decay. It is made with small pieces of india-rubber (not vulcanite) dissolved in turpentine, and if you can keep it free from grease it will not disappoint your purpose.

All lines should be thoroughly dried and hard before using, or the dressing will peel off as back from a green bough.

The dressing of lines are, however, often blamed for their want of performance while the cause is not the quality of the coat but the bad state of the rings of the rod, which when worn (more particularly the top ring) into sharp abrasions will soon scariify the best preparation known. For this reason the top ring, more particularly for spinning, should be made to unscrew, and a new and smooth one occasionally substituted.

The top rings, as shown in Fig. 1, page 99, are not so liable to this defect, nor are they subject to the line curling round them, a frequent occurrence in spinning.

We have given a description and diagram of the traveller float, as generally used on the Trent and occasionally on the Thames. We now picture an improvement therein by “Otter,” (Mr. Alfred, jun.), which consists as shown (Fig. 1), in placing the ring at
the end of a twisted wire, at the shoulder of the float, instead of at the head. The consequence of this is, the leverage of the line is rendered more complete and free, and the tell-tale action of the float more certain and indicative.

Swivels are a very necessary portion of spinning tackle, and one is sometimes used on a trolling line, to give the necessary play or gyration to the bait, without coiling the line into kinks and entanglements.

They are of about six descriptions, the four below (Fig. 2) being of the principal kinds—box-swivels, hook-swivels, spring-hooks, buckle-blocks.

The box-swivel is intended as a fixed connection between two portions of tackle, the other three to permit one of the attachments being fastened by a loop in the line, but where the rings of the box-swivel are large enough the loop can be readily arranged.

The hook-swivel is far from safe, more particularly for spinning purposes, the attachment of hooks and bait being frequently thrown off and lost in casting, to the great annoyance of the angler.

The spring-hook and buckle-swivels are safer, the buckle-swivel particularly so, and it is more easily adjusted to the loop without the use of force, or a liability to fret the line in doing so.

Swivels are made in many sizes, from the eighth of an inch in length to an inch and a half or two inches, the smallest of course being used for the finest tackle, generally for minnow spinning for trout. The more minute they are, however, the more liable they are to fail in their work. They should, therefore, always be looked to, to see that corrosion has not taken place, or that weed or dirt has not got into them, to prevent the freest possible action.

A little sweet oil occasionally, and then wiping nearly dry, will assist to keep them in order. It may be also as well when purchasing to examine the lesser kinds with a glass to see whether they hold any burr in the loose joints, and if so, to reject them.

Barrel leads (Fig. 3) may be purchased ready-made, or manufactured at home. To make them requires a mould, which may be formed by two pieces of Bath brick, each half hollowed out to the section of the size required, the ends being close to the edge of brick, to allow of the molten lead being poured therein, immediately after which the two halves of bricks being tied firmly together, a steel skewer may be introduced into the aperture, and turned therein two or three times, while the lead is cooling, to form the perforation.

The burr, if any, can be removed, and the shape perfected, if necessary, afterwards, or if many are made at a time, straight pieces of wire may be left in and drawn out at leisure, but of course this will require some force.

Plummets may be either purchased or made in a similar manner, but are obtained at so cheap a rate that there is nothing gained by the trouble expended in casting them. Plummets are of three kinds—sugar-loaf, square, sheet lead (Fig. 4).

The sugar-loaf and square plummets have either a fixed plain ring at the top or a piece of spiral wire, for the greater security of the line. The line and hook is passed through the wire-loop A, and the hook inserted in B, the cork.

This piece of cork likewise permits of a piece of fat or other adhesive substance being attached to it, and thus, by sounding, a portion of the sand, gravel, marl, clay, or mud, may be brought to the surface, and the nature of the swim determined, which is of some consequence under certain conditions and the fish you are in search of.

The old anglers, if we may judge from their written works, paid but little attention to the form and shape of their hooks; and although they went through the tedious process of making them themselves, they apparently took but little heed of general form and the niceties of the bend, which at the present period engages the attention of every practical angler.

"It is a bad workman that complains of his tools," is a false axiom in regard to hooks.

Hooks are amongst the most important portions of an angler's appliances, yet it is by few, even in these days, that a proper attention is paid to them.

Chance seems hitherto to have directed even the operations of the manufacturer, who, having made many in the absence of any guiding principle, adheres to those for which he finds a demand.

It is indeed a very difficult task for any one not a fisherman, to copy a hook, even if he has a good pattern, as two samples may prove perfectly identical to an uneducated eye, and yet possess very different properties. How often has—more particularly the roach-fisher—missed fish after fish, and yet could detect nothing amiss with the hook on the closest examination; on changing it for another of the same parcel, the vexatious losses have ceased as if by magic.

A very great difference of opinion exists at the present time as to the proper length of shank for particular kinds of fish. For instance, in roach-fishing, some advocate short, others long shanks. Each has its merits, but whichever is employed, the shape of the bend, and especially the direction of the point, ought to be adjusted with reference to the length of the shank.

Our theory is that an angle formed by two lines, one a prolongation of the direction of the point, the other drawn from the point to the top of the shank, ought not to exceed 22°, or the fourth of a right angle.

Some hooks with long shanks are made with a more acute angle than this, but a vast number, particularly those with short shanks, have such a wide angle, that they will not pull in when pressed against the finger.
THE last words that I wrote to you were on the selection of the best materials to enable you to take your own part with credit to yourself in the great sport of cricket. I take it for granted that you have armed yourself in a manner befitting the occasion, and that you have omitted none of the precautions that were recommended. If you have not equipped yourself fully you will be severely handicapped at the outset, and the injury to your prospects may be irreparable. I mean you to infer that to take high rank in the array of King Willow you will have to keep your ears open and your eyes well on the mark, and receive every item of instruction that may be furnished.

You will find yourself much disappointed if you labour under any sort of impression that the science of cricket can be mastered except after the expenditure of much time and patience.

"The science of cricket!" some of you among the scoffers may say unceasingly, "what science can there be in an amusement so simple? Surely there can be no great skill requisite to acquire proficiency in driving a piece of leather about with a piece of wood, however curiously wrought and carved; it may be for the special purposes of the game."

But ask Longscore and Trenchard, who have acquired eminence in their profession by dint of long practice and laborious study, and I fancy that the most confirmed of you sceptics will feel induced to recant and become converts to the term science. If you still persist in your heretical opinions, I should like to take you to the Oval some of these days, when a great match is on the cards, and give you an insight into the little mysteries of cricket. I should like to put you at the practice nets, my young friend, at what is known as the dinner-hour—because, I presume, it never exceeds forty-five minutes—and give you a short spell with the bat against the crowd of eager volunteers, each ready with ball in his pocket to deliver at high pressure speed, with a view to disarrange the uniformity of the three stamps that form the recognised wicket you have to defend, and then leave you to your fate. I fancy you would be ready and willing enough then to admit your utter incapacity, as well as to acknowledge the arts that you can see used by others to maintain the integrity of the wicket you were powerless to hold.

Do not be misled by the idea that to be a good cricketer, either as batsman, bowler, or field, is an inborn gift. Take the converse of that hackneyed proverb about a poet, and be assured that a cricketer is made, not born. It will save you weeks of wasted energy if you recognize this accepted fact at the first, despite that it may not be agreeable to your self-love and personal glorification.

It is in batting more than in the other branches of the game that you will find practice the great secret to success.

Rome was not built in a day, you will remember, and you cannot plan even the foundation of a famous batsman without time.

You will remember, some of you, the old story about that soldier of Suetonius, who, failing to cut the horse's tail off at one blow, fell to pulling out the hairs one by one. You could not have a better illustration of the routine that you will have to undergo before you can hope to acquire fame as a batsman.

You will ask what is the first point that will have to be mastered before you can enter on the high road to success. I answer unhesitatingly Position. Master this one great rudiment, and you are on your way to advancement. It is not so easily mastered, though, so take the best advice, and if you can possibly secure a favourable opportunity to watch an expert and well-tried batsman at work, do not fail to take advantage of the chance.

I do not go so far as to assert that example is better than precept, but I do state emphatically that the former will materially help to secure the due realisation of the latter. If you are lucky enough to see such a prominent notability as Mr. William Gilbert Grace, or so graceful an expert as Richard
Daft, at the wicket you will find the benefit that will accrue from such a practical illustration.

I wish you not to lose sight of the first necessity of acquiring a useful as well as proper attitude of batting. It is not that I want to dishearten you with needless formalities, but I wish to put you through the best routine, as the recruit has to go through the ignominious torture of the goose-step.

I would drill cricketers as soldiers are drilled, or see that they are duly catechised at the first under the care of a good posture master.

It is the same in most things, that an evil habit is the most expensive to a good beginner. An easy position is as capable of achievement as an ungraceful, cramped, and crooked attitude, though the bent may be more in the wrong direction.

If you can secure a tutor who will show you what ought to be done, and what ought to be left undone, you will not require an elaborate treatise for your edification.

I gave you, first of all (page 161), the sketch of what I may call the chief or stock position of a batsman. Try the effects of this attitude, and you will discover that you are much in the same state of preparation as is the fencer when en garde. You are practically, indeed, now ready for any emergency, and if you are bent on defence, and insist on a close imitation of the original, it will be your own fault if your armour be not shot proof.

I have seen this special position represented elsewhere under the title of "preparing for action," and the denomination is by no means unsuitable. It is obvious enough, you will see for yourselves, that before you have sufficiently advanced to enable you to turn your thoughts to offensive movements, it is necessary that you shall have at least progressed so far as to master the ordinary plans of defence.

It is essential that you shall at least be capable of maintaining your wickets erect before you venture on anything like an attack, and this you will find to be sure of attainment if you adhere without deviation to the imitation of the model I have given.

The greatest preventive, let me warn you, to your progress as a batsman, will be that fatal propensity for playing with a crooked bat, which has marred many a promising beginner. You had better commit any other mistake than show a tendency to use your bat in a fashion at all diverging from the perpendicular. I want you to avoid falling into this most fatal of all errors, so that you must excuse my persistency in directing your attention to this one point.

I never knew any player who won fame, or at least enduring fame, who did not not play with a straight and upright bat. Exceptions there are, of course, and batters there have been who have for a time defied all laws made and provided, but none ever earned an undying reputation except he proved true to the great rule of batting.

See how well school-boys under proper supervision are taught to overcome this defect, and see how, with the benefit of wise tuition, they generally secure an important share in the prizes of the game. Go down to Eton or Harrow, and you will see, any afternoon in summer time, this rudimentary precept in the course of infusion into many a young beginner.

You will see, I warrant you, more than one old Etonian or old Harrovian, removed though they may have been for years and years from the active pursuit of the game, shouldering the bat and showing how fields were won. They will tell you, if you ask their advice, to keep the right leg firm as a rock, the left shoulder well forward; and some of them, under the influence of an honest enthusiasm, will even go so far as to see that there is an impediment so placed that it is impossible to move that same right leg away from the exact position assigned to it.

It is not to be wondered at that with such Mentors and such advantages a public school has come to be regarded as the best nursery for the notable cricketers of the future.

If you look at the diagram closely, you will see that the bat is held tightly in both hands with the fingers of the right or lower hand clenched firmly, the thumb downwards, the left or upper hand equally rig, but in this case so different, that the back is chiefly presented to the bowler, instead of the thumb and knuckles, as is the case with the right hand.

The great secret, though, is to use the bat so as to suit varying circumstances, but as this can only be bought by experience, it will be sufficient to represent the manner of grasping the handle for general purposes. Minute details will not be deemed superfluous when it is considered how even the most qualified doctors disagree on these points. If you were to watch a hundred batmen at work you would find how awkward would be the task of deciding with so many different examples.

Some few wield the bat cautiously enough to suit the most exacting critics, holding it at the very bottom of the handle, just where the insertion into the blade takes place. Others, of a more reckless temperance, are used to grasp it at the very top of the handle; but here again there should be moderation, and you will find generally that the player adopting this latter line of action usually belongs to the genus "slogger," and rarely lasts more than a couple of overs in the hands of an accomplished bowler.

Of two extremes I would rather choose the least, and play the free and open game than hold the bat in such a position that your attitude must be cramped and anything but graceful.

I would rather urge on you that you should make the most of your height, and stand so as to get well over the ball instead of playing over, and every now and again falling apparently over the wicket, as is the manner of some.

It is difficult, on the other hand, to grasp the bat as firmly as it should be grasped so high in the handle, and, moreover, unless your wrist be almost as strong as an iron band, you will feel the jar of the bat more than will be pleasant.

Consequently a course midway between the two extremes may be chosen, and in this advice I have the support of no less an expert than the greatest batsman of the day, Mr. William Gilbert Grace.

To use his own words: "From my own experience I have always found it to my advantage to hold the bat half way up the handle, and this happy medium I recommend for adoption, as thereby you can control it as effectually as if held nearer to the blade, and the benefits incidental to the extra length are very important. To hold it higher in the handle neutralises this advantage, as the bat is not so well nor so firmly grasped, and the power of hitting at a ball with certainty is considerably lessened."

You have here the opinion of the most skilful batsman that the game of cricket has ever produced, so that you can hardly stand in need of other counsellor.

Now that you have got so far as to have a thorough mastery of the bat itself, you will find that the other requisites follow inevitably.

I have before attempted to impress upon you the virtue of an attitude that requires you to have the left shoulder well forward and the left elbow well up. Do not disparage this caution, for will find your efforts feeble enough without it, I can assure you.

The gift of a straight and upright style of play can never be acquired unless you adopt the primary ingredients in the mixture. I warn you that any attempt to hold your bat so as to show its full face to the bowler, unless your left shoulder and elbow are placed, as I have stated will end in ignominious failure.
GAMES OF THE PLAYGROUND.

By C. W. Alcock.

FLY THE GARTER—JINGLING—I SPY—MOUNT NAG.

His is merely another species of the Spanish Fly, ruled, though, by slightly different principles. In this case the title is obvious enough, and, consequently, no imagination is required on this score. The garter is represented, by a line marked in the ground and in all likelihood the pastime originally derived its appellation from one of these appendages being used as a mark for the starting-point. Here you will have to select one of your number to act as "first back," and as the position is not the lightest, it will prevent disagreeables if you choose him by lot, as in the other varieties of the same sport. The chief necessity is that you never overstep the line known as the garter, for your fly does not count if your feet pass over this limit. The difficulty obviously consists in the length of the fly, as the "back" gradually increases his distance until it is almost impossible to clear his body unless the player be more agile than the rest of his fellows. It will not be long, you may be sure, before some of the number fail to get over according to the stipulated conditions, though in these failures the "back" does not always escape scathless. It is this failure, though, that secures his freedom, so that the game is after all well worth the candle. The first player that fails naturally receives the forfeit of ill-success and in his turn becomes "back" until he is relieved by one equally unfortunate. So the game goes on merrily enough, every fresh failure causing the play to be commenced afresh, until utter exhaustion or the advance of time necessitates an abandonment or temporary postponement.

JINGLING.

It would be perhaps heresy to state that this game is merely a revised and corrected edition of our old friend Blind Man’s Buff. Still it has the merit of a very humorous side, to which most other similar amusements are strangers, so that it should be encouraged.

It has, too, another recommendation, in that it requires no very great individual skill, so that all the players are placed on level terms, and there can be little superiority to engender petty jealousies.

Any place where there is just a sufficiency of room to prevent the players straggling will form an excellent arena for the pursuit of the game.

It is necessary that the limits should be somewhat straitened, as the Jingler himself is the only player who is allowed to have his eyes uncovered. He is armed with a bell, which should be as small as possible for the purpose, and it is his manipulation of this implement that gives rise to all the fun of the game.

The rest of the players have meanwhile been carefully blindfolded, so that of course they are amenable to no influence that can help them but that of sound.

You do not require to be very keen of intellect to foresee, I fancy, by this time, the comic element in this special amusement. Immediately the Jingler commences to use his bell the comicallities commence, and the confusion certainly becomes most ludicrous.

Of course the Jingler is compelled to wield the bell without relaxation, and the object of the rest of the players is to secure his capture, guided as best they can by the sound of his instrument. The more contracted the area of the ground the more the fun.

Euck’s remorseless guidance of Bottom and his brother actors in “A Midsummer Night’s Dream” will give you an idea of the complications that may ensue from the freaks of the Jingler. It is his main aim to reduce and exhaust his adversaries.

In this employment he will lead the unfortunate blind men into all sorts of dangers, although these risks will often enough be provided by the extraordinary gyrations of the poor players themselves. You will see sometimes one of the misguided ones rush off into frantic pursuit, only to find himself clasped tight in the arms of another sightless fellow, and the Jingler plying his calling as merrily as ever in another quarter; and at another you will find them wandering into the most remote parts long after the object of their search has sought other fields; and everywhere the same futile quest being pursued in the same ridiculous manner, without apparently the slightest hope of success. Of course it often happens that the Jingler himself is entrapped, for you know that “The best laid schemes of mice and men Gang aft agley.”

It sometimes occurs that he is suddenly taken off his guard and seized by an unexpected captor, but it is not often that this takes place until he has had his fill of amusement.

His capture necessitates his abdication and relinquishment of the bell, and the post of Jingler is taken by his successful rival, while he in turn goes through the process of being blindfolded like the rest.

I do not know a game that is capable of producing a greater amount of good and honest fun without giving the slightest loophole for the display of malice than this same pastime of Jingling.

If you want a good hearty laugh, only be Jingler for a quarter of an hour. You will enjoy it, I promise you, more thoroughly than with the poor blind men.

“I SPY!”

It will not take much time to discover that this is a form of hide and seek; but it is a game that is very popular, and affords scope for more ingenuity than would appear on the surface. It naturally requires a convenient locality, where there is plenty of shelter and places suitable for concealment, but this is its only drawback. It is necessary that there should be plenty of players, for they will have to divide themselves into two separate parties.

The one is deputed to spy while the other undertakes the duty of hiding. Of course it is essential that the former should conceal their faces in order to prevent any unfair knowledge of the whereabouts of the hiders. A signal from the party concealed, in the cry of “ready!” meets shortly with a responsive “coming!” from those who have to spy—and with this latter shout the game begins.

The seekers now go forth in quest of those who are hidden, their object being, after they have discovered any of the hiding party, to reach home before those whom they have discovered can touch any one of them.

In the pursuit of the sport in some places the searchers
CROQUET.

By CHARLES BLACK, Champion.

THE BALLS—WOOD—HOOPS—BRACES—CLIPS—PEGS—SETTINGS.

There is a limit to the size of proper croquet balls; and they are not, like the mallets, at the mercy of individual performers. The diameter should be 3½ inches, and if any player should find that the circumference of his ball is more or less than 11½ inches, he should at once discard them as useless for all purposes of practising for match play. He should also ascertain that they do not weigh less than fourteen ounces. Elm and box are the chief woods used for making balls; the latter is very preferable, as being less liable to chip and heavier, so as to travel more steadily across the lawn and over the inequalities of the turf. This latter is really the best feature of the heavy balls, as the light ones, if struck sharply, jump and hop over others, so as to try one's patience sorely.

There are two ways of painting balls, first with stripes, secondly
with whole colours—that is to say, the balls are sometimes partially painted with one, two, three, or four stripes of one colour so as to distinguish them from each other, the space not occupied by the stripes being merely varnished; sometimes they are painted all over with different colours; the latter being preferable, as it preserves the balls more effectually, and presents a better object to aim at; while the stripes on the strikers' balls often puzzle the eye, if they lie diagonally to the line of aim.

I should never be surprised to hear that a more elastic substance than wood had been used in the manufacture of balls; it is perfectly practicable, and would facilitate the execution of many strokes.

It may be advisable to warn players of an excitable temperament against rushing out to the croquet lawn and letting all the balls fall together, thus inevitably chipping or cracking them, and a ball that has suffered either of these injuries is not worth a son.

It is best, too, to have netting round the lawn, and thus prevent the balls continually going on the gravel, and getting dented.

Nothing illustrates the progress of scientific croquet more than the gradual diminution in the size of hoops. In the presence of the existing 3¼-inch hoops, it is difficult to recall the days when the three side hoops, placed judiciously at a distance of one yard apart, might be all passed by one vigorous straight stroke. The gaping arches then presented such an inviting appearance that a player took shots at his hoop, no matter how great the distance which separated him from it.

Now no sane person ever thinks of attempting to run a hoop except at a distance of less than a yard. There are exceptions to every rule, and there were two remarkable shots made last year.

In the championship matches, Mr. Peel ran a 3½-inch hoop at an angle of 45° from a distance of seven yards, and followed up this exploit by two shots at eighteen yards.

Mr. Pearson also ran a four-inch hoop at seven yards, but under circumstances of peculiar difficulty, his own ball having been lodged so close to a hoop that the mallet had to travel in a curve, in order to strike it; add to this the fact that the achievement of the stroke was necessary, in order to prevent his adversary winning the next turn, and the trying nature of the shot will be appreciated.

Such tours de force are sometimes indispensable at a crisis, but the best thing is to avoid such crises, and stick to the safe one or two feet.

Tournaments opened with six-inch hoops, but the width has become "fine by degrees, and beautifully less, till at present, four-inch hoops are the most in vogue, and 3½ for important matches.

There is not much to choose between 4½ and 4 inches in point of difficulty. Five-inch is the best size for a beginner.

Lest it should be thought that the narrowing of the hoops is due to the fancy of a few pro-
points, i.e., ten times round, all but two hoops, was made for the break prize with 4-inch hoops.

Hoops should be of half-inch iron, their width being regulated according to the advice already tendered. The crown of the hoop should be at least twelve inches clear of the ground. It will be found best for many reasons to have the crown of the hoop at right angles to the legs, as in the woodcut (Fig. 3).

Braces are sometimes used, as shown in the second woodcut (Fig. 4) to keep the legs of the hoops from bulging outwards, as they are apt to do from repeated blows from the balls. The brace is a thin piece of narrow iron, rather longer than the width of the hoop, so that its ends may be curled round to receive the legs of the hoops, which are thrust through the hoops thus made, before they are placed in the ground, and the brace is driven into the turf after the hoop is set upright in the ground. It keeps the hoop very firm, but is apt to hurt the turf.

The legs of the hoops are also sunk in sockets, which makes them more rigid, and enhances the difficulty of passing them at an angle. Hoops made of steel were also used last year, but they were found rather brittle.

The joys and pains of croquet gather around hoops; hitting a ball is all very well, sending it far away is better, but neither can compare with the genuine pleasure of passing a hoop. What just triumph is felt, if you do it yourself; what intense gratitude if a fair partner does it for you; what deep mortification if you miss it yourself; what earnest sympathy if your partner misses after putting you through!

Well do I remember going down to a country croquet party, after winning the champion cup, and being put through more than half my hoops by a lady partner; chagrin might have been in place, but the good genius of croquet asserted itself; gratitude left no room for chagrin. — Moral for all would-be swells!

Hoops are useful, not only for balls to pass through, but also for punishing adversaries; as there is no more hopeless position for a striker’s ball than rammed tight against a wire, or placed so that the hoop effectually prevents the mallet striking the ball; such a ball is much more safely disposed of than if it were at the bottom of the lawn, as in the latter case a fluky shot may turn the tables; in the former, any shot at all is almost impossible. It rewards any player to practise constantly the wiring of an adversary’s ball.

There is a standard way of ascertaining whether a ball has really passed through a hoop. If there is any doubt as to whether a ball is through, apply the following test:

First, set the hoop upright, then pass a mallet head down the legs of the hoop, on the side from which the ball was played (Fig. 1); then if the mallet-head reach the ground without touching the ball, the ball is through the hoop; but if it even graze the ball, the hoop must be passed again. The ball, however, is deemed “in position” for that hoop, and need not be struck back before going through at the next stroke.

Connected with hoops are certain appendages called “clips,” which are used to indicate the state of the game, both to the players themselves, and to the bystanders. They are painted with discs coloured like the balls, and are fixed on the various hoops or sticks for which the different balls are destined. At first they were made of wood, and had springs of coiled wire to give them clinging power; now they are made of metal, and furnished with steel springs (Fig. 2).

Croquet players are indebted to the inventor of the clip for a veritable olive-branch of peace. The prevention of incessant wrangling about the right hoop will alone for a multitude of his sins.

The typical croquet swindler who could boast of having falsely claimed half his hoops, must have cursed the day when this simple contrivance for registering the truth was introduced into croquet.

The two pegs which are required to mark the turning and the winning points, demand a word.

Their diameter should not be less than 1½ inches, and they should stand at least eighteen inches above the ground. They should be made of springy wood, so that the balls may easily bound back; and a short wooden crossbar should be driven through the top of them, to furnish a holding-place for the “clips.”

Pegs are often utilised by infuriate players as a kind of anvil, on which they expend their anger by redoubled blows of their mallets. This habit is amusing, and perhaps useful as a vent-pipe, but it is hardly beneficial to either pegs or mallets.

We now come to the arrangements of the hoops, or what is commonly called the settings.

Illustrations and explanations have been already given of the two earliest in use, viz., the original ten-hoop, and the eight-hoop, with the trap in the middle; but it is now time to speak of those of later date.

There are three settings which have claimed the attention of croquet players during the last few years: the Grand National Club, or eight-hoop setting, and the seven-hoop and six-hoop settings used by the All England Club.

The sizes given for the ground are those required for public matches, but they can be reduced proportionately, so as to suit private lawns.
The latter is distinctly the easiest of the two, and was devised by W. J. Whitmore, Esq., the chief supporter of the Grand National Croquet Club. That club has ceased to exist, owing to his decease, and probably the setting will not be long in fashion, but as it has been extensively used at local tournaments, it will be well to say a word or two about it.

The following are the distances between the hoops, arranged in the illustration.

Pegs are in the centre of the ground, 7½ yards from the nearest boundary, and the hoops up the centre of the grounds are five yards apart, and the two middle ones two yards off the centre line; the corner hoops are about six yards from centre, and lie in a line with the pegs. Starting point about two feet from first hoop, straight in front.

The setting which has now been adopted by the All England Club, for their own matches and for the championship games, is arranged with only six hoops. It is due to Mr. Hale, and was first thought only to possess the advantage of being easily compressed, so as to suit small grounds, but its capabilities have been developed, and it is now a great favourite among the best players. The distances are as follows:

The pegs are in the centre line of the ground, eight yards from the nearest boundary; hoops up the centre line, eight yards apart; corner hoops, seven yards from centre, and in a line with pegs. Starting spot, one foot from left-hand corner hoop, and opposite its centre.

There is also a setting with seven hoops, which was in vogue with the All England Club in 1871, but has since been discarded.

It is by changing the setting that variety is kept up in croquet, and it is very often good for one’s play to alter the regular order, so as to develop new tactics. But two other suggestions have been made for the sake of averting any possible monotony.

Dr. Prior has conceived the idea of a tethered ball in the centre of the ground, at which an exiled player might shoot, and if successful, gain the advantage of an extra shot from the vantage-ground of the centre. One objection to this is, that it would have a tendency to develop wild “shooting,” a feature which is already too predominant.

Mr. Lillie has suggested that a certain part of the centre of the ground should be set apart as a baulk, in which a player who was distant from every ball might try and lodge his ball, and if successful, might have a second shot from any part of the baulk at any ball he liked. The great merit of this is that it puts a premium on such fine judgment of strength as is required to drive a ball exactly into the baulk and no more.

KITE-MAKING.

KITES—DRAGONS—FLYING STAGS—MANUFACTURE—TAILS—CUPS—THE ANGEL—ASS'S HEAD—OFFICER.

It is not to be wondered at that kite-flying is a highly popular amusement. Few recreations have so much, and none have more to be said in their favour. It is to be pursued, to begin with, in the open fields and the fresh air; it is unattended by danger; and yet not without its adventures, as when one is pursued as a trespasser by some unreasonable personage; and it affords healthy exercise, and the glorious excitement, too, of almost establishing communication with the distant clouds. Then, what a beautiful and graceful toy a kite is, either when ascending, or when it has reached the end of its tether, and hangs high in heaven like a great bird surveying the world. That reminds me that a kite is so called from the bird of prey of that name; at least, so it is generally supposed, and there seems no reason to dispute it.

The bird is remarkable for its gracefulness of flight and power of sailing and wheeling about, or gliding in the air, and the elegant movements of the flying toy likely enough suggested to people that “kite” would be an uncommonly suitable name.

In Scotland kites are often called “dragons,” that will be perhaps because of their long tails.

In France corbeau, or flying stag, is the name our toy receives, but why it obtained it is an etymological puzzle, at the solution of which any one is welcome to try his hand.

In the present article my object is to describe, in the plainest way possible, how to make a kite; having done that, I shall speak of fancy kites, and various other matters of interest in connection with kites and kite-flying. Perhaps it may be said that as cart-loads of kites can be bought any day in the shops, there is little need for having their manufacture explained.

But to this it may be answered, that those which are bought are not always those which fly best; indeed, too often they are made to sell, and don’t fly at all. Besides, there is a real enjoyment to be had out of one’s own handiwork, and, in the case of kites, a real profit as well, for toy-shop kites are much more expensive than home-made ones. Lack of success may beg to be excused, and extravagance insist on spending its money, but you, worthy reader, will manage and make for yourself.

And, first of all, it is to be remarked, that the size of which you make your kite is quite immaterial. It may be so small that half a sheet of tissue paper will do for its covering, and a ball of cotton thread will fly it, or it may be six feet or more in length—a huge monster, covered with calico and flown with the strongest line.

Having settled upon the size, you must next prepare the skeleton, and this is done as follows:—Get a straight latch of deal for the “upright,” or “straighter,” or “standard,” (it is marked A B in Fig. 1), its length being of course that of your proposed kite. Its width and thickness must be in proportion to its length; and it is to be observed that it is of the greatest consequence to have every part of the framework of the kite as light as is consistent with the necessary strength. Shape the standard to a point at the top, and notch a small piece on each side a little way from the top, and a small piece also on each side a little way from the bottom. The former notches are to hold the string which fastens on the bow; the latter are to catch the string over which the paper is pasted. And this is all that is to be said about the upright, which forms the backbone of the kite. The “bow” or “bender,” C B, in the Figure, may be made of a piece of pliant wood—ash or hazel will do, or a piece of cane; according to some the best thing is a piece of a hoop, free from knots, thinned down to the thickness of a
common case. Whatever it be, it must have equal thickness and weight throughout its whole extent, and its length must be about the same as that of the standard. Balance the bow on your little finger, and, having ascertained its centre, fasten it with string to that point of the standard, just where you cut the first two notches a minute ago. Now cut a small notch at each end of the hoop; fasten a string in the notches at e, carry it down to the lower end of the lath b, tie it round the notches there, and continue it to the end of the bow f. Before making it fast at f, see that the skeleton is equally balanced, that is to say, that the portion on one side of the backbone is not heavier than that on the other. When this is done, carry the string from f to e, giving it one turn round the lath at g, from e carry it to the top of the lath a, and from thence to f again, and fasten it there; last of all, bring it a little more than half-way down the lath to b, secure it there in notches cut for the purpose, and then carry it to e. Give the string its last fastening now, for the skeleton is complete. You may try the balance again before proceeding further; should it be in any way faulty, shave off a piece from one side or other of the bow.

If the kite is to be covered with paper, old newspaper will do well enough for the purpose, unless the kite is to be ornamented and coloured, in which case the paper should be white. Perhaps one sheet of paper may be too small; then paste several together, allowing them to overlap each other about an inch. Lay your skeleton upon the sheet, and cut away all superfluous paper, leaving only a margin broad enough to lap over the strings and the bow, and you may as well note that the margin for turning over the bow must be larger than that for overlapping the strings. Paste these margins firmly over both bow and strings. This being done, turn the kite with its face downwards, and paste two or three slips of paper across the upright, so as to secure it to the covering of the kite. And it is a good plan, if the kite be large, to paste smaller pieces of paper over and along the cross strings.

The kite must be allowed time to dry; bore two holes in the standard with an awl, taking care not to split the wood. One of them must be about a fifth of the whole length of the kite from the top, the other must be rather less than the same distance from the bottom. Pass a string through these holes, and fasten it by knots on the back part of the lath. This string is known as the "belly-band," and to it is fastened the line by which the kite is flown. It is worth giving great pains to ascertain the right point at which the line should be attached, an error in connection with it being fatal to the proper flying of the kite. Often, when a kite plunges, it is quite as much due to a wrong point of attachment of the string as to anything else.

To give a code of rules and regulations on this head is almost useless; the exact point depends entirely on the balance of the kite, and can only be ascertained by experiment. At the lower end of the upright pierce another hole, which is to be used in attaching the tail.

And now we come to speak about the tail. What its appearance is everybody knows; it is ordinarily nothing but a long string with pieces of folded paper tied on it at regular intervals. Its length depends on the size of the kite and the weight of the string, and the weight of the pieces of paper, and a number of other considerations. It should never be less than twelve times the length of the kite, and may in certain cases be made twenty times that length. The longer it is, the more graceful. As for the tail papers, they are made of slips about an inch and a half broad and three inches long, folded four times longitudinally. They should be fastened to the string by noose knots, at intervals of three or four inches. A tassel is to be tied to the end of the tail, made of a piece of paper folded together and cut up from the bottom so as to imitate a real tassel. Sometimes I have seen this tassel supplanted by a turf cut in the fields, a proceeding which has this advantage, that one is enabled by it to regulate the weight of the tail, and make it heavier or lighter as circumstances require. But folded papers are not the only things of which we can make the tail. Little bundles of straw rolled up neatly and cut with shears all one length may be put in their place. Or we may have nothing to do with either paper or straw, and suspend little conical-shaped bags on the string at considerable intervals. These bags or "tail cups" as they are called, are made of cotton, and are of the shape shown in Fig. 2. Each cup should be about three inches in depth. Its mouth is ordinarily about two inches in diameter, and is kept open by a ring of thin wire hemmed neatly in. To this light ring the strings are fastened which attach the cups to the central line of the tail. The advantage of the "tail cup" tail, it has been remarked, is that, when the length of the tail is found insufficient to balance the kite, one may weight the cups with a little sand or a few pebbles.

For the benefit of the scientific reader I may add that the tail is indispensable to the kite. "In the first place," remarks a sage observer, "it keeps its head to the wind, and prevents its lower half from going too far to leeward; and in the next, it lowers its centre of gravity, and throws it towards its extremity, which not only prevents the chance of the machine being upset in the air, but so poises and regulates the position of the kite as to maintain the angle which it is necessary for the string to make with the surface." If the kite appears to rise with difficulty the tail is most likely too heavy; should it dip and plunge, that often indicates that it is too light. And now we have exhausted all that is to be said about the tail.

Wings or tassels may be attached to each end of the bow, but it has been questioned whether they do not diminish the
kite's flying powers. They add to its elegance, but that is quite another thing. They are made of two strips of paper of a length and width corresponding to the size of the tassels required. These strips are cut from the bottom upwards, so as to look like a comb; they are then rolled up and bound round the top with string. This is also the way in which the tassel for the end of the tail may be made.

Up to this point I have said nothing about the style in which the surface of the kite should be adorned, but that well deserves to be spoken of. It is a department of kite-making in which ingenuity finds scope for exercise, and no one who has any fancy at all will rest satisfied with a plain kite of white paper, or one made of newspaper. A general rule is to be laid down in regard to all kite ornamentation—it must be of the boldest sort possible. Brilliant colours and decided lines are to be employed, for fine and delicate work is thrown away when it has to be looked at from such a distance as half way to the clouds. The adornment of which the common shape of kite—which we have alone been considered—is capable, may be varied to a great extent. We have three examples in Figs. 3, 4, and 5. Fig. 3 is an allegorical device representing the sun, moon, and stars, with an angel flying overhead and a serpent crawling beneath. The figures may be cut out of dark paper and pasted on the white groundwork of the kite, care being taken not to interfere with the kite's balance. Fig. 4 shows the ass's head device; it is a good one, and when drawn upon a kite of large size never fails to produce both wonder and amusement. Fig. 5 exhibits the officer kite, a common favourite. In painting the officer use bright red for the face; make his hair and cap as black as can be, his coat blue, his epaulettes and belts bright yellow, and the rest gaudy and attractive.

There is a great disadvantage, however, connected with kites of paper, they are very easily destroyed. A slight blow is enough to tear them, and few survive a good shower of rain. To remedy this defect calico and silk are sometimes used by way of covering, and thin gutta-percha cloth is also employed for the same purpose.
DRIVING.

By Way Bradwood.

PART from such dangers as those named, no lady or family man should ever sit behind an animal that has once displayed a tendency to "megrimes." Care may obviate such attacks to a great extent, or vice versa; but the disease, primus facie, is one of constitution. It is apodytis.

A human being thus subject accelerates his fate if he sleeps in a hollow-backed arm-chair, with a tight neck-cloth, after dinner. A horse driven fast on a hot day, with a short-throated collar that hampers the jugular vein, runs similar risk, though he may never have been so seized before. The symptoms once seen can never again be mistaken: the horse checks his pace, raises and shakes his head, and seems as if bothered with a fly on his muzzle; but if the latter were the case, he would bore on the rein and seek to rub it off on his knee. An instantaneous halt, and a relief from pressure of the collar, if on an incline, by scooting a stone under the wheel, will give time for the gorged vessels of the head to relieve themselves, and the horse may quietly complete his journey; but from that date he should be tabooed from any harness work beyond a walk.

The fashion of low build in ladies' phaetons has a further heinous evil beyond that of crippling the driver's powers. The splinter bar to which the trace is attached is usually lower than the point of a horse's or even a pony's shoulder. The animal is ever pulling up-hill, lifting part of the weight behind him. He feels instinctively that the lower he drops his shoulder the more horizontal and easy becomes the strain, and so, when the road is heavy or up-hill, he is tempted to crouch to a bent-knee action, which soon ruins his appearance as well as his sure-footedness.

The latter point is an essential, and more than ever so in two-wheel harness. Assuming that the horse has never been driven, and that at first sight his action is plainly not that of a daisy-cutter, that would cut every rolling stone, still the purchaser should look closer before he signs his cheque. Let him examine the shoes. Are the toes more worn than the middle of the shoe? If so, the horse will dig his toe where he sets his foot down, and will trip ere long.

If the shoes are too new to betray wear, let him take the animal on the soft sand or mud; let him draw slowly, and then examine the shoe-prints. Such inspection as this is beyond the province of a "vet," called in simply to give a certificate of soundness; nor could the latter be expected to make enemies by volunteering advice or information on such a matter.

For the benefit of the aspirant to four-in-hand or tandem driving, we may append the following explanation of how to hold his reins, referring at the same time to the illustration on page 91, of the rein hand in four-in-hand driving.

Let him take up his reins thus:—The near leader's rein between his thumb and forefinger, the off leader's between fore and middle, the near wheeler's between fore and middle, the off wheeler's between middle and third fingers. Thus, the fore-finger parts the leaders' reins, the middle finger the wheelers', the near or left-hand rein in each case uppermost. (We have seen the driver of a mail, and more than one horsebreaker, adopt a different grasp, viz., the wheel reins as before, the leaders divided by the three centre fingers of the hand, so that the off-leaders' rein passes between the third and little fingers, the other three reins in the same places as in the grip we first described. But this last grip, though it separates the reins with a little more clearness than the former grip, exercises but little power over the off-leader's rein, and is therefore not to be recommended, and, in fact, may be styled unorthodox.) That first described is the only grip to be adopted.

Turning corners will be the bugbear of a tyro. He must learn to turn each pair on the same spot, letting the wheelers come up to where the leaders turned, before he attempts to turn them in the same direction. Each pair should turn in the centre of the road, otherwise one pair or the other will turn in the gutter, or thereabouts—an ugly, and possibly a dangerous, performance. A turn to the right is comparatively easy. In turning to the left, the right hand must not be stretched across to pull the leaders' reins outwards, but the rein should be taken up quickly with the right hand, pulled in, and tipped at a shorter length in a loop between the thumb and forefinger of the left hand. The right hand is then liberated to steady the horses in the turn given across the off rein, and to direct the wheelers. So soon as the leaders have completed their turn, the left thumb is raised, the near rein slips back to its original length, which has been gripped all the time in the palm of the hand with the other fingers, and the length of the rein is in status quo. But this can be shown far better by a practical illustration than by a verbal description.

Remember, that the direct control of the coach is with the wheelers, and they should be driven as carefully as the leaders. It is an old but unsound saying of half-taught whips, "Take care of the leaders, and the wheelers will take care of themselves." In practice this may pay when the wheelers are old stagers, and understand from the motions of the leaders what they are required to do; but, theoretically, it is pernicious, and would be productive of certain "grief" in driving a raw team. It would be almost a less harmful extreme to reverse the proverb, and to take care of the wheelers only. But a good whip will drive one pair as carefully as the other. All that is here said is applicable also to tandem driving. One companion at least is necessary, even in the latter occupation; but should the driver chance to be alone (as in bringing up the cart from stable, going to front door), and the leader should chance to turn round and look his driver in the face, while waiting for a gate to be opened, then—safer than trying to turn him back again, which will probably back him on to the point of the shaft, and set him off kicking—turn the wheeler round after him, and get the pair once more in position, though facing in the wrong direction.

It is always best to employ a veterinarian to inspect an intended purchase; and safest to obtain a warranty with the animal if possible. At the same time, occasions will continually occur on which a purchase at a sale may be necessary, and in such a case a full warranty cannot be expected. The definition of "quiet in single or double harness" does not of course guarantee soundness; at the same time, it does entitle the purchaser to return his purchase in three or a certain number
of days if it should be found that he belies the sale definition. The words "has been driven in harness" should always excite suspicion; if the horse was known to be quiet in harness the catalogue would doubtless say so. If such a horse has been a kicker, and hence this reticence in definition, he will probably, on close examination, show scars from contact with the splinter-bar; "capped" hocks of course, in such a case, would make suspicion a certainty. The attendant groom will doubtless have a plausible story at his fingers' ends to explain any suspicious blemish, but that, of course, may be taken for what it is worth. Broken knees, it is needless to remark, will always tell their own tale.

While offering a few such general cautions to readers, it must be understood that a volume would hardly teach them sufficient to enable them to dispense, as a rule, with the advice of a trustworthy vet.; and if we may add one caution beyond others, it should be—not to be keen for a "deal," not fond of displaying your cleverness, real or imaginary, therein. Even if you have, or seem to have, the best of the first bargain, let your vanity and appetite be abated, or you will soon find yourself overreached. Most of all, avoid selling a horse to a friend; everybody expects to have the best of a "bargain"—a natural impossibility—so that one or both of you will not feel satisfied with the bargain before long. Better sell the horse away elsewhere to strangers; better lose a few pounds than a friend.

COLOURING PORTRAITS.

By the Author of "Harmonious Colouring as Applied to Photographs," "The Art of Miniature Painting," etc.

WATER-COLOURS (continued)—CHROMATICS, OR THE OPTICAL PRINCIPLES OF ARTISTIC COLOURING—MANIPULATION AND MIXING OF THE COLOURS—PRIMARY, SECONDARY, AND TERTIARY COLOURS, WITH THEIR COMBINATIONS—THE SECRET OF BRILLIANT COLOURING.

A knowledge of the science of anatomy is essential to correct figure drawing, and a knowledge of perspective science is essential to good landscape painting, so a knowledge of certain elementary principles of optical science is essential to the colourist.

It has long been the fashion to inconsistently admit the former facts, while ignoring the latter, and to speak of harmonious and effective combinations of colour in painting as resulting entirely from the circumstance that the painter chanced to be gifted with what is popularly known as "a good eye for colour."

In point of fact a good eye for colour is not more likely to make the painter an artistic colourist without the collateral study of optics, than a good ear for music is likely to make a good musical composer, or a good eye for form to make a good figure draughtsman without a knowledge of anatomy, or a good landscape painter without perspective.

To quote a former President of the Royal Academy, Sir Martin Archer Shee:—

"... As in music, so we find in art,
Unless sound principles their aid import,
The eye and ear, how'er by Nature just,
Are guides correctness always fears to trust,"

As in adopting water-colours my readers are making a good stride in advance of colouring with dry pigments, they must be prepared to enter upon studies less mechanical and simple, and prepare for more ambitious flights. We shall therefore, touch briefly upon the optical principles we have referred to.

Light is the source of all the wonderfully varied colours we see in Nature. It is of a compound character, consisting of red, yellow, and blue rays, united in such proportions that they appear to the eye colourless. A very simple experiment, easily performed, will clearly demonstrate the existence of these rays.

Admit through a small hole in a shutter a beam of pure sunlight into a darkened room, and you will find it is white or colourless. Make such arrangements that this beam of light will fall upon one side of an angular piece of glass, called a prism. In passing through it the beam becomes split up into its seven distinct rays of varied colours, because the rays entering the glass at unequal angles, in passing through are bent or refracted by its density in different degrees, and come from it no longer united. Place a piece of white paper to receive these rays, and this will at once be seen, for you will have no longer white light, but that rainbow effect which follows the refraction of light through spherical rain drops, or in other words, you will have the prismatic or solar spectrum. The smaller the hole which admits the light, and the farther the white paper is from the prism, the more brilliant will be the colours.

The simple rays are only three, namely, the red, the yellow, and the blue. The other coloured rays are compounded of these elementary or primary rays mixed in varying proportions.

The red mingling with or overlapping the yellow forms orange, in all its gradations, or with the blue forms purples and violets. The yellow blending with the blue forms greens—blue green, deep green, light green, and yellow green.

So, by the separation of these rays, some being reflected, and some absorbed by the surfaces on which they fall, and by the varying proportions in which they blend, are formed all those myriad colours which in Nature afford the eye an endless never monotonous source of pleasure and delight.

It is most probable that you know so much long enough before I wrote. Yet it may not be so; for once I sat at the dinner-table of a great alderman of our good old City of London, with numerous eminent civic guests, not one of whom had ever heard of such things. I was called an atheist by the great alderman's lady, why, no one knew, and was smiled at as a poor enthusiast and dreamer by the great alderman and by many of the guests, merely because, eyeing admiringly the gorgeous colours of flowers and fruit in the light of a stained glass window through which the sun was streaming, I said, in the course of conversation with my next neighbour, "What a vast flood of extraordinary and suggestive facts the simple truth that all colour resides only in light lets in upon us." I was called upon to explain my meaning at once, and one old gentleman of great wealth and high position, who listened attentively as I did so bashfully and with some confusion, evidently doubted my sanity, for he regarded me during the remainder of the evening with looks in which apprehension of danger for himself and pity for me were oddly intermingled.
"What!" exclaimed he, in astonishment, "do you mean to say there are no colours in the dark?"

It was not so with the poet Cowley, who was born in 1618 or thereabouts, for in his "Ode on Light," he says:—

"All the world's bravery that delighteth the eye,
Is but Thy several luxuries;
Thou the rich dye on them bestowest;
Thy nimble pencil paints the landscape as thou goest."

It is probable, however, that there will always be a little difference between poets and aldermen, even when aldermen aspire, as some have done, to wear the poet's bays, and poets, as some do, become wealthy.

If you desire to enter more fully into the nature of the colour-rays, we cannot do better than recommend you to study the works of the eminent French chemist, M. E. Chevreul, who is on this subject one of our best and most practical authorities, for I shall merely give you a very brief compendium of the elementary principles.

Before leaving the prismatic spectrum, we may, however, as well point out two other suggestive facts connected with it. The first is that in the red ray there exists a band of crimson which, looked at in the ordinary way is invisible, but which may be seen if you look through a piece of cobalt blue glass.

The second is that by using paper stained yellow with turmeric, instead of white paper, a lavender grey colour is seen beyond the violet.

It may be interesting to add that it is to these more refractive rays that it is supposed nocturnal animals owe their power of seeing in comparative darkness.

Each of the colour rays has its own de ree and kind of chemical power, by virtue of which it plays the most important part in the organisation and government of the world, but with these we have nothing to do here, our business relating solely to their optical influence, and in connection with colour.

The first practical lesson the young colourist learns from the above facts is that there are no two pigments wherewith he can make a primary or elementary colour. We can produce a great variety of purples by mixing blue and red, we can make as many greens with blue and yellow pigments, and as many different kinds of orange and buff with red and yellow, but we cannot make either red, blue, or yellow.

Take gamboge, and with water rub off a little of it on your palette. Mix with it a little Prussian blue, and you have a green; a blue-green if the blue predominates, a yellow-green if the yellow is in excess, a greenish-yellow or a greenish-blue if the quantity of yellow or blue is very minute.

Take Indian yellow and mix it with vermillion, or the extract of vermillion, and the result will be orange; take crimson lake, and in the same way mix it with a blue, say ultramarine, and you have a purple; substitute cobalt for the ultramarine, and you have a pretty violet colour.

If you use too much water in rubbing off the colour you will have to mix more colour than you require, and the colours will be apt to run one into the other.

If in mixing them you use too much of one, there must be a corresponding abundance of the other to effect the required change, and you thereby waste both your time and your material.

By the above mixtures you obtain green, orange, and purple, with their various shades, tones, tints, and degrees of purity, according to the nature of the pigments with which they are compounded.

For instance a yellow containing a little red, mixed with a blue also containing a little red, would not give so pure a green as a yellow leaning towards green and a greenish-blue would give.

Green, orange, and purple, being the result of mixing two colours, are called the secondary colours.

If you mix one secondary colour with another, you obtain a colour belonging to the next order, which is called tertiary. The tertiary colours are represented by citrines, a mixture of green and orange; by rassen, a mixture of orange and purple; and olive, a mixture of purple and green. Mix them on your palette, and you will see that the tertiary colours are as far removed from the purity and brilliancy of the secondary colours as the secondary colours are from the purity and brilliancy of the three primaries. From the mixture of impure reds and yellows are produced the varieties of brown colours; and from the mixture of impure blues with these arise the grey colours. Blacks and neutral colours are produced from a mixture of impure blue, red, and yellow. The annexed diagram will show you the arrangement we speak of at a glance; help to fix it in your memory, and also serve to associate each set of secondary and tertiary colours with its primary element. The learner will do well to commence by colouring this diagram as follows:—

Take a pair of compasses, and first, on a piece of drawing-paper, strike out the intersecting circles, making them much larger than those of our diagram. Mix on your palette a little vermilion, liquid enough to flow easily from the brush, and sufficient to cover the circle marked A. Wash it over the whole circle, and let it dry. If you have done this well the result will be a flat smooth even disc of colour, with no appearance of brush marks on it. If your colour has not been sufficiently liquid, you have applied to the paper more than sufficient for covering such a surface; or if it is too pale it will have an unsatisfactory appearance, and will not give your experiment its proper result. Now take Prussian blue, and with this, in the same way, cover the circle B, and when that also is dry, with gamboge colour the circle C. Where the blue circle overlies the red one you will have purple, where the yellow one over...
WHIST.

BY R. B. WOEMLD.

THE CARD TO LEAD.

LEADS FROM SUITS HEADED BY AN ACE.

From ace, queen, king, etc., lead the ace, and follow with queen. This lead is diametrically opposed to the theory and practice of the old-fashioned school of players, with whom it was an axiom never to lead from a major tenace. With such great strength, however, it is of far more importance to clear the suit than to take the doubtful advantage of a finesse.

From ace, nove, ten, nine, lead the ace, and follow with the knave.

leaves the red you will have orange. Now mix extract of vermilion with Indian yellow, and colour the circle marked d, and let it dry. Where the orange overlaps the red you will have a red-orange, and where it overlaps the yellow a yellow-orange, and where it overlaps the orange previously formed by the combined red and yellow at e, you will see a deeper orange. Now proceed to mix a purple with crimson lake and the French ultramarine, and cover it with the disc marked f. Where it crosses the red you will get a red-purple, where it overlaps the blue a blue-purple, and where it covers the purple a dark-purple. Next mix a green with gamboge and Prussian blue, and with it cover the circle marked 2 in my diagram, where it covers the blue we have blue-green, where it covers the blue-purple we have olive, where it covers the green we have dark-green, where it covers the yellow we have yellow-green, and where it covers the yellow-orange we have citron.

When you have made many sets of these circles, you have practised for an hour or so on them, and have been successful, you will have made your first steps in the region of artistic colouring. You will know how to put on a flat wash of colour, which is a very essential thing, and you will know in what proportion the pigments must be mixed to produce the secondary and tertiary colours in their various degrees of intensity and purity. If in colouring within the circles, you do so with all your different yellows, reds, and blues, with the various purples, greens, and yellows, and with citrines, russets, and olives, you will obtain a knowledge of a very wide range of effects, and provide quite a little library of volumes of reference to guide you in colouring your ports.

But there is another important bit of experience you will have acquired, in pointing out which we shall conclude our present paper.

One of the maxims of those who in painting preserve their colours pure and bright and clear is to avoid in making a compound colour the mixture of more pigments than they find absolutely necessary. If they can get it with the primaries they do so, if the secondaries are required, they use those which are the purest, that is to say, those in which the two colours mixed are least tainted by mixture with other colours. The effect of a contrary course is illustrated near the small circle which centres and unites our colour-circles. Here the result of the various mixtures are shown in a progress towards that annihilation of colour which appears in the centre, where neutral tints and blackness reign.

were to lead the king instead, his partner, if he held the ace, would naturally pass the trick, and by thus retaining the command, might seriously prejudice the leader's chance of bringing in his long suit.

From king, queen, knave, ten, and one or more small cards, or from king, queen, knave, ten, nine, the ten and nine are respectively the orthodox leads; but both the ten and nine, more especially the latter, are perplexing leads, and in our opinion it is a very moot point whether the knave is not the best lead in both cases, if only from the fact that it is more likely to induce the second player to put on the ace if he has it, the rule being to cover a knave with an ace.

From king, queen, and two or more small cards, lead the king.

From king, knave, ten, and others, lead the ten, and from king, knave, ten, and others in sequence, lead the lowest of the sequence. This is an exceptional lead, but it is strictly based on trick-making principles. With such a strong hand the leader cannot afford to allow the first trick to be won by anything less than an honour; while, in the event of his partner holding either ace or queen, it is quite possible that he may succeed in establishing his long suit on the first round. The above, however, is the only lead from an "intermediate sequence" that is generally recognised by the modern school; but we think, as recently advocated by "Cavendish," that the principle might be extended advantageously, and strictly logically, to some minor intermediate sequences. If the nine is the proper card to lead from king, knave, ten, nine, and two, it is not easy to understand why, from king, ten, nine, eight, and two, the two should be selected in preference to the eight. It may be urged that the lead of the eight is calculated to mislead the leader's partner as to the strength of his hand; but may not the same objection be equally raised against the lead of the nine in the other case? It appears to us that the only difference between the two is, that in the one case the lead is sanctioned by custom, while in the other it is not.

From all other suits of four or more headed by the king, lead the lowest.
LEADS FROM SUITS HEADED BY A QUEEN.

From suits of four or more headed by a queen the lowest should almost invariably be led in plain suits. The only recognised exception is—From queen, knave, ten, etc., lead the queen, continuing with knave if the queen wins.

Among the old school the queen was also led from queen, knave, nine, etc., and the nine finessed on the second round; but this is now exploded, at any rate in plain suits.

LEADS FROM SUITS HEADED BY A KNAVE OR TEN.

From suits of four or more headed by a knave or ten, lead the lowest, except from knave, ten, nine, etc., or ten, nine, eight, etc., when the knave and ten are respectively the correct leads.

In “What to Lead,” by Cam, an attempt was made to introduce the lead of the lowest but one from a suit of five or more without an honour; but the proposed innovation, which is an example of a pure convention, never found much favour.

SUMMARY OF LEADS IN PLAIN SUITS.

The following is a summary of the various original leads from suits of four or more, not being trumps:

The ace is led from three combinations of cards, viz.:
- Ace, queen, knave, etc.
- Ace, knave, ten, nine, etc.
- Ace, and four or more small cards.

In the event of the ace winning the first trick, the lead of the queen, knave, or small card on the second round will clearly indicate to the leader’s partner the nature of the lead.

The king is led from two combinations of cards, viz.:
- Ace, king, etc. | King, queen, etc.
- The fall of the ace or otherwise in the first round will enable the leader’s partner to distinguish between the two leads.*

The queen is led from one combination of cards, viz.:
- Queen, knave, ten, etc.

The knave is led from two combinations, viz.:
- King, queen, knave, and, at least, two small cards.
- Knave, ten, nine, etc.

Here again the distinction between the two leads will be rendered sufficiently obvious to the leader’s partner on the second round at the latest, while in the event of his holding either king, queen, ten, or nine in his own hand, or either of the above-named four cards falling on the first round, he will be in a position to draw his inference at once.

The ten is led from two combinations of cards, viz.:
- King, knave, ten, etc. | Ten, nine, eight, etc.

Here, as in the preceding example, the possession by the leader’s partner of either king, knave, nine, or eight, or the fall of any one of the four to the first trick, will indicate the character of the lead.

The nine is led from two combinations, viz.:
- King, knave, ten, nine. | Ace, queen, ten, nine.

In this case the fall of any one of five cards (the four honours and the ten), or their possession by the leader’s partner, gives a certain clue to the lead.

The lowest is led from every other possible combination of cards in plain suits.

THE ORIGINAL LEAD IN TRUMPS.

The original lead in trumps, owing to their exceptional character, differs in many respects from that in plain suits, and is also frequently influenced by the position and nature of the turn-up card. The following examples will be found to comprehend all the principal combinations of cards, wherein the trump lead differs from the lead in plain suits:

From ace, king, queen, etc., lead the lowest of the sequence, as by so doing you inform your partner of your strength.

From ace, king, and two, three, or four small trumps, lead the lowest. By this means you give your partner an even chance of winning the first trick, and in any case remain with the complete command. With ace, king, and more than four small trumps, lead the king. (This is the orthodox rule, according to the “books,” but with ace, king, and four small trumps many good players prefer the lead of the king to the small one.)

From ace, king, knave, etc., most of the authorities counsel you to lead the king, and change the suit, with the object of finessing the knave. This manoeuvre is, however, condemned— in our opinion justly—by many players of the modern school, except when the queen is turned up on the dealer’s right, which, of course, renders the finesse a certainty. At the same time, the lead of the king, followed by a change of the suit, has the advantage of informing the leader’s partner that he holds three honours.

From ace, queen, ten, nine, with or without others, lead the nine.

From ace, knave, ten, nine, etc., lead the nine.

From ace and small ones, lead the lowest, unless you have seven trumps, when lead the ace.

From king, ten, and others, lead the king, with the object of finessing the ten.

From king, queen, and small ones, lead the lowest, unless you have seven trumps, when lead the king.

The trump lead, as we have before remarked, is not unfrequently influenced by the turn-up card. We append a few of the principal examples:

From ace, king, knave, etc., with the queen turned up to the right, lead the king, and stop.

From ace, queen, ten, etc., with the knave turned up to the right, lead the queen, which gives you a certain finesse on the return of the suit.

From ace, knave, ten, nine, with queen turned up to the left, lead ace, and continue with knave.

From king, knave, nine, etc., with ten turned up to the right, lead the knave.

From queen, knave, nine, etc., with ten turned up to the right, lead the queen.

ROWING.

By LAMBERT YOUNG.

FEATHERING—HOLDING WATER—BACKING—PADDLING—SPURTING—EASING—STOPPING—STARTING—OVER-EACHING—COACHING.

Such a position as that we last named is far superior to an entry with the back of the blade forming an acute angle with the water and the front of the blade an obtuse one. In either of these cases, however, there is something wrong with the thole rowed against, the part of the loom which bears against the thole, or with that on which the oar rests when traversing the water.

When in the proper position, the front or hollow of the blade should be looking slightly downward upon the surface, and not along it.

The entry will consequently be at less than a right angle,
ROWING.

and thus the oar is able to take a full and square hold of the water at once, and prevents its sinking too deep; also splashing is prevented, if it is firmly and properly managed. No effort whatever should be made to force it over; it ought not to be turned over too much, as if so, it will not enter the water easily, but will turn or twist in the hand, and possibly strain the wrists. Through practising this peculiar catch the oar descends to the shoulder or upper end of the blade, and it must continue in this position until the arms are up to the chest, but not stopping at the distance of a foot from it, when the stroke is concluded, and the feather commences.

During its passage through the water the blade of the oar should be barely covered, and no more—this is an accepted rule—and with the extraordinarily light boats used at the present day, very strict attention must be paid to this principle.

When bringing the stroke to an end, the blade of the oar, by a sudden movement—caused by dropping the hands and turning the wrists—is feathered or brought into a plane with the surface of the water, from being previously at right angles thereto. This action should take place at the moment of the oar’s leaving the water, and the lower end of the blade, by being suddenly turned cleanly aft as the loom rotates in the rowlock, throws the water astern in a little eddying whirlpool, and the whole business of the stroke is completed.

The appearance of this whirlpool should be studied very carefully by the “coach,” as it is a good criterion of how a man is rowing; and if the coach himself is pulling, as is sometimes the case, it is one of the only guides he has in judging how his pupils are rowing behind him. It is not easy to describe the look it ought to wear, but plenty of small air-bubbles should keep rising, as in a soda-water bottle, long after the swivel has left the oar; the smaller eddies should be deep and well marked.

Rowing very lightly makes a splash that soon subsides, and deep rowing shows no air-bubbles. It must be admitted that the foregoing descriptions of the component parts of a stroke and its succeeding feather are numerous, and to a certain extent even incompatible; but yet they are so blended in the work done by a first-rate oarsman as to serve but one action.

Each, however, is fitly and correctly performed, and the sum of these separate actions is consequently also perfect. Besides pulling, there are other manoeuvres which are necessary to make the science of rowing complete, and are applicable in all sorts of boats. They consist of “holding water,” “backing water,” “paddling,” “spurtling,” “easing” (or stopping), and “starting.”

“Holding water” is necessary when the boat is to be suddenly stopped, in which case her crew on both sides remove the blades of their oars, and, according to the pace at which they have been going, drop them more or less into the water, holding their arms straight, and keeping the inside hand firmly upon the loom, to prevent the water sinking the blade too far under, and thus causing a “crab.”

It is a very difficult manoeuvre to execute well, but after a great deal of practice it will be found that by a simple turn of the wrist, so as to twist the handle to or from the body, the blade can be raised or lowered according as it is found necessary to slacken or increase the power exerted to check the boat—i.e., by simply turning the blade with its upper edge downwards towards the nose of the boat, the oar sinks, and by depressing the after or lower edge, it immediately rises to the surface of the water.

This plan of managing the boat is not often wanted in racing, except when a buoy or mark-boat has to be turned, when it is done by rowing rapidly up to it; then, at the word “Hold water, all!” the oars are held steadily in the water till the way is stopped, after which the rowers on one side hold, or even back water, and the other row the boat rapidly round.

Practice is the great point here, as the principle is simple enough; and nothing but long practice will enable a crew to turn a boat in the small space and time which we often see on the Thames and other rivers, where the boats row at a racing pace up to the buoy, and sometimes the stroke oar, if possible, catches hold of it; at all events, they stop as if by some magic, and are round in about a quarter of a minute. A boat, if well handled, may be turned nearly in her own length.

“Backings” is performed in exactly the opposite manner to rowing, pushing the blade through the water, and pulling it through the air the moment it leaves the water. The blade should be neatly feathered, care being taken not to dig too deep, and to back in good time, and with the same length of stroke. This stroke is commenced with the body well back, and is finished but a little beyond the knees, here again the first being the vital part of the stroke. When a whole crew back water neatly and in good time, it is a very pretty sight, and the boat is propelled at a better pace than could be expected; in rowing and backing a boat round, care should be taken that it is done as gently as possible, for nothing strains or screws an outtrigger so much as force applied under these circumstances. A boat will last as long again as she otherwise would if this point is always attended to.

“Paddling” is simply the act of rowing at about half-power, or a milder form of rowing hard, of which the opposite extreme is spurtling; the pace is about twenty to thirty strokes per minute, according to their length, and according to the amount of strength applied. At this pace one can detect every fault, the keeping of time and stroke, if bad, being very evident; paddling is therefore very valuable for the coaching of crews before venturing on races, especially those that are to be contested over long distances.

“Spurtling” is performed by all the crew exerting themselves to their utmost powers to propel the boat through the water with the greatest velocity of which she is capable, whatever the distance may be, a few boat lengths or half a mile at a time.

“Easing,” or stopping, and starting, being the exact opposites of one another, are performed differently; the former is merely the ceasing to row, all together, at exactly the same moment, and when the coxswain gives the word “Easy all,” which he should invariably give at the end of the stroke, when all the oars should not be wholly recovered from the feather, but should be half way between the horizontal and the perpendicular, and at right angles to the boat, so that as soon as the way is a little off her they may lie flat on the water, and thus prevent her being unsteadily by their power of balancing. Easing is generally understood to mean “leave off pulling;” if it is merely desired to reduce the speed, the order employed is “row easy all.” The latter, or “starting,” is effected when all row off at the same moment, the position being nearly at the utmost reach forward, and giving two short strokes and a long one when intending to get quickly off; but usually it will be found best to start off with the usual steady stroke.

The length of the stroke is that which all in the boat can well keep up without the forward reach being so far as to make the drop unsteady, or the backward swing being carried so far as to bear too hard on the oar, and thus cause a depressing or downward pull on the boat. The stroke oar must be very careful not to over-reach his crew, though he should be able to do so if necessary, by which a young crew will be greatly improved, and have their style and powers developed to the fullest extent. The only limit to the length of a man’s stroke is his length of reach forward, which is limited by the bend of the body at the hip, and the swing backward, which must be guided by a careful and long observation of each man’s style in the crew, for.
if any are found that are clumsy and slow in their recovery, the swing must be so guided as to keep them in stroke, or they may fall in this movement and in the reach forward also.

Rowers must sit square to their work, and hold their oars in a proper manner, and have the stretchers adjusted to the length of each man's legs, or the oars will not clear them; the body must be kept in the proper position, pointed out to them by their coach, and they should pay most careful attention to his every instruction, or they will not do credit to their boat—one awkward man in a boat spoils the effect of the whole, even if the others are all good oarsmen. And when a man has once acquired a slovenly style, it is most difficult to give it up and learn to row properly; indeed, the teacher has much less difficulty in imparting a proper style to a green hand, than to coach an awkward one into an elegant oarsman.

Straps have come greatly into use since the present light racing boats have been the fashion, and were introduced to enable the rower to raise himself after delivering his stroke without bearing too heavily on his oar; and now a regular rower could not put forth his powers of muscle, and get the utmost amount of speed from his egg-shell boat, if he was without straps. Some great authorities say that straps are objectionable, as they cause the body to be doubled forward on the oar; but this is more owing to the lightness of the boat than of the straps themselves.

Coaching is a very important portion of a rower's studies, as upon it depends his proficiency in the art; and novices should always learn from an acknowledged master of the oar, as his form will in the future depend entirely on the manner of the teacher.

Beginners should invariably be taught in tubs, to acquire the proper manner of handling their oars, boats, and yoke lines, and their teacher should accompany them in their boat to correct every error, and tell them how to become perfect in each action and movement, and to prevent and correct the frequent mistake of shirking, which all young oarsmen are prone to; and this fatal habit may take place either at the commencement or end of the stroke, or both; sometimes it is done so cunningly that hardly any of the ordinary lookers-on could discover it, and is done with a view to the idle man shirking his fair share of the work. It is accomplished by neglecting to give the whole power to the oar at the moment it comes into contact with the water, and not keeping the muscles of the arm in a rigid state, and the arms themselves not straight, by which a properly firm grip of the water, so necessary for correct work, is lost. To all appearance the work is the same, as the oar enters the water at the same moment as the others, but the boat is moving from the power exerted by the others of the crew, who work fairly. The easiest way to discover this piece of dishonesty is to carefully inspect the moving water that leaves the oar of the suspected man, and the coach will soon see if the sneak is shaming. A man can shirk by rowing with only a small part of the wash of his oar immersed.

It takes a very long time to get a crew to row well together; and in commencing it is a vital point to select healthy men, as during their training they have to undergo some trying work, which will tell severely on any but a thoroughly good strong constitution. Some people say that from the waist down in rowing the whole limbs are idle, but one moment's consideration will show the fallacy of such a statement, for the legs, thighs, and lumbar muscles, all have to take their share of the work, and are most essential to the proper performance of the oarsman, good thighs and knees being as requisite as shoulders, chest, and arms. The power seems to be in the arms and back, but this force cannot be exerted unless the pushing power of the thighs and legs against the stretcher tended to prevent the body from slipping off the seat and taking its place on the floor of the boat. The man's frame should in all cases be examined, to see if he has a muscular development such as will enable him to put forth the force that will pull the oar through the water in the orthodox manner; for, unless the loins are powerfully developed, the finest muscle and bone of the arms and shoulders are utterly worthless, and a race may be lost from mere want of attention in selecting a properly proportioned and developed crew. The best way of selecting men is to take them out in an old-fashioned boat, or skiff, and before the start everything should be set in proper order, or the mat, stretcher, oar, or other things, may be found wrong, and have in the end caused unexpected errors in the pupil's work. The instructor sees that his pupil is in a proper position—i.e., that he is quite square and upright on his seat, his feet pressed firmly against the stretcher, with heels together and toes well apart, the outer hand should be close to the end of the oar, the inner hand about one and a half to two inches from the other, his arms being straight, his shoulders square, chest well out, the head well up, and the knees apart; he must reach out and try a stroke, which is to be closely watched by the teacher, and every movement explained and pointed out to him, and shown at the same time, by the teacher himself rowing a stroke or two; the body should bring its weight to bear on the oar steadily, and both the entry and finish be clean and neat, command being kept over the oar from beginning to end of the stroke, for with a novice the oar will, in naval parlance, "take charge," and be the master of the learner.
BILLIARDS.

BY A. G. PAYNE, R.A.

SIDE—UNDER THE CUSHION—LOSING HAZARDS—THE SPOT STROKE—PLAYING FOR POSITION.

We described in the latter part of our last article how to regulate side, and recommended the beginner to practise with one ball only if he wished to see fully the effect of putting it on. Now, it may seem somewhat paradoxical, but it is, nevertheless, perfectly true, that a thorough knowledge of side and its effects are principally useful in order that it may not be put on. There are many more games lost by putting on side when it is not wanted than from side not being put on when it is.

To get the exact amount of side on, no more and no less, will be found an exceedingly difficult matter, still, by playing at a cushion, the error is apparent; by playing at another ball it is often difficult to say whether too much or too little side has been put on, as the slightest variation in the position of the spot in which the object ball is struck causes often considerable variation in the angle at which the ball flies off.

Many strokes are missed, and indeed very often the ball itself missed, from putting on side when it is not needed. Hitting a ball when tight under the cushion exemplifies this.

When we were describing how to hit the ball—a most important point in billiards—we did not mention this peculiar position, which very frequently happens, and many a game may be and is lost owing to the striker being unable to play from the fact of his ball touching the cushion. How often does one hear the common expression in a billiard room, "I couldn't play, I was tight up."

When therefore the striker's ball is close under or, even within a few inches of the cushion, it is necessary for him to form a bridge entirely different to the ordinary one, for it is evident that he cannot rest his hand on the table at all. The way to form the bridge in this case is to rest the tips of the fingers only on the wood-work of the table. Should the ball be quite close to the cushion, in order to strike it will be found necessary to raise the right shoulder and at the same time shorten the cue; i.e., hold the cue nearer the tip than when playing an ordinary stroke (Fig. 1).

It is evident that in this position the ball must of necessity be struck rather downwards, and consequently it is of the greatest importance that it be struck in the middle, otherwise the result will almost certain to be a miss, for the following reasons—If a ball be struck downwards with side on, it will travel in a curved line and not in a straight one.

Figure 2 gives the position of the balls in a very pretty stroke, which a good player ought to be able to make almost to a certainty. It will be seen that all three balls are in a straight line, and that the red ball is over the top pocket. Now, in order to strike the red ball, the player must either play off a cushion, or cause his ball to make a curve round the white; this latter is by far the easier of the two, and by striking the ball rather hard
on the left-hand side, and at the same time striking downwards, the ball will follow the course of the dotted line, and strike the red. We should, however, warn beginners from trying this stroke, because, it requires considerable practice to strike a ball downwards without missing one's cue; and as the result of missing the cue (striking downwards) is almost certain to be a cat's tail, for which one has to pay, very properly, the sum of a guinea, they would do well to think twice before they risk the attempt.

In striking a ball downwards care must be taken not to strike it too hard, even when struck in the middle, otherwise the ball will jump. A good player can cause his own ball to strike another ball and then jump off the table, whenever he likes, by simply hitting it very hard and striking downwards. When the ball is a long way off this is very difficult.

We recollect some years back witnessing a match at Saville House, Leicester Square, between Roberts sen. and an amateur named Mr. Downes. Roberts giving 700 points out of 1,000.

Now it is usual to commence every game by giving a miss in baulk, because it is very difficult to score at starting off the red and also very difficult to strike the red ball and bring both it and the white ball into baulk.

In this match the amateur began, but instead of giving a miss, he purposely ran a coup, i.e., ran his ball into a pocket, his opponent thereby scoring three.

What was Roberts to do? If he gave a miss in baulk the amateur would have run another coup, and, to be consistent, Roberts must have given another miss. But then Roberts was bound to play at the red some time or other, as the effects of his scoring three to his opponent's one would be that he would score 290 to the amateur's 300, thereby making him win the game, as he received 700 points.

But Roberts was conscious of his own powers, especially of his power of cue, and we believe no one has ever had such a mastery of the balls as he. With an admonitory "look out, gentlemen!" he raised his right shoulder, struck his ball hard, and downward, swift as lightning flew the ball, struck the red, and both rose off the table. The effect of the stroke was of course to leave the red—which had to be spotted—where it was before, to double up an old gentleman's hat, which was sitting quite twelve feet above the table, and, with a grin on his face, the marker called the game 3 to 700.

Mr. Downes found that his tactics would not do, and so gave the usual missed. Of course, the stroke we speak of none but a perfect master of the game could make. But we have mentioned the occurrence to show what wonderful perfection the game can be brought. It must be borne in mind too that Roberts sen. was an exceedingly powerful man, and we doubt if even the more perfect players of the present day—if making longer breaks constitute them as such—could make a certainty of playing from baulk at the red and knocking both balls off the table.

The beginner having learnt to hit his ball fairly well, must first, if he wishes to become a good player, turn his attention to losing hazards. Losing hazards are the backbone of billiards, and all good breaks consist mainly of a series of these most useful of all strokes.

We would here, however, warn some of our readers who may be very good players, that at present we intend to ignore the spot stroke altogether, our articles are intended to teach, and one of the most important points in teaching is to ground well; and it would be as absurd to attempt to explain how to perform the spot stroke to beginners as it would be to commence the differential calculus with a child before the multiplication table. But we would warn these same very good players, that, as a rule, to amateurs the "spot stroke" is a delusion and a snare, and would call their attention to a few remarks on the subject that appeared some months back in Land and Water.

Land and Water states:—"There are many moderate players at the present time who play about twenty or thirty points in a hundred under their game in consequence of their attempts to play to get the spot stroke, which generally results in their breaking down on the second hazard, whereas, had they continued the old-fashioned round play, they might have made a good break.

"Experience, which makes fools wise, seems to have no effect upon them, and, with a perseverance worthy of a better cause, they continue to play to get that which when obtained is of no service. The only cure for this distressing form of billiard mania that we know of is a tight match with a steady old player, and a bet of not less than five shillings a game. This cure, though expensive, is generally found successful."

We have already described a losing hazard as pocketing the striker's ball off another one. We will suppose the balls to be left in such a position as that there is any easy losing hazard into some pocket off say the red ball. Now, let the striker, before making this easy stroke, think to himself for one moment about the position of the balls after the stroke which we for sake of example have supposed to be so easy that it cannot be possibly missed, the position of his own ball is certain, i.e., he will have the choice of placing it anywhere in the baulk circle. But where will the red ball be? This entirely depends upon how he plays his stroke. Of course he should try and leave it in such a position that another easy stroke will be left next time. This is what is called "playing for position," and it is upon the amount of thought and attention given to it, that progress in learning the game depends. But before we enter fully into the important subject of position play, we will explain how to make losing hazards.

There is one angle at which it is easier to make a losing hazard than at any other, and it is of great importance that the player should accustom his eye to this particular angle, so that he may know when playing from baulk for a losing hazard, how properly to spot his ball in the right place.

Beginners will notice, if they watch good players making a break, that whenever they play from baulk they are very particular as to the exact spot on which they place their ball, and that often after placing it they will cast their eyes to the object ball and then move their own ball sometimes not more than
SWIMMING.

BY THE SECRETARY OF THE ROYAL HUMAN SOCIETY.

THE SIDE STROKE—INDIAN STROKE—HEELS OVER HEAD—THE FLOAT—THE PLANK—LEAF-BOAT—DROWNING PERSONS—HOW TO SAVE.

GUBB, winner of the first gold medal presented by Sir W. Frazer, Bart., for a mile race in the Thames, swum from above Hammersmith Bridge down to the wharf above Craven Cottage, Fulham, says, apropos of the side stroke, “To my mind, this plan of swimming is not only the most useful and comfortable, but it is also the most elegant. The swimmer can change from side to side at pleasure, and alternate with chest or back-swimming, or floating.”

He also lays down the following rules for the guidance of those who wish to become proficient in the art of side-swimming:

“Lay the face and body well down sideways in the water, with the mouth a little raised, so that you may breathe freely. It matters not which side you swim on, the plan of proceeding being of course the same. The hand must be used as a sculler, taking care that when you project it from the shoulder, you send your legs out at the same time. Let the other arm rest close to the body, till you have had some practice with one hand, then commence using both hands. The upper hand is to be employed solely to propel the body, while the under hand acts both as a propeller and a sculler.”

Mr. F. Cavill says:—“Since the side stroke has become so popular, a good swimmer seldom swims on the breast, although you must gain confidence with the breast stroke before attempting the side; also acquire the power of swimming under water. Lay yourself on your side, and draw your hands up to your chest, as in the chest stroke, then the right hand must be thrust out to its full extent, the left hand only going about as far as the elbow of the right arm; next, the thumb should be tightened over the forefinger of the left hand, so as to form a cavity or scoop, which gives a much greater power over the water, a stroke with that hand should then be taken back to the thigh, using your full power with this stroke, the right hand taking a downward stroke, which act propels you along. The arms are then drawn up into the first position; at this movement you should inhale sufficient air to well fill your lungs, at the same time as your arms are being drawn up to the first position, draw your legs up to your body, and as the arms are struck out as before described, so shoot out the legs, taking care not to let the feet come out of the water; or if so, the power of the leg-stroke will be quite lost.”

In commencing it is not advised that more than five or six strokes should be taken, then a few should be taken on the chest, and as you become more expert, you can increase the number of strokes, until the side swimming becomes the natural mode of progressing through the water, to the exclusion almost of any other style, unless you may happen to be in a saw-way, when the chest stroke will be found the preferable, from its keeping the head and face so well raised out of the water and surf.

The principal feature in this side stroke is to keep your head in exactly the same position in relation to the body as when walking, and not to raise it up and down, as most inexperienced swimmers do, giving as a reason for so doing, that it is to prevent the water from touching their faces or going into their mouths, instead of closing their mouths and pushing their heads through the water, the apex of the head being used as the outwater in advance, to ease the progress of the body through the resisting water.

By lifting up the head the way or impetus is stopped, just as in a rowing or sailing boat, any rolling or other motion other than advancing, tends greatly to impede her progress; therefore, on exactly the same principle, when swimming, the body and head should not move, only the arms and legs, as propellers. Being on the side, and in the proper position for this stroke, it is impossible to see ahead, you should therefore steer yourself by an object behind you. By occasionally making a slight turn of the head, you can easily see that you are keeping in the right direction, or what is in your way. Care should be taken in turning the head, that it is not done suddenly, but gradually, as any sudden turn is sure to check your speed.

Having by thorough practice acquired a complete mastery over the side-stroke plan of swimming, the learner may proceed to a modified, but what by some is thought to be a more powerful mode of swimming, called in some cases “the Indian stroke,” because generally used by the North American Indians; by others it is called “thrusting,” the latter used when the arm is thrust forward, the former when it swings; the action is like an almost continuous stroke, as in a screw propeller, the position is just the same as in the side stroke, the only difference being in the stroke of the arm. Whichever side you swim on, the directions will do for, merely reversing the sides and the actions of the hands and arms.

In the “Indian stroke,” the left hand commences from the thigh, with the palm of the hand up, and conveys; the hand is then drawn out of the water, very steadily, to the full extent of the arm, ahead of you, replacing the hand in the water, palm downwards, where the full power of the stroke is given back to the thigh; then the right hand is wound in a circular stroke from the right side to the left chest, and as the left hand rises out of the water, draw the right hand back to the right side, ready to strike out; these strokes are made simultaneously, the legs working with the arms, thus a continuous stroke is obtained.
This is rather a showy style of swimming, but some people don't care much for it. The swimmer is certainly propelled very rapidly for a while, but it requires such a great amount of exertion, that the swimmer tires ere he has gone any very great distance, or practiced it for long.

In a race for prizes some time since, the effects of this stroke on the powers of a swimmer's endurance were well marked. One competitor went easily ahead of all his antagonists, and all expected him to have won easily, and so he would have had the course been a short one, but, unfortunately for him, it was rather long, and consequently, when he had proceeded over about half the distance, his tremendous exertions told on him, and he became wild and irregular in his strokes, so that before very long those of his companions who had swum steadily along, gradually overtook him, and when about two-thirds of the distance had been done, he was passed by two of them, the result of the race being that, though when half-way over the course he was well in advance, at the finish he was not even placed.

Another kind of fancy swimming is to turn Head-over-Heels. The body is curved or bent at the hips, and the hands being straightened along the sides, are used as if throwing the water over the back, by this you drive the head under, at the same time using the feet as in ordinary swimming, the result being that you make a complete somersault, or turn head-over-heels. Head-over-Heels is done by the swimmer, when lying on his back, drawing his legs up with the knees straight, and then by paddling very sharply with his hands, bringing his feet over his head, and the body being over-balanced, a complete revolution is effected.

Sometimes two swimmers join in making a Double Wheel. This is done by interlacing their feet and knees, and then whilst keeping their bodies apart, they each use their right hands with great power, and their left hands as sustaining paddles, thus making revolutions in a large circle.

The Float is the name given to a very useful method which should be practised more frequently than it is. It is done as follows:—When one swimmer lies on his back with feet stretched out, another takes him by the feet and propels him forward—a most useful exercise to know in cases of cramp or danger.

Another mode, called The Plank, varies only a little from the above, and is done by two swimmers; one places himself flat on his back with feet widely apart, hands close to his body, and the head very low, his companion takes hold just above his ankles, and pulls at them, and at the same time impulses himself, and, if correctly done, one swimmer will quickly pass over the other.

Leap-Frog is another amusing way of swimming, and is practised by one swimmer treading water, whilst his companion swims up to him, then laying both hands on his head, he gives a shore downwards, and whilst his companion sinks he passes on, and then treading water himself offers a "back" in his turn, just as it had been given him before. There are many other feats performed in the water, as the "Wrestler," the "Driver," "Pick-a-back," etc., but the foregoing are those usually practised by good swimmers.

Races of all kinds, and diving for objects thrown into the water, are very common amusements, but they frequently induce swimmers to make too severe efforts, which, joined to a long continence in the water, are often very injurious.

INSTRUCTIONS FOR SAVING DROWNING PERSONS.

1. When you approach a person drowning in the water assure him, with a loud and firm voice, that he is safe.

2. Before jumping in to save him, divest yourself as far and as quickly as you possibly can of all clothes; tear them off if necessary, but if there is not time, loose, at all events, the foot of your drawers, if they are tied, as, if you do not do so, they fill with water and drag you.

3. On swimming to a person in the sea, if he be struggling, do not seize him then, but keep off for a few seconds, till he gets quiet, which will be after he gets a few mouthfuls of water; for it is sheer madness to take hold of a man when he is struggling in the water, and if you do, you run a great risk.

4. Then get close to him, and take fast hold of the hair of his head, turn him as quickly as possible on to his back, give him a sudden pull, and this will cause him to float; then throw yourself on your back also, and swim for the shore, both hands having hold of his hair, you on your back, and he on his also, and of course his back to your breast. In this way you will get sooner and safer to the shore than by any other means, and you can easily swim thus with two or three persons; the writer has often, as an experiment, done it with four, and gone with them forty or fifty yards into the sea. One great advantage of this method is that it enables you to keep your head up, and also to hold up the head of the person you are trying to save. It is of primary importance that you take fast hold of the hair, and throw both the persons and yourself on your backs. After many experiments this is found to be vastly preferable to all other methods. You can in this manner float nearly as long as you please, or until a boat or other help can be obtained.

5. I believe there is no such thing as a death grasp, at least it must be unusual, for I have seen many persons drowned and have never witnessed it. As soon as a drowning man, begins to get feeble, and to lose his recollection, he gradually slackens his hold till he quits it altogether. No apprehension need therefore be felt on that head when attempting to rescue a drowning person.

6. After a person has sunk to the bottom, if the water be smooth, the exact position where the body is may be known by the air-bubbles which will occasionally rise to the surface, allowance being of course made for the motion of the water, if in a tide-way or stream, which will have carried the bubbles out of a perpendicular course in rising to the surface. A body may be often regained from the bottom before too late for recovery, by diving for it in the direction indicated by these bubbles.

7. On rescuing a person by diving to the bottom, the hair of the head should be seized by one hand only, and the other used in conjunction with the feet in raising yourself and the drowning person to the surface.

8. If in the sea, it may sometimes be a great error to try and get to land. If there be a strong "outsetting" tide, and you are swimming by yourself, or having hold of a person who cannot swim, then get on to your back and float till help comes. Many a man exhausts himself by stemming the billows from the shore on a back-going tide, and sinks in the effort, where, if he had floated, a boat or other aid might have been obtained.

9. These instructions apply alike to all circumstances, whether the roughest sea or smooth water.

10. In case you are roughly seized by a drowning man when attempting his rescue, the best thing to do is to dive with him at once, as this is almost sure to make him let you go, as he won't like the sensation of going to the bottom; but, in the event of his sticking to you, as a last resort, a smart rap or two on his head will make him quiet, and enable you to save him in safety.

I was on one occasion seized by a maniac, who had attempted suicide, and I went to save him, when, as he would not let me go, I, as a last resource, punched his head soundly, and then was able to save him, entirely through his being reduced to a quiet state, for if I had not done so he would have drowned us both.
DRAUGHTS.

BY GEORGE FREDERICK Fardon.

THE winning game, or draughts proper, is governed by
the following

LAWs.
[Explanatory remarks in brackets.]
1. The board is to be so placed that a white square is at the
upper right-hand corner. [The double corner at the right hand
of the player.]
2. The choice of colour is to be determined by lot.
3. The black men to have the first move, and after the first
move the men to be changed. [By this means each player
alternately takes the black men and first move.]
4. The player who touches a man, excepting for the purpose
of adjusting it, must move it, if a legal move can be made with
that man.
5. A man moved over the angle of a square must be moved
to that square. [This is to prevent the moving a man backward
and forward from right to left in the undecided manner common
to some players.]
6. A man en prise must be taken.
7. If the man en prise be left untouched by accident, the
adversary has the option of huffing; or of compelling the
capture of the offered piece; or of allowing the offending piece
to remain on its square.
8. The huff is not a move, and after the piece is huffed, the
player makes his move as usual. [Hence the saying, "Huff and
move."]
9. Five minutes is the limit of time for considering a move.
[In match games an umpire is appointed to call the time.]
10. When a piece is en prise, and there is only one way of
taking it, one minute is the maximum time allowed for the
move.
11. The penalty for exceeding the time stated, is the loss of
the game. [The Time Laws apply more particularly to match
games; in friendly contests time is not necessarily insisted on.]
12. A player making a false move, must either replace the
men and make a legal move, or resign the game, at the option
of his adversary.
13. When, in the act of taking, the player removes one of
his own men from the board, he cannot replace it without the
consent of his opponent, who can either play or insist on the
move standing, or of the piece being replaced.
14. When only two kings remain on either side, if neither
player can force a win within twenty moves, the game is drawn.
15. When three or more kings are opposed to two, the player
with the weaker force may claim a draw if his opponent fail to
win within forty moves. [The forty moves are counted for each
side.]
16. Notice must be formally given of the intention to count
the moves.
17. When several pieces are taken by one move, no man must
be lifted from the board till the move is completed; and if
the player fail to take all the men he can, his opponent may
huff him.
18. When a man arrives at the last row of squares on his
opponent's side of the board, it must immediately be crowned;
and such king cannot be moved until a move has been made by
the other player.
19. Pointing over the board or otherwise annoying or ob-
structing the opposite player, shall, after due notice, be con-
sidered a breach of good manners, and, if persisted in, forfeit
the game.
20. All matches, unless otherwise agreed, must consist of an
equal number of games. [This is to give each player the first
move an equal number of times.]
21. All disputes to be decided by an umpire, or by the
majority of the company present. [In match games it is
perhaps best to reduce the facts to writing, and to submit the
question to a competent arbiter.]
22. During the progress of a game neither player is allowed
to leave the room without the consent of the other.
23. A breach of any of the above laws to be considered a loss
of the game. [Hence the phrase, "If you leave a game, you
lose it."]

It unfortunately happens that there are no standard laws for
draughts, or, indeed, for chess; and thus it is that the rules,
as given in the several published treatises, vary somewhat;
but in the above an endeavour has been made to include all the
points of importance in a brief epitome.

THE OPENINGS OF GAMES.

The openings, as in chess, are the most indispensable elements
of the game. We, therefore append a list of those which are
most in vogue among good players:

Old Fourteenth.—11 to 15; replied by 23 to 19; followed
by 8 to 11, 22 to 17, and 4 to 8.
Single Corner.—11 to 15; replied by 22 to 18.
Double Corner.—9 to 14.
Second Double Corner.—11 to 15; replied by 24 to 19.
Cross.—11 to 15; replied to by 23 to 18.
Will-o'-the-Wisp.—11 to 15; 23 to 19; 9 to 13.
Laird and Lady.—11 to 15; 23 to 19; 8 to 11; 22 to 17;
9 to 18.
Maid o' the Mill.—11 to 15; 22 to 17; 15 to 18.
Fife.—11 to 15; 23 to 19; 9 to 14; 22 to 17; 5 to 9.
Ayrshire Lassie.—11 to 15; 24 to 20.

The first two moves of the Laird and Lady become the
Defiance, when, instead of moving 8 to 11, the player chooses
9 to 14, followed by 27 to 23; the Whitter, when the third move
is from 7 to 11; and the Glasgow, when the fourth move is
from 11 to 15.

These openings will be analysed in a future chapter; our
first game, played throughout, with its several variations, being
the well-known "Old Fourteenth."

Having in my preliminary chapter given a general outline of
the game, I presume that the student will be prepared to follow
the rules of play observed by all professors of draughts. But,
whether he play well or ill, there are certain

GENERAL INSTRUCTIONS

which should be always borne in mind:—

Never touch a man that you do not intend to move.
Always play in strict accordance with the laws of the game.
Open your game upon a regular plan, whether with a superior
or inferior player; by so doing you acquire method in both
attack and defence.

Before making your move, look well over the board, and
endeavour to penetrate the motive of your opponent's play.

By discovering the secret of his finesse you are enabled to
counteract it.
THE POPULAR RECREATOR.

When there is only one way of taking a man, take it without loss of time; nothing is so irritating as unnecessary delay.

By no means limit your attack to one sole mode, as you thereby give your opponent an opportunity of judging your strength.

Back up your advanced men, and do not be afraid of leaving your last row empty. As a general rule, however, it is well to keep the command of the double corner.

A few judicious exchanges at the opening of the game greatly simplifies its progress: a crowded board is a frequent cause of embarrassment.

When you are a man ahead, you may exchange with impunity; but beware, in so doing, that you do not fall into a trap. Recollect that, with an open game, the possession of one man more than your adversary is a certain win.

Avoid all scattering of your forces, and as they get fewer, endeavour to keep them well together—unity is strength. Fortify your position by safe exchanges, and work up for a king as quickly as possible.

Play towards the centre of the board, rather than to the sides. If your opponent goes into the side squares, let him, as his freedom of play is much impeded by the limitations of the board; while you, on the contrary, can march onward with comparative safety. As an instance of the imprisonment of men in the side squares, take the "Eife game":

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<tr>
<td>11 to 15</td>
<td>23 to 10</td>
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<td>9 to 14</td>
<td>22 to 17</td>
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<td>5 to 9</td>
<td>17 to 13</td>
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<td>14 to 18</td>
<td>19 to 16</td>
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<tr>
<td>12 to 19</td>
<td>20 to 23</td>
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<tr>
<td>19 to 26</td>
<td>30 to 5</td>
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Many players open in this way, and win; the man on square 5 remaining a prisoner till quite late in the game.

Directly you notice that your opponent weakens his double or single corner, endeavour to attack that position, but you must do it with resolution, or you may fail. As he must advance, you are often able to make the first king—a certain and undeniable benefit to your game.

But, while working up for a king, move your men so as to prevent your opponent from pushing his pieces too far forward.

It is better to exchange than to allow your position to be too fiercely attacked; but wait rather for an opening than attempt a risky move. With a skilful opponent, an ordinary coup will generally fail. In making exchanges, look well that you do not give the move to your adversary.

Directly you perceive that your adversary has become aware of the trap set for him, abandon it, without you can absolutely force the position, and then try some other plan of attack.

When there is no possibility of saving a piece, do not linger over the move, but make it; and endeavour to retrieve your position by another.

When surrounded and strongly attacked, it is often better to sacrifice a man than to attempt to defend it.

Towards the end of the game, with a man less than the other side, make your kings as quickly as possible, and bear down with them boldly. Three kings against four is a much stronger game than two kings against three. As it is advantageous for the stronger side to exchange, endeavour to avoid being forced, by keeping your kings in a close phalanx (\(\text{C},\text{C}\)) with the side of the board for a base of operations.

Play with judgment, choosing a stronger rather than a weaker adversary; do not fatigue yourself with too many games at a sitting; with a tired or preoccupied mind decline play altogether; never make an attacking move without a motive; keep your men well together; avoid remarks upon the game, and especially such as are likely to irritate your opponent; never point over the board or indicate a move or series of moves with your finger; never announce a win in a certain number of moves, unless you are absolutely certain that you can accomplish it; avoid satire; win with modesty, and lose with good temper.

We now come to two or three of the more ordinary and obvious ways of finishing a game. These should be thoroughly mastered by every beginner, as, like the checkmate in chess, they are indispensable.

TWO KINGS TO ONE.

The winning with two kings to one, within the stipulated number of moves, is often a matter of difficulty with beginners; and yet, the secret once known, nothing is easier. In fact, with good players the game is always abandoned when it gets to that point. Suppose the single king has attained the double corner; his opponent must bring up his two kings to the squares commanding the double corner. This he can do from any part of the board, in nine moves at most; and in eight more he can win the game. We assume that a white king stands on square 28, and the two black kings to stand on squares 19 and 23. The process is then as follows:—If it is White to move, he can only go from 28 to 31, when Black moves from 19 to 24, thus:

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<td>19 to 24</td>
<td>28 to 32</td>
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<td>23 to 19</td>
<td>32 to 32</td>
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<td>24 to 28</td>
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<td>28 to 32</td>
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<td>19 to 15</td>
<td>31 to 26</td>
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<tr>
<td>15 to 18</td>
<td>26 to 30, or 31;</td>
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<tr>
<td>18 to 22</td>
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and White has only to give himself up. The error usually made by young players is for the attacking man to go from 19 to 23 instead of 15, which allows the single man to get into square 27, when Black must retire to either 18 or 19, and begin his attack again. But the move from 19 to 15 leaves the single man nothing to do but retreat. All the moves of the single man, when once the two kings arrive in front of the double corner, are forced. A corresponding series of moves on the other side of the board of course produces a corresponding result.

It is quite possible—though it would be evidence of very bad play on the part of the stronger side—for one king to draw the game against two. Suppose the position to be this:

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\[\text{Diagram of the position.}\]
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What is Black, with the move, to do, but give a man and accept a draw? Say Black moves either of his kings, White takes, and cannot be forced out of the double line; while, on the contrary, if Black make a false move he loses. Suppose Black to move from 12 to 16, White takes by moving from 11 to 20.
Now Black move from 3 to 7, and draws; but if he move from 3 to 5 he loses the game, as White advances from 20 to 16, and Black has then the choice of three squares—5, 4, and 12—on each of which he is stopped by white king moving to 11. If Black, in the first place, move from 3 to 8, he is no better off, as he cannot keep the white king from coming out of square 4, and getting into the double line, though, if he is insensate enough to move into square 12 with a view to attack White on 8, he is caught, as before, on 11. This is given with a view to show young players how carefully they should be in making the proper moves towards the finish of a game.

**TWO KINGS TO TWO.**

This is usually a drawn game; for if each party act on the defensive, no other result can be arrived at. But if you can force your opponent out of the double diagonal line of squares, or get him to follow you, a position like this may perhaps be attained:

![Diagram of two kings to two game](image)

When Black plays, and wins by moving from 7 to 10, and winning two for one. But, in endeavouring to get this position, be careful that you do not give what is called the Breeches, by allowing your opponent to place a king between your two kings; and particularly avoid getting into such a fix as this:

![Diagram of a losing position](image)

When Black must sacrifice a king and lose the game.

**THREE KINGS TO TWO.**

This position is rather difficult; for, in order to win, it is necessary to effect an exchange. The player with two kings generally moves one into each double corner, and then the proper plan is to bring the three kings into a line, and give one for one. The mode of forcing an exchange is sometimes puzzling to tyros; but, properly conducted, it is sharp and certain.

Suppose Black kings on squares 5 and 32, and White kings on squares 10, 18, and 19; White plays and wins.

![Diagram of three kings to two game](image)

Now it matters not which king Black moves, as he must accept an exchange at White’s next move. Or if Black plays 32 to 27 instead, as his reply to White, he still loses. See:

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<tr>
<td>32 to 28</td>
<td>10 to 6</td>
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<tr>
<td>31 to 27</td>
<td>19 to 23</td>
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<tr>
<td>27 to 24</td>
<td>6 to 9</td>
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and again White makes the exchange. If, on the other hand, Black, at his second move, returns to square 32, 6 to 9 is the reply; forcing the exchange. As soon as the exchange is effected, White wins in the usual way with two to one.

**THREE KINGS TO FOUR.**

This is a more difficult position, and the man with the weaker force can prolong the game. Presuming that White with four kings has forced Black’s three into the following position:

*Black.*—Kings on squares 30, 31, and 32.

*White.*—Kings on 21, 22, 23, and 24.

![Diagram of three kings to four game](image)

Black, having to play, has but one move, 32 to 28.

![Diagram of a losing position](image)

And White, with two kings to one, wins in the usual manner. If, instead of this move, he play 27 to 23, his opponent takes 18 to 27, and wins.
HAVING in our previous papers given instructions for making articles which, both in their construction and use, apply to in-door occupations, we now proceed to furnish a design for a small summer-house, the work in which will afford additional recreation from being carried on entirely in the open air.

In commencing to build this, I suggest a frame-work foundation, which is far better than ramming the four corner posts down in the ground. In that way the ends of some sink more than others—the bottoms often rot, and various annoyances ensue.

The annexed sketches will show how the frame should be made. Having determined on the size of the summer-house, let the four pieces which are to form the foundation frame be about a foot longer, so that they may be placed to cross each other at the angles, like "Oxford frames." This is done by the operation called by joiners "halving"—namely, cutting away half of the thickness of each piece, as shown in Figs. 1 and 2. When this is done, the one piece may be dropped on to the other, and will be flush with it. A square hole is then to be mortised through both: this is accomplished by means of the mortising
chisel, shown in our first paper. The chisel differs from the usual flat tool, as it is thicker, and has a more solid handle; it is driven by blows from a mallet.

The bottom ends of the four uprights are then to be cut to square tenons (Fig. 8), which drop into these square mortises. Fig. 6 will represent one corner.

The ground should be levelled, and a groove cut with a spade

the exact width of the frame, so that it may sink until it is just level with the surface.

The size of the summer-house will, of course, depend on circumstances. The one proposed in this paper is supposed to be six feet wide in the front, and five feet six inches high, up to the horizontal tie-beam.

Now, in addition to the uprights at the corners, there are to be two others at the front and back, the space between them in the front forming the entrance.

These uprights are to be mortised into the bottom frame, in the same way as the corner posts, and the whole four are to be mortised at the top into the horizontal piece called the tie-beam. All the wood hitherto spoken of is to be two inches square.

The tie-beam is to project three inches on each side, and must therefore be six feet six inches long; its ends must be cut as shown in Fig. 5, and a mortise being cut in the slanting piece called the "principal," it will drop on to it, and must be secured by nails, as shown in Fig. 6. In this sketch, the upright A is called the "kingpost." This should be cut out of a piece of wood four inches wide and two inches thick, and should be about half the length of the tie-beam; it has a tenon at the lower end, which fits into a mortise on the upper side of the tie-beam; and it has a mortise cut on the slanting part at B, into which the tenons at the upper end of the principals must fit. A piece of iron band, called "hoop-iron," should be fastened round to brace up the tie-beam to the kingpost, as shown at C.

A deep recess should be mortised in the top of the kingpost, into which the plug of an ornamental spike (Fig. 7) is to be
FEATHER WORK.

By Eliza Chadley.

A FEW more words by way of postscript to our feather subject.

Have you seen feather fans? I do not mean those composed of ivory and feathers, which are made by the clever people in Spain and South America, for I am humble enough to think that the making of such is beyond my skill and (pardon me) that of my countrywomen.

These to which I allude are made by our Canadian cousins, and latterly they have come into frequent use in the ball and concert rooms on this side of the Atlantic, now that we have the requisites, and we find that they are easy to form — so pure and white, so soft and downy, they are the prettiest daintiest fans that ever adorned a lady’s hand.

They are made of the feathers of the white turkey. This gentleman was until the last few years a comparative stranger to this country; it was only occasionally that one appeared,
from America, the land of his birth, but about Christmas-tide you may see numbers of them hanging on putters' door-posts or window-frames.

In the North of France large flocks of these birds are reared, more particularly on account of their plumage, which is now sold at as high a price as twelve shillings per pound. But bear in mind the common comparison, 'As light as a feather;' and if that a pound of feathers weighs the same as a pound of lead — and the money's worth seems to lean heavily in favour of the former; therefore, in your eagerness to make a feather fan, do not be rash and order a pound of turkey feathers, or, for the matter of that, of any other kind of feathers.

All the feathers which clothe the body of a barn-door fowl — and who would have the patience to count them? — do but weigh three ounces; and the weight of the whole plumage of that great philosopher the owl is only one ounce and a half. So, at least, affirms a trusty chronicler of feather weights.

But we must turn to more practical details.

The fans are round and small. Seven inches either way is the extent of their size, and the short handle measures from four to five inches in length. The foundation for the fan is made in the same way as for the round hand screens which were described a short time ago. I don't know whether you then succeeded in stretching the material tightly over the framework; or whether you had recourse to those who are adepts in that branch. Perfectness of form is very essential, and I know it is difficult to preserve an exact circle, and, at the same time, to keep the centre stretched smoothly. Out of this difficulty you can creep in this way:

These fans are completely covered, the fronts with feathers, and the backs with silk, so that when they are completed, no portion of the foundation is visible. Now it often happens that at Berlin wool shops you may meet with small hand screens of canvas ready stretched, prepared for ornament of either wool or beads; but Time has lengthened his dusty fingers on them, or the sun has tanned their countenances with his hot rays. Anyhow, they are disfigured, and no longer fitted for their original purpose; but for ours they will do admirably, and in addition to being saved trouble, we have the satisfaction of having got a bargain.

Well, then, prepare your feathers, sorting them a little as to size, and then gum them on, beginning of course at the outer edge. Put them on thickly, in order to give a soft nest-like appearance. In the centre fasten on with needle and thread the head and breast of some gay little bird. If you lived in Canada you would choose the robin, as making a pretty centrepiece, he being a smart blue fellow with a red breast; but as our English birds dress themselves in more sombre colours, you had better go to the tropics for one appropriate to fill this prominent position.

Now the back of the fan requires a covering. A round of white silk cut an inch larger than the fan itself, the edge being turned in evenly and neatly, is gummed on, the gum being laid only on the edge.

Silk is a material which at all times refuses to remain "turned down" as the expression goes; so it were better to tack it down before you begin to gum, arranging the thread so that it can be easily withdrawn after the covering is put on.

A gilt handle sets off the fan, and a bow and ends of bright-coloured ribbon hides its mode of fixture.

These said white turkey feathers also make exceedingly pretty muffs. Cut the size of the muff in thin calico, and join it, before you proceed further; then sew on the feathers one over another in such order that when you pass your hand over them they all stroke one way, as they do when on the bird itself.

To be sure, in course of time, white loses its purity, and at the end of the winter the muff will look rather "shady," but do not cast it aside with the belief that it has had its day, and now had better cease to be; but take the covering off the wadding, and wash it without any anxiety as to results, give it a good many shakes while it is drying, as you see birds invariably do with their feathers when they emerge out of the water; arrange the feathers and then lay it by until chill October warn you that another winter is nigh, when you can again put it on its warm lining, and your friends will look upon you as the fortunate possessor of a new muff.

Large mats for lamp-stands look very handsome when they are trimmed with feathers. These are usually made square, a clear space must be left in the centre; no feathers must there obtrude, or, the surface being uneven, continual catastrophes will happen. When one deep border is finished, cut a square of cloth or velvet, and with strong gum fix it over the centre; this adds richness to the whole, and hides the shafts of the latest row of feathers. The peacock eye-feathers are undoubtedly the best adapted for these mats, the curled edges forming a natural fringe.

A very pretty pen-wiper is made in this way from the body of a butterfly—a giant from the tropics is the proper species for imitation—of cotton wadding covered with black velvet, and wind narrow yellow silk braid round it, then add feather wings, which appendages may be made in two ways, either by cutting the shape of the wings in cardboard and then completely covering them with tiny feathers, which on the whole presents the most life-like appearance, or else by arranging separately the wing-feathers of some bird, such as the chaffinch, in due order, pushing the shaft of each feather into the fly, a row on each side of its body.

Covers for photograph books are made in a somewhat similar manner. These books, being so often handled when they lie, as their custom is, on the drawing-room table, soon lose their first bloom of beauty, and the brilliancy of their complexion, especially if it be a delicate one, oft-times fades. They can be made beautiful, if not for ever, yet for long years, in the following way: — Make covers for them, if possible of velvet, and ornament the centre with an outspreading design in peacocks' feathers—the head of a bird, surrounded by a circle of feathers has a very good effect. The cover does not require lining; it should be made large enough to fold over the original cover, and be tacked with needle and strong sewing silk inside the book.

Tufts, cockades, rosettes, and all kinds of ornamentalations for hats, whether for great or small people, you can form with your stock in hand. Take a piece of wire and bend it into the form you admire most; stretch muslin over it, and then lay wadding on; part it according to what you purpose representing. The breast of a bird would want much more than any other ornament. Now cover over that side with another piece of muslin, and now put on your feathers. If they are of a tolerable size, and you wish them to stand erect, push them through the wadding. A background of white with gay colours in front, finished by the head of a bird, is one of the prettiest combinations.

Swan's-down trimming is especially pretty; but swan's-down is becoming very scarce; and as it can only be obtained at one season—during the migration of the birds—it is necessarily expensive. But goose-down is an excellent substitute; not, perhaps, so light and fluffy a substance, yet bearing sufficient resemblance to make a very pretty border for your little sister's cloak or your baby brother's coat.

Spread out a large sheet of newspaper, and put on it a small quantity of down; blow it with a gentle puff of breath such as will neither exhaust you nor scatter the light down.

You want to know the reason for doing this?
Amongst the downs are many atoms and much fine dust, which can well be dispensed with, otherwise the down will look thick, and neither of which you can extirpate in any other way. Having provided yourself with some long strips of thin calico, take a tuft of down, and keeping the upper part as much out of the needle's way as you can, sew it on. The tufts being placed near together, will join at their surface. By this manner of making it, the trimming will wash when soiled. A quicker method is to dip a portion of each tuft in a cement made of rice-flour and water, boiled to the consistence of liquid gum, and then place them on the strip, to which they will adhere.

Feather brushes come under the title of "useful and ornamental," for besides their duty of gently wafting the dust off valuable glass and delicate china, they also look very pretty when hanging beside the fireplace, or if they be large, fill up some unoccupied corner or bare nook.

Ostrich feathers which have been discarded as being no longer fitted for hat or bonnet, can be brought out again, and will look quite handsome in this new position.

Of course, strong wing-feathers will be too sturdy, but pliant feathers, be they long or short, with filaments fine and feathering, make very handsome brushes.

The first step to take is to get a wooden handle turned in a fanciful fashion, and then painted in an artistic manner, say a groundwork of blue, or scarlet, with gay flowers or golden devices laid on it.

Its length and thickness depend entirely upon your feathers, whether they are long or short, few or many. Put the shafts of the feathers (which in this instance need no preparation) close together within an inch of the lower end of the handle, and then bind them firmly on, by winding string evenly round them. If the string is prepared with oculator's wax it will more readily keep its place.

A few inches higher up (I am describing a large brush) put a second row of feathers, and fasten them on, and again fix a third set at an equal distance. The fastenings and bare stems of the first two rows are completely hidden, not so those of the third. Find a scrap of thin soft leather, if it be morocco all the better, and cut it V shape, grip the broad edge, then sew up the sides together. Let your thread be strong, your stitches close and the wrong side.

Sip it on to the handle, and fix it so that it falls over the ragged parts of the last row. To make a neat and complete finish, put a narrow fancy gimp or braid on the edge of the leather, and fasten both down together to the handle by means of ornamental nails.

As to colouring feathers, no simpler process exists than steeping those of the white goose in one of the many liquid dyes. It is, however, far preferable to buy foreign skins and to trust to Nature's hues. As before said, foreign skins can be bought at a very cheap rate, especially damaged skins—that is, not wanting in bright hues, but ragged and torn almost beyond repair in the stuffer's art; and amongst these the parrot family will afford a grand variety of tints, the Australian blue mountain parrot bearing on his breast the reflection of the most gorgeous sunrise upon which he ever gazed.

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THE MAGIC LANTERN.

THE DEMONSTRATING LANTERN—LIGHT—TRANSPARENCY—SHADOWS.

The most convenient arrangement for proving the assertions the lecturer has to make regarding the phenomena of light and the laws of optics is the "Demonstrating Lantern," shown in Fig. 1, wherein the source of light is an electric regulator or oxyhydrogen jet; but a more simple arrangement is shown in Fig. 2, which represents the "schoolmaster lantern" I exhibited in the educational department at the Albert Hall International Exhibition, 1871, which consists of a square columnar shield that can, at a moment, be dropped over a moderator or petroleum argand lamp attached to the schoolmaster's desk for the ordinary purpose of illumination, and be brought into play on a screen arranged like a spring roller "wall map."

In the first arrangement it will be seen that a stage projects from the front of the lantern, the use of which is to carry a set of telescopic stands for the support and adjustment of various screens, diaphragms, lenses, etc., employed by the demonstrator.

This stage is fitted to the lantern by a combined dowel and clamp screw arrangement, that admits of its immediate removal, while two fillets are screwed to the sides exactly three inches apart between their inner faces, to allow of the circular feet of the telescopic stands being readily adjusted to and from, and "centred" with the optical axis of the condenser and power, as will be instantly comprehended by aid of Fig 3.

It will therefore only be necessary in future to give technical diagrams of each arrangement of apparatus employed to demonstrate those properties of light we shall now proceed to deal with.

Rectilinear propagation of light.—One of the earliest recognised properties of light is that when transmitted through the atmosphere, or other medium of homogeneous character, it maintains a perfectly straight course. Unlike "Paddy's gun," a ray of light will not "shoot round a corner." Let us take our lantern, adjust the source of light at the focal point of the condenser so as to obtain a beam of parallel rays, remove the power with the tube that carries it, and arrange the appliance for our experiment, in the following manner, and as shown in Fig. 4. In the brass stage of the lantern we place a metal slide with a round hole about the
diameter of a large knitting-needle, pierced in it; on the wooden stage of the gallery we fit a telescopic stand a second metal plate pierced with a similar hole, and hinged, so as to admit of its being moved from side to side, and at the end of the stage another telescopic stand fitted with a counterpart pierced plate.

We now adjust both telescopic stands so that all three holes stand exactly in one straight line, and on producing a brilliant light, by turning on the oxygen, we find a bright spot of light projected on the screen. If we now move the intermediate plate on its hinge, on one side or the other, or up or down, by means of the telescopic fitting, in either case the spot of light on the screen is extinguished.

If we now remove the two telescopic stands, and view in a dark room the ray of light proceeding from the hole in the lantern stage we shall find that its path is traced by a perfectly straight line of bright light of the same width as the diameter of the hole in the metal plate, stretching from the lantern to the screen.

Bright sunlight passing through a small hole in the window shutter of a darkened room will prove this fact, as the light marks its rectilinear course through the dust floating in dancing specks above the apartment.

Transparency and opacity.—If, while matters are in statu quo, as for our last experiment, we place on the gallery stage a diaphragm stand, such as is represented in Figs. 5, 6, we may
show such a body as plate glass will not intercept the passage of the line of light, ground glass will dim the brightness of the spot of light; while glass deeply coloured will stop the light off from the screen altogether.

If we remove the metal plate from the stage, so as to allow the full beam of light to fall upon the back plate of the diaphragm, and then turn the wheel so that a bi-convex lens of obsidian is brought opposite its central aperture, we shall find that a ring of light is projected on the screen, while the space that it surrounds is black.

The plate glass is a type of what we term "transparency," being a transparent or diaphanous body; the dark glass is a type of "opacity"—being an opaque body. Between the extremes of transparency and opacity there are numerous gradations—the ground glass may be taken as a type of "translucency" or those semi-transparent bodies, which break up the rays while transmitting a soft, pale light, and only admit of the form and colour of objects placed behind being imperfectly distinguished; the obsidian bi-convex lens being opaque in the centre, graduatings into translucency at the edges on account of its wedge-like nature, as shown by its sectional representation in Fig. 7, is a type of that infinite range of gradation between opacity and transparency, due to thickness, depth of colouration, the molecular arrangement of bodies, etc.

No substance is perfectly transparent nor perfectly opaque. Thus, it has been calculated that if our transparent atmosphere had a depth or thickness of 700 miles it would be impervious to the sun's intense light; on the other hand, gold, one of the densest of the metals, may be hammered out into laminae so thin that it transmits light of a green tint. Porous bodies are imperfectly transparent, but if their pores are filled up with some transparent substance their translucency is usually increased, as in the case of paper when saturated with turpentine, etc. The molecular arrangement of a substance may determine its transparent or opaque condition. Thus, the elementary body carbon, in its crystallised form of the diamond, is transparent in the highest degree, while in its amorphous condition, as charcoal, it is as black as jet, and opaque. Coal, however, is partially transparent for red light, which accounts for the peculiar orange aspect of a London fog, when the beams of the sun are striving to penetrate its murky cloud-banks. Depth of tint, whether produced by increased thickness, in a body apparently colourless when seen in thin plates, or by the immediate introduction of a large quantity of colouring matter, diminishes transparencies or causes absolute opacity. Thus, plate-glass, when it is viewed through a considerable thickness, is found to diminish in transparency; and crown glass, which, even in thin plates has a greenish tint, stops back a large amount of light, even in masses of moderate thickness; and it has been calculated that sea-water, which even at a depth of a few feet appears of a deep green tint, would at a depth of 700 feet, lose all its transparency. Ice, when it is seen in large masses, appears blue, as it quenches more or less of the red rays. Glass may be so deeply stained red, yellow, green, blue, or violet, that even a plate 1 in.
R O U N D  G A M E S.

COINCIDENCES—MAGIC MUSIC—POKER AND TONGS, OR HOT BOILED BEANS AND BACON—THE MAGIC WAND—THE LOTTERY—THE COOK WHO DOESN'T LIKE PEAS.

THE Round-Game Club met for the third time.

"We have begun these last two evenings with writing games," said Emily, "let us commence with something else to-night."

Writing games are not in favour with this young lady, for she has not yet reached that age when people begin to think they have poetic and every other kind of intellectual ability.

"To please you we will have Coincidences," replied the princess.

There was a general movement on the part of the company, and they formed themselves into a half-circle. David resumed the post of leader: he seemed to do so by a sort of natural right, for it was under his roof, as I said before, we were always assembling; besides, he had the art of commanding without making himself disagreeable. "Let every one whisper to his right-hand neighbour," said he, "the name of some person."

"Famous or known only to ourselves?"

"Either you please. And when that is done, whisper to your left-hand neighbour a proverb or a familiar quotation."

Every one came in this way to be possessed of a name and a proverb, given him by different persons.

"We will begin with you now, Tom," said David; "let us hear what your strange coincidence is."

Tom declared that his was "Mr. Gladstone," and "Never say die."

Arabella, who sat next to Tom, gave hers as "The great Napoleon," and "Enough is as good as a feast." John Ferguson had "Benjamin Franklin," and "Life is a jest, and all things show it;" Kate had "Spenser," and "Every man is a master and a servant;" the Reporter had "Carlyle," and "Soft and fair goes far;" Mary said hers was "Shakespeare," and "A rolling stone gathers no moss." Now it came to the Laughing Hyanna's turn, and he informed us that his coincidence was "Notes-and-Queries," and "The good of ancient times let others state, I think it's lucky I was born so late."

It was easily seen that Alice, who sat on the Laughing Hyanna's right, had assisted him to find a proverb suitable for the name entrusted to his keeping. This was held to be quite contrary to the spirit of the game, and it was then and there laid down as a rule that no private arrangements of the sort were to be allowed. After finishing this round of Coincidences, we had another, and then a third—but the third came to an abrupt termination, for some one asked somebody else if he had ever played at Magic Music, and after that Emily and Tom never gave us peace till we commenced that lively game.

Magic Music began by our sending John Ferguson out of the room. When he was gone we set our wits to work to fix on something he was to be required to do when he came back. "What is it to be," said David; "shall we make him sing a song, or open the window, or remove a chair?"

"Or give a recitation, or poke the fire, or pick up a pin?" added Notes-and-Queries.

"I say let him pick up a pin," exclaimed Emily, and suiting the action to the word, she produced a pin and laid it on the carpet, in the centre of the floor.

Notes-and-Queries, who is our chief musician, though not our only one, took his seat at the piano, and John Ferguson was called in.

"You have a task to perform," he was told, "and when you appear to be drawing near the performance of it the music will grow louder and louder; when you get away from it the sound will grow faint."

John Ferguson advanced towards the centre of the room, Notes-and-Queries executed a crescendo passage; he passed the centre and went looking about him, and then the music sank from forte to piano, and last of all to pianissimo. He returned to the centre, and, after a few movements backwards and forwards, made up his mind that some way or other his task was to be discovered in the centre, and nowhere else. He thought he would try making a motion with his hand towards the ceiling; the music became slightly softer; he tried speaking; the effect was the same; he at last made a bow, and the result was so encouraging, that he got down on his knees so as to touch the ground. "You can hardly make much more noise than that on the piano," he said to Notes-and-Queries, and just then his eye caught sight of the pin. "Why, here is a pin!" he picked it up, and the music ceased, and every one acknowledged that he had done what was required of him. "Here is this pin for you, Alice," said he.

"Lay it down," she answered, "it isn't lucky to take a pointed instrument out of the hands of any one."

David now went out of the room, and we decided that his task was to be the whistling of "Gerry Owen," one of his favourite tunes. He failed to find it out, so he had to pay a forfeit.

"You might be the seeker now," said the Laughing Hyanna to Tom, "and we'll have a variety of this game."

The variety was called Poker and Tongs, or Hot Boiled Beans and Bacon. A small article was hitler—we chose a fern-leaf—and hid it in a book on a side table. The Laughing Hyanna then called Tom, "Hot boiled beans and bacon; make haste and come in to supper"—a form of summons which Notes-and-Queries was of opinion had been in use for centuries. Tom re-entered the room, and the Laughing Hyanna made the guiding music by holding the poker between the legs of the
Kate had this advice—"Never marry but for a thousand a year; love is out of date," and you may imagine the sentiment was held to be neither good nor well-advised.

Other pieces of advice were—"If you attend so much as you do to the affairs of other people your own will come to grief;"

"Men with plenty of money and no brains were made for men with plenty of brains and no money;" "You think yourself a person of consequence, but are much mistaken;" "You are always silent when you should speak, and speak when you should be silent;" and—

"You beat your pate, and fancy wit will come:
Knock as you will, there's nobody at home."

"Much of this advice will be rejected with scorn, I am afraid," said John.

"What else could you expect," said the Laughing Hyenna, "when so much of it is stuff and nonsense." He felt, to all appearances, a little angry with fate about the good counsel he himself had received.

"Now let us have The Cook who doesn't like Peas," cried Emily; "who knows that game?"

"I do," said Maggie.

"And I," "And I," "And I," cried Kate, and John Ferguson and David.

The rest shook their heads; they did not know it.

"Well, some of you know it and some don't: that makes all the more fun." Our chattering Emily ran on, "You, David, must be leader; I can't be it, you know."

David turned to Notes-and-Queries: "I have a cook who doesn't like peas. What should I give her to eat?"

"Parsley."

"That won't suit her: you must pay a forfeit."

David asked the same question at Alice.

"Apple-pies," she answered.

"That won't suit her: you must pay a forfeit."

"Will chops do?" said Arabella.

"Or potatoes?" suggested the Laughing Hyenna.

"A forfeit from both of you," was David's reply.

"Gingerbread?" said the Reporter.

"Yes she likes that well enough," and David this time had to pay a forfeit himself.

Notes-and-Queries thought he would try again, and suggested "Pickles: he had to pay a second forfeit."

Tom thought "Mutton" might do: he escaped a forfeit, and David had to pay one.

After this had gone on for some time the players straggled, and said they would play no longer unless they knew the system on which they had to pay forfeits.

"That would end the game," said our leader, "but we have had enough of it, so I'll tell you. The Cook—my cook—does not like P's, letter P's, you understand. No article the name of which includes that letter must be proposed for her consumption."

"I feel quite wild at being taken in so!" cried Notes-and-Queries, who had suffered severely in the way of forfeits. The rest all laughed, and appeared rather pleased than otherwise at having been so victimized.

"We had better settle the forfeits for the evening," said David, "if we must break up."

"There are the forfeits of our last meeting to settle as well," said John.

"Oh, I had forgotten that: the sooner, then, we begin the better."

This winding-up of the business of the evening took another hour at least; but how we enjoyed it! Then there was a general leave-taking; and our third meeting came to a pleasant end.
LEGERDEMAIN.

ONJURING tables may be divided into two classes—those that require a person concealed beneath or within them, and those that do not. Both kinds may have trap-doors and other contrivances to assist in performing tricks; and, of course, the presence of a confederate, close at hand, but unseen by the audience, must often be of immense service to the performer. For instance, a conjuring table with a small trap-door, that opens by touching with the foot a spring in the leg of the table, may be used for the purpose of making any small article, such as a lemon, disappear; but no mechanical contrivance that we know of can make any borrowed article, such as a watch, come up through the table when wanted.

As perhaps many of our readers do not clearly understand the nature of trap-doors, or how a lemon could be made to disappear, we will explain these contrivances to be small openings in the table, square, round, or any other shape, that, when closed, fit so tightly, that they are imperceptible. The spectators, therefore, are ignorant—or supposed to be so—of their existence. In the case of the lemon, suppose the conjurer to be standing behind a small table, covered with green baize (but no cloth over it down to the ground); suppose the table to have a fringe round the edge five or six inches long. The table may easily be made to have a trap-door opening downwards on pressure, but shutting itself with a spring. The fringe with which the table is surrounded is amply sufficient to conceal enough space in which to hide articles considerably larger than a lemon. If, then, the conjurer takes the lemon in both hands and rolls it on the table, spreading his hands over it, by a sudden pressure with one of his thumbs when he has rolled it over the trap-door, the lemon will easily be made to slip through, and, of course, the door, by means of the spring will shut itself.

The conjurer now lifts his hands, with the lemon supposed to be between them, from the table, and as we have before said, allowing sufficient time to elapse before he shows them empty, which time he employs by pretending to squeeze the lemon tighter and tighter, and to a certain extent screwing his face in order to appear as if he were really using force.

On opening his hands, of course, the lemon has disappeared; and as by the time he shows them empty he has walked away from the table, and diverted the eyes of the audience by the movements of his hands, the probability is that the majority have even forgotten the fact of the lemon being rolled on the table at all.

But then, after all, what has been done? Not much: we have got rid of a lemon, certainly, in a mysterious way, but if we wanted it again we should be obliged to take the table out of the room. Besides, these conjuring tables are expensive to buy, and very difficult to make, unless the amateur possesses a knowledge not only of joinery, which he might acquire very soon by a careful study of our articles on the subject, but of working in metal and wire. In fact, for a man to be a good conjuring-trick maker, he has to combine a variety of trades in one: he must be a good cabinet-maker, blacksmith, whitesmith, bell-hanger, and watchmaker, upholsterer, be able to do needlework, and a variety of other things. It is, in fact, sometimes necessary to work with glass, as we will prove when we come to explain how we made our inexhaustible bottle, from which we were able to produce several gallons of fluid without changing the bottle, much to the disgust and indignation of our indulgent father, who did not seem to see any fun or amusement in the breaking of some three or four dozen empty black bottles in our attempt.

However, we succeeded, and what is more, we have the bottle at the present time, and will before long describe its mechanism. Another fact about these tables is that they are liable to get out of order. Now, if there is one thing in the world more likely to unnerve a conjurer, it is the feeling that he cannot absolutely depend upon his machinery.

We recollect what a relief it used to be, when we were showing our tricks many years ago, to finish the one of bringing the "bowl of gold fish out of the cloth," lest one of the covers should slip. So, too, in regard to trap-doors. How very horrible it would be to have one stick open and refuse to shut! We once knew a case in which this happened, when the conjurer, with great presence of mind, threw his handkerchief over it and carried the table bodily away. We would take advantage of this recollection to warn our young friends against attempting a premature exhibition. We once made an awful failure; and had we the pen of a Dickens we could give every reader between the ages of fifteen and nineteen nightmares for weeks by describing the agony we once suffered when we found ourselves called upon unexpectedly to exhibit before a grown-up evening party.

We had been cruelly deceived, and thought we were going to amuse a few children, when, alas! we found ourselves the youngest there, with the exception of an assistant, who had come with us, and whose duty was to work under the table. Though not perhaps naturally shy, we had arrived at that most sensitive age, when we wore a jacket on week-days and a coat on Sundays, and very proud indeed we were of the latter, for it was our first.

As may be imagined, everything went wrong. Tall gentlemen, in white ties and whiskers (we had neither), persisted in standing where everything could be seen—including the small boy under the table, too nervous to do anything, and who
eventually put the crowning touch to all by tumbling out of the portfolio. For our youthful and "vaulting ambition which overlaps itself" had led us into attempting this difficult trick, which really requires a stage.

There was a picture a short time ago in Punch, of a scene where some crafty fellow, with a deep knowledge of the world, had induced his hated rival to sing a comic song in the very presence of the lady of their choice. No one laughs, and probably the ruse was successful. Could the crafty one have induced his rival to make the exhibition of himself that we did, there would be no probability about it—it would be a certainty.

These conjuring tables, which require springs and wires to make the trap-doors work well, have also a small shelf or ledge at the back, which is very useful in changing things; but we will leave this class of table for the present, and describe a larger, better, and simpler kind, by means of which really good tricks can be performed in a large room. We will prefacese description by saying it is an essential that the table be covered with a cloth, and that some one be underneath it; and with an account of a first-rate trick that we witnessed at a theatre abroad, one that can be easily performed.

The trick may be described as bringing a borrowed watch out of a loaf of bread, the loaf being suspended from the ceiling by a string, previous to the watch being borrowed.

The conjurer, having first called attention to the loaf, advances with a small box in his hand, which he opens by means of a drawer, and asks any one of the company to lend him a watch. While the watch is being examined, and passed from hand to hand, the conjurer places the small box with the drawer in it, open on the table, and on one of the audience advancing and giving him the watch, places it in the drawer. This he instantly closes, and hands the box to some one to hold, telling him not to open it.

This trick is performed with the sleeves of the coat so turned up that it is quite impossible for the performer either to change the watch, or to slip it up his sleeve, as is so often done. In fact, there is no doubt but that the watch is really placed in the box, which is immediately given into the hands of one of the audience to hold; and, in fact, he can feel the watch slipping to and fro in the drawer.

It is, of course, needless to say that when we speak of one of the audience we imply that it is not a confederate.

The conjurer now places on the table a large plate and a carving-knife; he shows his hands quite empty, and pulls up his coat to prevent the possibility of anything being up his sleeve. He either lowers, by means of a string, or un-hooks the loaf, and putting it sideways on the plate, cuts off a thick slice from the top, places it upright, and hands it to any one, with the request that they will dig in the crumb of the loaf with their fingers until they find something.

On the request being complied with, the audience are astonished at seeing the person, one of themselves, bring out the very same watch that was borrowed; and on opening the box, in place of the watch, there appears a box of sugar-plums. This trick, which is quite independent of any sleight-of-hand whatever, will give some idea of the wonderful things that can be done with a properly constructed conjuring table, and a reliable confederate concealed beneath.

Before explaining how the watch gets into the loaf, we will describe the construction of the table itself, and give hints and suggestions as to the best means to manufacture one at home.

It has been said that we sometimes learn more from our mistakes than we do from our successes. On this principle we will describe our first conjuring table, its faults, and why it did not succeed, in the hope that others may learn from our failures.

We obtained leave, when young, to experiment for the purpose on an ordinary toilet table, and immediately commenced operating with a pocket knife. The wood was soft, but we were impatient, and we well recollect breaking both blades in using them to scoop out the wood, in attempting to make a hole through the top.

However, eventually we succeeded in cutting a square hole, about four inches long by three inches wide, and in fitting in a small door with a pair of hinges. The next thing to do was, of course, to cover the table with green baize, as, owing to its roughness, this is the best material to hide the cracks round the trap-doors. We got a quantity of glue, which we poured over the top of the table, and placed the green baize on it, pressed it down, and waited until it was dry.

With a sharp knife we then cut round the trap-door, having taken the precaution to mark the place by sticking in four pins, one in each corner. But here we experienced a double disappointment—the baize shrank, and left a white rim of wood showing all round; and the glue, having trickled down the cracks, had made the trap-door hard and fast, and it consequently resisted all our efforts to open it. We partially overcame the difficulty by means of a little green paint, and the second by a tremendous blow with a hammer, which had the effect of knocking the door right through, hinges and all. But it was an undisputed failure, and was too small for anyone to be concealed underneath with comfort, for every time the confederate stirred, the table moved, which, of course, would at once have been detected had we attempted to perform.

Fig. 1 represents our first attempt, which was very successful. We had learnt, first, to shrink the baize before putting it on; secondly, to prevent the glue getting into the cracks round the trap-doors; and, thirdly, to make it large and steady. We therefore made the table four feet three inches long by two feet wide, and cut three trap-doors in it. Fig. 2 represents the top of the table. The trap-door a we made seven inches long by four and a half inches wide. The smaller trap-door (b), near the centre of the table, we made four and a half inches long by three inches wide; and the round trap-door (c) two and a half inches in diameter. For the construction of the table itself we will refer our readers to our articles on joinery, but a few suggestions on constructing the trap-doors may possibly be useful.

They should be fitted to open easily, i.e., without the slightest noise, and yet be made to fit close at the top. In order to ensure this, the holes in the table must start outwards, i.e., the square on the top surface of the table must be slightly smaller than the square at the under surface. It is as well, too, in fitting the trap-doors, to make them project a little above the table, and when the hinges and fastenings are quite finished, to plane them smooth afterwards, as by this means they are more likely to fit close.
The round piece of wood that fits into the trap-door c must be fastened securely to a large board (Fig. 3), which must be attached to the under surface of the table by means of two hinges, as it is impossible to fit a hinge properly on the round piece of wood itself.

Putting on the green baize requires great care. The baize should first be shrunk by dipping it into some lukewarm water. It must then be dried (which takes a long time) and ironed out smooth. The trap-doors must be opened, and the insides well greased with some hard fat, which will prevent the glue from causing them to stick. The top of the table should then be placed before a large fire, to make the wood hot, and the green baize placed for a few minutes in an oven. The table may then be lifted upright, and a quantity of hot glue poured on it, and spread over it with a large brush; the green baize quickly placed on, but not stretched, and smoothed all over with a hot flat-iron, which process should be continued for some time.

Great care should be taken, after the glue is quite dry, in cutting out the trap-doors. A very fine needle run in underneath will mark the place where to cut, and a very sharp knife must be used. It is very important, too, that the cut should be made inside rather than outside the edge of the trap-door, as, should the cut be made however slightly outside the edge, the piece of baize on the door being larger than the opening, it will catch every time it is opened. A fine lancet is by far the best instrument to use for cutting out the trap-doors, as, being very thin, it fits into the crack, which is, of course, the best guide.

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**WINDOW Gardening.**

By J. C. Leake.

**FERN CASES—TO MAKE A ROOF.**

HAVING, as described in our last article, constructed the body of the fern case, it now only remains to make the top or roof. At first sight this may appear to be a somewhat difficult job for an amateur mechanic to undertake, but if our directions be carefully followed, there will be little real difficulty—in fact, none which may not be readily overcome by means of a little patient application.

The first thing will be to construct a light frame of wood, of exactly the same shape and size as the top of the fern case. The wood for this frame should not be more than half an inch in thickness, and about an inch and a quarter wide. The angles must be halved together, exactly as described for the top of the case, and the joints must be strongly screwed, so as to render the frame as rigid as possible.

The next operation will be to prepare the bars which will have to support the glass. These will be somewhat different in shape to those used for the sides of the case, as for the grooves will be substituted what are termed "rabbets." The shape is shown in section at Fig. 1. Of these bars eight will be required (as shown at A in Fig. 2, which shows the plan of the top of the case). Beside these, one longer bar, which is to be placed longitudinally (as shown at B in the same figure), will be required, and the length of the whole of these will be determined both by the dimensions of the case and the height or pitch of the roof.

The better plan will be to lay the frame upon a table or bench, and mark the places wherein the bars are to be inserted (as shown in the figure). The length can then be measured, and a proper allowance made for the extra length required on account of the inclination or "pitch" of the roof.

Unless the constructor is possessed of a good bench and proper tools, as well as of some considerable skill in their use, it will be better and cheaper for him to get a joiner to prepare these bars, which he can do at a very small cost. It is as well to have them made as light as possible—certainly not larger than the upright bars in the bottom of the case—or the frame will look clumsy and heavy.

The only remaining material now required will be the two pieces of wood marked c in the figure, into which the bars will have to be mortised. These should be circular in section (as shown in Fig. 3), and at least an inch and a half in diameter. As there will be a good number of mortises in these, it will be well to have them of a good hard wood, such as beech or ash, or they will be liable to split while in course of working. With these preparations, we may at once set about the fitting together of the case.

The best plan of effecting this is to first of all cut two circular pins or tenons upon the longitudinal bar (as Fig. 2), so as to separate the upright ends (c) to the required distance. The ends (c) must then be bored with a centre-bit, so as to receive these tenons (as shown at A in Fig. 4).

When both these ends are fitted—nor but wedge, as they will have to be taken on and off in the course of working—the frame (d in Fig. 2) should be slightly fixed upon the bench, and the longitudinal bar, with the ends attached, fixed in its correct position, both as to height and with respect to the sides and ends of the case.

It will now be a very simple matter to indicate upon the end pieces the exact position of the mortises which are to receive the bars, by placing each bar over the lines already drawn upon the bench (as in Fig. 2). As soon as this is done, the mortises should be bored in the ends (as shown at A, Fig. 3), taking care to bore them carefully, so as not to make them meet. They may now be replaced upon the bar, while the angle bars are prepared.

As we before mentioned, eight of these bars will be necessary; and it will be better if the whole of them be prepared, and the pins or tenons cut, before any of them are fitted to the ends. As will be observed from n, Fig. 5, the shape of these tenons is slightly different to the others, on account of their inclination. The angle required can easily be ascertained by placing a bar in the required position, and marking it by the end (c, Fig. 2). When one bar is thus cut and fitted, all the rest may be prepared from it, using it as a mould.

This will complete the arrangements for the upper part, and now each bar should be carefully fitted into its place, and the bottom end cut, as shown in Fig. 5, in which A represents the frame, and n the bar. This kind of joint is technically known as a "bird's-mouth," and if the bar is properly fitted, the joint here will be very strong. As each bar is fitted it should be temporarily screwed into its place, but only so as to be readily removable.

The whole eight bars having been thus fitted, the screws should be taken out and the mortises and tenons of one bar at
a time carefully coated with good hot glue. The bottom of each bar should then be firmly screwed to the bottom frame, as shown in Fig. 5, repeating the operation until the whole frame is fixed together. This done, the frame should be left until the whole of the glue is thoroughly dry, when it will be found that the case is quite rigid and fit to receive the glass. Before having the rustic work, the better plan will be to screw small fillets of wood into the angles, as shown at A in Fig. 1, so as to fill up the rabbets and bring the bars to the same thickness at the top as at the bottom. This will afford better fixing for the decorative work; but of course care must be taken not to press too heavily upon the glass, or it will be broken.

Fig. 2.

Fig. 1.

Fig. 4.

Fig. 5.

Fig. 3.

glass fitted, the whole of the glue which may be left in the angles should be carefully removed by means of a sharp chisel, or when the glass is placed in the rabbets it will probably break. The best way of getting the glass fitted is to take the frame or roof to the glass-cutter, who will cut each pane to the required shape and size.

The method of framing the glass in the frame will depend very much upon the style of decoration required. If the case is to be a plain one, the best and easiest way will be to employ common glazier’s putty in the same manner as for glazing ordinary windows, but if it is intended to decorate the case with

In order to secure this top or roof to the lower part of the case, four pins of brass wire, about one-eighth of an inch in thickness and an inch long, should be driven into the top frame of the case, and, corresponding holes being bored in the frame of the roof, the latter may be set in its place without any danger of its being displaced.

It now remains to fit the zinc tray which is to contain the earth and ferns, and our case is complete. We have found it most convenient in our own practice to make this tray with a couple of wire handles, and of such a size as to allow of its being readily lifted completely out of the case. This permits
of a very easy and complete access to every part of the case for cleaning, as well as for the purpose of planting and trimming up the ferns, and is much to be preferred to the ordinary plan of a sliding side or door. It may be as well to observe here that both the inside and outside of the case should be well painted or varnished before use, in order to preserve the wood and glue from the action of the damp air, which would speedily destroy both the glue and even the wood itself.

It will be observed by the intelligent constructor that the case which we have selected is one of a typical form, and that the details of the work will be equally applicable to almost any variety of fern-case which may be selected for construction. For instance, an octagonal case may be made by the same method as that given above, while of course a square one may be also constructed upon the same principles, but with greater ease, on account of its simpler form.

One great advantage of wooden cases is that they may be readily and elegantly decorated with rustic work or cork bark, an example of which we shall probably present in our next paper.

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THE AQUARIUM.

By W. A. Lloyd.

MY NEXT ATTEMPTS—THE TWO GLOBES—VEGETATION IN WATER.

I BOUGHT another lot of minnows, and they did the same as the first, but I did not part with these, but in a fit of mad extravagance, I purchased another globe. I got the money, and warmth, and, by accident, such sunlight as came into the window fell across globe two. After a while the fishes ceased to swallow air at the water's surface, and swam about freely in its midst. Here, then, I had arrived at something without knowing why. First, I had conformed to the required conditions of so much water, so much vegetation, and so much of animal life, and I had had no success. Secondly, I reduced the quantity of water, without diminishing the number of fish, and yet the fishes at once became more healthy, which seemed paradoxical. Thirdly, I dispensed with the vegetation (as I thought), and the vessel and water in which it was seemingly not present, became, after a short period, fully as capable of maintaining animal life without change of water, as the vessel in which there was quite a forest.

GLOBE B.

I knew could give me any explanation of what seemed so contradictory. About this time I had a small compound microscope given me by the late Doctor C. D. Badham, author of a series of papers in Fraser's Magazine, entitled "Prose Haliutics." When these essays were afterwards collected into a volume, the Doctor (who was by the way not a D.D. but an M.D.) recommended me to the publisher to compile an index to the volume. I did so; and the money the bookseller paid me was
the first I ever earned by my pen in a literary manner, and very proud I was of it, and Badham was so pleased that he gave me the microscope. It was a small affair, made by Chevalier, of Paris, drawing out of a wooden box, and the object-glasses were three little button-like affairs, screwing on to the lower part of the tube, separately or together, and so changing the powers. Immensely pleased as I was at the possession of such a treasure, I yet very soon got tired of using it as a toy, and I wanted to do some work with it, for I could not satisfy myself by merely amplifying the dimensions of minute objects with it, or by only looking at the prettiness of things, only because they were pretty, I wanted to see the elegance flow naturally from the utility of the objects I saw with the aid of my newly-acquired instrument.

For all that, my wishes were not then put in these words, or in any words at all; I merely had a vague feeling of desiring to do something serviceable with the instrument.

I had not long to wait, for one sunny Sunday morning, as I sat by the window watching my aquaria, and wondering why one of them flourished as well without vegetation as the other one did with it, I looked up and saw that in the water-glass in the cage of a goldfish in the room on which the sun was shining a little irregular stream of minute bubbles rose from one corner of the glass, which, because of its narrowness, had escaped cleaning. I took it down, and placed it in the sun on the window-sill for more easy examination, and the bubbles again rose in a column, and broke on the surface of the water, after gathering there a little. Searching more minutely for the cause, I perceived a small ragged spot of green downiness attached to the glass where the bubbles rose from. With one of the detached lenses of the eye-piece of my microscope held in my fingers, I magnified this where it was, without disturbance, and discovered some filaments, attached to the glass by their lower ends, the upper ends being free. So I resolved to have some of them out and examine them under the microscope, and, shaping a little stick of white wood to a point, with it I scraped away and removed a little of the green stuff, and put it, with a drop of the water, between two slips of glass, a thick one underneath and a thin one (a mere film) to cover it, on the stage of the microscope. When I looked down upon it, through the instrument, I saw that the green matter had resolved itself into objects of definite form, of the nature of which I had no idea. But, as the morning wore on, I perceived bubbles also rising from similar green places in my globe number two. Then I saw more attached to and coming from the surface of the Falsamia in globe one, and examining that, I found that the bubbles came, not from the Falsamia itself, but from green stuff growing upon it parasitically, which I magnified, and, taking sketches of it as seen under the microscope, I the next evening, after work, rushed to the library of the London Institution, Finsbury Circus, and there, consulting Dr. A. H. Hassall’s book on fresh-water algae (to which I had been recommended), I saw at once that that which grew in my vases and bird-cage glass was no other than a low form of algae, or vegetation, spontaneously appearing, emitting bubbles of oxygen, and evidently serving all the purpose of the higher vegetation which I had with such trouble-obtained and planted.

Here, then, were some important points, or facts, or principles, learnt. First, in spite of a large mass of ready-grown vegetation present in a vessel of water, the fishes did not thrive; secondly, and in an apparently paradoxical manner, the fishes thrived better in a less quantity of water, for a time at least; and, thirdly, they seemed to do as well or better in a vessel or aquarium where there was no vegetation apparent to the unassisted vision, as where there was an abundance of large grown-up plants. The reason of the first was because the vegetation did no good, as it was not in a growing condition; of the third, because the vegetation, though minute in amount and in kind, was growing and doing good; and of the second, because the plant-life, doing no service, was not aided by being exposed to the atmosphere for its absorption by large surfaces of the water exposed to it. The water, when piled up, as at page 180, had a surface exposure of only a few square inches, but half the water had an exposure of many square inches; and the health of the fishes was in the same proportion. Mr. Gosse adverts to this law, and suggests that tanks be made broad and very shallow, so that vegetation may be dispensed with. But under no circumstances can there be any omission of vegetation, consistently with the preservation of animal life. Indeed, it is a law to which there is no exception,
that whenever water and light co-exist at ordinary temperatures plant vegetation will make its appearance. We are so used to see this, and so generally unobservant of natural things, that we take no heed of it. But when one reads of the hyssop which grew on the wall," and are told that in certain towns some streets are so deserted that "grass grew between the stones," or that in the sluggard's garden of Dr. Watts's hymns certain plants flourished too luxuriantly, we seldom think that no one planted these things, and that they came merely in obedience to a law of Nature which is ever causing vegetation to flourish as a purifying agent. At about this point in my experiences—in 1854—when I was puzzling myself exceedingly about the best manner of growing vegetation in aquaria, I read the following advertisement:—

"For sale, a quantity of building stone, warranted not to vegetate. Apply to, etc. etc."

Now, this was a practical acknowledgment by a tradesman of this law. The kind and the amount of the vegetation will vary according to the amount of moisture, and of light and heat, and of the nature of the surfaces exposed to be vegetated. Thus the plant life which comes on a stone or other substance which is only occasionally moistened, will be very different to that which appears on a stone which is always below the surface of water, and the plants will be again varied, according to whether the stone, etc., is rough or smooth, or whether the amount of light is large or small, or whether the temperature is low or high, or whether the water is fresh-water or sea-water, but it may be accepted as a fact, to which there are but few exceptions—or perhaps none—that all substances whatever, having surfaces which are not rapidly decomposed, removed or changed, become covered with some forms of plants, when submitted to the conditions named, in a period of time which may be long or short, as circumstances vary.

The advertiser having become possessed of some stone which his experience told him, by some peculiarity of grain or of texture, would vegetate slower than some others he knew of, he announced it as being desirable not liable to become soon covered with plants which would mar its appear unsightly. The idea made a lasting impression on the writer, as exhibiting in a striking manner the efforts unceasingly made by Nature to provide plant life to counterbalance animal life, inasmuch that animals cannot live without vegetables, as animals by their breathing evolve a poisonous gas called carbonic acid gas, composed of oxygen and carbon, and this gas, as soon as it appears, is, by the necessarily pre-existing vegetation, decomposed, and rendered harmless, the carbon being united to the plants, of which substance they are mainly built up, and the oxygen being set free for the use of the animals. Vegetation being so absolutely essential, therefore, the spores or seeds of it exist everywhere in the air, seen and unseen, and, directly there is an accumulation of water, and the existence of solar light to make vegetation grow, and warm enough to stimulate it, some plants must come, they being at first so minute as to be mere single cells or minute threads, only to be distinguishable by a powerful microscope, yet living and doing their purifying work, and making up for their small size by their number.

Supposing now—though one can often see both in town and country—a cistern or even a water-butt is set up as a recipient of water, and having no cover, is exposed to light, or that a hole is purposely or accidentally made in a field, and that it becomes filled with rain or other water, and the ground is not porous, and is compact enough to retain the water. At first one sees nothing but water, which may even be turbid, or may contain decomposing organic matter which would cause speedy death by poisoning to such an animal as a fish, placed in it. But by-and-by the water becomes clearer by subsidence and by contact with the surrounding atmosphere, especially if no more impure water is mixed with it, and then the light enters it, and the everywhere-present seeds of vegetation are urged into growth, they having found a suitable resting-place. The water will by this time have gradually become sparklingly clear and pure by the chemical influence of the plants, and be fit for the maintenance of microscopic animals, which accordingly begin to appear in obedience to the law which causes organisms to come in places adapted for them. These animals prey upon the vegetation, or on each other, and then higher forms of vegetation come, and these are succeeded by higher and larger forms of animals, and they again, by still higher plants, and so the thing goes on, until it becomes what is called a pond.

The conditions of this pond will depend on a variety of circumstances surrounding it and connected with it, and the kind and number of both plants and animals will be materially affected by a few or by many of these circumstances. For example, if no current runs through it, it may contain no fish, but only animals lower in organisation than fishes; or if a current exists, and it is but a small one, the fishes may be of kinds adapted to that circumstance. If the stream be large, and comes from a pure source, the fishes will be of higher organisation to suit that condition again. But whatever may be the peculiar modifications, it is seen that here is an instance of that which always occurs; namely, that a body of water finding itself in a suitable place, and not being subjected to directly adverse conditions to life, becomes gradually stocked with that life, firstly with vegetable life, and then with animal life, the conditions of both being selected according to their surroundings—not self-selected, however, but chosen in obedience to a certain law acting upon the whole.

If, however, instead of being a pond, the water is in the form of a brook or river, the character of its vegetable and animal inhabitants will be again of a different nature. Supposing, again, that instead of fresh-water we take the case of sea-water. On rocky coasts, such as those of Devonshire and Cornwall, there are found what are termed "rock-pools," that is to say, excavations of various sizes made by natural causes here and there between tide-marks, and these pools are left full of water at each recess of the tide, which washes over them at its flow, and such pools are found to contain, as their permanent vegetable and animal inhabitants, exactly what is suited for them, and if sometimes there is left behind in them creatures of a character unsuited for such pools from any cause, that is only an occasional accident. And the kinds of plants and creatures found on such coasts, whether in pools or not, are always found to be selected according to the conditions they inhabit, these conditions being mainly controlled by the rocky nature of the coast and by the character and forms of the rocks.

On these coasts of Devonshire and Cornwall, too, there is another matter which affects their produce; namely, the warmth which arises from the peculiar oceanic current which impinges upon them. On coasts which present hard tracks of sand or of mud, as the shores of Essex and Suffolk (opposite flat Holland), the flora and the fauna again assume another character, for there are no rocks or large stones or boulders for sedentary creatures to adhere to, or for hiding animals to creep under, or for many sea-weeds to grow upon. Hence, the animal life there found is mainly of a free swimming character, and the plant life is sparse both as to variety and quantity. The character of the marine fauna of Scotland, too, is different from that of England, and there are some animals which are almost exclusively Scotch, just the same as some English marine and fresh-water fishes are but rarely met with north of the Tweed.
I WISH that some more attractive title could be found by which to designate these exceedingly pretty objects, for at the very word "skeleton" unconsciously there rises up before our mind's eye the shaking, tottering frame, the fleshless make specimens for oneself, and to have them ever before one's eyes; on the contrary the skeletons of which we speak are exquisite exhibitions of fairy lace-work, full of elaborate and delicate intricacies, and at the same time suggest no unwelcome ideas

staring bones, of human being, four-footed beast, crawling reptile, or some such uncanny spectacle.

Skeletons such as these are, I doubt not, very curious and wonderful. Nay, the ardent anatomist will probably exclaim that they are most beautiful, and so they are in a certain sense, but it is not that kind of beauty which makes one wish to be able to that the object has ever been otherwise than it is now. This said "skeleton" comes from a Greek word, signifying "I dry," and it is a name which, to use the formal explanation of the "Encyclopaedia," is applied to those harder parts of organised bodies which form a framework on which the softer tissues are fixed. Therefore, you see, the word is rightly used to describe

LEAVES OF THE POPLAR, WILLOW, IVY, HOLLY, AND LIME; FRUIT OF THE THORN APPLE; ETC.
these leaves, and we cannot object to it on those grounds. Our friends across the Atlantic are much more sentimental, for they speak of "spiritual" and "phantom" leaves and flowers. But it avails not to caril at a name; suffice it that the objects themselves do in reality exhibit a rare and peculiar beauty, and and in all probability is damaged and imperfect, for fallen leaves must meet with countless dangers: they are buffeted by turbulent winds, crushed by the heel of the passer-by, or pressed, it may be, too closely by their comrades. It is almost impossible for leaves to skeletonize themselves without help, and they cer-

that in them we see specimens of Nature's fretwork which human skill can only unveil, but never imitate in all its delicacy.

Now and again, "whensoever Autumn fadeth into age," and when "pale concluding Winter" is ready to put his icy finger on all that remains of the benevolent seasons which have gladden the year, on rare occasions it does so happen that we pick up a skeleton leaf, but the treasure is sure to be discoloured and yellow, tainly cannot don their whitest robes without assistance, for the process of maceration, as it is called, requires that they be soaked a long time, and that of bleaching necessitates the aid of chemicals to bring it to perfection.

As a rule, we rather despise a plant which repays us for our care by bearing leaves only; but if leaves have not the dazzling colours and the great variety of form possessed by flowers, the variegated shades of green serve to repose the eye and preserve

GROUP FOR A GLASS SHADE.
the sight, and their movements, as they gracefully wave to every breath of wind, animates the landscape.

Have you ever pictured to yourself how truly dismal the earth would look if it had no "green things" upon it? We should still have the high and mighty hills, and gentle valleys, the babbling streams and the rushing rivers, it is true, but desolate indeed would all the land appear if bereft for ever of her garment of green! And if one thinks of it, a tree is one of the noblest and most beautiful objects, with its massive trunk, the curious mystifying yet graceful tortuosity of its branches, and the lovely variegated green of its leaves.

It is the opinion of Mr. Ruskin, that whatever people undertake to represent, whether by pen or pencil, chisel or knife, on paper, in stone, or wood, their first business should be to try and understand something of the structure and organisation of the body they are copying, even though it be a model only, that is to say, if they wish to depict it in a masterly manner.

The Professor of Art declares that, for instance, a student would paint the legs of a robin in a much more real and life-like manner (although it may be said that nothing but a line of black is needed to represent them) did that student know somewhat of the anatomy of the bird, and how that those elongated ankles of his possess such elasticity and spring, that they enable their owner to dance more nately and prettily than any other bird in creation.

Added to this, so much more interest and zest is given to the whole performance, when a little knowledge sheds a ray of light; when you do not work in a mechanical manner, but know the why and the wherefore of all your actions.

Therefore, good friends, although you are not going, under my guidance, to represent leaves in any way, but merely to alter their appearance, yet you will have to look upon them and to handle them, and you will feel doubly interested in this particular pursuit if you are acquainted beforehand with their habits, uses, and all their little ways. I shall, with your permission, give you a short lecture, with which I trust you will not feel bored, and then we will proceed to describe how to transform them.

On the under surface of a leaf you may observe numerous projected prolongations running in various directions; these are continuations of the petiolo or stalk which attaches it to the branch, and they are called nerves.

Now the nerves of plants bear no relation in structure or functions to those of animals, for they are merely bundles of porous vessels.

These nerves are always prominent and very distinct, that one called the mid-rib is the most so. It divides the leaf into two lateral parts, which are usually equal.

From its base and sides issue other nerves, which run hither and thither in different directions; sometimes they are prolonged beyond the circumference of the disc of the leaf, and when this is the case, and they become rigid, they then form spikes or thorns more or less acute, as in the "needle-leaved holly."

The nerves of a leaf are always very distinct, but you see some lines which are not so prominent, which cross one another, and intermingle in the most sociable manner, those are the veins, and they form the skeleton of the leaf.

You remember that the upper surface of a leaf is different in colour and texture to that of the under. Well, the reason of that is that a leaf has two skins. The epidermis of the upper surface is commonly smoother, of a deeper shade of green, and adheres more closely to the framework than does that of the epidermis on the other side of the leaf.

It is to get rid of these vegetable tissues, the fleshy matter which fills up the interstices, and at the same time to preserve intact the nerves and veins by which the whole is kept in shape, which is the object of the lover of skeleton leaves.

And now what about the use of leaves with regard to the plants which bear them. Simply this, that without leaves a plant dies. And why—did you say? Because air is essential to the life of plants, and they absorb the air through their leaves, the leaves absorb gases for nourishment, and also exhale moisture and gases which are superabundant.

Then there are many singular things to relate with reference to the conduct and behaviour of leaves, their ways and habits. They almost invariably assume a horizontal position, the upper part tends towards heaven, while the under looks down upon the earth.

Some of them change their positions at night, occupying a different one to that they hold during the day. Some lie down to rest one on another during the hours of darkness. There are leaves which shrink at the slightest contact; there are others which not only resent the most delicate touch, but revenge themselves on those who dare to intrude.

The extremity of the leaves of the Dianca muscipulae are connected by a hinge, and if any unlucky fly or insect ventures to settle, be it ever so slightly, on either of these lobes, such is their irritable temper, that they quickly rise and approach each other, and enclose the unwitting offender in a leafy tomb.

Such like and many other curious traits might be related of leaves. It is an interesting study, but I am not going to take up any more of your time on that part of the subject.

The process of skeletonising leaves is slow and oft-times decidedly tedious, more particularly in this way, that decomposition is in some plants very very tardy, so that weeks and months—I do not mention such short measurements of time as days—must come and go before you can proceed with your work, and this delay is rather tantalising.

But we must begin at the beginning, otherwise by confusion we shall be confounded. In the first place we must make a wise selection. You will never succeed if you catch hold of a few stray leaves of any kind and at any season, and try and make these beautiful for ever. There must be method in all that you do.

First as to the time of year. When the leafy month of June, has nearly run out her length of days, then you can begin to make your collection, for leaves should be chosen when in their prime, and they are hardly in that condition before the longest day. When they begin to fall from the tree, that is a sign that their short life is over. Take your specimens of such leaves, and then examine them, see that no greedy insect has destroyed their pristine beauty, that no blotch or bluish has rendered them unfit for specimens. I should advise you to select a good many of one kind, for you will find, when you come to mount them, that perhaps but half of the whole number are perfect, for very many come to an untimely end during the process of maceration or of bleaching.

They must be living leaves too, and not young ones, so if you take them from a bough do not pick them from the end of the branch.

Then as to the kinds to be selected. I dare say that your first impulse is to set off in search of the king of the forest, the oak. To carefully avoid him is my advice. I agree with you that his leaf is of a pretty shape and form, but, unfortunately for our purpose, it contains much tannin, and tannin is a vegetable acid which prevents decomposition, so, that supposing you procured oak leaves and essayed to skeletonise them, you would find yourself foiled. Take good care that leaves which possess this quality do not get amongst the others, or none of them will be able to divest themselves of their clothing, for tannin impregnates the water, and thus prevents any of the leaves lying in
PHOTOGRAPHY.

it from decaying. The walnut, hazel, chestnut, and elm are of this kind.

Again, have nothing whatever to do with leaves of a resinous nature, such as those belonging to the fir tribe, and many of the evergreen shrubs, laurel and bay.

You will think that I am sadly curtailing your list, but you will find plenty left from which to select. There are those of the plane-tree, and the broad-leaved sycamore, which is early in leaf, the pear-tree and the lime, the holly with its leaves " wrinkled and keen," the ivy which is always in season, as it is evergreen—but remember, with the evergreens, to give the preference to the older leaves, and not to those which have been born this year—the black and white poplar, which, although they bear the same surnames, differ considerably in form of outline. The leaves of the latter are white and waving, its young leaves are covered with down, therefore avoid them; they are also, strange to say, larger than the older ones. We may rob the tulip tree, the leaves of which are quite characteristic, are totally unlike any other; and, it is said, resemble a riding saddle.

I will tell you of some more another day, for if I mention any others you will not have time to listen to the process. I shall not describe that fully, but shall give you enough to do for the present.

The maceration of leaves can be accomplished in a few hours by boiling them in a preparation of lime and soda, but connoisseurs generally think that the finest skeletons are obtained by the natural but slow process of maceration. I shall therefore not enter more into this rapid method, the chief fault of which is that it renders the skeletons very brittle.

Open earthenware vessels are what you will require for holding your leaves; vessels with wide open mouths; and this for two reasons. In the first place, as plenty of sun is desirable for the leaves, they will be able to catch more of its rays, and in the next, you will the more easily take out the leaves. Having put them in, fill the vessel with rain water, place it in a warm sunny spot, and there let it remain for some time.

If you ask me for how long, I answer that I cannot tell you, the leaves vary so much; those of the tulip tree would probably be ready for removal in five or six days, whilst those of the ficus or india-rubber would not be ready in as many months. Of course thick leaves such as the latter must have a thicker cuticle and much more of vegetable tissue to decay than that of a lighter leaf such as the tulip. Then circumstances alter cases all the world over, and, in this instance, warmth is a great help; if the weather be hot the decomposition will proceed much more rapidly than if the summer were cool and cloudy. And again the water has an effect, for if it is very "soft," as the term is, it will help on the process. Do not change the water, but allow your leaves to soak, and I will give further directions quite in time for you to follow them.

PHOTOGRAPHY.

By J. C. LEAF.

FINISHING.—THE NEGATIVE COLLIDION PROCESS.—DESCRIPTION OF A PHOTOGRAPHIC NEGATIVE.—HOW EMPLOYED.—MANIPULATION.—DESCRIPTION OF COLLIDION AND CHEMICALS.—PREPARATION OF NITRATE BATH.—DEVELOPER AND INTENSIFIER—READY FOR WORK.

To continue the description of our process. Besides the film of bromo-iodide of silver, there is present a certain quantity of nitrate of silver solution, both upon the film and in it; and if we can set up some chemical action which will reduce this silver to its metallic state, we shall find that the metal will be precipitated principally, if not altogether, upon those portions of the plate upon which the light has acted. We shall also find that this action is so exquisitely delicate as to give every possible variety of light and shade, by the varying thickness of the deposit of silver. The high light of the lace collar will be represented in our picture by a thick deposit of the metal; the lightest parts of the flesh by one slightly thinner; the shaded parts by one even thinner than this; while the deepest shades in the dress, which have not been acted upon by light at all, are entirely free from any trace of the metal.

Our developing solution of sulphate of iron is what is termed a reducing agent, that is to say, when we mix the nitrate of silver solution with it by pouring it upon the plate the metallic silver which the latter contains is precipitated. When, therefore, the mixture of these two solutions takes place upon an exposed plate, the metallic silver is precipitated upon its surface, but the portions of the plate upon which the light has acted attract and receive the metallic deposit; while those which have not received any light reject it. And this is how our picture is formed.

It is highly important that we should understand this, because, by-and-by we may meet with failures, and we want to know exactly what we are about, so as to detect the cause of any accidents which may occur in our practice.

Bearing in mind, then, that the picture is formed of finely precipitated metallic silver, we shall see at once, that, if we can dissolve out the iodide and bromide of silver which surround it, we shall have an impression consisting of white metal in the lights and simply the glass with a coating of collodion in the darker portions. To dissolve out this iodide is the office of the solution of cyanide of potassium, which we have called the fixing solution. We, therefore, pour this over the well-washed film, and instantly, as if by magic, our picture starts into its proper light and shade. The yellow iodide of silver vanishes, and we have a complete and perfect representation of our sitter.

We cannot, however, stay to admire our picture for a moment until the whole of this fixing solution is washed off, as it is so energetic in its action that in a few minutes it would dissolve the picture entirely away, we therefore thoroughly wash the plate, and, still remembering that this cyanide of potassium is deadly poison, carefully cork the bottle and put it away before proceeding to examine our picture in full daylight.

Laid face upwards upon a piece of black cloth or velvet, we observe that we have every reason to be well satisfied with our first attempt as photographers; our portrait is clear, sharp, and well-defined, and an excellent likeness into the bargain. The face is well lighted, and modelled, showing every contour of the features, and really a picture, not merely a map of our sitter. The lights are nearly white, while the deepest shades are to all appearance as clear and transparent as the glass itself. Even our fair model is satisfied—which is more than most sitters are—and we therefore set to work to finish and preserve our first portrait.

In order to effect this, the plate must first be dried in front
of a clear fire, not making it too hot, or the glass may crack. When
the plate is quite dry we coat the film which contains
the impression with a clear transparent varnish, known as
spirit varnish, and which we procure of our photographic
chemist at the cost of one shilling per bottle holding about a
quarter of a pint. This varnish is applied in precisely the same
manner as was the collodion in an earlier part of the process,
and when the fluid has been spread in a perfectly even manner
over the surface, the plate is held in front of the fire for a few
seconds until it dries to an even and glossy surface, almost
as smooth as the glass itself.
It will have been observed that in order to show the picture
properly it is necessary to back it up with some dark material.

There are several methods of accomplishing this. Some
operators use cloth or velvet, while others prefer an opaque
varnish.

A piece of very dark maroon cloth or velvet makes an
excellent backing where the dress of the sitter is not so dark as
to show the texture of the backing through the picture; but in
most cases a black varnish is the most suitable. The varnish
known as Brunswick black, and procurable at most oil-shops,
will answer every purpose, and it should be laid on with a soft
brush upon the back of the plate, and dried before the fire.
The only remaining operation is that of mounting the
finished picture, and the most suitable method of doing this is
by placing it in a case made to open somewhat in the
fashion of a book. Upon purchasing this we find that it is
provided with what is termed a "preserver," which is
simply a frame of very thin metal, employed to bind the
picture and the outer glass together.

In this frame is placed a piece of glass, which is to preserve
the surface of the picture from injury by scratching or dust,
and upon it will be found a perforated disc of gilt metal, which
is termed a "mat," and which is intended to hide the corners
and defective edges of the picture, and to impart a finished
appearance to the whole. The openings in these dies or
mats are made of different shapes, as so to suit various
styles of pictures; and as ours is one showing the head
and shoulders only, we select the oval opening as most suitable.

The front glass having been carefully cleaned and dusted, is
laid upon the rim of the preserver, and the mat placed upon
it. The picture is then laid face downwards upon the mat, and
a piece of cardboard having been cut to the required size and
laid upon the black varnished side of the picture, the edges
of the preserver are turned over so as to secure the whole
together.

We may now press the picture gently into its proper position
in the case, and present it, together with the prettiest com-
pliment we can improvise at the moment, to the fair sitter
who has served us so well.

Although our attempts at producing pictures by means of
the positive collodion process just described may be con-
sidered as highly satisfactory, we soon discover that when a
number of pictures of the same person are required the work be-
comes tedious and troublesome alike to sitter and photographer.
Hence we are led to enquire by what means we can produce a
number of pictures of the same subject without the necessity
of a fresh sitting for each.

It is true that we might copy, by the means of the camera,
the first picture taken, and also repeat the operation any
number of times without injury to the original picture, but
this also would be a very irksome business, and would,
moreover, be unsatisfactory in the end, inasmuch as the
copies would of necessity be inferior to the original.
The question, therefore, arises—Is there any process by which
we can produce a picture which shall be useful for copying pur-
poses only, and from which we may be able to print any re-
quired number of copies? To this enquiry the reply must be in
the affirmative, as the negative collodion process is capable of
fulfilling all these conditions in the most perfect manner.

It is somewhat surprising to us, in our state of advanced
knowledge of matters photographic, that the fact that the
camera impression is mostly of the negative character, that is
to say, with its system of light and shade reversed, should have
so sorely puzzled many of the early experimentalists, yet it is a
fact. For some time it did not occur to them to use
the camera impression as an engraved block or plate is used,
namely, simply as an impression from which other impressions
or prints could be produced at will. As soon as this idea
dawned upon them, it was at once seen that what had at
first seemed disappointing failure was in reality the highest
success; and that from the one impression taken in reversed
light and shade, could be printed or reproduced any number of
copies, which in the turn should be true to Nature.

This discovery may be said to have been the point upon
which the success or failure of the art depended, as, how-
ever beautiful camera pictures might be, it would have been
well nigh impossible to produce a large number of copies at
anything like a reasonable cost.

By means of the negative process, however, we can produce a
picture in the camera which is capable of yielding, by simple
and comparatively inexpensive materials, an unlimited number
of proofs of the utmost beauty; and it is therefore no wonder
that this is the method which is now all but universally
adopted.

With these few remarks we may at once pass on to consider
the more practical part of our subject.

Before considering the more technical details of the process,
however, it will be well to describe as nearly as we can what are
the chief peculiarities of what is termed a "negative" photograph.
It will be remembered that the first pictures we made were what
is termed positive, that is to say, they were at one operation in
the camera produced in their correct light and shade.

In the negative this is exactly reversed; that is to say, in
this kind of picture those portions which are in Nature white,
will in the picture be dark or black, while the shades will
in the negative be white.

In taking a negative upon collodionised glass the high lights
will be nearly opaque, while the darker portions will be very
nearly transparent. Some idea of the effect of a negative may be
 gleaned from the illustration (Fig. 1), which represents a
picture of this description as it would appear if held up to the
light. At first sight this would appear to be useless, but if we
consider that if by a subsequent process we can prepare a
surface which can be darkened by the action of light, and place
this under the negative, those parts of the plate or paper
which are covered by the opaque parts will remain white, while
those which are under the transparent parts will become
darkened, and we shall thus produce a picture similar to
that shown in Fig. 2, which it will be observed is, in its system
of light and shade, true to Nature.

This is precisely what occurs in the process we are about to
describe. After taking a negative impression in the camera, a
paper which is sensitive to the action of light is prepared, and
pressed into close contact with the glass picture. Under the
action of light the paper darkens, and a picture is produced
which is in all its lights and shades the exact reverse of the
negative, and consequently a correct representation of the
natural scene.

Having thus explained the character of the pictures which
we hope to produce, we may at once proceed to the actual
working of the process.
PHOTOGRAPHY.

From what has been before stated in our description of the positive collodion process it will be readily understood that the merely technical details of manipulation are precisely similar, whether the photographs are to be of a positive or a negative character. Thus, the plates must be cleaned, coated with collodion, dipped in the nitrate of silver bath, developed and fixed exactly (as far as manipulations are concerned) as we have before described. The chief difference will be in the chemicals.

In the positive process our aim was to produce a thin film of bromo-iodide of silver, giving a clean bright picture without much intensity. In the negative process we require sufficient opacity in the thicker parts of the picture, such as the face, to preserve the whiteness of the paper while the other portions are becoming darkened.

One of the chief means to this end is the collodion. A good negative collodion is somewhat thicker than that used for positives, as well as somewhat differently prepared, as we shall hereafter explain. For the present we content ourselves with explaining to our chemist, that having been quite successful in our first attempts, we are anxious to extend our sphere of work, and with asking him to supply us with, say, four ounces, of good negative collodion.

We must also purchase a fresh supply of nitrate of silver with which to make a bath; as that used for positives will not answer our purpose. We therefore purchase one ounce of the best nitrate of silver, and have it dissolved in twelve ounces of distilled water.

Our next and only remaining purchase will be half an ounce of pyrogallic acid, and an equal quantity of citric acid, which we put up in small bottles, as both these substances require to be kept dry, or they speedily spoil.

The nitrate of silver will cost us about four shillings and sixpence, as we have the best, the pyrogallic acid, two shillings, and the citric acid, say, fourpence. Thus furnished, we may proceed home and prepare our chemicals for work.

The preparation of a nitrate of silver bath for negatives is regarded even by many experienced photographers as a difficult job; and so indeed it would be if the complicated methods so frequently recommended were followed. Happily, however, our plan is exceedingly simple, and, with pure materials, perfectly successful. Having very carefully filtered the solution bought at the chemist’s, and placed it in the bath-trough, we clean a plate and coat it with the negative collodion, and, when the film is well set, we immerse it in the bath precisely as if we were about to take a picture. Instead of removing it, however, we leave it for a few hours in the solution, if possible, all night. When we remove it in the morning, we shall in all probability find that, instead of the creamy yellow film of bromo-iodide of silver which we might have expected, we have only a layer of collodion, out of which the whole of the iodide has been dissolved. This is precisely what we wished. It must be remembered that a solution of nitrate of silver will dissolve iodide and bromide of silver until it becomes saturated,
This is what is termed a re-developer, or more properly an intensifier, and it is used because it not infrequently happens that a picture is not sufficiently opaque after the first development with iron to exclude the light while it is being printed. By-and-by, when we become more experienced, we may be able to produce perfect negative pictures with the iron developer only, but meanwhile we may console ourselves with the remembrance that many of our very best photographers adopt the plan of intensifying by a second solution, as the best method of the two.

Now we are ready for work. It is scarcely to be expected that our first efforts will be perfectly successful, as we have entered upon a very much more difficult branch of the art, still, we have carefully prepared everything, and are quite determined, in case of failure, to adopt the good old rule which never fails—"try again."

BUTTERFLY AND MOTH COLLECTING.

BY THE AUTHOR OF "THE LEPIDOPTERIST'S GUIDE."

TIME FOR SEEKING—VARIATIONS—APPARATUS.

THE summer months are as a rule the most productive of perfect insects, but spring and autumn must by no means be neglected, for many species, some of them of considerable rarity, then occur, and caterpillars are at these periods most abundant. The time to go in search of any particular species may, in most cases, be determined by a reference to the "Manual," by hints picked up from friends, or from our own experience; but, of course, all seasons are not alike, some we call "back ward," others "forward," and the appearance of an insect may be hastened by warm weather, especially when accompanied by occasional showers, or preceded by rain, or it may be delayed by cold or east winds.

Again, it must be borne in mind that, speaking generally, insects emerge later in the north than in the south of England. Besides those, we have another guide in the state of vegetation, which may serve to remind us of the time at which we should start in pursuit of our game. This consists in the observation of certain buds, leaves, and blossoms, which appear simultaneously with the objects of our search. For example, when the blue "Bugle" is in flower, we stand the best chance of finding the Broad Bordered Bee Hawk (Macroglossa stantiopea) in its proper haunts; when the Bramble is blossoming the Hair Streaks (a most interesting group of butterflies called Thoas, after a certain virgin saint) should be on the wing; when the sap of the Hawthorn begins to rise, it is time to search for the Early Moth (Hibernia rapicaeuror), and so with hundreds of others, but it is not necessary here to enumerate them.

It is the principle of making such observations as those just mentioned that we are desirous of impressing on our readers.

Then, some insects are so punctual to the hour of day or night at which they take wing, that a few minutes' delay in visiting our hunting grounds may be fatal to our chances of success. Many hunters will pass the whole night in the woods or elsewhere, in the hope of discovering the exact time at which some rarity is to be met with, and, having obtained the required information, are enabled to time their future excursions accordingly. Even the familiar butterflies do not fly during the whole of the day; there are breaks in the times at which they love to disport themselves in the bright sunshine. Some moths are day flyers, others fly just before dusk, a third batch at or after dusk; others again after dark; and at favourable seasons a succession of different species make their appearance during the hours of night. The species which we meet with at 9 P.M., for instance, will be quite different from those that we obtain at 11 P.M.

It should be well remembered that hay should be made while the sun shines, the moral of which is, that whenever an insect worth capturing is detected, we should supply ourselves with a sufficient number, not only for our own wants, but for the requirements of our friends and correspondents. There should be no procrastination in this matter, for to-morrow may be too late. Thus it was in the case of a lovely little species named Eudraea comastula (we forget the English name), which occurred about the year 1830 for the first time, and was not again met with till some fifteen years afterwards, when one of our trustiest and best entomologists, Mr. Henry Doubleday, stumbled upon it in Epping Forest, but he was at the time unfortunately unprepared with apparatus, and only secured a couple of specimens in two pill-boxes which he happened to find in his pockets. The next day he visited the same spot, but not a single example of the little gem was to be seen.

What a lesson! Well, after about twenty more years Eudraea turned up again, and the collectors of the present day were not slow to make a harvest of it, for they hunted it high and low, day and night, capturing it by hundreds, until the poor little thing was pretty nigh exterminated. This was carrying the matter to the other extreme with a vengeance. But collectors of the present day, especially those who collect for profit, are not particular what they pull down, or what they gather up, or where they tread, or whose property they injure, so long as they can attain their object, and this is the chief reason why the law of trespass is now-a-days so strictly enforced against the fraternity.

A certain amount of botanical knowledge is very essential for the guidance of the collector, but we do not think our readers need distress themselves on this point, for if they be of an inquiring turn of mind, it is surprising how quickly the requisite information on the subject is to be picked up. There is no need to study the scientific characters of plants, but simply to learn their names, as occasion may require, and to know them by sight; if we gradually find out the times at which they bud, blossom, and seed, and the affinities of the various groups, so much the better, it will be very useful to us as we progress.

The young collector is apt to fancy that to catch moths and butterflies all that is necessary is to roam the country, keeping his eyes well open and his legs and arms constantly employed. He therefore rushes from one spot to another with no steady object in view; if an insect crosses his path he runs wildly after it and strikes with frantic energy. This is not collecting. Should nothing be observable at a cursory glance he goes on to
a fresh place, condemns it as barren, and avoids it for the future, notwithstanding that to-morrow, or next week, or next month, or even next year, that very spot may prove an Eldorado. There never was a greater mistake than to set to work on such a principle. Each place which takes the fancy of the collector should be thoroughly investigated before he proceeds further, and whenever he is so fortunate as to make a capture of any importance, it should set him at once thinking as to how the insect in question came to be in the particular neighbourhood. Perhaps the food-plant, some attractive blossom, or the presence of its lady-love, for instance, may have been the cause of its appearance; and if he can satisfy himself upon this point, his course is pretty clear.

When we were young and foolish we remember once to have captured a "fox" moth (Bombus rubri) flying wildly over the heather, on a sunny afternoon, and before we had time to secure it in our net we saw several others, all in the same excited state, but, "hey presto!" they as suddenly disappeared, and no more "foxes" were seen during that afternoon, though there were hundreds of acres around us abounding with similar vegetation. The mysterious occurrence puzzled us very much at the time, but at the present moment the explanation appears very simple; a lady "fox" in the vicinity was the object of attraction, and had we been better informed and sharper, we should have caged her ladyship, and have patiently awaited the arrival of her swains by a process which will be discussed in another place, for "foxes" in those days were not to be despised.

Again, one may be misled by the exceptional appearance of an insect at its worst season: thus, for example, we may, though very rarely, find the "mottled umber" (Hibernia defoliaria) at rest on tree-trunks and fences in the spring of the year, whereas the normal time to search for it is late in autumn. Some people, who meet with a species at a particular date, are so positive as to their having hit upon the exact time for it, that nothing will convince them to the contrary. We once knew a gentleman who was so stubborn in this way that, having accidentally found a rarity on a certain day of the year, he persistently visited a distant locality year after year about a fortnight after the species was over—reminding one of the story of the unlucky finder of a guinea in the gutter—and when this gentleman was informed that others had been more successful in searching for it at an earlier date, he declined to be put upon the information, and though he had sufficient sense to abandon his unprofitable pursuit, he always persisted that he was right. We hope that there are not many amongst our readers who are too obstinate to learn from the experience of others.

Suppose, then, that we have fixed upon a species, or several species, which we propose to hunt; that we have formed an idea of their appearance in Nature, whether in a state of rest or activity; that we know the locality or whereabouts; the plants which they frequent or upon which they find sustenance; the surfaces upon which they will probably seek rest; the kind of places in which they will endeavour to conceal themselves; the best times of year to meet with them; and their habits of flight. The next question which arises is, what preparations should be made in order that we may start with a fair prospect of bagging our game?

"To be forewarned is to be forearmed," they say, and the point upon which with our readers now require to be informed is how to equip themselves for the occasion, for all are not Colin Campbells, ready at a moment's notice to go, to see, and to conquer; certain impediments have to be got in readiness before a start can be thought of.

Perhaps it will be well first to glance at the costume best adapted for an ordinary day's collecting. In the heat of summer there can be no doubt about Panama hat and spuggaro being the coolest and most comfortable wear for the head, though, may be, a little too conspicuous. In the spring and autumn, when our rambles are chiefly devoted to caterpillar collecting, the conventional chimney-pot hat will often serve duty for a botanist's collecting-box, forming, as it does, a most convenient receptacle for green-meat which we may be desirous of conveying home. As for the coat, it should be furnished with ample pockets for the reception of pinning-boxes, any number of chip and pill-boxes (previously prepared for use), killing apparatus, and ring-net, folded up, for such as wish to keep this implement out of sight. The shape of the garment is of course optional; but we have frequently remarked that those who affect the worst cut clothes are generally the most successful collectors. The material should be according to season, but light in the double sense in summer. The shades of grey, the rest of the outfit being in unison, will best suit the collector who is of a retiring nature.

The pockets of the coat should never be used to carry the captures contained in our boxes. These should be conveyed in a satchel or bag slung over our right shoulder (we take it that our reader is right-handed), not only for the sake of the greater ease afforded to the observer, but also for the freedom of action at any moment to be attained by detaching ourselves of the burden when an emergency occurs. It cannot here be too strongly impressed upon the beginner that the empty and tenanted boxes should be kept in separate receptacles, otherwise infinite trouble, loss of time and of insects, and consequent vexation, will inevitably be the result. We should hardly have considered this remark necessary, but that a writer in one of our contemporaries has recently gravely recommended his readers to jumble up their captures with their empty boxes. We should have thought that a single day's experience would have taught any one in his senses better than to commit such an egregious blunder; but, evidently, "experientia docet" does not apply to everybody.

The waistcoat is chiefly useful for the conveyance of a watch, a pocket compass (but not in too close proximity to the former, or it may magnetise and injure the works), a pocket amorph, if deemed advisable, a chloroform bottle made on the principle of permitting the slow egress of the fluid through a small nipple, as shown in Fig. 1, and stopped by a closely-fitting screw-cap, a very small bottle charged with oxalic acid, and also a pin cushion stuffed with entomological pins of various suitable sizes, amongst which prudence dictates that a needle and thread should be included, since there is no knowing at what moment a rest in our garments or our net may occur; for accidents, which proverbially "will happen, etc.," usually take place when we are least prepared for them.

Descending, the knickerbocker notion decidedly allows more freedom of action than is to be obtained under the regular "continuations;" but this is a very doubtful advantage, for in our humble opinion, the only practical way of teaching a beginner how to collect is to set him down in a good locality, and then to tie his legs together, as people serve the corresponding members of donkeys when they want attention to be fixed on a particular patch of thistles. This brings us to gaiters, leathern leggings, which, in districts frequented by adders or abounding with gorse, are very necessary articles of apparel to be adopted. Lastly, a pair of strong well-fitting boots should encase our feet, long Wellingtons or fishing-boots being preferable when we purpose passing an evening in the marsh, or paying a visit to a boggy wood, there to work the sallow bloom, a very favourite attraction for certain moths, as we shall presently show.
As for apparatus, we cannot well get on without a net of some sort to start with, so we will first consider the kinds which are generally carried for an ordinary day's collecting, leaving those which are adapted only to a special purpose to be described when we come to treat of the subjects with which they are connected.

Of all nets, the "umbrella net" is perhaps the most general favourite, not only because, from its close resemblance when folded up to the useful "desideratum" from which it derives its name it enables its proprietor to escape observation during his progress to the hunting ground, but also from the obvious advantages of comparative lightness, strength, and capacity which it possesses over the ordinary kinds; and, moreover, it is ready for use at a moment's notice.

If we wish to manufacture one for our own use, the frame of it is easily made upon the following principles by any one gifted with a little mechanical ingenuity. We shall require two pieces of stiff jack spring, each of from two to two and a half feet long (old ones do quite as well as new, and may be purchased for a few pence), a light, smooth, but strong walking stick (a "partridge" cane answers the purpose admirably), a small quantity of stiff brass wire, a pair of pliers, a bradawl, and a gaslight.

The first thing to be done is to roll up the ends of the springs by the aid of the pliers, keeping the former quite hot in the gaslight during the process, and leaving an opening of just sufficient size for the wire to pass through, A representing the size of the wire, B the spring (Fig. 2). Next place the stick flat on the table, and with the bradawl make a hole about two or three inches from the ferrule end; now bend one of the ends of the wire at a sharp right angle, and drive the bent end into the hole in the stick, wind the wire once round the stick, pass on, and make another sharp bend, slip on one of the springs (previously curved to the form of a semicircle), with its concave side towards the stick, and make another sharp bend, pass the wire across the stick, make another sharp bend, put on the other spring, and make another bend; then wind the wire once more round the stick, make a sharp bend, cut off the wire half an inch from it, and drive the end into another bradawl hole.

Fig. 3 represents the successive bends in the wire, excepting the last turn round the stick.

Fig. 4 shows the points at which the wire commences (1) and terminates (2), these should be on the under side of the stick when the net is in use.

Fig. 5 shows the wire, as seen from above, when the net is held in the ordinary way.

The next step is to fasten the free ends of the jack springs in such a manner that they may slide easily up and down the stick; this can be done in the way just explained, with the exception, that the first and last bends of the wire must be omitted.

The only other point requiring attention is the fixing of a stop at that part of the stick where, when the two movable ends of the spring meet against it, they will together form a circle, this may be done by taking two turns of the wire round the stick, starting and finishing as in Fig. 4. This completes the framework.

All that now remains is to make and attach the bag of the net, and in doing this a few things have to be borne in mind. In the first place the length of the net should be about as long as the collector's arm, and the seams should be outside.

It is also a good plan to let in a circular or oval piece at the bottom, as shown in Fig. 6, in order that our captures may not be rubbed in their struggles between the folds of the net.

The open end of the net should be stitched to a strip of calico, or other durable material, with which the springs should have been previously encased. As for the fabric of which the net is formed, muslin is, perhaps, as serviceable as any; leno (especially green) is frequently used for the purpose, the latter has the advantage of being less conspicuous, the disadvantage of being easily torn. A black net is certainly preferable for night work, as our captures can be more readily discerned through it.

Grenadine is a texture which we ourselves consider best of all, but it is a rather extravagant article.

To give the net its umbrella form the springs should be pressed down flat against the stick, and the net wound evenly round until it is completely folded up, and then an ordinary umbrella case should be drawn over it. To bring it into use, slip off the cover, and, holding the handle lightly in the right hand, pull with the left hand the end of the bag, so as to unroll the net, when the springs, being self-acting, will at once assume the circular shape, the whole operation occupying but a very few seconds.
BOATS AND BOAT-SAILING.

By J. C. Wilcocks.

ON THE TRIMMING OF BALLAST—THE SECOND CRUISE.

As in small boats the weight of even one person, if wrongly placed, will put them out of trim, a few rules upon this matter are here introduced.

If when under weigh, and turning to windward, the head of the boat falls off from the wind, and requires the helm to be put down to make her keep the required course, move some of the ballast from aft forward, until this tendency ceases. When a boat falls off from the wind, she is said to carry a lee helm, which is a dangerous feature, because if caught in a violent flaw, she would not relieve herself by coming to the wind and shaking across the line of the keel, as to offer very great resistance to the passage of the water. It is thus evident that both sails and ballast should be so trimmed that the boat may be nearly in equilibrium, although not quite, and that the excess of power should be in the direction from which the wind comes, that is to say, against it, for the sake of safety. The trimming of ballast to windward has often been adopted in sailing craft of various sizes, from small open boats up to racing yachts. It is a practice which was formerly very much followed in racing, but has been of late years falling into increasing disfavour, and

[Diagram: Pair oar with two lugs—Fore-lug Chinese]

her canvas, but on the contrary, by falling off, would feel the whole pressure, which, if greater than her stability, must capsize her. If the boat comes up to the wind, and will not fall off when the helm is put up, she is said to be headstrong, and the remedy is to bring some of the ballast from forward aft, until her head falls off from the wind sufficiently to fill the sails, when she will draw ahead, and yield to the power of the rudder. A boat is in her proper trim when, on the helm being let go, she will come up to the wind gradually, and only requires the helm to be kept a little up, so that she may feel the full benefit of the wind on her sails, and be maintained on her proper course.

If on the tiller being let go the boat luffs or turns towards the wind, she is said to carry a weather helm, which it is right she should do, because if caught in a flaw of wind, she will of herself luff or turn towards it, and by shaking the sails relieve herself of undue pressure, but if she carries too much weather helm, that is to say, endeavours to luff or turn towards the wind too strongly, this tendency has to be overcome by putting and keeping the helm too much up, which, although it may enable the boat to maintain her course, is only effected by the sacrifice of speed, because the rudder is thereby brought so much it is right that it should be so, because it gives a false stability to any craft, and can only be of use to make a boat or vessel stand up under canvas which her natural stability will not enable her to carry. In open boats it cannot be too strongly condemned, for they are obliged to be built shallow, and somewhat of flattened form in the bottom, that they may readily pass over shoals and land on beaches. Now, although this form is essential to open boats, and gives them the necessary stability, it is not the best for securing the ballast, and accordingly, as the writer has directed in another place, it should be prevented from shifting, by slips of wood screwed down on either side of it, or by a board about four inches deep, set on its edge and nailed firmly to the central bottom-board by nails from the under side, commonly known as spikes. This is an excellent arrangement, but may be put to a bad use by packing the ballast upon the weather side, which is true, will enable the boat to carry her canvas much longer than if the weight was in its proper place, but should the boat be taken aback, or the ballast be not changed to the other side with sufficient quickness in going about, an upset will probably occur, through the weight of both the wind and changed ballast being brought
on that side, which has now become the lee side of the boat. The writer would recommend all beginners, if possible, to make three or four cruises on tidal rivers, or any piece of water large enough to allow space for the working of a boat, before proceeding to sea, as a familiarity with the sails and gear in general, will thereby be acquired, which will give them confidence, and be of incalculable value, when brought into use on more open water. If this is not practicable, and from the nature of the locality they have no choice, but only the open sea to deal with, they should commence their practice of boat-sailing when the wind is very moderate, and particularly at such times as when it sets off the land. He does not consider it necessary to give relations of such cruises, as they would be more or less repetitions of the first, but he will suppose them to have been made, and that we are now on the point of starting on our second cruise, as we will term it, which is to be in the open sea.

THE SECOND CRUISE.

The accompanying small chart represents about six and a half miles of coast line, and extends into the offing in its widest part from the shore, to the distance of a little over two and a half miles. The general tendency of the portion of coast shown is from north-east to south-west, and there is a bar harbour near each end of the coast-line. A compass is delineated on it, but the letters denoting the points have been omitted, as they were marked in the first chart, to which reference can be made if necessary. The points are not marked in charts of modern times, every sailor learning to say them off by heart, or to "box the compass," as it is called, as one of his first duties. We take our departure from the south-westernmost harbour, and our track is denoted by the unbroken zigzag line on our outward course, our return by the broken line. The arrows show the direction of the currents; those feathered on both sides the flood, whilst the others feathered only on one side the ebb. The dotted spaces are the shoals and beaches covered at high water, and the crosses denote benches and scattered rocks along the shore. We leave the harbour at nine o'clock in the morning, at which time it happens to be high water; by doing this we shall carry the flood stream with us for three hours, when, weather permitting, we should reach the other harbour. In regard to the tides, there is a matter which often causes misunderstanding between landmen and seamen. It is this: that whilst landmen would apply the terms flood and ebb to the perpendicular rise and fall of the water, seamen constantly employ it to designate the direction of the stream. Now it often happens that the current continues to set along shore for two or three hours after high water, this current will therefore still be termed the flood tide, although the water is diminishing its depth, and ebbing out of the various harbours over a considerable district of the coast.

In like manner, the current may be running into a number of harbours, although the ebb stream is still continuing its course outside. No error is more common than to suppose that on the flowing tide the set of the stream is straight on to the shore, and on the ebb straight off it. Nothing, then, can be a greater mistake than such a supposition, for the water having been set in motion by the joint action of the sun and moon, does not immediately change its course when the exciting cause ceases, and is exerted in the opposite direction, but, having acquired a certain momentum, continues it for a time, until gradually lessening, it ceases, and after a longer or shorter period, according to the local configuration of the land, returns on the same track, its rate being ruled by the age of the moon, as well as accelerated or retarded through the influence of strong winds. During the six hours' continuance of the current the direction is by no means uniform, and in some localities sets on every point of the compass through both flood and ebb.

We have the wind from north-north-east, which is fair, for us to run out of the harbour, although a good deal against us as regards our destination. Hauling our boat ashore, we step our mast and hoist our fore-lug immediately we have pushed off into the stream, and put the boat's head in the right direction by aid of the oars. Passing the fall of the halliards round the belaying pin under the mast thwart, the writer takes it in his left hand, and that above the thwart in his right, leaning backwards and pulling violently at the same time, brings a heavy strain on the halliards, whilst he gathers in the slack with the other hand. Repeating the process, the
third time the sail is well set, as indeed it should be, a long
beast to windward being before us. This method of dragging
on the halliards is termed ‘swigging,’ and is in universal
practice amongst sailors. Setting our mizen, we ease off the
sheets of both sails, and the eddy tide as well as the
wind being in our favour, we are very soon abreast of the
point.

Since our last cruise our little ship has been in the hands of
the boat-builder, and has received a keel case and centre-
plate, from which we anticipate much advantage; and as we have a
long boat of turning to windward before us, we shall have a
good opportunity of testing our additional powers. Hauling
our sheets well aft, we lower our plate to its utmost, and shaving
the point as closely as possible without grounding, we put the
boat on the wind on her first board to the eastward, and stand
out from the shore about a quarter of a mile on the port tack,
as we have the wind blowing on the left or port side of the boat.
We find we can lay a course of not quite east by north, which
as the wind is north-north-east is about five and a third points
from the wind.

Smart yachts will go as near as four and a half or a little less;
but small boats have not power enough to make headway when
brought very close to the wind, and particularly when the
water is at all disturbed. As it is now high-water there is no
stream for a few minutes in either direction in the harbour’s
mouth, but as we get outwards we begin to feel a little of the
flood current, which will run to the north-eastward until
nearly three hours after high water. There is, however, a
good deal of disturbance as we leave the shore, and, thinking that to
keep the smooth water will be more to our advantage, we tack
for our second board towards it. In going about, the prop-
erties of our centre-plate develop themselves very strongly,
for there is no hesitation or slackness in stays, but the boat,
on the contrary, is round and away again on her course almost
before the helm is fully put down, the boat maintaining her
momentum, or as sailors say, “holding her way” against the
waves, thereby giving increased power to the rudder, which
therefore brings her round with great alacrity.

Our friend finds a considerable difference between sailing in the
harbour and in the open sea, the action of the boat being much
more lively; there is a certain amount of difficulty in steering a
steady course, and the boat consequently now and then comes
too closely to the wind, causing the sails to shake and lose part
of their propelling power; he is desired, therefore, to watch the
luff of the sail and keep it well full, to give the boat a fair-
choice of making the best of her sailing, which she cannot be
expected to do if kept too closely at it, or, as it is termed,
“pinched.”

Our boards towards the shore are in the direction of north-
west two-thirds north on the average, although the boat in the
flaws will sometimes come up a whole point, and when they
have passed, fall off as much, this variation of course almost
always prevails when the wind draws off the shore, as it is
very much influenced in its direction both by the configuration
of the coast line as well as by the elevations and depressions
of the land, in fact the currents of air at a headland often meet
and neutralise their respective forces, causing for a short dis-
tance a calm to prevail, until a certain space has been passed,
after which the wind again blows fairly, and good progress can
be made.

If the wind blows obliquely off the land, and the shore con-
sists of cliffs, the wind will be drawn towards them as much as
a point or more different from its general direction.

Having made four boards off the shore and the same number
towards it, we find we have advanced about two miles, or a
third of the distance towards our destination. On our last
board off the land we passed near a projecting point of the high
cliffs, which took away the wind for the time, we therefore put
cut our oars and pulled to windward in the smooth water for a
short distance, when we opened the line of coast eastward of it,
and felt again the true breeze.

We made our fourth board off the land somewhat longer than
the preceding, because from this headland there is rather more
tide going to windward, half a mile, however, we find sufficient,
as beyond this there is a considerable wash, which, unless the
tide is very strong, always checks the speed of a small boat,
we therefore again go about towards the shore, and stand
pretty closely in, intending to make a long stretch on our next
board, to keep the advantage of the tide, besides which we have
another headland to windward, which will help to smooth the
water. We prolong this board, which is our fifth from the land,
to the length of a mile and a half, when we tack again landward.
As we stand in we find the wind somewhat less, yet we still
continue to make good progress.

On going about for our next board off the land, the wind still
lessening, we put out an oar on the weather side, which, acting
against the sails, for a time gives good way to the boat, and
enables her to maintain her course; but after continuing it
half a mile, the wind falls so light, that it is evident we can
make far more progress by our oars alone, and we therefore
lower our fore-lug, and each taking an oar, pull direct for our
destination. We have traversed the larger half of our dis-
tance from our point of departure, but before we are inside the
other harbour, we have three miles more to accomplish.

As our centre-plate or drop keel is now of no service, we raise
it into its case, and, pulling off our jackets, lay out to our work.
It is somewhat warm, as the sun has shone out brightly since the
wind began to fall, but the water is fast becoming quite smooth,
which is commonly the case after a strong breeze off the land begins
to die away, and we consequently make good progress.

When, however, a breeze has been blowing some hours from
any direction seaward, although the water smoothens to a cer-
tain degree on its cessation, yet a considerable swell remains for
some hours, which has a great effect in retarding a boat’s progress.

On arriving abreast of the point of the sand-bank shown in the
chart, we begin to feel the tide is against us, for it is now
noon and half ebb, and we shall in consequence have a some-
what tough bit of pulling before we can make good our entrance
into the harbour. We skirt the edge of the sand on our port
side as nearly as we can venture without grounding, and
slanting across the main channel, which leads to the south-
eastward, we attain the beach on the north-eastern shore.
As we do not intend to return for some hours, we run our boat
abroad on the beach, and pitching out the anchor with half a
dozens fathoms of cable, leave her to herself for the present.

We do not return until 8 P.M., when we find our little ship
riding safely at her anchor, and are put on board by a friendly
boatman, who has kept his eye on her during our absence.

As it still wants nearly an hour and a half of high water, a
rather strong tide is yet flowing into the harbour, and as there
is not an air of wind stirring, there is nothing for it but to pull
and, pointing the head of the boat to the south-south-west, we
cross the harbour’s mouth diagonally, and reach the western
shore, along which we have a tough pull until we attain the
open sea, where the stream much diminishes in strength. After
pulling about three-quarters of a mile a light air begins to steal
over the water from the westward, but as it is not yet strong
enough to be of much use to us, we stick to our oars for
another quarter of a mile. By this time we think the sails
may help us, as the wind is a little stronger, and accordingly,
having first lowered our centre-plate, we set our canvas as
speedily as possible.
CRICKET AND CRICKETERS.

By C. W. Alcock.

“TO SHOW ITS FULL FACE TO THE BOWLER”—FORWARD AND BACKWARD PLAY—A GOOD PLAN—CRAFTINESS OF BOWLERS—DEFENCE—COMPOSITION—SEEING THE BALL—THE WICKET—PLAYING FORWARD.

I am compelled to call prominent attention to that first sentence, for thus, involuntarily, I have touched the mainspring of batting. Of the special merits of this full face I can give you one little illustration, though the subject may perhaps be regarded as hardly worthy of the occasion. A famous Nottingham player, known better to the generation that has just faded away than to the present, was standing one day as umpire in the ordinary fulfilment of an engagement he had made with a certain small school that used to be allowed the privilege of playing at Lords. With the honest scorn of a genuine cricketer old Tom B—had been watching the performance of his employer, whom no arts or device of the bowlers could induce to move his bat. At last, goaded on by the impatience of the opposition, came the appeal from the pedagogue to the cricketer. “Shall I be out B—as they tell me, if I don’t move my bat.” “I don’t know about your not moving your bat,” was the reply, “but I know you’ll soon be out if you do.”

The remark was quite correct, but the truth was unpalatable, and the post of umpire was afterwards filled by another form. The moral of the story is in the inference that it was the complete manner in which the wickets were protected by the bat that proved the safeguard of the timid preceptor. Had he for once forsaken his Fabian policy, and presented the side face of the bat, he would have fallen, and there might have been no need of a change in umpires. As it was, he served to illustrate in a modified way the force of a great cricket precept.

It would be to argue a great lack of appreciation on your part if I were to advocate the advantage too of presenting a full front to the enemy on mathematical grounds.

You hardly require to be told, I fancy that it will be materially to your assistance if you can face your foe and defend your wicket with a buckler or shield of four and a quarter inches in width, instead of a meagre makeshift of a cross bat or the side of the bat that does not exceed half that substance. It would be well for you to recognise the absolute importance of this truth at the outset, for the acquisition of this one accomplishment will save you endless trouble.

I know one of the most promising cricketers now in the south of England, whose play has been marred solely by the neglect of proper advice to remedy this one defect in the early stages of his cricket tuition. You can see that the bat is held slantingly; and you will hear the best judges decry, solely on this one ground, the merits of a young player who possesses every other qualification to take his place in the same rank with the very best cricketers of the day.

It is like the old nursery fable of Humpty Dumpty; all the king’s horses and all the king’s men cannot set Humpty Dumpty on the wall again.

I mean that, to eradicate the one fault, it will take time and labour that might be more usefully employed in promoting your advancement, even should you ultimately succeed in surmounting the obstacle.

Now I will take it for granted that you have learned how to grasp the bat properly, as well as how to present arms in the most approved fashion.

You will feel, I expect, that one great difficulty has been overcome, and that you are already beginning to feel your feet. You ought now to have progressed so far on the way to success as to experiment a little on your own private account.

Do not be impetuous, though, until I have finished the instructions that I am now giving you in the A B C of batting. You have hardly completed the primer yet, and you may fall at a word of five syllables that you hardly expected to meet.

I have told you what to do with your hands and arms, and now you must bear with me a little while I treat on the method of arranging your legs and feet.

You must first of all see that you form for yourself a position that will enable you to stand firm without yielding an inch, while at the same time it affords the greatest facility for rapidity of motion either forwards or backwards.

You must not indulge in eccentricities, after the fashion of the dancing bear, or your career will be ignominious. Above all things keep your right leg as firm as a rock, as this leg essentially forms the “pivot,” to regulate the movements of the batsman, and you cannot adapt yourself readily to the varying necessities of the game if the muscles be relaxed, the knee bent, and the posture generally that of a cat milant. Be sure that you insist on this stout support for your actions, for the posture of the other leg will be of minor importance or at the best a matter of choice.

It is marvellous to see the contortions in which some batsmen indulge, and still more surprising the success that attend some of those who affect the most eccentric attitudes. There are men who stand with their legs separated to the full extreme, after the form of the letter V in an inverted state, and others who give you the idea that they pay rent for the use of the ground, and are determined to occupy the very smallest possible space, so cramped is their attitude.

Steer midway between Scylla and Charybdis, and you will find the benefit of navigation in the deep waters of mid channel.

The portrait of Mr. W. G. Grace, which I introduced to serve as an illustration (page 260), will exemplify this combination of elegance and force that I wish you to have as your principal aim. There never was a batsman to instil terror so forcibly into the heart of a bowler, nor was there ever a player who could adapt himself more readily to the exigencies of the moment; and much of this success may fairly be adjudged to his happy method of rapid motion, to the benefits accruing from the adoption of a suitable position in conjunction with a great aptitude for decisive action.

You have much to learn, though, before you venture to imitate him closely; so that you had better select primarily an attitude less demonstrative and more indicative of caution.

Place your left foot about twelve inches in front of the right, and see that it is as nearly as possible at right angles with it. You will find that in this position your left eye will be just above the level of the left shoulder; and I know more than one
batman who insists upon this as an absolute essential to the acquirement of a good position.

Keep your bat well down, though not so close to the ground as to hinder your quick recovery in case of hitting; for mere defence of the wicket you will soon learn to consider tame and monotonous.

You are now to all intents and purposes flogged, and you will have to venture on your maiden flight. Whether you succeed or not, though, you must not be disheartened, for I warn you that vaulting ambition will surely overlap itself, and you will come to earth rather more quickly than you anticipate.

I have written at this length on the subject of position, for it is the main element in the formation of a batsman; and in the interests of the most genuine of our British sports I want every one of you to do credit to your preceptors.

To the more elaborate features in the art of batting I will soon introduce you at length, if you have patience to listen while I tell of "cuts" and "draws," of "hits to square-leg," of "off-drives and on-drives," of "playing forward and playing back," and of many other little niceties involved in the experimental pursuit of cricket.

If you place any reliance on my precepts, you must follow me throughout unconditionally, or I shall refuse to admit your claims on my instruction, and you can consider yourself discharged without a character. I promised you, if you behaved yourself, to introduce you to the niceties that mark the play of a skilled and accomplished batsman; and I will be true to my word, whatever may be the shortcomings of some of you. You have reached a certain amount of perfection, and you have gained a proportionate feeling of decision consequent on practice and the natural attainment of self-confidence. You have progressed so far as to experience little difficulty in playing a ball properly with the bat, when it is either so short-pitched that you have time to take it on its first bound, or when it is tossed so well up to you that ball and bat meet one another without the need of any extension of the arms or body. You have, in fact, mastered the first obstacle in the way of a young beginner; and we will allow you that your bat is as straight as it should be to satisfy the most exacting critic. You have passed the Rubicon, and you are well on the way to promotion, I readily admit. Only pause before you attempt any advance, until you have made your footing sure for an onward movement.

I want you now to overcome a still more important barrier on your road to success. To know precisely when to play forward and when to play back at a certain style of ball is an achievement in itself; but to decide on the precise course to be pursued, and to act with the requisite amount of resolution, is a feat that will take you some time to accomplish with anything like certainty. There are some batsmen who lunge out at every ball, and trust to their keenness of vision more than to any judgment in calculation to enable them to overthrow the best laid schemes of a bowler—to divert balls, that might have secured the collapse of many a batsman of more genuine pretensions to fame, into the next parish by a mighty swing of a stilted arm. You will find in every quarter some players who defy all recognised laws in the dispensation of cricket, and yet attain a success that is wanting to an honest and persevering disciple of the game. Some are strict believers in that canon of Danton, "P’audace, encore l’audace, toujours l’audace!" and, to do them justice, the manner in which they consistently "swipe" at every ball, whether it be on the wicket or yards removed from the regular track from stamps to stamps, should stamp their character for recklessness for ever.

Do not be misled by this species of sensational play, I warn you, for you will find that it is only a species of Jaqueroy that a little friction will very soon efface. The ambitious youth who "slogs," to use the apt phrase of the period, like every dog, has his day, but here his triumph ends; and when his eye becomes dim his failure is as lamentable as will your success be marked, if you are bent on acquiring a stable and honest method of play. On the art of playing forward and playing back there is groundwork for an elaborately treatise alone, if the subject had to be thoroughly exhausted. There is one representative class of ball in the hands of a good bowler that will unnerve the heart of the most expert tactician that ever handled a bat.

It is dangerous in its simplest form, for it requires promptitude and resolution to meet even when the ball is divested of spin or intentional gyration from the hand. If you mark out an imaginary line from wicket to wicket, and place yourself in the attitude of a batsman, at the same time placing a paper on the spot that seems to your idea to be the most awkward for the ball to pitch, you will soon discover for yourself the debatable ground whereon a bowler should seek to maintain his fire.

Mark out the bowling-crease, and place a piece of paper in a part about a yard in front of the popping-crease, and you will have gained the precise situation that I wish you to realise. To get a batsman into what is called "two minds" is the main aim of the bowler; and it is this very ball that renders him the most effectual help. Old Felix, one of the best and most qualified writers who ever discoursed on cricket, speaks feelingly on this point—"Every well-practised batsman knows there is a spot of ground—yes, there is a spot of ground—upon which if the ball should alight produces an indescendible sensation; and this indescendible sensation seems to be caused by the difficulty of being able to decide at the instant whether or not you should lung out to meet it, another it and kill it, or take it upon the back play. For when once you throw your body forward, in vain (should your judgment be incorrect) will you recover yourself time enough to overtake the ball."

You will see that I have not overrated the importance of mastering this special difficulty, so that I shall give in this paper some hints on the best policy to be pursued to meet the exigency of the case. I take it for granted that your bat never deviates from the strict perpendicular, as without this provision all tuition will be fruitless. You will soon discover yourself—on the supposition that you are called upon to defend your wicket against the attack of an expert bowler—in need of your best deportment. He will not be long, you may be sure, in hitting upon that precise spot of ground that you would wish him to avoid, and then you will either be completely at his mercy, or you will be able to exhaust his supply until he degenerates into a style of bowling less dangerous and more congenial to your wishes.

As a main principle, I would advise you, when you are in any doubt whether to play forward or back, to choose the latter course. If you hesitate, you are in most cases lost; for it usually happens that in halting between two opinions you make up your mind to play forward, and your tardiness in allowing the ball a chance of rising from the ground causes you to return it gently into the hands of the bowler, to your intense mortification and the grim satisfaction of the enemy. A propensity to any excess in this habit of playing forward is one of the most agreeable sights that you can present to a crafty bowler. I have seen instances out of number in which the skill of the attack has outweirded and outmanoeuvred the defence solely by reason of this one defect.

It is amusing to watch bowlers after the manner of Sountherton and Alfred Shaw beguiling these innocent batsmen to inevitable ruin. See Sountherton, trim in form, and so appa-
rently at leisure in his ways, gently dropping the ball by degrees more and more towards the desired spot, until the crack comes. Of course, this method of allurement on the part of a bowler has to be altered to suit the differences of various batsmen, and it must not be imagined that one stereotyped mechanical style has to be acquired. It needs no little skill, let me tell you; for a batsman gifted with such a length of reach as Mr. W. G. Grace would be able to send out of the ground the very ball that would cramp and puzzle a player sturdily as Jupp or short as Charlwood.

Defence, and not defiance, should be the motto of the young batsman, until he has proved himself able to take his own part against the attack from first to last with the same amount of confidence. Take care of the stumps, and the runs will take care of themselves. You must feel your way gently at the outset, until you have accustomed yourself to the style of the bowling to which you are opposed, and until you have begun to understand the plans of the attacking party. I must impress this necessity most forcibly on you, for it is a secret that you will soon be able to estimate the advantage of acquiring.

You will have a very important task to perform, believe me, if you walk to the wickets before the critical assemblage that watch your every action, when it becomes your good fortune to be honoured with an invitation to participate in one of the great contests of the season at Lords or the Oval. You will need some composition, Juvenia, my self-satisfied young friend, when you reach this first round in the ladder; and you will discover that the confidence with which you have been used to face the rustic delivery of Hodgson and Ruddyphilk, in the green meadows of Surrey or Kent, is a little shaken when you are summoned to meet such a crafty marksman as Southerton, in the view of thousands whose occupation is to criticise, applaud, or depreciate the cricketers of the period, in the magic ground of Kennington Oval.

You will probably reach your position at the wickets in a pleasant state of uncertainty as to your past, present, or future, and you will, under the influence of very natural excitement, attempt to reach Olympus in one stride. I mean that you will seek to immortalise yourself in the first hit, and you will find that you will have fallen never to hope again.

I want you specially to be prepared for such eventualities as these. It would hardly be natural if your first appearance in an important match were not to cause you some little perturbation of mind; and I would not give the conventional sum of twopenny for the young batsman whose enthusiasm did not create some little anxiety with respect to the result of his maiden effort.

You are sure to have some reasonable diffidence, but you will soon find that you gain all the confidence that you will need if you adopt this Fabian policy of playing steadily until the proper time has arrived for hitting.

If you survive the first two or three overs, you will have done a great feat, and you will insensibly begin to feel that the ball seems to grow larger and larger as the eye becomes more used to its curves, and the nerves become, as a natural consequence, proportionately bruised by the improvement of vision. I have heard some of the best batsmen, at the end of a long innings, when some unlucky and unexpected incident has secured their downfall, bewail their fate in a comical manner: “What hard luck, when the ball was as big as a balloon!”

I remember well Mr. W. G. Grace amusing several of the oldest frequenters at the Oval with the complaint that he was just beginning to get a good sight of the ball, when he had made upwards of a hundred and fifty runs, and seen every man of his side out in a match between the Marylebone Club and the County of Surrey.

To “get a good sight of the ball” is one of the most important aims of the batsman from the commencement of an innings will soon enable you to take more than to counteract the schemes of the most wily bowler. You will generally find that the weakness of a batsman is in the protection of his “leg stump,” and it is to this special subdivision of the wickets that most bowlers seek to direct their attack. It will hardly be necessary for me to explain which of the stumps is so called, but none the less there be some so far uninitiated that a definition may not be out of place.

The wickets are separately designated by the title of the “off-stump,” that farthest from the batsman as he stands in position; the centre one, as the “middle stump;” and that nearest to the batsman, as the “leg-stump;” from being most contiguous to his legs, from the obvious fact that he places himself on guard, just clear of the stumps, to prevent his body being in front of the wicket. Many batsmen prefer to take their guard so as to cover the middle and leg stumps, rather than the middle stump alone; but this is, after all, a matter of taste, and the advantages or disadvantages are only to be learnt by experience. I have already dwelt on the necessity of decision in meeting the ball, and the importance of immediate resolution either to play the ball forward or back. On these two methods obviously hang the main principles of batting, so that I shall now enlarge with some little freedom on the best manner of procedure in each special instance.

If I were to advance at the outset the opinion, that to be a forward player of any reputation requires the possession of singular elegance and majesty on the part of a batsman, you might think that I wish to advocate the adoption of a forward style of play under all circumstances. Do not be misled by any such supposition; for there are times when to play in this style is most injudicious, and there are, equally, occasions on which any other method of resistance would be as impolitic. If you wish to achieve eminence you will have, in some small measure, to make effect subervient to utility; though neatness of style, without doubt, does much in general to form the materials of a good batsman. There is a time for everything, and it is to the seasons for the use of as well as the avoidance of forward play that I am now anxious to draw your attention. You must make up your mind to adopt your mode of action at once when the ball is on the point of emerging from the hands of the bowler. Follow strictly the movements of the bowler as he advances to the wicket to effect the projection of his missile, and you will rarely find that your calculations with regard to the probable pitch of the ball are very wide of the mark. It is here that most batsmen prefer to face the attack of fast bowlers, as the ball travels so quickly that to decide and to play are simultaneous, so that irresolution is effectually prevented.

I recollect well the manner in which Mr. R. Lang, of the Cambridge University eleven, used to overthrow the wickets of most of the professional cricketers to whom he was opposed during the few seasons in which he was prominently before the public. I remember, with equal force, too, the remark of a celebrated professional batsman of Cambridgeshire, after an innings in which he combated with masterly resolution this same lightning species of bowling. “Whenever I saw his arm swing,” was the remark he made in answer to a question, “I played; and it so happened that my judgment never erred.” Every fast bowler now and again drops a ball so slow that it entirely overturns the ordinary calculations of the batsman; and it is this style, technically known as a “head ball,” that does most of the mischief.
ELECTROTYPING.

BY CHARLES HURST.

ACTION OF THE ACIDS—VARIOUS BATTERIES—WEIGHTS DEPOSITED.

It is not at first sight apparent what the arrangement named in our last is useful for. It is requisite to generate a greater quantity of electricity, so that the action shall be constant, unvarying, and rapid. A greater quantity of electricity is generated because there is a reciprocal action going on between the zinc plate, the liquid, the copper plate, and the whole apparatus.

If we could only now see the process by which Nature is aiding our operations, we should indeed be interested. The sulphuric acid is disintegrating the zinc, through the innumerable pores of its quicksilver-coated surface, thereby evolving an abundance of electricity, which in its turn is acting upon the water, separating its particles of oxygen and hydrogen, and endowing each with electrical life. By an inconceivably rapid alternation of decomposition and re-combination of the substance, water, the current pulses with the speed of lightning to the surface of the copper plate, which is acted upon more feebly by the acid, and so assumes a negative electrical state with regard to it, exercising thereby a strong attraction for the positively charged oxygen particles, and repelling or setting from the negatively charged particles of hydrogen. Then the current rushes through the wire to the positive electrode, and by it is communicated to the copper-saturated liquid, which in turn it decomposes, having the strongest affinity for its metallic particles, and inducing in them each the strange electrical property, impels them towards the negative electrode by the force of the current, under the inerterable law which demands the formation of a circuit. Something new has happened also in this latter part of the process, to give a new impetus to the motion, and to react upon the motion started in the generating cell. The liquid, robbed of its copper particles, acts chemically, by reason of the acid contained in it, upon the copper plate which forms the positive electrode, and dissolves it just sufficiently to maintain its own equilibrium: by that action generating now and positive electricity, which increases the quantity already in motion, and doubles the force of the action. Aided by these reciprocal impulses, the current speeds on at a rate altogether inconceivable by any effort of the human intellect, effecting such marvellous changes in its passage that, if only mortal eye could behold them, would strike us dumb with wonder.

It will be found that both the zinc plate and the copper electrode are dissolved in proportion to the amount of copper deposited on the negative electrode; and if it should be thought strange that the copper plate in the generating cell remains apparently intact, and the negative electrode actually receives an addition to its volume in the shape of the deposited particles, while both are exposed to the same chemically dissolving influences as the other two plates, it must be remembered that the force of the electrical current is setting strongly towards them (see page 201), they being in the negative or attracting condition, and thereby probably protects them from the action of the acid, thrusting it aside as it were with a force stronger than its own.

Having arrived at this point, that the object is to obtain electricity in quantity, we will now proceed to describe the various forms of apparatus that have been devised with that view. These are known by the names of their inventors, and are usually spoken of as Daniell's battery, Grove's battery, etc.

It is improper, however, to speak of a single apparatus as a battery, even as it would be to speak of a single cannon as a battery of artillery: it requires two or more cells to be connected together, in a way we shall shortly describe, to constitute a battery.

The arrangement just described is a single voltaic pair, or cell. We shall, for convenience, adopt the usual nomenclature, and commence by describing

Daniell's Battery.—This is a favourite arrangement, and consists of a porous cell placed in an outer vessel constructed of or lined with copper. An amalgamated rod of zinc is placed in the porous cell, which is filled with dilute sulphuric acid, and the outer vessel is filled with saturated solution of sulphate of copper, mixed with a few drops of sulphuric acid, and having a small cambic bag of crystals suspended in it, to be dissolved as the solution becomes weaker.

Our first single-cell arrangement can be converted into a Daniell's by simply bending round a sheet of copper to form a lining for the outer vessel. A wire from the zinc forms the positive electrode, and one from the copper cylinder the negative. (Fig. 1.) The advantage of this arrangement is manifold.

First, the negative attracting surface surrounds the positive generator, and induces more electricity; second, the hydrogen is not allowed to escape unused, but is arrested by the sulphate of copper, which it decomposes; and third, a constant process of loss and renewal goes on through the deposition of copper crystals on the outer cylinder, and the corresponding dissolution of the crystals in the bag.

All these are active generators of electricity. By the use of this arrangement, two depositing processes are therefore conducted at once, viz., that on the copper lining of the cell, and that on the model or mould; and this might appear wasteful, but that the deposited copper has a marketable value, and can be readily sold for jewellers' purposes, being pure and free from alloy.

It was in making experiments as to the best methods of generating voltaic electricity, that the beautiful process of electrotyping was stumbled upon. The decomposition of a sulphate of copper solution seemed to recommend itself as a likely method; and when tried and found to succeed, it was also discovered, without being looked for, that the result of the decomposition was a deposit of metallic copper, which showed the print of every line and scratch of the surface it was deposited upon. Thus, many of our most valuable inventions are the result of accident.

Grove's Battery is also a favourite, from the energy of its action. Our two original vessels can again be made to do duty. Within the porous cell suspend a slip of platinum foil, folded lengthwise without touching, so as to get as large a convoluted surface as possible, for the acid to act upon. Place the porous cell in the middle of an earthenware jar, and surround it with a
The substances which have been named, and many others, are known to electrical science for their positive and negative properties, their relative positions with regard to each other in that respect being well ascertained. The action of the different acids upon each of them is also well understood, and the superiority of one arrangement over another consists in the more or less ingenuity with which these different elements are combined. Some have a preference for one system, some for another, and the probability is that if advice were sought from a dozen experimenters, each would recommend a different apparatus.

Any of them may be procured complete from the manufacturing chemists of any large town. With a single pair on any of these systems, and with a convenient square depositing trough of sufficient size, the learner may obtain copies of casts, medallions, etc., large enough to form respectable ornaments for his walls, or may even make his amusements serve him for a variety of useful purposes, which will easily suggest themselves.

He must remember that, for copper deposition, what is wanted is volume, not intensity, of current. Some of the arrangements, such as that of Grove, are valuable for their intensity, and as such are not so suitable for this purpose, but for other purposes, of which we have yet to speak, intensity is a desideratum, and this is to be obtained in perfection.
by the most powerful systems arranged in the form of a battery.

We shall describe this in its proper place; so far as we have yet gone, we want only volume, and this is to be obtained almost without limit by increasing the size of the plates and the capacity of the vessels. "Give me," says Mr. Aitken, apostrophising the new power, "give me more elbow-room! Increase the capacity of my chambers; give me more cakes, more drink; lengthen my arms of copper wire; make my workshop bigger. I care not how far distant. I will work from eve to morn, from morn to dewy eve; I want no day of rest! Give me what I ask, and leave me alone to work." And by liberally acceding to these demands, the Messrs. Ellington have succeeded in depositing metal statues two tons in weight and from ten to fourteen feet in height, some of which may be seen adorning the world-famed Albert Memorial in Hyde Park, London.

**FENCING.**

By Major Hough.

**EQUIPMENT—BLADES—MASKS—FOILS—GLOVES—JACKETS—THIGH-PIECE—SHOES—THRUSTING IN CARTE AND TIERCE.**

Health and comfort will be promoted by wearing a flannel shirt and trousers under the defensive clothing, which must consist of mask, jacket, glove with gauntlet, and thigh piece or apron.

The masks must be made on the French plan of twisting the wire so as to form an hexagonal mesh (Fig. 1). English wire-work is unsafe, as the broken end of a foil would stab through it (Fig. 2).

The German foil blades that are imported from Soingen marked "King's Head" have the oldest reputations, but they are so generally imitated that it is difficult to make sure of getting them.

They generally sell terrible rubbish at the toy-shops. If you join a Fencing School or Club, of course the master will provide you with everything; it is his perquisite. For the jacket, some men prefer soft leather, lined and padded; others choose a leather which is stouter and stiffer, and requires no lining.

Some again are contented with a sort of right-armed breast-plate, buttonless, buckling round the neck and body; or, still seeking to be as cool and unencumbered as is consistent with
safety, they have a regular jacket which buttons up properly, but made with the right side of leather, the left of jean or canvas (Fig. 3).

The disadvantage of a jacket of this description is that it is useless if you wish to practise with the left hand; neither is it available for stick-play, should you desire to take a turn at that for a change, but, however it is made, it must be high and stiff in the collar, to guard the neck.

The glove must be nicely stuffed at the back of the fingers, and the thumb end well covered, to protect the nails in case of a jar; the palm of very soft pliable leather, so as not to interfere with the grip of the sword hilt; the gauntlet long enough to guard the wrist.

If you were certain never to meet any but cool, careful, and skilful fencers, all defensive clothing might cease at the waist, but as such a state of affairs only exists in Utopia, and we have not got there yet, you should wear a thigh-piece, strapped round the middle and the upper part of the leg, and having a flap to pass between the legs, kept in its place by a third strap fastening it to the waist behind (Fig. 4).

Or, if you prefer it, a leather apron will answer the same purpose. The instructor, having to receive the perpetual longings of his pupils, must wear a thickly padded breastplate called a plastron; this sometimes has a little heart of red cloth sewn on in the centre, to direct the thrusts.

The shoes should be soft and pliable, but we do not recommend india-rubber soles, which beat the feet. Some fencers like to have a broad flap spreading beyond and on both sides of the right shoe, while others cannot see any advantage in it: tastes and togs differ.

The great matter is to feel easy and comfortable, and not to wear anything which cramped the free play of the limbs or impeded the circulation.

We cannot too strongly urge you never to fence with a man who is not properly protected, with mask, and jacket at any rate. In a school, indeed, it is seldom or ever that you will find any one inclined to neglect such a natural precaution, but sometimes, in a private room, or the hall of a country house, you may meet one, a tyro most probably in the art, who will propose a bout at fencing, and simply pull his coat off.

Refuse to cross foils with him unless he will put on something more efficiently defensive than shirt sleeves. It is all very well for him to run the risk of being hurt if he chooses, but he has no right to put you in the way of incurring the danger of hurting him.

There is nothing more distressing than to inflict an injury on a friend while mutually engaged in sport; and, indeed, when such accidents occur the one who is injured may generally be considered to have the best of it.

Now, when a fencer longes in proper form, the straightening of the arm preceding the advance of the right foot, the impetus behind the light and slender foil is tremendous, at the moment the point touches the opposing breast, the whole weight of the man is pressing upon it.

Should the two happen to longe together, exchanging mutual hits, the shock is doubled, and one of the blades may possibly snap. Then who can tell where the jagged end of the broken foil may strike before the holder of it can recover? If upon leather, the damage done will be limited to the price of a foil blade; if upon flesh, a very ugly wound may be the result.

We once saw two very even fencers, who, though not rough as a general rule, got wild and breathless at the end of a long rally, in which neither gained the advantage, and longed together in this manner, exchanging mutual hits. One of them was wearing such a half-jacket as has been mentioned above, which only guarded the right side. The blade of his adversary snapped, and the broken part hit him on the left arm, which had been brought to the front, passing clean through the fleshy part above the elbow. Fortunately, he was a strong healthy young fellow, and his wound showed no bad symptoms, but it was a nasty, ragged cut.

There is another way in which an accident may happen; a sharp beat high up on the faible has been known to strike off about an inch of the end of a foil without either of the fencers perceiving it, leaving one of them armed with an unbeathed weapon.

There is an instance of this on record which is worth mentioning, if only for the presence of mind displayed by the man who suffered by the accident.

This was a French maître d’armes, who was fencing in his shirt, and, being overmatched, had retreated, till he was brought up by the whitewashed wall of the room in which the assault took place. Then his adversary, not knowing that the button of his foil had been broken off, attacked vigorously, and hit him in the chest, the blade passing through his body and sticking in the wall behind.

“Wipe the point!” he gasped to those who ran forward to withdraw the weapon. He did not want his chances of recovery to be lessened and the lacerated parts irritated by the introduction of grit. They did wipe the point, and he lived.

Now it is true enough that you might frequent a fencing school for years and never see an accident; but then, on the other hand, you might only go once and meet with one. It is sheer folly to risk it. Besides, danger apart, a thrust from a foil with the softest button on the unguarded breast is very unpleasant; and, altogether, you had better put implicit faith in the old saw, “There is nothing like leather.”

When a foil becomes bent, it may be readily straightened again by laying it on the ground, placing your foot upon it, and drawing it upwards in the opposite direction.

When a blade breaks, it is no very difficult matter to set another in the handle, if you have a vice, a file, a mallet, and a hammer.

First, the tang should be fixed in the vice, and the foil bent slightly so that the tang may run with the curve in the handle, and the point incline downwards and to the left. Then fit the guard to the shoulder of the blade, by filing the aperture, if it is too small, or introducing a piece of leather, if it is too large. Then drive the handle down with a mallet, tighten it with splinters of wood if there is any looseness, pass the end of the tang through the pummel, file off the projecting portion, and clench the end with the hammer.

These hints are not intended for the dwellers in towns where gymnasiums and fencing clubs exist. But it sometimes happens that a few neighbours desire to enjoy the pleasures and advantages of fencing in a place where they have to provide their own tools, accoutrements, and instruction, and to them any practical details will possibly prove of value.

It may be well to mention here that any fencers thus situated should make it a rule to go through a longing lesson before they commence; first one putting on the plastron and acting as instructor and then the other. A very simple exercise will suffice if the men have but once learned, say this—

On guard, engage in quarte; disengage, longe, recover in tierce.

Engage in tierce; disengage, longe, recover in quarte.

Engage in quarte; mark one, two, longe, recover.

Same from engagement in tierce.

Engage in quarte; disengage, the instructor passing with the counter, follow him round, longe.

Same from tierce, longe.
Round quarte; round tierce, longe.
Instructor disengages; parry simply, longe.
Instructor disengages, parry counter, longe.
Engage in quarte; beast and longe.
The same; beast, one, two, and longe.
Same in tierce.

In these exercises the pupil must touch the plastron when he longes. The instructor, when he disengages, need not longe; it will be sufficient for him to point his foil towards the other’s breast, to show the attack. To fill his part usefully he must pay great attention to the other’s form, and check him if he fails to straighten his arm properly before longing, if he bends forward, overlongs, leans on the plastron, or is slow in recovery, or neglects to lower his left arm. The pupil in longing at the plastron is to relax the grasp of his fingers and raise his hand as high as the face as his point touches.

If you cannot get any one to take the part of instructor, longe at the wall, paying strict attention to the position of your arm, body, and legs, for a little time before commencing loose play. By this means you will in some measure check the deterioration in style, which is apt to attend too constant fencing without intervening lessons from a qualified master.

For a couple of ordinary amateurs to attempt to practise the more intricate exercises together would, however, be of such doubtful advantage that we do not think it advisable to give them here. But there is another way in which steadiness and a correct position may be maintained, and that is by two fencers keeping up the old-fashioned custom of

THRUSTING IN QUARTE AND TIERCE.

before they commence loose play.

The exercise, which is a very showy one, is thus performed:—The fencers, fully accounted, with the exception of their masks, which are laid on the ground behind their backs, face one another in the upright position, with their left hands hanging easily, the palm upon the thigh, the points of their foils presented towards each other. They, then, bringing their weapons to their left sides, raising both hands above their heads, as shown in the first article (on position), they come on guard, crossing swords in the engagement of quarte, beat twice with the right foot, and expose their breasts, with their hands in tierce. Then one proves distance, by longing in quarte, reaching, but not actually hitting the other. Next, both rise to the upright position by bringing the right heel to the left instep, and salute the spectators by turning the sword hand to quarte, to tierce, with corresponding movements of the head and eye, and then saluting one another in a similar way, they bring the foil to the left side, and come on guard as before, repeating the movements of raising both hands above the head, etc.

The one who has proved distance now disengages into the outside line high, nails up, maintains the opposition of the blade, and directly the disengagement is fully developed and the other’s parry felt, slackens his hold upon the grip, and, by reversing his fingers, turns the point towards himself, the pumel towards his adversary. In this position he rests a little on the longe (Fig. 5).

Meantime, the other parries tierce, on the disengagement, and presents his point as in return of seconds, but without touching. The fencer on the attack recovers in tierce; disengages in quarte, again reversing the point, in this instance towards his right shoulder, the pumel towards his adversary, the eye glancing over the arm (Fig. 6).

The defender parries quarte, and presents his point as in the return of septime (a half circle), but without touching.

After repeating these longes a few times the fencer on the attack passes in quarte, beats twice with his foot, and offering his breast, by turning his hand and blade aside in tierce, affords the other the opportunity of longing, in his turn, to prove his distance. Both rise to the upright position, salute to right, to left, to each other as before, and fall on guard. He who first attacked now parries, and vice versa.

Upon the termination of the thrusting, the double beat with the foot, and the one, too, both regain the upright position, and then move the left foot one step backwards, falling on guard; beat twice with the right foot; bring the left foot up to the right, again assuming the upright position, salute in quarte and tierce, fall on guard, the right foot in advance of the left, beat twice again, bring the left foot up to the right, reassuming the upright position, and at the same time salute each other by bringing the hilt up to the mouth, and lowering the sword slowly.

Captain Chapman likewise recommends practising the counters of quarte and tierce: the fencers dispensing with the salute, wearing their masks, and longing with the intention of touching, but always waiting until the position of defence is perfectly recovered before passing the disengagement.

After a few thrusts, on both sides, from the engagement of quarte, and upon which the counter of quarte should always be taken, the players should change their engagement to that of tierce, when, upon the disengagement and longe, the counter of tierce becomes the necessary parry.

The two diagrams (Figs. 7 and 8) representing the positions of the hand and hilt, while resting on the longo during the performance of the salute, are taken from Captain Chapman’s admirable work, “Foil Practice.”

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ANGLING.

By Greville Fennell.

A GOOD test of a small hook is to see if, when properly whipped, it will pull into a piece of soft leather; if it will not do this it is worthless, for although it may be well in the mouth of the fish at the moment of the striking, it will pass out again harmlessly, or at most with a mere scratch in its progress, without penetrating any available portion of it.

Of course this observation does not altogether apply in those cases in which the fish is expected to gorge the bait, under which circumstance the hook has a greater chance of attachment, although even then we have known hooks pass out freely, despite of the desire on the part of the fish to retain the bait.

Indeed, it is well known to pike-fishers, that armed as is the
THE POPULAR RECREATOR.

leaded gorge with double hooks, the fish often casts it forth at the moment previous to capture, if the hooks possess the defect in question.

At the same time it ought to be stated that the facility with which the bait is sometimes rejected arises from the barbs of the hooks not setting outwards sufficiently far, or their barbs, getting embedded in the bait, having no power to act. But of this more anon.

As a rule the point of a hook ought to turn in in inverse proportion to the length of the shank. This is the reason that hooks with a portion broken off the shank rarely answer, as the hook that will pull in well with a long shank is usually worthless when the angle of pull is altered.

The points of all hooks ought to be kept extremely sharp, particularly when there is any chance of a barbel, as it is a great trial to fine single hair to strike a hook below the barb in the thick leathery mouth of that fish.

Many hooks on angling recommend a small flat file to be kept at hand, wherein to sharpen the point of the hook; but the writers, it is manifest, never tried what they suggest, or they would have found that from the hardness of the steel used in hooks such an application would have a reverse result, and the file would suffer from the contact. Let the angler use instead a small piece of Turkeystone, and he will at once have all he requires for this purpose.

The points should be rubbed square or in an angle, and not rounded, as the edges when left sharp are less liable to tear, and penetrate with greater facility, as does a glover's needle into leather.

The form or bend of hooks is of importance, for herein likewise consist their penetrating power. This may easily be determined by taking the "Limerick," "Round," "Kendal," and "Sneek" shaped hooks, and, by the gut to which they are connected, pulling their respective points into a piece of close-grained cork.

To ascertain the pressure necessary for each, place the loop of the gut over the loop of a pocket steel-yard, and pull the finger ring of the measure until the barb is thoroughly buried in the cork to a proportionate depth, watching at the same time the extent the index travels.

Experiments thus made by Mr. Pennell, have shown that the pull required in the "Limerick" over the "Sneek," is just double, and that the "Round" and "Kendal" are between the two, thus giving the preference to the Sneek as requiring less force to cause it to do its work effectively.

Limerick Farrows, No. 2  3 lb. average pressure required.
Round  "  "   2½ "  "  "  "
Kendal  "  "   2½ "  "  "  "
Sneek  "  "   1½ "  "  "  "

There is a hook called the "Sprout," which is also very highly spoken of.

In carrying out this experiment care should be taken that all parts of the hook, excepting the point, are perfectly free from contact with the cork.

The cause of this very great disparity is easily explained. It depends almost wholly upon one thing—the angle of impact, or the angle at which the barb meets the mouth of the fish. Examination of the shape of the hook, and, still more, a trial of the experiment, will show that in the Sneek, more than in any other bend, the angle is coincident with the direction of the line—that is, with the direction in which the pull or stroke comes; so that the penetrating pressure is applied nearly vertically instead of more or less laterally.

Thus there is no waste of force, and the resulting penetration is increased and aided by the perfect straightness, from point to point of the barb portion of the Sneek-hook, a particular in which it is rivalled by no other bend, and approached only in one, the Limerick.

It is obvious, therefore, that with a hook of this shape, fine wire in their manufacture will possess qualities equal, or in excess, to much coarser wire in which the form is misdirected.

Mr. Francis Francis, upon this all-important point, tells us, in his "Book of Angling," in reference to reach hooks, that "Probably more thought and care have been bestowed on them than upon all the others put together; and yet many of the patterns are not only bad, but execrable. As a rule the shanks are almost always too short to strike properly. Take an ordinary short-shank reach-hook, just fix the point in a stout piece of paper, pull the gut gently, and see what ensues, and the position the hook takes. The shank of the hook and the gut will form a small obtuse angle, in some cases almost a right angle. The whole strain falls on the inside of the point instead of directly on the point; you may pull, but the effect is not to force the point in, but to tear the hook open. Consequently, with such a hook, when the sharp stroke peculiar to reach fishing is given, the hook springs outwards instead of burying the point and barb, unless the wire of the hook be so coarse and unyielding as to refuse to spring, when a much harder stroke than would be necessary if the hook were of the proper shape, may perhaps effect the object. But it has been the practice of reach fishers to discard hooks of coarse wire, and to insist upon having a hook with a very fine wire, in order that the gentle or maggot, which so many use for a bait, may be threaded on the hook with the least possible damage; and the consequence of this has been that anglers have considered the bait too much for the hook, and consequently they have been using the very worst possible hook they could adopt for their purpose—very short in the shank, round and broad in the bend, with (if anything) an out-turned point instead of an in-turned one, and fine in the wire, so as to spring rather than penetrate. Consequently the point only gets fixed, the fish gives a turn over, or comes half way home, and gets off; and when this occurs it often spoils sport, as it by no means improves a reach swim to have a dozen or so of well-pricked fish in it. I have seen hook after hook of the above description positively give and open and become utterly useless in a dozen swins, and so, no doubt, have many others."

Mr. Francis adds that "if roach fishers must have hooks of this shape, the wire must of necessity be coarse to give any chance of hooking at all a fair proportion of fish. We, however, greatly prefer a hook with a turned-in point, and a shank of sufficient length."

We have quoted enough to show what a divergence of opinion exists in reference to the subject of fine or coarse wire; but it should be borne in mind that if a worm is to be the bait, it does not matter much how coarse the wire may be. Indeed it is rather an advantage, as it is less liable to tear and damage the worm.

Not so, however, where the bait you are using is a gentle or maggot, the comparative smallness of which renders a finer perforation necessary, and the toughness of the skin protects it
from that ripping-up to which the worm is exposed, while the aperture, being small, does not permit of the intestines of the gentle to escape and leave on the hook a piece only of untempting skin.

It is therefore our opinion that, given the proper shape to pull straight, and a gentle or paste the lure, the hooks may be of fine and properly tempered wire, and this is the opinion and practice of many of our greatest metropolitan roach fishers, who, indeed, make these two conditions imperative, and to whom a coarse and consequently clumsy roach-hook is both unsportsmanlike in appearance and fatal to the neatness and preservation of their favourite baits.

The importance attached to the shank is borne out by the following experiment:—Take a long-shanked hook, and tie three pieces of gut to it at three different points along the shank. Fix the point, and then pull each gut alternately, and it will be at once perceived how much more advantage there is in a tolerably lengthy shank than a short one. The barb should not be too rank, as it is not only quite unnecessary, but requires a harder stroke than could be given, and is liable to be broken in the frequent unhooking, and occasional contact with bones, etc.

Hooks for spinning, trolling, fly-making, and other special purposes will be considered under those heads.

It may be, however, well to remark that in the whipping on of a hook, whether upon gimp, gut, or hair, we should be particular in placing the line inside the hook, as in that position it is greatly removed from the chances of wear, and the pull is improved if anything by this means, particularly if the gut be of a coarse nature, or when the hook is tied upon bristle.

The improved eyed hooks which we have constantly used for worm-fishing, since their introduction in 1866, have the eyes carefully drilled through the shank, and must not be confounded with "loop" end hooks. The hooks in question can be attached to both single and double gut, and it seems to us that it is almost impossible that when once tied as these are, that the gut can ever slip or draw through the eye, which sometimes occurs in ordinary whipping with silk.

The shank being thus left bare and free, the worm or gentle can be threaded with greater facility, and, being carried over the knot, is retained in its proper position.

As we write for those abroad, who cannot always help themselves, as well as those at home, who may be presumed to have every appliance at their disposal, we here give an illustration of the method of using these patent Warner hooks.

First soften the end of the gut by steeping it in water, or by holding it in the mouth for a minute or so; then thread it through the eye, and draw it out about an inch on the other side; turn the short end round the shank, and pass it through the loop thus formed, as in Fig. 1, and draw the knot close.

Then pull the long gut tightly from the hook to the other end, to make the knot neat and firm, and also to test the gut.

Then, with the short end of the gut, tie another knot in the usual way round the end of the shank and the gut, as in Fig. 2. This will keep the gut in the groove, and prevent it from chafing.

Lastly, finish off with a similar knot around the gut, and close to the end of the shank, and cut close (see Fig. 3).

The eyes in the larger sized hooks will take stout double or treble gut, or a single gut can be twisted double by the following simple method:—

Select a long gut, thread it through the eye, and draw it out to about the middle of the gut. Tie it as above directed. Divide the two ends, one on each side, and between the thumb and finger of the left hand; then, with the finger of the right, twist the gut down from the hook to the other end. The twist can be "set" by holding the gut in both hands and passing it quickly through the flame of a candle or gas.

This plan will answer well for sea or ceil fishing. The strain or pull will be likewise equal on both sides the hook.

Although this plan of tying may at first sight appear rather complicated, it will, after a trial or two, be found a simple and effectual mode of fastening on a hook.

In the short-grooved hooks, used principally for flies, only the first and last knot is required. It has been said that small hooks, even if they could be drilled effectively, would not possess an eye sufficiently large to admit the thickness of gut; but as gut is now "drawn" by machinery as fine as hair, this objection is removed. Still, gut thus drawn is not to be depended upon, as the process has the effect of breaking and over-straining the fibres of the silk of which it is composed; but no such objection can possibly exist against single hair, which is commonly used on the Border and more northern rivers for trout.

We here anticipate the remark which may naturally be made by the inexperienced, that in their youth no such fuss was made about the pull, bend, or shank, nor did they require needle-eyed hooks, an ordinary benten pin doing all the offices which their demands required. We beg in reply to say that this is a vulgar error, sanctified by time and the mists of recollection. Fish of any description were seldom hooked and caught with benten pins, that simple instrument being merely used upon which to attach the worm, and the greedy minnow or prickle-back, having sucked in the end of the worm, was lifted out of the water, not by the attachment of the hook, but by the bait itself, from which the tiny fish could not get free.

Many are the troubles which arise from playing with edged tools, and the uses of hooks are not an exception. Should you, however, hook yourself instead of your fish, first calmly review the difficulties of the situation. If it has only penetrated your garments, a thread or so of the fibre at the most is all that need be sacrificed. If, however, it has entered your flesh, detach the hook from the line, and instead of attempting to withdraw the hook by the same way as that through which it entered—always premising that the barb is large and rank—strip the shank of its whipping as clean as possible, and then carry the point round through the flesh and draw the shank out through the second aperture.

It is a common practice with many fly-fishermen, after placing their rod against a tree or other object, to keep the fly they are about to change for another between their lips for the convenience of arrangement. A breeze of wind or other cause carries the rod silently from its perpendicular position and the angler suffers
the fate of his victims, and is hooked either by tongue or lip. In this case it is better to let another person operate, either with a sharp instrument cutting down to the hook, or treating it as we have directed; but from the greater tenderness of the lip and tongue—although the latter heals with marvellous rapidity—an incision with a sharp penknife to enlarge the orifice may be preferable to stripping the hook and further increasing the pain by the metal travelling through fresh regions of nerves.

A friend of ours, a well known salmon-fisher, once presented himself at a pic-nic in Wigtownshire like a Sioux Indian, with a large gaudy salmon-fly attached to the divisional cartilage of his nose, and when he declared the fact that he had persevered in fishing all day on the Lune after this accident, with the feathered appendage supplementing his moustache, it by no means tended to remove the question of his sanity, to which his first appearance thus adorned amongst the group had given rise.

One objection which we have heard to the Nottingham reel (Fig. 4) is, that the line, becoming saturated in its use, the water is squeezed out by the winding-up of the reel, and, running down the butt of the rod, wet the angler’s sleeve and legs. This, it is suggested, can be obviated by wearing a maclintosh apron, or by using a guard to the reel between it, and the grasp, which may be made of wood, metal, or any substance sufficiently stiff to direct the flow of moisture from off the tackle at once.

These precautions are superfluous, say some, if the rod is rightly handled. Let the angler, when he makes his cast, and before the bait drops in the water, raise his rod, and not lower it again while reeling up. This would certainly obviate the difficulty in some degree. But this plan of working the line must of necessity cause the bait to spin very near the surface, where, during the best pike-fishing months—and these often the wettest—one does not expect to meet with the most or the largest fish.

A bit of mutton suet slightly used on about ten yards of the line before beginning to fish, or upon as much line as is to be thrown out, is useful, and prevents the water clinging to it. But it is just to add that really well-made lines require no such protection. It is a proof, indeed, that a line is far from perfection—too soft—that is not sufficiently closely plated, if it holds moisture to any appreciable extent. With such a line, the habit of holding the rod low and too close to the water must thus increase the evil, for nearly all the line out is subjected to saturation; and setting this aside, the strike in case of a run or seizure from a fish is much weakened by the friction of the water, more particularly if any very great obtuse angle is to be overcome before direct action ensues.

But how to use this exceedingly touchy apparatus is the question; and one of the finest trials of patience is certainly to be seen when the fisher takes it in hand. He casts off, and whir goes round the wheel, and out flies the bait. But the knack has not been achieved, for the wheel having received an undue velocity, not compensated by the line, turns perhaps ten or fifteen times after the line has ceased to travel, the consequence of which is that the wheel, instead of giving out, takes up the line and over-rides it. Our first attempts were thus marked with disappointments, although we practised for some time upon our own lawn before we essayed the stream, until we had well overcome its vagaries, which often ended in a hopeless mass of tangle and loops, only to be let free by the application of the knife, at the sacrifice of several yards of good line. But this was nothing to some of the distresses we have witnessed, which have been seriously comical: the flight of the line receiving a check, maybe when only half out, causing the row of spinning hooks to fly two or three times round the angler’s body, and actually to tie him up in such a manner that he could only be extricated by desperate means. We have seen line after line severed in furious rage at these vexations events; but anger aggravates the evil. Patience and perseverance and a lesson from a master hand, triumphed at last, and when the art of throwing your line clean off a Nottingham winch is once acquired, the advantage it has over the ordinary winch, or with the line coiling at your feet, is indeed supreme.

Our lesson is worth recounting. It was given to us by Mr. Morley, of Nottingham, the well-known tackle maker. Fitting up a rod, he placed it in our hands, and bade us show him how we would cast it. This we did instinctively in the ordinary way, by partly turning our body. This was a radical error, to be at once unlearned: the body should be kept perfectly motionless, and the arms, from the elbow alone, employed. We held our rod with one hand about eighteen inches above the winch, the other hand below. This was right so far, but the left hand should be close under the winch, so that the second finger and longest digit could touch the revolving portion of the winch when required, and thus act as a break or skid upon its too great impetuosity. Here then, were two of the most practical hints, and they will doubtless occur as forcibly to others as to ourselves.

But there needs extremely great practice in applying the finger, as it must not be done suddenly, or the line would be arrested in its flight, and confusion would arise, nor too slowly; indeed, very nice judgment is requisite, which, once attained, will be applied instinctively, circumstances varying with the weight of the bait, the distance to be thrown, and the lightness or otherwise of the descent of the lure. Then there are other considerations—banks, trees, bushes, direction of wind, weeds etc., which may require a slight deviation from the above precept, and you must turn the body a little round to get a swing, but not to get too much power; do it gently, letting power and force be subdued by tact, and if it is to any particular spot you wish to cast your bait, look rather at that spot than at the bait itself.

The winch, moreover, should be held partly sideways, so that the line shall not get over the side between the rod and the reel, and the line is always to be reeled up (except when in exact-throwing a few yards are drawn out), and not suffered to hang, as with the brace contrivances (Fig. 3).

We have already made mention of the remarkable lightness in weight of the lines adapted to these reels for roach-fishing. Fifty yards of trolling-line of the best silk, plated, weigh but three-quarters of an ounce; one hundred yards of spinning minnow-line weighs but the same; and one hundred yards of line for bottom fishing weighs but a quarter of an ounce, yet are these lines fully equal to the strongest fish for the capture of which they are designed.

A very great advance has been made in modern times on the old-fashioned brass winch. In some cases the form is improved, and made more elegant and effective, without disturbing its simplicity; in others an entirely new material, termed ebbonite, is employed, doing away with much of its weight. However, bear in mind, that whatever rod is used it should be of ample size, to let out or take in the line easily and quickly, and be without checks or stops of any description. Perhaps no better fittings exist than the simple sliding and fixed rings, as shown at Fig. 5.

The clearing ring. In the Thames and other navigable rivers in which every impediment to navigation is removed almost as soon as it is occasioned, the clearing ring is seldom called into requisition, but in streams left in part or entirely to Nature it is a companion which should ever be at hand.
of spinning hooks, trace, swivels, and leads, the loss may prove a great mortification, the more, as it may not readily be supplied. Yet this is a constant source of vexation in waters in which trees are left to fall, sink, and rot, or piles have been purposely driven, armed with tenter hooks, not to catch the lawful angler's line, but the marauding poacher's net.

Under such circumstances the clearing ring, either of skilled manufacturer or of home construction, becomes a friend indeed.

**BICYCLING.**

**By Charles E. Innes.**

**MAPS—SPEED—PRICES— TO MAKE A BICYCLE.**

In taking trips it is necessary to be provided with a good map of the district—these are easily obtainable; and, having your map with you, it is better to trust to that than to local information. Experience will always enable you to judge for yourself which is the best road to take; whereas, by attempting to follow the advice of the country people, you will often find yourself on roads practicable enough for carts, but anything but pleasant for bicycles. In the matter of food a very good motto to follow is "Little and often." Heavy meals should be avoided, but a few sandwiches taken at frequent intervals will keep off that terrible feeling of utter emptiness, which otherwise is so apt to assail the travelling bicyclist.

As much doubt still exists in the minds of non-bicyclists regarding the capacity of the two-wheeled machines for getting over the ground; and as comparisons are often made between them and other means of progression, it will not be out of place here to refer to some of the actual trials of speed, which have been made at various distances, and compare the results with those obtained by other means.

In December, 1872, a match came off at Little Bridge between a pedestrian and a bicyclist, the conditions being that the latter should travel fifty miles against his opponent's twenty, virtually giving the walker thirty miles' start. The machine used on this occasion was a Surbiton, with a fifty-three-inch driving wheel, and it proved itself fully equal to the occasion.

The first six miles were walked in 1 hr. 2 min. 8 sec., whilst the rider covered the same distance in 25 min. 11 sec.; the ten miles occupied 2 hrs. 10 min. 10 sec. in walking, against the bicyclist's 42 min. 39 sec.; and at 18 miles, accomplished in 3 hrs. 29 min. 30 sec., the pedestrian gave up, hopelessly beaten, his antagonist continuing his journey to the end, finishing the fifty miles in 3 hrs. 34 min. 25 sec. The last mile was done in 4 min. 25 sec.

In this match the machine was undoubtedly one of the best that could be procured, and its rider, though not a professional, far above the average. Still, as a test between bicycling and walking it was fair enough, few men probably caring about walking their 51 miles an hour when out on a tour—a rate of speed which was in this instance exceeded by the looser.

Of course it is impossible to take the above times as a criterion for a fifty miles' journey on turnpike roads, over hill and dale; but looking back some months previously we find an account of a handicap race from Knightsbridge to Brighton, where the winner of the second prize, on a forty-four inch machine, covered the whole distance (about fifty-three miles) in five hours and a quarter, running from London to Crawley without stopping.

This is a good example of what may be done, for travellers by the Brighton coach can testify that the road is by no means a level one, and that the hills are many and steep, notably the long drag up over the Clayton Tunnel; at the same time it by no means follows that in a few years this feat will not be put in the shade, considering the improvements that are constantly being made in bicycles, for it is only a few years ago when the same journey occupied ten hours, which was at the time considered fast travelling.

Another fast run on the high road was made from Kingston to Guildford—eighteen miles from mile-stone to milestone, against a head-wind, in 1 hr. 7 min. 30 sec.—to test the speed of a fifty-three inch machine, used on this occasion, against one with a forty-eight inch driving wheel, which had previously taken 1 hr. 14 min. to make the same journey under more favourable circumstances.

It was at Wolverhampton, however, that some of the fastest races were run, a ten-mile race having been won there on a fifty-five inch Surbiton in 35 min. 30 sec.; whilst the fastest mile on record was also run there in 3 min. 6½ sec.—not bad travelling when we remember that it generally takes a first-class pedestrian 44 min. to cover the same distance, running at the top of his speed, whilst it took Ellington 3 min. 4 sec., in 1856, to win the Derby over a course of but half a mile longer.

Notwithstanding the increased height of the driving wheels at present used in fast machines, the weight of the whole bicycle has been reduced to little more than half, many of the old description weighing over seventy pounds, whilst they can now be made, if necessary, under forty pounds.

Bicycles may be procured at any price ranging from £3 to £21, according to their size, quality, and design, but for £9 or £10 a very good average sized one can be bought. By applying to any of the bicycle makers the prices of their machines can always be ascertained; meanwhile, the following figures will give a general idea of the cost of some of the best classes:

<table>
<thead>
<tr>
<th>Diameter of driving-wheel</th>
<th>Size</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>44 in. to 46 in. Nickel, plated all over</td>
<td>20 10 0</td>
<td></td>
</tr>
<tr>
<td>Ditto</td>
<td>16 10 0</td>
<td></td>
</tr>
<tr>
<td>Ditto, Painted</td>
<td>15 0 0</td>
<td></td>
</tr>
<tr>
<td>46 in. to 50 in. Nickel, plated all over</td>
<td>21 0 0</td>
<td></td>
</tr>
<tr>
<td>Ditto</td>
<td>17 0 0</td>
<td></td>
</tr>
<tr>
<td>Ditto, Painted</td>
<td>15 10 0</td>
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</tbody>
</table>

The above prices are for first-class machines, with patent anti-friction bearings to the front wheel, improved guiding arrangement, india-rubber tires of the best design, step, break, and ebony handles complete.

A second class of machines, similar to the above, with the exception of their having hardened steel bearings instead of the patent anti-friction ones, come to about £2 less, whilst yet a third class can be turned out for about nine guineas, with
gun-metal bearings and a different sort of india-rubber tire.
To those, however, who cannot afford to give such high prices,
as also to those who, living in the country, would wish either to
make a machine themselves or get the different portions made
by the local blacksmith, and then fit it together, we recommend
the following description of a bicycle, that will not cost more
than from £3 to £3 10s.

The diameter of the front wheel in Fig. 1 is thirty inches,
that of the hind wheel twenty-six inches, and they might be
bought made of wood thoroughly well finished, including iron
tires, for about twenty to twenty-five shillings, but very often
good second-hand ones may be met with at about half this
price. The remainder of the machine, (with the exception of
the steel springs, and the handles, which are wooden) should be
made of wrought-iron.

The iron-work (a, Fig. 2), to the ends of which are fixed
the handles, may be made five-eighths of an inch in diameter,
curved as shown, and swelling out at b to enable a hole to
be bored, through which the spindle of the front fork passes,
and a nut (c), screwing on to the top of the latter, keeps it in
its place.

The handles themselves may be of almost any description;
and if there is no turner in the neighbourhood, a pair that will
answer the purpose might be taken off some other sort of
implement.

The front fork (d n) should be flattened out to an inch in
width on the side faces by a quarter of an inch thick, whilst
the upper part of it forming the spindle or staff should be
 circular, three-quarters of an inch in diameter.

The axle should be seven-eighths of an inch square, but
three-fourths of an inch circular at n where it bears in the
front fork.

The crank a to be three-quarters of an inch by three-eighths
of an inch flat iron, on the lower of which flat wooden treads
may be attached.

The spring (x, Fig. 1) to be flat steel one and a half inches
by a quarter of an inch curved, and fixed to the backbone near
the spindle by two screws, as shown at t, Fig. 3, whilst at the
other end it is supported by two short pieces of bar iron three-
quarters of an inch by a quarter of an inch on either side of the
back-bone, thus (Fig. 6):—

- n. Side-support, 3/4 in. + 1/4 in.
- l. Backbone.
- x. Method of fixing spring.

On this spring the saddle (x, Fig. 1) is fitted so that it can be
shifted to any position required. The backbone (h n, Fig. 1), is to
be seven-eighths of an inch diameter till within fourteen inches
of the after end, where it is bent to allow room for the hind wheel,
it may be reduced to three-quarters of an inch (see Fig. 7).

- a. Backbone, 1/2 in. diameter.
- n. Axle for hind wheel, riveted into backbone at o.
- w. (Fig. 7.) Hole for spindle to pass through.

It will thus be seen that a hind fork is dispensed with; the
backbone, by being bent in the manner shown, allowing the after
wheel to be fixed to it alone. It will be observed that the
method of attaching it to the spindle reduces the friction that
used to be involved in the old style to a minimum.
EGG-COLLECTING.

COLLECTING—OLD COLLECTORS—RARE BIRDS—WHERE TO GO—PREPARATIONS FOR THE CAMPAIGN.

In the days when as schoolboys we first commenced to take
an interest beyond the mere pleasure of acquisition in
our birds-nesting spoils, and fairly began to form a
collection of eggs, many were the taunts we had to endure
from our seniors both at home and at school.

For the latter we did not care much, for were they not always
in the opposition," and had we not already had sundry differences
of opinion with regard to squirrels, white-mice, and other pets?
But it was far harder to find that such "childish tastes" were
considered unworthy of the dignity of the "fifth form;" and
it was only the real naturalist enthusiasm within us which
prevented our being discouraged; however, we managed to
show the scoffers that we could do something else besides
"egging," and in fact we here took our first lesson in the
important part of "living it down."

This feeling of hostility to the mildest form of science has
now passed away; many of our public schools possess local
museums apart from the private collections formed by the boys;
and several local lists of the birds of the neighbourhood have
lately been published by actual members of Eton, Harrow, and
Marlborough; their essays in authorship being regarded with
just pride in these degenerate days, instead of the contumely
which would have greeted them in the good old times.

Yet even in our days such very "low science" as egg-collect-
ing was slowly and surely developing, and the increase in the
number of its votaries was shown by the demand for such expensive
books as Mr. Hewitson's admirable works on the nests
and eggs of British birds; however, their price was then a
serious obstacle to acquisition, for boys of our day were not so
liberally supplied with pocket-money as now, and we had to
content ourselves with gazing over such publications in the

NEST AND EGGS OF THE GOLDFINCH.

library of the British Museum. Since those days various works
have been published, which have at least the merit of being
suited to the capabilities of all pockets; and of the cheapest
of all we can at least conscientiously say that it is a very good
shilling's worth.

In most of our large and in many of our smaller towns local
collections are being formed, many in connection with mechanics'
and similar institutions, and every effort is being made by their
members to show that community of tastes lends all distinction
of rank, and that, to quote the hackneyed and yet appropriate
line, "One touch of nature makes the whole world kin."

The first British egg-collector of whom we have any record
was Sir Thomas Browne, of Norfolk, respecting whom Evelyn,
writing in the time of Charles II., says that he kept great store
of eggs in the crowns of his old hats—bustards', cranes',
storks', eagles', etc.

Even in these days, when our foreign rambles have enabled
us to obtain all these good things, how it makes one's mouth water to think of the times when such were obtainable in our own country; and a spice of regret mingled even now with the conviction of the utility of the measure, as some Nestor in botany recounts how, before the drainage of the fens, he has obtained a hatful of barrister's eggs, besides other rarities, in a single morning.

For us those times are past; but in spite of the increase of population and the enclosure or utilisation of waste ground, there is but little, if any, diminution in the number of species recorded as breeding in our islands. For, as if to make up for the destruction or banishment of many of our birds of prey by game-preserving and drainage, increased attention has shown the existence of others of whose breeding haunts we had little idea; and, again, the individual numbers of several species, formerly rare, have been greatly augmented, owing to the destruction of their winged enemies, and, in these days of cheap and rapid communication, even the humblest collector enjoys on the whole many advantages which in our days were only within the reach of a long purse.

In spite of the spread of the lines of bricks and mortar on every side of our big towns, the holiday maker who possesses a taste for birds'-nesting or butterfly-collecting may easily indulge it at a trifling expenditure of money and time.

It is sometimes asked, "Where is the poor man to go," except along the high road, without being confronted by the ominous notice, "Trespassers will be prosecuted," and expecting to hear the hoarse voice and to feel the rough grip of the keeper as soon as he crosses the dyke, or through the gap in the hedge, to follow up some bird which evidently has a nest?

Well, in those good old times of which we hear so much the notice on the board used to be, "Man-traps and spring-guns set here," and it was no empty threat: they were set in those days, multiplying tenfold the risk of overstepping bounds.

But leaving these reminiscences of the risks we had to run, let us stick to our ideal virtuous mechanic, who wouldn't on any account omit a trespass. Where is he to go to study Nature? Why, if a Londoner—to name a place almost at his own door, of the easiest possible access, and though shorn of much of its former glories, yet still the wildest country within a radius of thirty miles of London—Epping Forest!

Of course our "faultless monster" will not go down to High Beach in a van, to imbibe much liquor and to play at kiss-in-the-ring for the rest of the day; no, we suppose him to take a third-class return ticket to some one of the smaller stations, and have plunged at once into the more secluded portions of the forest, in which even now he may ramble for miles and scarcely see a living soul, even when crossing the intersecting roads.

We are speaking from our own experience of a Whit-Monday of all days, not two years ago; and we can safely assert that we enjoyed such a day's birds'-nesting as it would be difficult to match in any part of the home counties within a long hour's ride by rail, and that too within sight of St. Paul's, if the day had been clear enough to see that edifice, which it was not.

It is there that in these days of pheasant worship one must look for the nests of the carrion-crow, the magpie, the kestrel, and the sparrow-hawk; the jay, owing to his cunning, is still tolerably common everywhere; but it will surprise many of our readers when we assure them that at this time of writing a pair of ravens—a bird which we are accustomed to look upon as extinct in civilised districts—are hovering round the site of their last year's nest, and are preparing for those duties of incubation which they have for years fulfilled with but rare interruption, and this too in a county in which what may fairly be called a part of London now stands.

Let the beginner console himself; there is plenty of collecting to be had yet without going far a-field for it; and, thanks to the exertions now being made to preserve intact the waste lands yet remaining to the people, the present generation at least has little reason to complain that there is no place left for the poor man, or indeed any one who is not a landed proprietor, while for those who are residents in the country, we believe that in spite of high farming, which has interfered with those tall double hedges that many birds delight in, the numbers of the smaller species have, owing to the destruction of "vermin," increased instead of suffering any diminution.

But our rambling habits have made us discursive in writing, and we have run far away from our first British collector, Sir Thomas Browne, who was a burning and a shining light in those dark ages when Harvey had but just discovered the circulation of the blood, when hawking was going out and shooting was but just coming in. After him we hear of no other collectors of eggs until what may be called the renaissance began some forty years ago amongst a knot of northern naturalists, many of them connected with Newcastle.

It is quite needless to mention names here—sufficient it to say that investigations in the neighbourhood of Newcastle itself revealed the breeding haunts of many interesting species; that expeditions for the express purpose of egg-collecting were made to Scotland, the Orkneys and Shetland, to Iceland, to Sweden, Norway, and of course to Scotland; and an enormous increase to our stock of knowledge was the result.

The movement spread. It took especially strong hold in Cambridge; and it is not too much to say that some of the most distinguished ornithologists of the present day were for a long time known principally as enthusiastic birds'-nesters and egg-collectors; indeed, an ornithologist may be defined as one who was an egg-collector, stuck to it, and got on to something better, and that we trust many of our readers will do.

We do not want them to remain mere collectors; but, depend upon it, the habits of patience, perseverance, and observation acquired in forming for oneself, not by purchase, a collection of any kind of natural-history specimens, will never be thrown away in after life, even although opportunities may hereafter be wanting for carrying the pursuit beyond a mere amusement.

Many of those university collectors have since done good service to science even of the "high and dry" description. It might be invidious to mention the names of living men; but we may be permitted to say that considering the early age at which he was snatched away, few men have laboured so ardently and indefatigably as the late Mr. John Wolley. Nothing daunted that man in his favourite pursuit—he passed dreary winters in the wilds of Lapland, to be ready for the earliest breeders in the spring; he plunged into icy Scotch lochs to swim to ospreys' nests when the cold was so intense that he had afterwards to be run up and down by two gillies to restore circulation; whilst, as for his climbing powers, the hardy Faroese, who gain their livelihood on the tremendous cliffs of their islands, and who think but little of the cragging powers of any other visitors, only last year spoke with enthusiasm to a friend of ours of his visit nearly thirty years ago, and said that "there never was a man like that Englishman John Wolley."

As we propose to confine our remarks to those species which a young collector may find within the limits of our own islands, we will only say here that we trust those who wish to know something of the romance of collecting we strongly urge a reference to John Wolley's own writings in the pages of the "Ibis," to his biography, and to the account of the discovery of the breeding of the wax-wing, both by Professor Newton, and to "Ootheca Wolleyana," by the same able pen.
CROQUET.

But the great value of Wolley's example was the intense and scrupulous care he paid to authentication, even of the eggs of the commonest birds; and this is a point we would particularly impress upon the young collector. It is not necessary, indeed, it is frequently difficult in inhabited districts, to shoot the parent bird off the nest. Most of our common birds are so well known, or may be so easily identified by a little patient watching, that taking their lives would be cruel as well as superfluous; besides, we have not yet got away to the more remote districts, where he may see birds the like of which were previously unknown to him, but for the present we will not move beyond our hour's railway journey from the metropolis. So, with an urgent entreaty to have nothing whatever to do with dealers' specimens, at least for the present, we will tell him how to commence.

Perhaps he has a few eggs from previous seasons, but now that he is going to collect in earnest he requires a cabinet! Oh dear no, he does not; it is sure to be too big for the present, and will soon be as much too small; and, besides, it is certain to be somewhat costly, and his money can be better employed.

Again, if, as sometimes happens, he gets tired of his hobby, there is a useless bit of furniture. Let him begin by buying a dozen strong cardboard boxes, with glass lids to lift on and off—about nine inches by six inches is a very good size, as for depth, two, two and a half, or three inches will enable him to collect nests up to the size of those of a blackbird, if he wishes to do so; and, apart from the value of the nests in the collection, we think the eggs never look so well as in the nests themselves.

He need not keep many, or more than one nest. Other eggs of the same species may be ranged round the nest on cotton-wool, which should be cut out to the shape of the nest. In any case layers of wool should be placed till they rise to the surface of the box, then place the eggs neatly, and putting the lid gently on, they will be pressed down till the lid reposes on the sides; and then, excepting the eggs in the nest, the box may be shaken without one of those on the wool leaving its place.

With the addition of a little wool to those in the nests, they can safely be packed up just as they are, for nothing can hurt them so long, of course, as the glass remains unbroken. They can be piled one upon another, stored away in a drawer, and if the collector gets on, as no doubt he will, to some idea of scientific arrangement and classification, it is at most but shifting a species or two from one box to another, instead of altering the arrangement of a whole drawerful, as would be the case in a cabinet. And then the eggs can be seen so well through the glass, which keeps off many dangerous fingers; for ladies are so fond of touching, and they are so very sorry when they find they have done perhaps irreparable mischief, and if you are very young, and the lady is a relation, you lose your temper; and if you are polite, and the lady is a stranger, you vow that it isn't of the slightest consequence, and return your rage into your own bosom until you get a chance of letting it off upon somebody else, probably your sister, as being the only female you can safely vent it upon, and that makes disagreeable.

Decidedly glass is best, even for eggs without nests; with nests it is quite indispensable to have boxes, for all nests are sure to contain insects, and if placed loose in a drawer there would soon be a horrid mess. The boxes also keep them together well, and any moth which may make its appearance can safely be allowed to terminate its brief existence there; it cannot get out, or do any mischief within, and a drop of benzole will probably prevent the appearance of a single one.

CROQUET.

By CHARLES BLACK, CHAMPION.

THE LAWS OF THE GAME.

Having now dealt with all the paraphernalia of croquet, we must turn our attention to the game itself. But it has been already stated in the definition that the movements of the balls are controlled by rules.

What are these rules? Who framed them? And why should they be observed? Does one ask whether they have the "status" of the billiard code? Well, if our croquet code has not attained to the dignity of being framed and hung up in public rooms, its interpretation is not at the mercy of individual markers, as is notoriously the case with knotty points at billiards.

The code of croquet has the merit of speaking with average distinctness and gaining universal adherence. Here and there a player is led by his own "hobby" to kick at some particular enactment, but there is general agreement as to the adequacy of the rules.

The laws of croquet, as observed at all public matches now, were first drawn up at a general conference of croquet clubs in January, 1870, and a revising committee of leading players and supporters of the game have amended them in 1871 and 1872, any important alterations being only made after the opinions of the secretaries of local clubs had been ascertained. Such is their history and the sanction which they carry with them; but let no one suppose that it is a copy of these rules which he obtained in the croquet boxes supplied by the makers.

Unfortunately, I think, for the interests of the game, the laws are the copyright of the All England Club, and can only be obtained (for 6d.) from H. Cox, 346, Strand.

The All England Club jealously discharges the parental duties due to its adopted child; but its tutelage is so strict as to prevent the introduction of the infant into society. Seriously, the fact of the proper rules being copyright and only obtainable from one source, does hinder such a diffusion of them as is necessary for extending to all devotees of the game a correct knowledge of scientific croquet. However, Mr. Jacques distributes to his customers an able analysis of the rules, compiled for him by a leading player, and our readers must be content here with a summary of the most important clauses.

RULES.

1. There is no restriction as to the size of the mallet nor as to the place where the handle may be grasped; but the handle must not be used like a billiard cue; nor the side of the mallet head, except in cases, where the striking is impeded.

2. The player who wins the toss has the choice of balls and commencing the game. The game is begun as soon as a ball is struck from the starting-point; such ball being in play whether it passes the first hoop or not.

3. No ball can be requested twice consecutively without a point having been made in the interval.
4. If the striker's ball touch another at the beginning of a
turn, a roquet is supposed to have been already made.
[Herein croquet differs from billiards, where touching balls
prevent scoring.]
5. If a ball pass through a hoop and roquet a ball lying
beyond in the same stroke, both the point and the roquet are
made; but if a ball pass through a hoop after a roquet, the point
is not made, as a ball is in hand after a roquet.
6. A ball sent off the ground is brought out at right angles to
the boundary line and three feet from the spot where it crossed
the line.

[c.f. If a ball following the dotted line crosses the boundary
at A it is brought out to b (Fig. 1.)
7. A ball lying within less than three feet of the boundary
must be brought out three feet, unless it is that of the striker,
who has the option of bringing it out, or playing it where it is.
8. Croquet must be taken from a ball which has been roqueted
either by simply "taking off" (vide 2nd article), or by a
splitting, rolling, or stop stroke. The striker is not allowed to
place his foot on his ball.
9. If in taking croquet the player cause either of
the balls to cross the boundary, the turn
cesses, and the balls remain as they are; that
sent off the ground being replaced (according to
Rule 6); this latter ball being said to be
"killed."

[This rule is called the Dead Boundary Rule,
and was first framed by the Fourshires Club, to
whom a great debt is due for it. Its introduction
quite revolutionised the tactics of the game,
and made judgment of strength the sine quae non
for a good player.]
10. A player makes foul strokes when
(a) He hits another ball besides his
own;
(b) Makes an inaudible stroke, alias
"spoon;"
(c) Hits his own ball twice, i.e., by fol-
lowing on with his mallet;
(d) Allows any ball, when in play, to
touch any part of his person;
(e) Lets a ball rebound from a wire or stick upon his
mallet; (f) Moves a ball, which is resting against a wire or peg,
by striking that wire or peg.

The penalty for a foul stroke is that the turn cesses, and the
balls remain where they are.
11. A turn ceases
(1.) On the player failing to make a point or roquet a
ball;
(2.) On his failing to shake the ball off which he is
taking croquet;
(3.) On his "killing" a ball;
(4.) On his making a foul stroke.
12. If a player play out of turn or with the wrong ball, the
remainder of the turn is lost, and any point or roquet made
after the mistake. The adversary has the option of letting the
balls remain where they lie, or replacing them as they were
before the last stroke, also playing with whichever of his
own balls he chooses.

If, however, the adversary play without discovering the
mistake, the turn holds good, and all points made after the
mistake are scored.
13. If a player, after making a wrong hoop, makes a second
stroke, the remainder of the turn is lost, and any point or
roquet made by that stroke; the previous rule applying to the
position of the balls. But if the adversary does not discover
the mistake before a third stroke, the turn holds good, and the
player who made the wrong point proceeds as if he had made
no mistake.

[The severe penalties enacted in Rule 12 are necessary in
public matches to prevent careless play, and the confusion
resulting from it. In private games it often obviates some
feeling if a player warns his antagonist, should he see him
about to play with the wrong ball.]
14. If a striker in roquetting any of his own balls, after
it is a rover, drive it against the finishing peg, that ball is
"dead," i.e., out of the game, and the turn of the
striker's ball ceases.

[c.f. B and A are both rovers, and it is A's
turn. A wishes to roquet B gently, and then
after roqueting it against the peg, "peg out"
himself; but misjudging the required forces, A
roquets B against the peg; B is then dead,
but A's turn ceases, so that the adversary has
another shot at it before it can go out. The
theory of this rule depends on Rule 8, as there
is now no ball off which to take croquet, B
being dead.]
15. No ball has the power of making an adver-
sary's rovers dead unless it is itself a rover.
[The point of this rule is that it is often
advantageous to make a hostile ball dead, if its
partner is some way beside, as a player has
then two turns to his adversary's one, but this
privilege is only allowed to a player who has a
rover with which to do it.]
16. A ball lying in a hole may be moved
away from the direction in which it is to be
played, and may be also brought out more than three feet
from the boundary, if the stroke cannot be freely taken.
17. The duties of an umpire are:
(i.) To decide disputed points, but only when appealed to;
(ii.) To move the clips and mark the scoring card;
(iii.) To set hoops or pegs upright in case of displace-
ment;
(iv.) To replace balls sent off the ground.

The decision of the umpire is final. The players have no
appeal to the referee, who is duly to be consulted by the umpire
in case of uncertainty on his own part. If the umpire stops
or diverts a ball, when in play, he may replace it where he
considers it would have gone.
To recapitulate some new terms which have been used in
the summary a ball is "in hand" after making a roquet,
"killed" after crossing the boundary in taking croquet, "dead"
after hitting the winning peg.
"Bisque" is a term that has as yet been unexplained. It
is the means of equalising players in croquet handicaps. It
confers the privilege of prolonging a turn at any moment
by an extra stroke, provided that Rule 3 is not in any way
violated.
So many bisques given to a player mean so many chances
of taking this stroke.
ROUND GAMES.

BY JAMES MASON.

The first thing that struck us on our fourth meeting—and, by the way, you have no idea how punctual we all were—was that Notes-and-Queries looked as if he had something on his mind. In a little while it came out. Everybody had shaken hands with everybody, and had asked for everybody, and a sort of preliminary miscellaneous talk had gone on for some time, when our sedate friend said, "I was thinking after our last meeting how nonsensical it was that we in the years of discretion should be amusing ourselves night after night with round games."

"And, Sir Oracle, did that distress you?" asked Emily, who is an exception to Notes-and-Queries' rule, for she has not yet attained to the years of discretion.

"It did. But last night I picked up a volume of Aesop, and it happened, oddly enough, to open at a fable which set my mind at ease. I'll read it to you." He fumbled in his pocket, brought out a little book, and read as follows:

"A fop found the wise physician in company with some little boys, joining in their innocent amusements, and forgetting for a while his age and experience. The fop sneered at the philosopher for taking part in these puerile pursuits. Aesop, with that practical satire for which he is so distinguished, replied by placing an unstrung bow before the would-be wit, and demanding an explanation of the riddle. The fop was a man of the world, but not a man of brains, and could not explain the mystery. Then Aesop said, 'The mind of man is like that bow: if always bent, it would in the end lose its elasticity, and become useless; by giving it occasional freedom you preserve its tone, and it will serve your purpose.'"

"And so you brought that expressly to read to us!" said the Laughing Hyena. "I don't think we needed to hear it; we have all read it before."

"Then I read it," said Notes-and-Queries, "just to please myself."

The two spoke so snappishly to each other, that Maggie thought she could not do better than give the conversation a new turn, so she asked David if he meant Rhapsodies to be the first game.

"Yes," he replied; "let us sit round the table and begin." All drew in their chairs. David sat at the upper end of the table; I forgot—but it does not matter—who sat at the lower.

"Now," said David, "there's a piece of paper for each of you. I shall give out a number of short phrases—any I can think of—which you must write down. Then you are to write a rhapsody, founded on these phrases, introducing them in the same order as I shall give them.

"May we bring in the names of the present company?" asked Kate.

"Yes," cried Emily; but the question was not addressed to her.

"I think," said David, "that is a matter which should be left to every one's good taste. The phrases are:—'Out of sight out of mind,'—'I don't care what happens.'—The wicked wicked world—She won't believe a word you say—The never-ending story—As sure as a gun—What utter nonsense!—It is very little of its age—Sparrow—A pair of boots—Oysters."

Twelve pencils went scribble, scribble, scribble, for ten minutes or so; then eleven pencils went scribbling; then ten, then nine, and at last only one, and that one was poor little Emily's.

"I can't get in 'oysters,'" she said.

"We'll take your contribution, then, without 'oysters,'" answered David.

Emily folded up her paper, and threw it on the heap of rhapsodies which lay in the centre of the table.

David then began opening out and reading them.

The first ran:—"Two lovers were parting. They called the one Clara and the other Charles. 'I won't forget you,' said Clara, 'but may-be you'll forget me, for Out of sight out of mind, you know.' 'That's too bad,' cried Charles; 'do you think I am not as faithful as you? I don't care what happens, but you will always reign in this heart,' and he gave his heart a great thump with his closed fist. 'It is very odd, but no sooner had her lover gone away into the wicked wicked world than the lady's affections grew cold. Tell this to a sentimental young lady, and she won't believe a word you say; but it is true, nevertheless, and is a fact repeated on every page of the never-ending story of humanity. As sure as a gun, then, she never spoke of her past love without saying 'What utter nonsense!' and if any one alluded to her old affection, she answered, 'It is very little of its age.' Shortly afterwards she married a Mr. Sparrow. And what of Charles? When he returned was he wild at being jilted so? Not at all. Sparrow was a bootmaker: he went and ordered a pair of boots from him, and as they were an uncommonly good article he took note that the shop was opposite the sign of the Golden Oyster, wherever that may be."

This rhapsody was well received. Then came the reading of the second, which was as different from the first as could be. It began:—"A meeting of the Queen Street Literary Society was held last evening to consider the origin of the phrase 'Out of sight out of mind.' Mr. Notes-and-Queries opened the discussion. He said he had come to the conclusion that the phrase in question dates as far back as at least as the year 1599. It occurs once in the old play, 'I Don't Care what Happens,' published in that year. It is introduced by the hero in an extraordinary soliloquy beginning, 'It is very odd.' Mr. Whistler said, 'Was his learned friend, Mr. Notes-and-Queries, aware that the play to which he alluded was a forgery, one of the base frauds of the wicked wicked world?' and so on.

After this came a tale full of sound and fury, signifying nothing; and then a rhymed rhapsody, which, rightly perhaps, we guessed to be by John Ferguson; and then—but the rest may be left to imagination.

Next we played at Quotations and Authors. "Who will give the first quotation?" asked Alice.

"I," said the Laughing Hyena—

"'The oyster women locked their fish up, and trudged away to cry, No Bishop!'

"Butler!" shouted David and Notes-and-Queries, almost both at once. If anything, David had the advantage, so he gave the next quotation—

"'I would never have the power To love one above an hour.'"

"Beamont and Fletcher," said John Ferguson. He was the only one who knew it. John then gave—

"'But to see her was to love her, Love her, and love for ever.'"
There was quite a chorus of "Burns! Burns!" after this, but it was decided that Emily was the first to call out. So she had the right to give the third quotation. She looked this way and that way, but, do what she could, she couldn't think of one. Maggie whispered in her ear.

"Oh, to be sure, that will do," said Emily, and she gave—

"'Will the love you are so rich in
Make a fire in the kitchen,
And the little god of love turn the spit?'"

"Unknown author; nursery rhyme!" cried Notes-and-Queries. No one ventured to contradict him. "Hero is my quotation," he said:

"'Never will I give advice
Till you please to ask me thrice,
Which if you in scorn reject,
'Twill be just as I expect.'"

"Moore!" said Maggie; "Holmes!" said John Ferguson. Tom guessed it was "Shakespeare!"

"All wrong!" replied Notes-and-Queries; "it is by Swift."

Before this game had gone on long Emily began to fidget about.

"What ails you, Emily?"

"I am tired of the game; it is very humdrum."

"You want something more exciting," said the kind-hearted Maggie. "Before we leave the table let us have Birds, fly!"

"Let every one put a finger on the table then," said David.

When his instructions were obeyed, he went on:—"Your fingers are to be raised whenever I say 'Birds, fly!' or 'Pigeons, fly!' or 'Swallows, fly!' or, indeed, mention the flying of any winged object of natural history. Should I speak of any animal without wings flying, not a finger must stir; and if you make a mistake, and raise a finger when it should be kept down, or keep it down when it should be raised, you must pay a forfeit. Look out, now! Eagles, fly! Tom, you pay a forfeit; you did not lift your finger. Tomtite, fly! A forfeit from you, Maggie. Tortoises, fly! Notes-and-Queries, why did you lift your finger? You never saw a tortoise fly; you must pay a forfeit."

Thus David went on, bringing in the names of all the birds in the air; and occasionally surprising us by saying, "Fly away, elephant!" Lobsters, fly! or "Fly away, tiger!"

Much laughter was excited by the game, for somebody was always making a mistake, and landing himself or herself in a forfeit.

All now rose from the table, and it was pushed into a corner of the room. Chairs were placed close to the wall, and we decided on having a game at Proverbs.

"Will you go out of the room, Alice?" asked David.

"I'll do anything to please you," answered she, and she went out.

"We must fix on a proverb to puzzle her with," continued David; "suppose we each give one. We shall then have a number to choose from."

We set our brains to work, and very soon quite a choice collection of proverbs was made. Here are some of those we lighted on:

"A rolling stone gathers no moss."

"When the cat is away the mice begin to play."

"There's many a slip 'twixt the cup and the lip."

"Soft and fair goes far."

"Honesty is the best policy."

"A bird in the hand is worth two in the bush."

"It is no use crying over spilt milk."

"Time and tide wait for no man."

"One good turn deserves another."

"A friend in need is a friend indeed."

"Penny wise and pound foolish."

"It is an ill wind that blows nobody good."

"Still waters run deep."

"Faint heart never won fair lady."

"All is not gold that glitters."

"It is a long lane that has no turning."

"It never rains but it pours."

It was thought that the second proverb would do as well as any other; the players, therefore, took their seats, and to each one word of the proverb was entrusted. Alice was then called in.

She came forward, and, taking her stand with her back to the table and her right foot on the hearth-rug, "What am I to do?" said she.

"I thought you knew."

"Not in the least."

"Then," said David, "I'll explain. We have fixed on a proverb, and your business is to find it out by asking questions at us. You are to ask your questions from left to right, one question at each person. You may ask any sort of questions, and we may give any sort of answers, long or short, sensible or nonsensical; but—and this is the important point—every answer must contain a word of the proverb we have selected. The first player you ask will give the first word, the second the second, and so on."

"I understand quite well now," said Alice. "I begin at you, Notes-and-Queries. What brings you here?"

"The same reason that brings others. People are always ready to come when there is amusement in the wind."

"Whether would you say, 'Seven and five is eleven,' or 'Seven and five are eleven'?"

"Maggie, to whom this was addressed, answered, quite simply,

"I would say the latter."

Most of us laughed, though it was such an old trick.

"And I would say," said Alice, "'Seven and five are twelve.'"

"Some one is always sure to be taken in with that question," remarked Notes-and-Queries.

Alice went on: "Is Emily a cunning gipsy?"

"More than that," said John Ferguson; "call her cunning gipsy, sly fox, talkative parrot, mischievous cat—she is all that," a character which did not seem in the least to meet with our Emily's approval.

"Thus the questioning went on, till Kate introduced her word, 'mee,' so awkwardly that Alice said—"

"I think I have found out the proverb."

"You are just allowed one guess," said David.

"Well, spite of that, I'll risk it. The proverb is, 'When the cat is away the mice begin to play.'"

"Right!" cried David. "Now, Kate, you go out."

Kate, who is so matter-of-fact, said she was sure she could never manage either to put the questions or to find out the proverb; upon which John Ferguson, who is always foremost to oblige, volunteered to go out in place of her. It was agreed to puzzle him with a variation of this game, known as Simultaneous Proverbs.

In this variation no questions were asked. We drew our seats closer together, so as to form a semicircle. We fixed on a proverb; it was, 'A bird in the hand is worth two in the bush.' Each one was entrusted with a word; then John Ferguson was called in, and took his station in front of us. David gave us the time, 'One, two, three!' and when he said 'Three!' each of us shouted out his word.

"I can't make out the proverb," said John; and indeed it was no wonder, for the shout was about loud enough to split one's head. But we had agreed that he was to have three chances, so the proverb was thundered out again, and again. The third time he discovered it.
Every one seemed rather to enjoy the riotous nature of this game, and we had several rounds of it, the hullabaloo increasing with each round.

"We might end our meeting to-night by playing The Elements," said the princess, when there was a chance of her making herself heard.

"How is it played?" asked Tom and one or two others.

"In this way," said she. "You form a circle round the principal player, and he holds in his hand a ball of worsted, with so much of the thread unwound as to enable him to throw it at any one he likes, strike him, and draw it back immediately. The names of three animals, one inhabiting the earth, one the air, and the third the water, are then decided on. When the leading player touches any one with his ball of thread, and says 'Earth,' 'Air,' or 'Water,' he must immediately reply with the name of the animal living in the element mentioned. If he doesn't he pays a forfeit."

"I understand it, quite," said Tom.

"No, you don't," said the princess. "The principal player may also say 'Fire.' Then the one to whom the ball is thrown must not utter a syllable—for no animal lives in fire. Should he say 'The elements,' all the players together must pronounce in quick succession the names of the three animals agreed upon."

"I have seen the game played," said the Reporter, "without fixing on the names of any particular animals; in which case, when the leader names an element, the player he touches must answer immediately with the name of any animal known to inhabit it, and not mention the same animal twice, on pain of a forfeit. However, let us play the game in your way. What are the animals to be?"

"Cat, raven, whale," suggested Notes-and-Queries, and these it was thought would do.

"Here is a ball of worsted," said David, coming into the room, "and a pretty search I have had for it."

We took our places, and played at The Elements till it was close upon midnight.

Then we settled the forfeits.

Then every one said, "Good-night," and went stepping homewards.

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**BUTTERFLY AND MOTH COLLECTING.**

By the Author of "The Lepidopterist's Guide."

A FEW MORE WORDS ON APPARATUS—NETS—THE RING—THE CLAP-NET—STANDARD NET—KILLING—BOXES.

For those who prefer a more finished apparatus, a piece of brass, shaped as in Fig. 1, by the aid of a file, drill, and ringers, may be substituted for the wire fixings. This, of course, makes a neater and stronger job than the wire, but is a trifle too difficult for most amateurs. The holes at a a a are for rivets to fix the springs, those opposite b b are for the purpose of riveting the brass piece to the stick, and are only required at the ferrule end. The other end is all the better for being prolonged in a tubular form, and for having a notch cut in it to fit a stop, thereby giving greater stability to the whole apparatus. Fig. 2 will give an idea of the net when in readiness for use.

The cheapest form of all is made by fixing the ends of a yard or so of cane into a tubular tin T or Y piece, as shown in Fig. 3. Bamboo is sometimes employed for this purpose, and is very light to carry, but in practice it will be found that greater execution can be done with a moderately heavy net than with a very light one, especially in windy weather, though, of course, a great deal depends upon the usage of the collector.

The "clap-net," which our forefathers wielded with so much dexterity, is "nowhere" in the present day. For those who like to try it, the frame consists of two longish sticks (about four feet), with two laths or canes fitted at an obtuse angle to their extremities, the latter being hinged at the point where they meet. These form the frame, to which a square or oblong piece of net is attached, leaving the ends of the handles free for manipulation. In our experience, the spectator of a collector with a clap-net is about as great a curiosity as that of a dead donkey, for each case has but once come under our notice, the latter on what was once Hampstead Heath, the former near Epping, and that is where we found out what little we know concerning it. Fig. 4 might possibly, at first sight, suggest some connection with the game of billiards, so ably treated by a brother contributor, but it is merely intended to show the position of the thumb (1) and fingers—"index" (2), "middle" (3), "ring" (4), "little" (5)—in holding the clap-net. When using this implement we endeavour to get it underneath the insect, strike upwards, and as we find that our stroke has been made in the right direction, quickly disengage the fingers (2 and 3) and bring the handles of the net together. As soon as this has been done we lay the net on once upon the ground, and without delay pinch or box the capture.

But it is a cumbersome affair, and its manipulation is difficult to master. It is of very little utility for ordinary purposes, though for "beating" we may have to refer to it again.

After all, the wire ring-net is, perhaps, as good as any. This consists of a metal ring fixed firmly to a handle of some two feet in length. It may be rigged up in the simplest manner by binding the ring to the stick with waxed string; or it may be more elaborately carried out by means of screws and hinged joints, the handle being constructed on the telescope principle; the latter can be conveyed within the depths of our capacious pockets in a remarkably small space, leaving us at liberty to bow injudiciously to our constituents, our patients, our clients, our flock, our customers, or whatever the relationship may be, as we go to business; for your M.P., your doctor, your parson, your wine-merchant, or your postman, may be an entomologist without your in the least degree suspecting it.

Two feet is quite long enough for the handle of the net, indeed, too long; but there are some who prefer to conduct their operations at a distance of seven feet; using both hands, like our ancestors of the long-sword, and missing, as a natural consequence, a great many opportunities of adding to their collections.

Now, when an insect has been captured, the beginner naturally wants to know how he is to secure it. In the first place it may be "pinched," which means the greater or less disfigurement of the future "specimen," for the process is a remnant of an ancient barbarous custom, and, however neatly executed, must injure at least the under surface, and, may-be, interfere considerably with the structure. We will grant that the wings have been quickly got over the back at the proper moment, by tightening a fold of the net, and that the squeezed administered
has been just sufficient, and no more, to extinguish vitality with
the least possible derangement of the plumules, still, the ques-
tion remains—Is this violent course the most humane one at our
command? (for as yet it remains an unsettled point whether
insects enjoy entire exemption from pain, or whether, as some
would have us believe, they suffer in a greater or less degree.
The best methods of quieting our captives on the spot are, first, the
application of the cyanide bottle—which is certainly the handi-
cast killing apparatus yet introduced—or, secondly, the moderate
administration of chloroform, followed by a prick under the
insect over the mouth, which generally falls into the bottle
without further difficulty, though occasionally it requires a
gentle tap or two to make it fall. Once in, and the cork re-
placed, the captive is soon stupefied, killed, and subsequently
"relaxed," by which is meant limp and in proper order for
setting out.

When chloroform is used it should never be employed to kill,
for by so doing the wings of the specimen will become rigidly
fixed in such a manner that subsequent setting will be rendered
extremely difficult, if not altogether impossible. Its proper use
is to stupefy only, in order that we may kill the insect while in
a state of insensibility, and thereby avoid the possible infliction
of unnecessary pain. It is therefore advisable to apply the
vapour in the following way:—First get your insect into a
suitable-sized box, in the lid or bottom of which three or four
stabs with a penknife have been previously made; next allow a
drop of the fluid to run over these punctures, and place a thumb
or finger over it in order that the vapour may not be wasted,
but enter the interior of the box, to produce the desired result,
which in most cases takes place in less than a minute, the
patient the while remaining still, for insects do not generally
flutter during the inhalation of the soothing anesthetic. Then
turn out the now-quiescent inmate of the box, and having with
great care arranged it so that its body rests lengthwise between
the thumb and forefinger of the left hand, the head of the insect facing towards the right, proceed cautiously to insert the pin at the exact centre of the thorax or chest, that is, the portion of the body to which the legs are articulated, and inclining the head of the pin slightly forwards, but avoiding the least lateral deviation, press steadily downwards until the point of it emerges between the hind coxae, or, in other words, between the thighs of the third pair of legs, as shown in Fig. 5. These precautions will greatly assist the subsequent operation of setting out.

Our next step is to prick the under side of the thorax with the one-nibbed pen dipped in the saturated solution of oxalic acid, and after having pierced the outer skeleton, to turn the nib half round, that the poison may enter the wound. The capture may then be transferred to the pinning-box, which may be of any size or form, according to fancy, though the depth should not be less than two inches, in order that the spaces, lined with cork at top and bottom, may both be utilised. If the weather be hot, it is very necessary that this receptacle should be formed of some metallic substance, of which zinc is to be preferred, owing to its properties of relaxing the contents—a peculiarity due, as we believe, to arsenical impurities—and the cork lining should be wetted previously to using; otherwise we may have the mortification of discovering that our treasures have become stiffened during our travels, and that we cannot set them out until after they have been submitted for a time to the fumes of the laurel jar, of which we shall have to speak on a future occasion. Fig. 6 will show the manner in which the cork is best fixed to the metal—a representing the cork, b the box, c a double strip of metal soldered to the box, passed through the cork, and then bent over so as to clasp it down, and triangular pieces of metal soldered to the corners of the box. But it may not suit our purpose to kill our captures on the spot; time may be an object, and the insects plentiful, and of such kinds as will remain perfectly quiet in pill-boxes or chip-boxes. Here we may as well say that all the butterflies, with the exception of the Wood Lady (Lescophasia sinapis)—which batters the tips of its wings when thus confined—may be boxed with safety. The little "Elines" in particular are thus to be obtained in perfection. The larger species, however, such as the Vanessa, would occupy too much space to permit of this treatment. It is, on the other hand, always dangerous to box any of the larger Hawk Moths or Bombbyces, partly on account of their fluttering, and partly owing to their habits of shamming death, and thus rolling about, to their detriment; though the little Clearwings (Sesiidae) may be consigned without danger to these novel conveyances. The Night-fliers (Noctuæ) as a class remain perfectly still when thus imprisoned, a very important trait in their character, since many of them are dingy in appearance, and we cannot well stop to examine them minutely in the dust, for if we did we should lose many a good insect. A few of these, such as the Red-underwings (Catocala), the Peach-blossom (Clymatarhina betis), and others, will not brook confinement and must be settled on the spot. Similarly the Geometers, or "slender-bodied moths," are in most, though not in all cases, quiet in the boxes to which they have been consigned; and so also are many of the Pearlies (Pyralidina), as well as the Tortrices, Tineina.

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ELPHAWKMOTH.

and Plum moths. It is worth while to note here that Watermoths (Hydrocampa acrotropa, etc.) soon become dry and brittle if not killed and set upon the spot. It will save a vast amount of trouble and annoyance if the chip and pill-boxes have been properly prepared for use before we start upon an expedition (Fig. 7). This may be done by binding the edges of the lid and bottom with strips of calico (cut "on the cross") by means of shoemakers' paste, or they may be strengthened by merely running a brush dipped in liquid glue over the joints both internally and externally. The former mode of preparation is the best, for the smell of the liquid glue is objectionable for several reasons. If we neglect thus to fortify our boxes, we shall, at one time or other, regret the omission, for the first wet day will convince us of the necessity of the precaution, and it is no joke to find that a pet capture has got loose through inattention when the disaster could with foresight have been averted.

If the subject of apparatus has been a dry one, our readers must remember that to be provided with proper tools for the work before us, whatever it may be, is a very essential element of success. In our next paper we shall try to make up for the infelicity, by introducing our readers to the butterflies themselves; as Shakespeare said—

"Tell old tales, and laugh
At gilded butterflies."
THE following is a simple hand, illustrative of the original lead.

A and C are partners against B and D, and sit round the table in the order given below. A leads, and diamonds are trumps.

C’s Hand.
Hearts—King, Knave, 7.
Spades—Knave, 8, 3.
Diamonds—Ace, King, 6, 5.
Clubs—Ace, 8, 7.

A’s Hand.
Hearts—A, Knave, 6, 4, 2.
Spades—Queen, 10, 9, 5.
Diamonds—Queen, 4, 2.
Clubs—Queen, 10, 9, 5.

Trick 1.
A leads.
A returns his partner’s trump lead. Having two only of the suit remaining he properly returns the higher. The fall of the 3 of trumps in this round renders it clear to C that his partner must hold the 2, and he knows that D has the knave (the turn up card).

Trick 2.
A leads.

Trick 3.
C leads trumps, in the hope of bringing in his partner’s long suit of hearts. Having four trumps to ace, king, he properly leads the lowest.

Trick 4.
B on getting in opens his strongest suit, and leads the lowest from four spades to the ace.

Trick 5.
A returns his partner’s trump lead. Having two only of the suit remaining he properly returns the higher. The fall of the 3 of trumps in this round renders it clear to C that his partner must hold the 2, and he knows that D has the knave (the turn up card).

Trick 6.
C leads trumps, in the hope of bringing in his partner’s long suit of hearts. Having four trumps to ace, king, he properly leads the lowest.
C continues the trump suit, on the chance of the two honours falling together. If they are both in D's hand, A and C cannot possibly make game.

**Trick 7.**

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        A
        C
        D

        B
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Trick 7.—Won by A. Score, A C, 6; B D, 1.

C returns his partner’s original lead (see Trick 1). D having no heart, discards a spade, thereby declaring his suit to be clubs. A of course wins his partner’s knave with queen, and continues the suit.

**Trick 8.**

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        A
        C

        B
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Trick 8.—Won by A. Score, A C, 7; B D, 1.

D having declared clubs to be his suit, C properly discards a club; besides, he knows from Trick 4 that A must have an honour in spades, either king or ace, as D cannot have either, and B cannot hold both, otherwise he would have led one of them instead of the 2 at Trick 4.

**Trick 9.**

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        A
        B

        C
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Trick 9.—Won by A. Score, A C, 8; B D, 1.

**Trick 10.**

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        A

        C

        D
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Trick 10.—Won by B. Score, A C, 8; B D, 2.

**Trick 11.**

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        A

        C

        D
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Trick 11.— Won by C. Score, A C, 9; B D, 2.

**Trick 12.**

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        A

        C

        D
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Trick 12.—Won by A. Score, A C, 10; B D, 2.

**Trick 13.**

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        A

        C

        D
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Trick 12.—Won by C. A and C win 5 by cards.

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**LEGERDEMAIN.**

**THE CONJURING TABLE—POSITION OF LIGHTS—THE WATCH TRICK—THE LOAF—THE BOX—THE HANDKERCHIEF TRICK.**

It is using the conjuring table—the construction of which we described in our last article—for a performance, it must, of course, be covered over in front and on the two sides. Red glazed lining does very well for the purpose, with an ordinary white muslin toilet cover over it. This white cover can be looped up with a few artificial flowers, which gives a very pretty effect.

But the amateur performer must remember that he has not, like a professional conjurer on the stage, the advantage of the orchestra between him and his audience, and that the latter are almost certain to be principally composed of children. We would recommend him, therefore, to be very particular how the covering of the table is fastened, especially in front, as some child is certain to rush forward and lift it up, in order to look underneath. To prevent this, it is as well to have a strong piece of canvas nailed on, and, if possible, fastened to an iron rod joining the bottom of the two front legs; by this means, if the cloth is lifted, nothing can be seen.

The position of the lights is also very important. No light should ever be placed behind the front edge of the table, Much depends upon the room in which the performance is to take place.
Double drawing-rooms are best, in which the back one forms a stage, and the front the auditorium. Suppose the room to contain two chandeliers, the front one can be lit, and, if a gas one, turned up to its full height, but care must be taken not to light the back one at all, unless the conjuring table is placed behind it, as the slightest crack, caused perhaps by one of the trap-doors not shutting quite close, would otherwise be instantly seen; whereas, with all the lights in front, the performer is quite safe.

We will now proceed to explain how the trick "bringing a borrowed watch out of a loaf of bread, the loaf being suspended from the ceiling by a string previous to the watch being borrowed" can, by means of the conjuring table we have described, be performed.

First we will explain how the watch was obtained from the box.

Fig. 1 represents the box, and Fig. 2 the drawer which slides into it. The conjuror pulls the drawer quite out, and shows both it and the box to be empty. He then shuts it, and asks any one for the loan of the watch; whilst the watch is being found he pulls the drawer about three parts open, and places it on the table. Figs. 3 and 4 represent what Fig. 1 really is — one drawer sliding inside another.

If the part of Fig. 2 marked A were taken hold of and pulled with the left hand, and the knob of the drawer held in the right, the result would be that Fig. 3 would be pulled out with the left hand, and Fig. 4 remain in the right.

Now it will be seen that Fig. 4 has a large piece cut out of the bottom. When, therefore, the conjuror closes and re-opened the box by pinching the part B, Fig. 1, with his left-hand finger and thumb, he causes the part Fig. 3 to remain inside the box, and the drawer that was pulled out the second time was Fig. 4, which has, as we have said, a large piece cut out of the bottom. This was placed on the table immediately above the small square trap-door, and the moment it was so placed the trap was instantly opened, and the small round box of sugar-plums carefully pushed inside the box, and the person under the table waited with finger and thumb ready to take the watch from the conjuror's hand the moment he should place it in the box. On the conjuror taking the watch into his hand, he says, "You see I place this watch in the box;" he closes the box quickly, and gives it to some one to hold.

The person, of course, under the table takes, through the hole in the box and through the trap-door, the watch from the conjuror's fingers, and instantly shuts the trap-door, so that the performer on taking up the box discloses the table underneath perfectly sound, for, as we have said, these trap-doors are so constructed that when closed it is impossible to see them.

By this means the person under the table, whom for the future we shall call the confederate, has the watch.

The next point is how to get the watch into the loaf. The loaf, which must be a new quarter one, requires the following preparation before it is hung up on the string. With a sharp penknife cut out from the bottom of the loaf a piece of crust (about three inches of crumb adhering), three inches long, about one inch wide in the centre, and pointed at the ends. Cut off one inch of the crumb, run a wooden skewer through the centre of the piece that has been cut out, so as only to leave about an eighth of an inch protruding from the crust; fit the piece in again into the loaf, and if it has been cut neatly and with a sharp knife, it will be found that it fits so closely that it is impossible to see where it has been cut. Of course, the wooden skewer is the means of securing the piece in its place, and the loaf may now be safely hung up by means of a string tied round the top crust, without any fear of the piece falling out.

Suppose then the loaf thus prepared, hung up, and the watch, as we have described, in the confederate's hands by means of the box and trap-door, the plate is first placed on the table immediately in front of the small trap-door, and the loaf placed sideways on it. The instant, however, the loaf is so placed, the confederate opens the trap-door, and, with his fingers, pulls out the piece of crust, which he can easily do by means of the small piece of skewer protruding, which acts as a handle. He then, quickly, with his other hand, pushes the watch through the hole into the loaf, and pushes back the piece of crust again into the loaf, only this time without the skewer.

While the confederate is doing this the conjuror is cutting off the top of the loaf and, of course, for the purpose, has his left hand on it, which keeps it steady, otherwise the confederate would not be able to do what we have said.

The conjuror himself can of course see when the watch is safely inside the loaf, and must consequently not be in too great a hurry to cut off the top, but after a little practice the whole operation of opening the trap-door, taking out the piece of crust, pushing the watch into the loaf, and putting the piece of crust back again, can be performed in a very few seconds, and of course the quicker it is done the better. The confederate must of course not allow his fingers to be seen, but a large quarter loaf will be found amply sufficient to hide them; with a good clever confederate the trick can be equally well done with a half quarter loaf, or even a still smaller one; but perhaps the best loaf of all to use is a square tin one. The moment the watch is inside, the piece of crust placed back, and the trap-door closed, the conjuror can finish cutting the top off the loaf, and place it upright on the plate. In doing this he must be careful, in turning it up, that the watch does not cause the piece of crust to tumble out, and possibly fall out itself with a rattle on the plate. To guard against this catastrophe, it is as well to keep the tip of the little finger on the piece of crust, which can easily be done without its being seen. Of course, directly the loaf is upright on the plate everything is safe. The conjuror now places the plate on the ground, and, showing his hands to be quite empty, and pulling up his sleeves, he asks the person to give him back the box, which he places on the ground by the side of the loaf. Taking his magic wand, he first touches the box, and then the box, and says "Pouf!" then lays the wand down, and takes up the box, which he opens and hands the box of sugar-plums inside to some child, takes the box away (as it will not bear inspection), again advances and takes up the plate in both hands, keeping his fingers underneath the plate and his thumbs on the top of the loaf, he then asks some lady or gentleman, or, still better, the person who lent him the watch, to dig slowly and carefully with their fingers in the crumb of the loaf. Of course they soon dig out their own watch. We can assure our readers that this trick, easily and well performed, is as effective as any that can be performed on a stage. When the trick is finished, during the applause that will inevitably arise, the conjuror must recollect to place the remainder of the loaf out of reach, as it, as well as the box, will not bear examination.

We will now proceed to explain how to burn a hole in a pocket-handkerchief, and to restore the same. As we before observed, the conjuror takes the centre of the pocket handkerchief and pulls it between his left-hand finger and thumb, letting the four corners fall. This is, however, more apparent than real. The best method of doing this trick is as follows:— Have a lighted candle ready on some small table near, and ask any lady to lend you her pocket-handkerchief, show both your hands perfectly empty, take her pocket-handkerchief by the centre, pull it carefully between your left finger and thumb, and advance to the candle, but of course stop the moment you are about to burn it, and say, as if in answer to some remark
you had overheard, "What! I have changed the handkerchief? see for yourself, sir; ask the lady if that really is her handkerchief," take it out of your hand, and give to some one to look at the mark in the corner. You can now say, "But, madame, if I burn your handkerchief, would you wish me to mend it again? The answer is sure to be, "Certainly!" You now say, "Then I shall require my magic wand." When you go to fetch it, you take, and place, unperceived, a small piece of cambric about two inches square (with the centre pointed upwards so as you can take hold of it) and the rest rolled up as small as possible between your left finger and thumb, and, placing your wand in your pocket, you again take the handkerchief, only, in putting it this time in your left hand, you pull the small piece of cambric up and hold the real centre of the handkerchief between your second and third finger and the palm of your hand. You can now of course burn the piece sticking out, and having done so, ask some one to observe that it is really the same handkerchief, for the name is in the corner. In doing this, however, be careful to avoid any one, such as a sharp child, who very likely might make a snatch at it, whereby you would be discovered.

You now roll the handkerchief into a ball, and in doing so you separate the burnt piece from the handkerchief; you then take your magic wand from your own pocket, and in doing so of course you drop the small semi-burnt piece of cambric into it, touch the handkerchief with the wand, and hand it to be examined, when of course it is found to be perfectly whole.

This simple little trick is an admirable instance of the real use of the magic wand, which was first an excuse to go away, and second, an excuse to put your hand into your pocket.

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**SWIMMING.**

By the Secretary of the Royal Humane Society.

"WHAT IS DROWNING LIKE?"—TRAINING FOR SWIMMING RACES.

This is a question which many people must have been asking themselves lately; and it is a question to which most people at once conclude there can be no answer. That is a mistake, however, for we have a good deal of information from various quarters as to the sensations of a drowning person. It is so uncommon a thing, happily, for life to be restored after having been, as all intents and purposes, extinguished by submersion; and in more than one such case we have been favoured with the recorded experience of those who had nearly passed from life to death by drowning.

Perhaps the best case to take for our present purpose is that of the late Rear-Admiral Sir Francis Beaufort, for he possessed considerable powers of description, and having been requested by Dr. Wallis to give his testimony on this matter, he spared no pains to represent all that he had felt and known of it in a letter to the doctor, which may be found in Sir John Barrow's autobiography. When Beaufort was "a youngster at Portsmouth in one of the King's ships," he was upset from a small boat, and, not being able to swim, he could not keep himself up till help came. In his fright and shouting he swallowed a good deal of water, which, no doubt, helped him quicker through the first stage of drowning.

"From the moment that all exertion had ceased—which I imagine was the immediate consequence of complete suffocation—a calm feeling of the most perfect tranquillity superseded the previous tumultuous sensations—it might be called apathy, certainly not resignation, for drowning no longer appeared to be an evil. I no longer thought of being rescued, nor was I in any bodily pain. On the contrary, my sensations were now of a rather pleasurable cast, partaking of that dull but contented sort of feeling which precedes the sleep produced by fatigue. Though they were thus deadened, not so the mind; its activity seemed to be invigorated."

He then describes at some length the minuteness with which his mind ran over his past life, and yet two minutes did not elapse from the moment of suffocation to that at which he was hauled up. The sailors held him up by his heels, to let the water run out, and gave him gin, and he was quickly restored to animation.

"My feelings, while life was returning, were the reverse in every point of those which have been described above. I was now tortured by pain all over me—a kind of continuous nightmare seemed to press heavily on every sense, and to prevent the formation of any one distinct thought, and it was with difficulty that I became convinced that I was really alive."

The experiences of other persons have been similar to Admiral Beaufort's, and encourage us to entertain the hope that, by God's mercy, this death, as it is one of the most frequent of violent deaths, so it is also the easiest.

Training for swimming races is quite as necessary as for any other athletic contest, and for want of proper attention many amateurs have lost races entirely through not paying proper attention to their course of training. One great and frequent mistake in training for swimming races, is for all people to go
whole course should be done every day, except that just before the day of the race, which should be kept as a day of rest, not of absolute cessation from all exercise, but moderately quiet.

The dinner should be similar to the breakfast: beef-tea instead of cold tea. There is no objection to half a pint of stout; but the ordinary London beer or ale should not, under any circumstances, be drunk. All vegetables should be avoided, with the one exception of potatoes, and these should only be taken in small quantities. Pork, veal, ham, and any young meats should never be taken; also oysters, eggs, cheese, broths, soups, pies and puddings, seasonings and fruits, must be avoided. A glass of port wine after dinner will do no harm; but any hot beverage, in the form of spirit or negus, must not be thought of, and the less one drinks the better. Smoking is also to be avoided.

After dinner, half an hour’s sleep should be taken; and then the remainder of the afternoon should be spent in some light exercise, as rowing, or gymnastics, or, where obtainable, horse exercise. After tea, another long walk should be taken, or a steady run; in running, if you suffer from any pain, the part affected must be well rubbed.

If, at the end of the first week’s training on this system, the superficial fat is not reduced, a few Turkish baths would be advisable, but only sufficient to reduce the superabundance of fat. Of course this treatment only applies to those men who are inclined to corpulence; whereas those men whose animal life is low, should be subjected to just the contrary treatment, so as to increase the amount of blood in them.

To discover if the system of training is correct, the man under regimen must be watched to see if he appears in good health and spirits; and if he gradually increases in strength and wind, there is but little fear of failure; if, on the contrary, he is easily blown, or his spirits are low, or if he shows any sign of physical derangement, the system of training must be changed, and persevered in till all the symptoms disappear.

In many cases the joints become stiff from over-exertion in some of the exercises necessary to proper training; or, may-be, from some local weakness; this may be treated by rubbing the part affected with a liniment of barthorn and oil, or any other similar preparation.

When the course of training is completed, and the man is in good condition, the skin should be smooth, well-coloured, and elastic, the flesh firm, and the spirits good. There should be a general feeling of lightness and activity. A very good test of proper condition is to run about a mile at top speed; if this can be done without getting blown at all and without producing a pain in the side, it is a moderately good proof that the course of training has been successful. If a man is engaged in business, and cannot devote his time to a strict course of training, the morning should be set apart for the walking and running exercises, and the evening to swimming, taking care to retire to bed not later than nine o’clock. Of course business will not in any way prevent a course of diet according to the specified regulations; and if the body is in a thoroughly healthy state there need be no fear of the swimmer’s terrible base, “cramp,” in ever so long a day’s work in the water, as it is nearly always the result of a bad state of health or an overloaded stomach.
The measurement of 3 ft. 10$\frac{3}{4}$ in. from the top cushion is exactly two-thirds of one of the sides of the squares. Should, therefore, any of our readers try the stroke we have mentioned on any but a full-sized table, they must not measure 3 ft. 10$\frac{3}{4}$ in. from the top cushion, but first measure the side of one of the two squares of which every symmetrical billiard table is composed (one above and one below a line joining the two middle pockets), and then measure two-thirds of that side from the face of the top cushion, down the centre of the table, in order to obtain the correct spot on which to place the red ball in Fig. 2. We would strongly recommend any beginner to practise this particular stroke till he has mastered it. The stroke, too, has the advantage of being, to a certain extent, independent of strength, and it can be played so slow that the red ball will not come down below the middle pockets; or it can be played fast enough to bring the red ball over one of the middle pockets.

The exact spot on the red ball at which to aim is the extreme edge of the object ball.

If the beginner-plays first of all to hit the red ball “fine,” i.e., rather on the edge, he will find that the white ball rebounds and hits the top cushion; by gradually hitting the red fuller, he will find that he gets nearer and nearer to the top pocket, and will eventually make the losing hazard. He will now begin to see why this particular angle is easier than any other, at which to make a losing hazard, for if he has an observant eye, he will find that though constantly making the losing hazard into the top pocket, yet that the red ball rarely comes off at the same angle.

Now it is evident that if the losing hazard into the top pocket is only possible by hitting the red ball on one spot, the red ball would strike the cushion on the same spot after every stroke. The fact, therefore, of the red ball striking the cushion on various spots, notwithstanding that the losing hazard has been made, proves that there are various spots on which the red ball may be struck, from each of which the white ball will rebound and run into the pocket.

Now, a stroke being easy depends upon the number of spots on which it is possible to hit the object ball, and yet to make the stroke. For instance, the easiest stroke on the table would be to knock a ball in which hangs so much over the pocket that if it be struck at all it must go in. On the other hand the most difficult stroke would be to knock a ball into a pocket when it is so placed that there is but one spot on which it may be struck by another ball to cause it to go in—as far instance, to cut a ball placed on the centre spot of the table into one of the middle pockets from the centre spot in baize. This stroke is so difficult, that it may be said to be the limit of what is possible.

The losing hazard—of which we have been speaking, and which is so important a one, that, at the risk of being wearisome we must continue to speak of it—is easy, because there is a certain space on the red ball within which if it be struck the losing hazard will be made. Fig. 1 will perhaps explain our meaning. The red ball can be struck in any point along the horizontal line a b, but if struck in any point in that portion of the line a b not dotted, a losing hazard will be made into a certain pocket. Now the longer the line a b, the easier will be the stroke.

For instance, if the red ball be close to the pocket, and the other ball near it, it is possible that the line a b is more than half the diameter of the ball, i.e., it is almost impossible to miss the stroke; on the other hand, when the losing hazard is a very fine one, the line a b is very small, and the stroke consequently very difficult.

It has often been attempted to describe the place at which to aim, by what is called “dividing the ball,” and we hear of the “quarter ball,” and the “three-quarter ball;” but we do not think that any good can be derived from this division. In practice the ball can of course be hit in an infinite number of points, from dead full to the finest cut possible, and this space might be divided into degrees, minutes, and even seconds; but who, in taking aim, would possibly be guided by any such division? So in practice, to direct a man to aim at, say a quarter ball, seems to us as vague a direction as to tell him to steer along the meridian out at sea without a compass.

Hitherto, in speaking of making losing hazards, we have of course taken for granted that the striker has struck his own ball fairly in the centre, as otherwise the stroke we have named will not be made so easily. No side should be put on, as a rule, in making losing hazards, as the ball under the influence of side, is much less likely to run true.

We will now suppose the beginner to have practised the stroke given in Fig. 2 sufficiently to be able to make it, as a rule, at least twice out of three times, if this is the case his eye will probably have sufficiently accustomed itself to the angle to enable him to vary the stroke by moving the red to some other spot a little to the right or left, when he will, of course, have to alter the position of his own ball in baize, if he finds that he cannot make the losing hazard in the fresh position as often as he did in the previous one, he may rest assured that he has fairly learnt that most important and at the same time most difficult part of elementary billiards, viz., “learning to spot his ball.”

Let him now begin to try another class of losing hazards, viz., those in the middle pockets. These, fortunately for the beginner, are much easier than those into the top pockets, and consequently more encouraging, as nothing is more tedious, as we know by experience, than to be constantly failing in the stroke we are practising.

Let him, then, place the red ball on (side Fig. 2) the spot we have marked A, and playing from baize, try and make a losing hazard into the right-hand middle pocket. Now this stroke is so easy that the beginner should try and think about “position,” i.e., let him reason to himself and say, If I make the stroke, my own ball will of course be in the pocket, but where will the red ball go to?

Now in playing this hazard it is evident that the red ball will run up the table and strike the top cushion; if played hard, in all probability it will rebound and run into baize; if struck slowly it will not rebound perhaps beyond the centre line of the table between the two middle pockets.

What the player should endeavour to do is to avoid both these extremes of strength, and strike the red ball with just
sufficient force to cause it to run up the table, strike the top cushion, and return and stop as near as possible in its original position, A, by which means another easy hazard is left.

This stroke is as good as any to illustrate the meaning of a "break." Some players are so good at this particular stroke, that they can make sometimes as many as twenty and thirty losing hazards running in the middle pockets alone, as, should the ball come down the table a little too much to the left, there is of course an equally easy losing hazard into the left-hand middle pocket as there was before into the right-hand one.

In playing this stroke beginners must not get discouraged if they but rarely get the right strength, for they must remember that for any one to make even ten hazards running, i.e., a break of thirty, he must be a very good player. But there are other ways of missing the stroke (and by the stroke we mean position for the red ball as well as making the losing hazard), than that of either bringing the red into baulk, or leaving it above the middle pockets in the same line as the spot A. One of the most common of these is hitting the ball too full, and causing it to return too near the side cushions, and consequently leaving no easy hazard playable into the middle pocket the next stroke.

The only way we know of to correct this, as well as many other bad strokes at billiards, is for the player to think every time before he even takes his aim at the ball, what will be the position of the balls after he has scored.

The greatest as well as the most common fault of all amateur players is that they think too much about making the score, and too little about position, and it is for this reason that there exists such a great disparity between the play of professionals and amateurs. The former have, as a rule, studied the game, and the latter have not; and consequently, although we find that in cricket, rowing, athletics, etc.—games depending principally upon muscle—amateurs are able to hold their own against professionals, yet when we turn to billiards—a game depending upon pure skill and nerve—we find amateurs, so to speak, nowhere; for we have no doubt that Cook, the present billiard champion, could give any amateur 700 points out of a thousand, and beat him with the greatest ease. Amateurs would do well to think of this. We do not wish to see them spend more time upon the game than they do at present, for, on the contrary, we believe very many spend far too much, but we should like to see the time that is spent better spent. Billiards is called a scientific game, affording opportunities for thought, and it is as ridiculous to see some men play—who have played for years as they do—as it would be to see grown men play at nine-pins with checkers in preference to the game of chess itself.

Some losing hazards require side, but only experience will tell the player when to put it on and when not; but one important standard rule at billiards is—Do not put on side unless it is absolutely necessary for the stroke, bearing in mind that by the stroke we mean not only the score, but position. Now, side may be put on with two objects—viz.: 1, to alter the direction of the ball after contact with the object ball; 2, to assist the ball in going into the pocket when the latter is narrow. We will explain presently the meaning of a "narrow pocket."

We have already given instances of losing hazards into the middle pockets. Now, suppose a ball to have stopped on a spot thirty-five inches from the right-hand corner pocket in baulk along a line drawn from it parallel with the length of the table, it will be found, by placing the striker's ball on the left-hand corner spot in baulk, that there is an easy losing hazard into the middle pocket; but if the ball were an inch higher up the table, i.e., thirty-six inches from the right-hand corner spot in baulk, the losing hazard would not be so easy, and would require a hard stroke, which would probably have the effect of bringing the object ball into baulk, instead of leaving it over the middle pocket in position for another losing hazard the following stroke. The hazard is, however, rendered easy by putting on right-hand side.

Suppose the red ball to be on the spot we have mentioned, viz., thirty-six inches from the right-hand corner baulk spot. Now, if the striker plays from the left-hand corner spot in baulk, and hits his ball on the right-hand side, it will come off in one direction, and he will consequently make the hazard. But, if he were to hit his ball on the left-hand side, it would, after striking the red, come off in another direction. By striking the ball fairly in the centre it would come off in a direction between these two.

Perhaps the best explanation of a narrow pocket is as follows.—Place any ball within an inch of the cushion half-way between the two bottom pockets, and attempt to run a coup into either of them without putting on any side. Any beginner will find out for himself that this is by no means an easy stroke; but let him now try again with side, and he will find that what before was difficult is now comparatively easy. Of course what side to put on is self-evident. The effect of side is to cause the ball to rebound from the cushion at an angle different to that at which it would rebound had no side existed.

Now, in the stroke of which we speak, viz., running a coup into a pocket, when the ball is nearly touching the cushion before entering the pocket, it is almost certain to strike the extreme end of the cushion opposite the side, therefore, what must be put on is that which will cause the ball to rebound in the direction of the pocket.
It is often made an objection to the common paper kite that it is easily rendered unfit for use—a slight accidental blow, as was remarked in our last article, may make a hole in it, or a heavy shower of rain may bring it to an untimely end. Fault in Fig. 1. The framework consists of two slender pieces of wood, A A and B B, placed across each other. They are made to turn freely on a pivot at X, so as, when desired, to lie longitudinally one on the top of the other. The calico covering, after

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 5.

Fig. 6.

Fig. 7.

also has been found with the ordinary method of construction when applied to kites of large size; a large kite, made upon the usual plan is, it is said, very troublesome to carry, especially on a windy day. The first of these difficulties, as we have told, has been got over by covering the skeletons of kites with cloth, calico, silk, or very thin gutta-percha cloth, instead of paper. The second has been surmounted by adopting a new form of skeleton, and having the cloth covering so contrived as to be easily separated from that of the woodwork. The kite is then rolled up, and carried to and from the field in a bag.

This improved cloth kite we shall now describe: it is shown being cut to the requisite shape and size, is hemmed round the edges to keep the cloth from fraying. It is then securely fastened to the two ends of the long piece of wood, A A, and it is not intended, by the way, that these fastenings be ever undone. At the other two corners of the calico, which are to be attached to the ends of the short stick B B, tapes are placed, and tapes to tie to these are also affixed to the woodwork. Tapes may, in addition, be fastened to the centre of the calico to tie round the sticks at X, and keep all tight. When complete, the form of the kite is that of an oblong diamond, and, as may be supposed, it is very easily carried about. One has only to unfasten the calico
from the short arms of the cross, turn the two pieces of wood round on their axis so as to lie one on the top of the other, roll the cloth round the sticks, place it in the bag or case, and the whole apparatus becomes as portable as one could wish.

It used to be thought in this country that a good flying kite could be made only of one or two different shapes. This, however, was quite the mistake of an unenlightened generation. A kite may be made of almost any shape under the sun, and it will fly well if only the following conditions be observed: Its framework must be light, it must be perfectly balanced, and the surface must be sufficiently great to offer full resistance to the wind, and be readily borne up.

The Chinese, who are great kite-flyers, have long been aware of this fact. "On a suitable evening, in some parts of China," says one writer, "the whole sky will be peopled with kites of strange and wondrous aspect; mandarins, men and women singly and in pairs, wild beasts, birds, serpents, dragons, fish, in endless variety and profusion. To the Chinaman bent on constructing a kite, nothing animate or inanimate comes amiss. Let the shape be as eccentric as you please, he will not only make a kite of it, but will make one that will fly."

I shall tell you how to make two or three of the commonest of these fancy kites; that will do as well as if I were to describe the manufacture of a hundred, for the principles are, in all cases, the same.

In Figs. 2 and 3 you see the Sailor-Kite—the former shows the back, and the latter the front. The construction is proceeded with thus: Take a piece of thin lath, split it to the point A, and bind the wood there tightly, so that the split may not extend farther. Tie to this lath, which occupies much the same position as the upright in the common kite, a thin piece of cane, B B, bent to form the shoulders. Add a piece of wire, C C, bent to form the hat; a piece of wood, D D, must also be fastened, as in the Figure, to the split lath. Place strings as shown in the Figure, and be very careful to have the balance perfect—that is to say, contrive that the weight on the one side of the upright shall be just the same as that on the other. Now paste on the calico covering as neatly as you can, and the kite is finished. The painting of the sailor (see Fig. 3) must be left very much to taste. All I need say on this head is to remind you of what was said in my last article, that the lines should be bold and the painting brilliant, and that the calico should be sized, in order to make it take on the colours.

The Bird Kite, representing a hawk with its wings outspread, is a very pretty toy, and, when high in the air, forms a remarkably pleasing and natural object. Its skeleton is shown in Fig. 4. It consists of an upright, A A, with a large cross-piece, B B, and a small cross-piece, C C, all securely fastened together. The head and beak are made of bonnet wire or split cane, secured in a notch at the top of the upright. The strings must be placed as in the Figure. The calico covering should be cut fully an inch larger than the frame; this allows something for lapping over the strings and head frame, to which the cloth is to be glued. The kite, as it should be when painted and complete, is shown in Fig. 5. The weight, you observe, at the end of the tail, is in the shape of a small bird.

Fig. 6 represents the Fish Kite, the structure of which is very simple. It consists of a long lath, by way of straighter, a cross-lath behind the fins, and a shorter cross-lath behind the tail. Another fancy kite (Fig. 7)—a dog standing on its hind legs—if done of a good size, and well coloured, has a fine effect. I don't intend now to say anything more on this part of my subject, but leave it to you, my readers, and the exercise of your ingenuity, for which you will find it an almost boundless field.

The flying of a kite may for a little occupy our attention, seeing we have, as fully as is necessary, considered its manufacture. If you would fly a kite successfully you must first of all provide yourself with a sufficient quantity of string, and the string must be of a thickness corresponding to the size of the kite; if the kite be large, and intended to go high, it must be stout and strong, else it will be sure to be snapped by the force of the wind when the kite commences to "pull."

Next, a suitable day must be chosen. It must not be calm, for if there is not enough wind there is no sport, nothing but vexation and disappointment. There ought to be a nice breeze blowing, and then you may expect some enjoyment.

To raise the kite secure the assistance of a friend. Let him hold it by the lower end of the upright as far as he can from the ground. You, having previously unwound a sufficient length of string, turn your face to the wind, and, having given your friend the signal to let go, start off at a run. Up the kite will soar. If it be well made, and the breeze suitable, you need not run either very fast or very far, for the kite will soon find its balance, and float quite steadily in the air. The string is to be let out gradually: it is a great mistake to do it too fast.

Now all the fun is over; your kite is made, flown, and you have paid out all your flying tackle. No, you have yet something left to do—you can send up messengers to your kite. "Messengers" as they are called, may be made of various forms. Ordinarily they are small pieces of paper or pasteboard, three or four inches square, with a hole in the centre. The end of the string is passed through the hole, and the paper is quickly borne by the wind up to the kite. Another sort of messenger has been described as a hollow cylinder of thin wood, the diameter of which is sufficient to allow its free revolution round the string. To this cylinder are attached several flappers, or sails, in an oblique direction. The action of the wind on the oblique surfaces makes the cylinder revolve, and carries the messenger upwards. Too many messengers must not be sent up, else they will prove too heavy for the kite, and drag it down.

If you have an unlimited quantity of string, you must not imagine that your kite will go to any height you please. The fact is that, owing to the existence of several natural laws, a single kite will not ascend beyond a certain fixed point. A series of kites, however, may be made to reach any height, the first kite being fastened to the back of the second, the second to the back of the third, and so on.

As to bringing the kite down, that is an easy matter. With one hand hold the stick firmly round which the string is wound, and wind away steadily with the other hand. In sending the kite up the stick should have been dropped on the ground, and the line paid out through the fingers.
I add now, in conclusion, a few interesting miscellaneous notes, principally of an historical character, relating to kite-flying. This pleasant pastime appears to have been introduced into Europe from China, but the date is a matter of great uncertainty. Strutt, the well-known author of "Sports and Pastimes," is of opinion that its introduction into England cannot date farther back than about 1700. But Ben Jonson, the dramatist, when a boy, is said to have been seen flying his kite by the windmill in St. Giles's Fields, a locality which has long lured farewell to both fields and windmills. Now, this, if really the case, proves Strutt to have been considerably astray in his supposition, Jonson's boyish days falling in the close of the sixteenth century. Sir Isaac Newton was another great man given in his youth to kite-flying. He was the first to introduce it at Grantham, where he was at school. One of his mischievous pranks was the sending up of a lantern tied to the tail of his kite on a dark night, a proceeding which filled the natives of the district with terror and dismay, they taking the harmless lantern for a dreadful comet.

It is to China, I have said, that we owe the kite. The inhabitants of that country, men, women, and children, are the most enthusiastic kite-diors in the world. They have a sort of kite festival on the ninth day of the ninth month, and thousands of people then resort to the hills to indulge in their favourite amusement. I have also already spoken of the varied and fantastic shapes in which their kites are made.

A curious feature remains to be mentioned. By round holes and vibrating cords the kites are made to produce a sound like a humming top, sometimes, indeed, a much superior tone is produced and the effect is "most melodic, most melancholy," like the wild sounds of the Æolian harp—now joyous, now sad. These harmonious kites are kept flying during the night, and you can imagine with what unearthly strains they fill the darkness.

Our article would hardly be complete without some mention of Dr. Benjamin Franklin, and his sending one up to the clouds, and by means of it drawing down lightning, and so demonstrating the identity of lightning with electricity. I suppose I should also tell how the same philosopher used often to let up a kite before going into the water to bathe, and then lie on his back, and allow himself to be drawn by its means across the stream, and how he used to say that with a good kite and a favourable wind a man unable to swim might be supported in the water so as to pass from Dover to Calais.

Then I should mention that kites have been used as means of locomotion, not only on roads in England, where they have repeatedly been used, but in the Arctic regions, where, in some of the expeditions in search of Sir John Franklin, they were employed to transport sledges hundreds of miles over the ice and snow.

And I feel strongly tempted to enlarge on the story of the ingenious sailors who had laid a wager they would drink a bowl of punch on the top of Pompey's Pillar—a seemingly inaccessible spot—and won it, by the aid of a kite; for the kite carried a rope across the summit of the pillar, and by its means they all ascended, and drank the punch, as they had promised.

But one might run on in this way almost for ever, so many incidents occur to one's mind. Let the reader go kite-flying, and make incidents of his own. I hope they may all be pleasant ones; and with that wish I bring these articles to an end.

DRAUGHTS.

BY GEORGE FREDERICK PARSON.

OPENINGS—ENDEINGS OF GAMES—STURGE'S POSITIONS—VARIATIONS.

It will be seen that in draughts there is much more calculation required than at first sight might be thought to fairly belong to such an apparently simple game. Here, for instance, is a problem which well exemplifies the combinations that often occur in the course of actual play (Fig. 1):

White to play and win in seven moves.

This he does as follows:

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Taking six pieces and pinning the Black on square 20. As already said, there are five principal openings, each leading to a regularly-defined ending. It will be well for the student to make himself thoroughly acquainted with both the modes of properly beginning and closing a game. But first I introduce the

OLD FOURTEENTH OPENING

without the variations. These, however, are neither few nor unimportant, as the young player will discover as soon as he comes to examine the moves:

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<td>32 to 28</td>
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<td>16 to 11</td>
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<td>3 to 8</td>
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<td>31 to 25</td>
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And the game is drawn. The theory is that between two players of precisely equal talent, every game would be drawn; but this is hardly right, for where are we to find the two players of "precisely" equal knowledge, judgment, patience, and perseverance? Others conclude that, given an equality of skill, the player with the first move should win; but I must decline giving an opinion on so delicate a point, as every draught-player knows how much depends on circumstances—pre-occupation, weariness, lack of attention, or any small worry of business, being all circumstances likely to affect the calculations of even a Drummond, a Payne, or a Sturge.

You may play your game well throughout—giving man for man, making no mistake, and apparently remaining quite equal
to your opponent in force and position; and yet, when the
board is almost clear, get into a critical position, from which
there is no escape. A curious instance of this will be found in.
Black—Men on squares 1 and 3.
White—Men on squares 10 and 31.
At first sight there is nothing very alarming in this position;
but should White make the wrong move at starting, he will lose
the advantage he possesses, and merely draw, instead of winning
the game. The whole solution is lengthy, but important:

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These are the preliminary moves, and from this point the
variations are numerous. The situation now assumed by the
men is that in Fig. 2:

Without the greatest care Black will lose, as White is able
to move his man into square 7, and so threaten to get two for
one. If Black move from 27 to 23, 24, or 32, he makes a draw
if White exchange; but if White pursue the game without the
exchange, he should win.

Mr. Drummond, in his analysis, proves how indispensable it
is for the attacking player to hold the key of the position.
You may easily demonstrate this by placing the men as follows
—positions which frequently occur in actual play:

POSITION I.—WHITE TO MOVE AND DRAW.
Black—Kings on squares 31, 32, 28, and 20.
White—Kings on 22, 19, and 18.

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SOLUTION.

and the three kings draw against four.

POSITION II.—WHITE TO MOVE AND DRAW.
Black—Kings on 18 and 19, and man on 28.

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and White draws with the lesser force by holding square 20;
for, do what he will, Black cannot force his opponent to move
out of square 32.

POSITION III.—WHITE TO WIN.
Black—Men on squares 15 and 21.
White—King on square 32.

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And wins by commanding the square.

POSITION IV.—WHITE TO MOVE AND DRAW.
Black—Kings on squares 14 and 15, man on square 13.
White—Kings on squares 22 and 26.

SOLUTION.

and so on, the Black not being able to force White from his
position, or to give one for one.

In these positions we see the importance of holding a particu-
lar square at the end of the game. We shall see this even
more plainly if we examine the diagram on next page (Fig. 3),
known, from its standing at the head of Sturges’s hundred
and forty problems, as “Sturges’s First Position.”

White is to play and win. But the variations are so many and
so curious, that the analysis of them has been made a study by
numerous first-class draught players. So fully, indeed, does
this position exemplify the combinations of our favourite game,
that every student should make himself thoroughly acquainted
with the proper moves. For this purpose I give a full solution.
It will be necessary for the tyro to play the moves on the board,
replacing the pieces at each variation, and playing the
moves as indicated. In this way only can anything like per-
fection be arrived at. The letters at the side indicate the
different variations:

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<th>WHITE</th>
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<tr>
<td>1. 15 to 10</td>
<td>1. 9 to 14</td>
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<tr>
<td>2. 10 to 6a</td>
<td>2. 14 to 18</td>
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<tr>
<td>3. 6 to 1b</td>
<td>3. 18 to 23</td>
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<tr>
<td>4. 1 to 6</td>
<td>4. 23 to 27</td>
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<tr>
<td>5. 6 to 10</td>
<td>5. 27 to 32</td>
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<tr>
<td>6. 11 to 7</td>
<td>6. 32 to 27c</td>
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<td>7. 7 to 2</td>
<td>7. 27 to 24</td>
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<tr>
<td>8. 2 to 7</td>
<td>8. 24 to 27</td>
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<tr>
<td>9. 7 to 11</td>
<td>9. 27 to 23</td>
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SOLUTION.

and White wins.

VARIATION A—BLACK TO DRAW.

2.—11 to 7 | 3 to 8 |
7 to 3 | 8 to 11 |
3 to 7 | 11 to 16 |
7 to 11 | 16 to 20 |

Black draws by being driven out of the double corner, which
releases the man on square 17, who presently becomes a king.

VARIATION B.

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<td>3.— 6 to 2</td>
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<td>11 to 8</td>
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<td>7 to 11</td>
<td>16 to 20</td>
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<td>11 to 15</td>
<td>15 to 19</td>
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White playing 7 to 10 allows Black to draw by playing 20 to
24, 28 to 19, and 18 to 15. A draw also takes place if White
move 7 to 3, or 28 to 32, as Black can get into the double
corner: thus we see that the winning move is 7 to 11.
VARIATION C.

Black may now move from square 3 to 8, instead of 32 to 27; let us see with what effect:

6. 3 to 8
10 to 15 8 to 12
15 to 19 32 to 27
7 to 2 27 to 32
2 to 7 32 to 27
7 to 11 27 to 32
11 to 15 32 to 28
15 to 18 28 to 32
18 to 23 32 to 28
23 to 27 28 to 32
27 to 32 28 to 24
If White now move from 32 to 28, Black draws by moving from 24 to 19; the proper play is:

23 to 18 24 to 28
18 to 15 24 to 24
32 to 28 * 24 to 27;

and now refer to the original solution, 15 to 18—the 25th move; but if at this * move Black plays 24 to 20, the win is forced, thus:

24 to 20
15 to 18 23 to 26
15 to 11 13 to 16
16 to 19 23 to 23 26 to 30
28 to 32
11 to 15 19 to 23
and White wins.

VARIATION D—WHITE WINS.

If, instead of 32 to 27, the player has the option of moving from square 3 to 8, thus:

VARIATION E.

The next variation results in a victory for White;—instead of 32 to 28, suppose the play to be:

16—3 to 7
27 to 24 7 to 10
23 to 18 32 to 28
24 to 19 32 to 32
19 to 16 32 to 27
16 to 12 27 to 24
12 to 1 24 to 20
8 to 3 20 to 16
3 to 7 and wins.

VARIATION F.

27 to 31
and White wins as before.

VARIATION G.

27—24 to 28
15 to 11 16 to 19
11 to 16 19 to 24
32 to 27 28 to 32
16 to 19 and White wins.

VARIATION H.

29—20 to 24
18 to 23 19 to 26 23 to 19

and, once more, White wins; showing the value of this position.

In my next chapter I shall endeavour to show the player how to discover when he "has the move"—a most important piece of knowledge in some positions towards the end of a game.

HOME PETS.

By W. A. Blakston.

A GLANCE at the introductory chapter of the RECREATOR reminds me that I am not to write for young folks only; and I may observe that canary breeding is not a pursuit to which young people have as yet given much attention.

Rabbits, guinea-pigs, pigeons, white mice, any and almost every domestic pet, has been found to have some charm for them, but the canary is seldom found among their protégés, and a pair or two of breeding birds does not frequently form part of the stock.

THE CANARY—TO CHOOSE A BIRD—AGE—COCKS AND HENS—GERMAN CANARIES—SONG PERCHES.
in-trade which serves to make happy the hours of youthful recreation. But though my treatment of the matter will be eminently practical, and my endeavour will be to furnish standard information for older heads, my wish is to show every school-boy and school-girl that there is within their easy reach a new field of instruction and pleasure, in which they can recreate to their hearts' content. Those who desire to go deeper into the business will be inducted into all the mysteries of the 'fancy,' intending exhibitors will be told how to breed high-class birds, and prepare them for competition; and detailed instructions for the management of shows will be appended for the guidance of those who take a pleasure in periodically gathering together the finest specimens of the year for public competition.

But before we get to the serious business of breeding and rearing high-class exhibition birds, just a word to those who keep but one bird, and keep him only for company and for song. If you are not very fastidious as to the quality of the song, any description of canary, pink-eyed or otherwise, will suit your purpose equally well. It is all nonsense to suppose that a pink eye is indicative of weakness; it is indicative of something else, of which we shall treat in its proper place, and is the distinguishing mark of one of the most curious varieties of the canary. The main consideration is to select a healthy young bird, and with a view to setting the first point a fancier would make as close an examination and apply as many tests as there are methods given in a cookery book for determining the important question of the freshness of fish or poultry.

My first advice would be, put yourself in the hands of a respectable dealer, if you have no confidence in your own judgment, but if you wish to select your own bird, and it be one of a number in an aviary, have it placed in an ordinary song cage, and allow it to remain perfectly at rest, and to recover from the flutter and excitement of being caught and handled. If it be in health it will be close and compact in the feather, will pull itself together and hop from perch to perch with a sprightly active movement, while evince no desire to mope, but will rather call with a ringing 'cheep!' 'cheep!' for its companions. But if it be ailing, either from chronic or temporary indisposition, it will sit 'thick' and 'lumpy' (technical but expressive terms), will not gather up its wings, lift up its head and look about, as if to say, 'What now?' but will quietly settle itself down on the perch, and, if undisturbed, will ruffle up its feathers and regard its change of circumstances in a dull listless sort of way. If to this be added a heaving motion of the body when breathing, or a spasmodic jerking of the tail, however slight, have nothing to do with such a bird. Drawing the finger quickly across the wires of the cage makes a rattling noise is a common trick with unprincipled dealers, and will cause almost any bird, however dull, to pull himself together, and a bird kept in motion by such means will look sprightly enough, but the moment he is left to himself, down he will sit, and from such down-sitting there will eventually be no uprising.

Age generally shows itself in a canary not in his face but on his skin beneath. A young bird has clean thin legs, but as he gets older, the scales on the front of the leg become larger and thicker, till, in an old bird, they are unsightly projections. This may be taken as a pretty correct standard of age—clean, thin shins indicating youth, and the contrary, age. Some varieties indicate their age by their plumage, but as I am now speaking of song-birds, which plumage—as recognised by the 'fancy'—goes for nothing, it is not worth while in this place to refer to plumage as an age test, as it will be fully treated upon in its proper place.

To distinguish a cock from a hen, so that you may not have the mortification of buying a cook, which, after keeping you waiting in the exercise of infinite patience in expectation of its breaking into song, rewards you by laying eggs—is, like many other simple matters, very easy when you know how. The first criterion is colour, which, in the cock, is much more brilliant than in the hen. Some fanciers distinguish a cock by the shape of the head, which is longer than that of the hen, and an experienced breeder can, in this way, single them out in the nest before being feathered. The action, which in the cock is quick and sprightly as opposed to the quieter movements of the hen, the chirp, which in the cock is strong and defiant, and in the hen soft and plaintive, are so many signs which, to an experienced eye, indicate the sex. I have known a fancier who decided by the eye, and another who could almost undertake to separate a lot in the dark by the feel alone.

In the spring, and indeed all through the summer, while the bird is in song, until the moulting season, the test is easy, though it is more difficult to distinguish young unmated birds in the autumn, when occasionally experienced judges will be deceived, and will have to fall back upon other evidence, which education soon furnishes.

If you are particular as to the quality of the song, procure a trained German bird, and, in doing this, no knowledge of sex is required, as the little fellows will sing almost at command, and so declare themselves. Their song is something wonderful, and is entirely unmarked by the harsh, noisy, uncultivated rattle of the ordinary canary. It has numerous changes; and a highly trained bird will ravish you with delicious bursts of melody, including the choicest notes of the choicest songsters of our woods intermixed with long, low, plaintive trills, with which the ear is never wearied nor the most sensitive organisation distressed.

Having obtained your bird, an ordinary song-cage, such as is to be met with in great variety at any ironmonger's or wireworker's, is all you require, only, as soon as you get it home, take out the perch, and either send them into the kitchen for skewers or throw them into the fire. A single glance at the formation of the foot of the canary will show that a perch no thicker than a Cedar pencil is not adapted for his resting-place. On such a support he is about as comfortable as you would be sitting on a rail, holding on the best way you could. I have seen a Japanese juggler walk upon a thin wire, but we know it is not the national custom of the Japanese to sleep on clotheslines or balanced on the top of high poles. A canary can perch on the smallest twig, but there is no occasion to torture him by giving him no other resting place for the sole of his foot.

As this point will be treated in detail by-and-bye, when we come to speak of breeding cages and their fittings, it will be sufficient here to say, Supply perches at least twice the thickness of those usually sold with ornamental cages. Hang your bird where he will get plenty of sunlight, and out of reach of the cat, out of all draughts, stew the bottom of his cage with clean sand, supply him daily with white canary seed and fresh water, with a sprig of groundsel when it can be had, give him a saucer of water in which to bathe each time you clean out his cage, and a song-bird will require no more. A simple arrangement of a muslin round the lower part of the cage will prevent the husks of the seed and other matter being thrown out on the floor, and if in return for your attention he is too lavish with his music, you can at any time cover him up with a cloth and silence his voice.

A young bird, say one fresh from the nest, can easily be tamed, by a little attention, and will leave his cage to pick the crumbs from the breakfast table, will perch on the finger, and sing at command, in fact will do almost anything, only, beware of the cat.

Here we will leave song-birds for the present, and, in the next paper, get to the more interesting subject of breeding.
SKELETON LEAVES.

By Eliza Cheadle.

THE PROCESS—DECOMPOSITION—THE BRUSH—BEAUTIES OF THE FUTURE—BLEACHING.

I can quite imagine that you are standing beside the vessel of leaves which you began to macerate with an expression of mingled disgust and vexation impressed on your countenance—disgust at the unsightly spectacle before you, and vexation at having begun what now appears to be a recreation of a very unpleasant nature. This part of the process is not agreeable. The black decaying leaves, the swarming insects which always collect in such forces, and apparently float over the unwholesome-looking food, the odours drawn forth by the sun which are, well, decidedly they are not sweet—all these details, separately or collectively, are calculated to inspire one with a dislike to the whole undertaking.

But turn your eyes and thoughts away from the present, and see a vision of the future. A fairy bouquet of exquisitely lovely flowers and leaves, momentoes it may be of some much loved spot or famous place from whence you have brought these remembrances, and which, thanks to this process, you are enabled to preserve for evermore.

"Tis but for a little while. Do not be tempted to change the water, for the process of maceration goes on much more quickly the more the water is impregnated with the decomposing vegetable matter. Get a thick smooth wooden pin—the handle of a mop will serve your purpose—and now and then gently stir the mass. That is all that there is for you to do at present.

In a week or two you will be sure to find that some of the leaves are ready to be taken away. For proof of this you will have to make up your mind to examine them, to take hold of a leaf, and see whether its outer coating is pulpy and sticks to your finger, if so, it is ready for removal.

Have at hand a large shallow earthenware basin full of clean water, into which put those you deem to be sufficiently macerated. Shake it gently to and fro, and much of the green matter will float away. Another cleansing of this description will quite decide which require still further help before they will show their nerves and veins, the delicate tracery which is their chief beauty. Several measures must be resorted to, especially with those of thick texture, such as the magnolia, ivy, holly, etc. You will want a short-haired brush with bristles, which, though stiff, must not be hard. A soft toothbrush does this part of the business in a most satisfactory manner. You place the leaf in the palm of your hand or on a plate (in which latter case place a finger on the stem to hold it steady) and dab the leaf with the brush. The word "dab" is an inelegant one, but, with your leave, I use it, as expressing just what I mean; for if you were to sweep the brush over the leaf, its delicate framework would certainly be injured. Be very careful that no wet leaf gets on to the table, for you would not be able to get it off again without completely spoiling it.

As to the conveyance of leaves from one vessel to another, etc., you can do it with your own fingers, or float them on to a card, or use a wooden spoon for the purpose. Some people's fingers, are very delicate in touch, and some people's fingers are "all thumbs." Be prepared, however, to see a great many of your specimens damaged and unfit for use. Of course, some kinds of leaves are much more difficult to skeletonise than others. Strong leaves have strong ribs—the Magnolia to wit—which are not easily broken, whilst the gentlest touch is liable to dislocate and injure the trailer organisation of some such tender leaf as the Norway Maple.

When the network of the leaf is quite distinct, when every atom of cuticle has disappeared, then that portion of the work is done, so the next thing to set about is to dry the skeletons either by placing them between leaves of blotting paper or the folds of a soft towel. Now select what still remains perfect; and when I say perfect, I do not wish to be too particular; the loss of a stem is immaterial, that can be replaced, but the lacework can neither be patched or mended. I should now put them away in boxes until such time as you have them all ready for bleaching; and while you wait for the others, I may as well tell you what course to pursue in order to whiten them when the time arrives for so doing.

Much of the beauty of the leaves depends on this process. If they are not of the purest white they will not, cannot, look their best, the slightest tinge of yellow will mar the whole effect.

One tea-cup full of solution of chloride of lime, such as you buy at the chemist's, put into a gallon of water, this is the proper proportion; or, if you wish for smaller quantity, put one tablespoonful of the solution into a quart of water.

The best receptacle that you can now have for your skeletons is a wide-mouthed glass bottle, such as are used for the preservation of pickles, whose throat should be large enough to allow the broadest of your leaves to pass down it without hesitation.

As a matter of course the thickest part of the stem requires the longest time to bleach, and as the process commences first at the bottom of the vessel, it is therefore the wisest to arrange the leaves with their stalks downward. Cover over the top of the bottle, and put it in a warm place. You will not have to wait so long this time before you see the result—only a few hours, at the most a dozen—I cannot be more particular, because the time varies with the nature of the leaf.

Take a peep now and then, and at once abstract any that you see are ready, for if they remain in this liquid after they are properly bleached you will find that they become quite brittle. Do not try to bleach seed vessels in the same jar, they should always be kept distinct from the leaves. They require a stronger preparation; the proportion of chloride of lime must for them be quite double that used for leaves.

The bleaching process being completed, place the skeleton in a basin of clean tepid water for a short time. The main object of this washing is to free the specimens from any chlorine which might adhere to them. Dry them well after this, either as you did before, or by placing them in the sun, or before the fire—the fire not being too hot. The very last work is to press them in books. They are really now quite ready to be mounted into their future permanent place.

There is much to be said about the arrangement of these "spiritual" leaves, but for the present it will be best for me to tell you of some other leaves and seed-vessels of which you can make use, for you must have the whole collection ready before you can begin to form it into groups.

The leaves of the Magnolia and the India-rubber plant are excellent for skeletonising purposes. They are a long time, it is true, in slipping off their coats, but then they are not apt
to lose their stems, as do so many during maceration and its succeeding operations.

You will find these broad leaves most useful when you begin to group, for they hide small defects, and any of the ten varieties may be selected.

The *Eryngium maritimum*, or Sea Holly, is quite unique as a skeleton; but, as with our common holly, it is an exceedingly worse on that account; they make such light and feathery phantoms, so different from what you would expect from the thick leathery leaves on the tree. The smaller the leaf the greater the trouble; but, believe me, I have seen leaves skeletonised by human fingers to which, in comparison, box-leaves looked large. True, they are of little worth except as curiosities, but they show what is possible to achieve in this way.

difficult task to accomplish, by reason of the many thorns which arm the edges of their leaves. The skin is tough, and it clings so pertinaciously to each spike, that it is a matter for much patience to remove the cuticle without breaking off the point, you will therefore not be surprised to hear that not a few people despair and give up the attempt, at any rate to get a perfect specimen. If you go to Switzerland I advise you to get a leaf of the *Eryngium alpinum*, it will give you a very uncommon skeleton, a radialed star.

The leaves of the Box-tree are diminutive, but none the Jerusalem Sage, *Astrattia*, Knee Holly, and the wee-est of Campanula were, I remember, amongst the number. There is the well known *Wisteria* for you to try, and St. John's Wort—an evergreen shrub—the Musk-plant, and Butcher's-broom.

But your group will not be complete if formed only of leaves, seed-vessels add greatly to the variety. Those of the Corn Poppy, are perhaps somewhat stiff in their appearance, but they contribute to the general effect, so do those of the Campanula, which are exceedingly light and pretty, while nothing
can surpass the outward graceful appearance of the "belted pod" of the Henbane.

Do but listen to a description of the personal appearance and qualities of this plant when in its natural state — "Henbane is a hairy, clammy, fetid plant, it has an oblong stem clasping coarsely lacerated leaves; dull yellow flowers traversed with artistic than that of the moon (the resemblance to which suggested the name of Lunaria), nor for any exhibition of lace-work, for they possess none—but on account of the soft silvery appearance of their skins, of those seed vessels which glisten and shine in a most attractive way. Then there are the Mallow, Winter Cherry, and Medicago, which all skeletonize

livid purple veins and large spiny calyx, its odour is stupefying and disagreeable; its taste nauseous." Not one recommendation, you see; seemingly the very last plant we should seek for ornamental purposes. You would, therefore, hardly believe it to be possible that this unattractive plant could supply anything for our purpose. But it does do so.

The seed-vessels of Lunaria, or Honesty, as it is more familiarly called, are again quite different to any we have mentioned, and they hold a high place, not for their shape—that is not more very well—the pod of the latter is quite characteristic of itself—it is spirally twisted, resembling a shell, but there are a great many spines to torment you. Then you can take the Thorn Apple, if you like him, he is certainly a contrast, and can scarcely be called either "phantom" or "spiritual" in appearance, looking more like a substantial hedgehog than anything else. He is a favourite, but, to my mind, looks rather clumsy and out of place in the company of such delicate beauties. Unfortunately, he soon becomes discoloured.
ROWING.

By Lampton Young.

STROKE—PRESENCE OF MIND—THE SPURT—THE COXSWAIN—TRAINING—“ARGONAUT”—DR. EDWARD SMITH—WHAT TO EAT, DRINK, AND AVOID—MANAGEMENT.

These last lessons must not be too long in their continuance, but be frequently repeated for some weeks, till the learner has perfectly mastered the rudiments of the craft. Much good is derived by the pupil occasionally changing places with the instructor, and carefully watching every movement as to handling the oars, and after feeling that he has overcome many little points he could not see before, he should again change places and practise what he previously did not see the way to accomplish.

When he is considered to be a proficient in pulling his oar through the water, he may have some practice with a good oarsman rowing stroke, by which he, in taking the bow oar, can learn to keep time, and see how the oar should be manipulated to get the utmost power out of it in the act of propelling the boat; but it is by no means that the best oarsman makes the best “stroke” oar; for many men who are excellent when in a boat behind others, are so wanting in judgment and “time,” that the whole crew are thrown out directly they take the after oar.

The man entrusted with the all-important post of stroke should under every circumstance be a good oarsman, and possessed of that amount of English pluck that will enable him to “spurt” when the critical moment comes, and by sheer force of example put new life into his exhausted crew.

Presence of mind is another much-needed requisite with a good stroke, as it enables him to keep the time of his stroke throughout the race, and avoid any hurry when his antagonists may be pressing him unpleasantly.

Many a race has been lost for want of presence of mind; and it seems hard to reproach a man for the absence of a quality that he does not possess. At the same time it is wonderful what an extraordinary power the mind can exercise over the nerves. Determination to do a thing, if it does not always mean success, means this—a good place in a struggle. It has saved many a life, and, to a certain extent, is the result of education. Bravery is very often only knowledge, the result of education, and your man who dashes into the water where it is very deep does so solely from the knowledge that he possesses the power to control that water—to keep himself afloat. If in cases of emergency, of trial, where coolness and presence of mind would do wonders, the coxswain and the oarsmen could keep flurried at a distance, how different would be many results!

The next point is to ascertain the strength and lasting powers of the other men, and tell them off to their places, and to do this properly some careful trials must be gone through; and if a doubt arises as to which of two men is the best, put them into a pair-oar, not too light, and the teacher taking the yokes, they must be set to pull against each other, and in the end the pluck and strength of each will be satisfactorily decided, and the men assigned to their proper positions in the boat.

In these trials it is assumed that only men of nearly equal weight will be pitted against one another.

In these trials it is usual to employ a waterman to pull against each man in turn in a pair-oar, as thus the stroke oar need not exhaust himself by rowing against each man in turn, and much more progress will be made in a week by this means than by all rowing in the eight-oar, or against the stroke in a pair-oar.

Every one of the crew should copy the manner, style, and peculiarities of the stroke.

During the whole of this practice by the beginner the teacher must be careful to give a reason for every little thing that he shows his pupil; be kind, and not lose his temper, for on this very much will depend, the end being that the learner will leave off a proficient in all the little niceties and finished actions which make an accomplished oarsman.

His next move is into an outrigged pair-oared gig, or four-oar with good oarsmen, as, now that he can row and feather in time, he will soon be fit to row the best man in crack crews; but it will be the better for him to change seats with others in the boat from time to time, and so accustom himself to row in any place and on either side of the boat.

A coach will soon find after some practice who amongst his pupils give the greatest promise of being good oarsmen, and, when the time comes, they can be chosen for and placed in such crews as are to race.

The duty of the coxswain is one of the most important in boat-racing, but at the same time a very simple one, as it often makes a very great difference in the distance to be rowed over, whether the men are taken in-shore to save them, or out in the current when rowing against stream, or kept well out in the current in place of along the bank when coming down with the current.

The coxswain should direct each man what to do and when to put forth his strength, give the order when to start, stop, or ease; the yoke-lines should be kept “saut,” so that the rudder cannot move with the pressure of the water on either side, and by a careful adhesion to this rule the boat can be moved in any direction by the slightest touch of the lines, as a sharp pull when the boat is going at a rapid rate will send her out of her course far more than is necessary.

In turning sharp curves the outside oars must be pulled hardest, the inside being just kept moving, and in some cases even backing water; the coxswain should call out to his crew, saying, “Pull, bow side,” or “Pull, stroke side;” and again it may be necessary for him to say, “Ease, stroke or bow side.” The rudder must be used sparingly in turning, as a sudden use of it will impede the boat’s way too much, and tire the men, when, by using the oars, all is done that is necessary.

Coxswains are chosen for their light weight, and, if possible, they should be men endowed with great presence of mind and decision of action to get the boat out of any position of danger or difficulty in which she may be placed; but this seeking after light weights should not be carried too far, as a stone or two of greater weight combined with the requisite knowledge and a cool head, will do more to win a race than having a feather-
ROWING.

weight, empty-headed noodle who does not think what he is doing.

Races are sometimes thrown away when hanging in the balance by a lamentable want of judgment on the coxswain's part, by his steering suddenly in the wrong direction, or failing to call on his crew at the right moment to make a spurt, which in all probability would have made them win by half a length or so.

"Argonaut" mentions a case in point, which occurred at Henley in the first heat for the steward's cup in 1859, between the Third Trinity and London fours. They rowed as nearly level as possible from Henman to Poplar Point, where the Cambridge boat, on the outside, led by a few feet. Half-way to the finish the London four in its turn led, and when close home both crews answered to the final and impassioned appeals of their coxswains, and Third Trinity were declared the winners by about eighteen inches, or, at the utmost two feet!

The steering of the Cambridge coxswain alone won that heat; for, notwithstanding the disadvantage under which he laboured in being outside, and despite the attempt of the Londoner to throw him out at the fatal spot, he so far managed to hold his back to the course kept by the rival and his mind on the stretch, and landed himself the winner with the most consummate skill.

This circumstance should be borne in mind by all coxswains, as many important matches are lost by want of attention.

The simplest way of finding the capabilities of a man for steering a boat in a race is to give him a certain distance to row over a perfectly straight course, making the boat start from in front of the teacher and row to a given mark which has been selected, the coach will then see if his pupil can start the boat directly to the given point, without going to the right or left, and thus losing ground.

If, after several trials, he succeeds in this very important duty, he can safely be trusted to lead his crew on the day of the race.

It requires considerable nerve and determination to keep a boat going on her course, when pressed close by an opponent; as, if the coxswain were to give way, the loss of the race might be the consequence.

In coming up to a point that has to be rounded the boat must be steered wide of it, as then she will go round in a steady curve, in place of being jerked round at almost an angle. In a heavy wind abreast, the coxswain’s best judgment is called into action, as then the boat is fast making lee-way, and it will be found very necessary to keep her head pointed somewhat to windward of her true course.

The coxswain may very much influence the fate of a race, by judiciously watching his adversary, that is giving him the full benefit of the wash from the wave of displacement which usually follows a boat’s quarters, for, if sent on the bow of a boat, it very materially affects the result of the contest.

TRAINING.

It is customary to carefully prepare crews of boats for the contests they are intending to take part in by a systematic course of training, so as to develop to the utmost point their powers of endurance in the actual contest; but this preparation must be very gradual, the result being a great increase of strength, muscle, speed, and improved wind, and a power of continuing any violent effort without injury to his system. If too muscular it is only extra weight to carry. After the muscular or moving powers, it is very necessary to look to the state of the lungs and heart. The wind should be naturally good, and free from whining or coughing; and the heart healthy, and free from palpitation or excitement; and that these important organs are sound can only be ascertained by trials at the oar, or by running.

If the man, let him be as powerful, muscular, and full of pluck as he may be, or however much he may have practised, can, without training, hope to contend, with any reasonable chance of success, against an opponent who comes to the contest in good condition; for any one can see that the immense strain upon the constitution of a four or even a mile race cannot be undergone with any safety by a person in his ordinary state of health, as his strength must of a certainty give way before the task is finished—he's exhaustion is shown by his fainting, vomiting, or some other sign of distress, a proof that the system is in an utterly unfit state to undergo the excessively violent exertion called for in a rowing contest. The properly-trained pupil will, on the other hand, do the same work with comparative ease, because his course of preparation has been regularly gone through day by day.

If the crew selected to row is large, it should be a rule, if possible, to keep them together day and night; and, if this cannot be done, they should certainly have their meals and runs together, and should never, especially at night, be free from "surveillance." Where practicable, lodgings should be taken near the river, but on high open ground, if possible, as low ground on a river bank is very objectionable. If in the summer, the training should take place in the mornings and evenings; but some object to this plan, and say the rule, subject to variations in the time of year and in the weather, should be for all to rise at eight o’clock, and either jump into the river and come out again immediately, or sponge themselves with cold water and be rubbed dry with a coarse towel, getting dressed by half-past eight. They should then take a gentle run, or smart walk, and come into breakfast ready to enjoy it, but free from fatigue.

Argonaut says, in his work on Rowing and Training:—"A far greater latitude is admissible in the matter of diet than is generally allowed, and the more varied the repast the more grateful will it be accepted. Nothing is so sickening as to be for ever sitting down to chop, stale bread, and tea, varied only by steak, stale bread, and beer; and no one will thrive on such a bill of fare for a week, still less for a month or more. The meals should be taken at the same hour every day, and no stone should be left unturned to make the time spent in refreshing the inner man as genial and agreeable as possible. It cannot for an instant be imagined that it is better to sit down and silently gobble up one’s daily rations, with the certainty of indigestion following upon bolted morsels, than to spend a reasonable period in properly manufacturing one’s food, the while enlivened by agreeable conversation, and in allowing it to digest.

"As to articles of diet, every one knows, or ought to know, what suits him best, and what does not; and, short of allowing anything positively injurious or unwholesome to be put on table, too much consideration cannot be shown to men’s inclinations, for it should not be forgotten that what is one man’s food is another man’s poison; and here it will be seen that the advice offered in a little pamphlet named 'Principles of Rowing and Steering,' is most apposite to our subject. It says: 'Whatever a man’s habits have been, if reasonable and temperate, let him merely modify them now, upon general sanitary principles, and let him not be converted, just four weeks before a race, into an artificial creature, feeding only on the most flesh-forming food, dreading the innocent adjuncts of every one’s table in ordinary life, and trusting to beef and mutton to deliver him.'"

In our opinion the golden rule for all men in training to follow is to keep the body in a state of temperance, soberness,
and chastity, to give up smoking and the frequenting of ill-ventilated rooms, and seek a relaxation from all literary and sedentary occupation, and above all, the man trained should enter heart and soul into the task before him.

If a man is tall, fleshly, of full habit, powerful frame, and of great bulk, he must be ground down, to get rid of his fat; but it is a mistake to reduce a man simply because he is heavy.

The work, by Dr. Edward Smith, on practical dietary (founded to a great extent on his Reports made to the Privy Council, after a full and complete investigation of the diet of the various classes of the community), may be quoted here, although all his statements may not quite agree with our present mode of feeding when training. He says, when referring to jockeys, boxers, and competitors in running and rowing matches:

"The training of these classes involves the following sound principles:

"I. That bulk and weight depend largely upon the fluids contained in the body; and that, in order to lessen them, it is necessary to limit the supply of fluids and to increase the discharge of them from the body; also, that there are certain fluids which, when taken, tend more than others to increase weight and bulk, and that the excretion of water by the skin is more directly within the control of the trainer than by any other outlet.

"II. That it is possible to lessen the amount of fat already existing, and greatly to restrict the further formation of it, whilst the muscles are increasing in tone and vigour. This may be effected by limiting the supply of fat-forming and augmenting the quantity of flesh-forming food at the same time that much exertion is made with the whole and with certain parts of the body.

"III. That this may be rapidly effected, so that an average reduction in weight may amount to from one to two pounds daily, according to the bulk of the person so trained.

"In applying these principles to practice, the trainers limit the supply of separated fluid to about a pint and a half daily. Water and tea are universally allowed; but, whilst some allow coffee, wine, and hard old ale, others forbid them.

"In the case of jockeys (it having been affirmed that a single wine-glassful of wine increased the weight three to four pounds), wine has been rigorously withheld. The removal of fluid from the body is effected by causing the person to walk briskly for some hours daily when well clad in flannels, and thus inducing profuse perspiration; but the duration and security of this process are less with spare than with bulky men. The solid food consists of meat in large quantity, whilst bread and vegetables are eaten very sparingly, and sugar and butter are usually forbidden. Eggs are allowed.

"The exercise consists in gentle and in fast walking to the extent of at least twenty miles per day, and of such special exertion as may call into action the set of muscles upon which the result of the strife will chiefly depend.

"The result of the whole training is, that the muscular system gains in development, so that the muscles are rendered more prominent, and feel hard and resisting to the touch; but some of this is more apparent than real, since the fat having been taken away, and the quantity of fluid greatly reduced, the spaces between the muscles are enlarged, and the muscles appear more prominently than before. It is not a process which even one who had before been trained would undergo again for pleasure only, since it demands much self-denial in all, and in some is effected with difficulty, and felt most severely.

"It is, moreover, not conducive to improvement in health, but on the contrary, when too prolonged, exhausts the system; and in ordinary cases, when the struggle is over, the person finds it imperatively necessary to return to the ordinary quantity and admixture of food.

"It is believed that, when judiciously effected, it gives freedom of motion and endurance, but, afterwards, the prostration of strength is oftentimes deplorable.

"The restriction of fluids and the production of perspiration are carried out severely; whilst alcohols are often interdicted, vegetable food reduced, and animal food insufficiently increased. Hence we have, in the training itself, an explanation of the feebleness and early mortality of this class of persons.

"I doubt if much improvement can be made in the present system of training. I will, however, offer one or two remarks of a general tendency:

"I. The small allowance of fluid as food, conjoined with the daily diminution of fluid within the body, is fitted to lessen the digestion of bread and other farinaceous food; for the fluid will be absorbed into the blood almost instantly, instead of being appropriated to the solution of food in the stomach. The same fact, conjoined with the excessive diminution of fluid by the skin, and the consequent diminution of the kidneys, render it almost impossible for the waste of animal food and of the tissues to be removed from the body; for this proceeds almost exclusively by the latter channel. Hence a state bordering upon disease must always be present, and a gouty condition of system will follow, and it is only the limited period of the training which prevents the occurrence of serious mischief.

"I found in my experiments that three half pints of cold water, taken alone in the early morning, at intervals of half an hour, caused an evacuation of thrice the amount before midnight (no food having been eaten), and thereby materially lessened the weight of the body. I suggest to trainers the adoption of this plan every fourth day.

"II. Alcohols, in every form, tend to lessen the elimination of fluids from the body, and should only be given in training, when support of the digestion and the action of the heart is called for—that is, when the training is carried on too severely. The statement that a glass of wine increased the weight of the body by several pounds within an hour or two was entirely an error. No food can increase the weight of the body immediately beyond its own weight, but it may lessen the rapidity of decrease of weight, as by lessening the perspiration.

"III. Coffee lessons, whilst tea promotes, perspiration, and hence the latter is preferred.

"IV. The application of cold salt and water after the sweating is of the highest value, since it limits the sweating and restores the tone of the skin.

"V. It is highly probable that the large quantity of meat which is given at dinner is only partially digested; and it would be much better to limit it to half a pound at that meal, and if needed be to supply more in the evening. The value of eggs is far inferior to that of meat."
AVING completed the arrangements described in our last article, and carefully cleaned and dusted our lens, camera, slide, and dark-room—for we must remember that dust and dirt are far more difficult to deal with in the negative than in the positive process—we may at once proceed to clean and coat the plate with the negative collodion. Of course the mere coating of the plate is to be performed precisely as in the positive process; but, as the collodion is somewhat thicker, a little extra care is requisite, in order to produce a perfectly even film. It is, moreover, necessary that the film should be absolutely free from all specks, caused by dust or fragments of dried collodion, which may be detached from the neck of the bottle—as well as from all irregularities, caused by defective manipulation of the plate.

In the positive process these little defects may frequently be overlooked—or, at the worst, the mischief is confined to one picture, but, in the negative, it must be remembered that every defect, spot, stain, or marking of any description, will be faithfully reproduced upon every print which is made from it. If, therefore, any defect is observed upon the plate it should be rejected at once, and not immersed in the nitrate of silver bath.

The plate should also be cleaned with the utmost care, for the same reason, as one can always detect the careless and slovenly operator at once by dirty and stained pictures.

For negative pictures the proper glass is that known as patent plate, which is better than crown or sheet, on account both of its superior flatness and polish; but, as we can scarcely expect to produce first-rate printing negatives at the outset, we may make our first experiments upon flatted crown, selecting for use the flattest and stoutest plates we can find.

The plate being coated and immersed in the bath, in precisely the same manner as we have before described, should be allowed to rest for two or three minutes, after which it should be moved up and down in the solution, in order to facilitate the escape of the other and alcohol from the film. In about five minutes the solution will flow in a perfectly even wave over the surface, when, after a thorough draining, the plate will be ready for exposure to light in the camera.

The observant photographer—and all photographers should be observant—will at once detect an important difference between the films of collodion employed in the positive and negative process. In the former case, the coating of bromo-iodide was comparatively thin and weak, and of rather a bluish tint; while, in the latter, the film is much thicker and richer looking, having nothing of a blue or weak character about it, but presenting an appearance of rich creaminess suggestive of a far larger quantity of the sensitive salts. This is one of the tests of the suitability of the collodion for negative work, for, if the film be at this stage weak, blue, and thin, the chances are fifty to one that, upon development, the resulting negative will be weak, metallic, and eminently unsatisfactory.

With our nitrate bath and a good collodion, however, we find that we have a good thick coating of bromo-iodide, and that our plate is evenly and well coated, which is to us a satisfactory assurance that, so far, we have been successful. We, therefore, well drain our plate, and place it upon a slip of blotting-paper in the dark slide, ready for exposure in the camera.

Upon the time during which the plate is exposed to the action of light in the camera very much of success or failure depends. Of course, no definite rule can be given, as the time required will vary very much, according as the light is weak or powerful, or the subject well or badly lighted.

The nearest approach to a rule is that a negative will need twice as much exposure as a positive. With a fair light, and a well-illuminated subject—say a sitter in the open-air—ten or twelve seconds should be ample; but the only test of proper exposure is the behaviour of the plate during development, of which we shall presently treat.

Many young photographers seem to be possessed with an idea that it is a clever thing to work very quickly; and many an otherwise good negative is spoiled for the want of two or three seconds of exposure in the camera. Let us remember, then, that a full exposure is an absolute necessity in the negative process; and that, while it is quite possible to make a good print from a negative which is slightly over-exposed, no good thing can possibly come of one which has not received sufficient light.

Having these facts in mind, we proceed to expose our plate, taking the greatest care to protect it from the action of all light, except that which it receives in the camera.

Upon our return to the dark room, the plate is removed from the slide, minding not to allow the nitrate of silver solution which will have drained to its bottom edge, to flow back over its surface, or stains will result. The iron-developing solution is now gently poured along the upper edge, precisely as before described for the positive process. In performing this operation it is desirable to so spread the developer as not to remove any of the nitrate solution from the surface of the plate, especially from one spot, or the negative will be weak at that point, and there will be a dark unseemly-looking shade corresponding with it in every print. The solution should be kept gently working over the surface, and in a very few seconds the impression will begin to be apparent.

The image will develop in precisely the same manner as in the positive—namely, first, the lightest parts of the picture, such as white lace, then the high lights of the face and dress, and lastly, the darker folds of the drapery. It is here that the difference commences between the development of a negative and a positive picture. In the latter the process would require to be suspended before the darker folds had become visible, but in this case we must push the development so as that we may see all the detail, and only a very few small points in the very deepest shades must be left without any deposit.

The behaviour of the plate during this process will enable us to judge of the correct or incorrect exposure in the camera.

If, the moment the developer is applied the picture flashes out,
and the plate begins to cloud all over, we may safely conclude that the exposure has been too great; while if, on the other hand, the development is tardy, and the lighter portions of the picture begins to be very black before the shades appear, there can be no doubt that the exposure has not been sufficiently prolonged.

A well-exposed plate will develop with the greatest steadiness. Light after light, and detail after detail, will appear with the most beautiful regularity. There will be no hurry; but all the lights and shades will appear in due order, and with the utmost precision and steadiness. This is the true test of a properly timed exposure, as well as of the perfect state of the chemicals.

At this stage the negative will present an accurate representation of the sitter in exactly reversed light and shade (looking through the glass, of course); but it is only upon rare occasions that the simply-developed negative is sufficiently dense to altogether resist the action of light, even in the darker parts; and, if fixed and printed in its present state, the probability is that the resulting proofs would be weak and wanting in brilliancy or contrast of light and shade. Hence the necessity of a subsequent intensifying process, which shall render the lighter portions of the subject a little more intense or opaque. For this purpose we shall require the pyrogallic acid solution, of which we pour a small quantity into a perfectly clean measure; and, having well washed off the first developer from the plate, we pour the re-developer over its surface. When the film is well wetted, we pour off the solution into the measure; and, having added to it a few drops of nitrate of silver solution, we again pour it over the plate, exactly as in the development process. In a very few seconds, it will be observed that the image is gaining in intensity, and becoming rapidly more opaque in the lights. It must now be most carefully watched, and, as soon as the highest lights have become just so opaque as to allow of the finger to be seen through them when held at the back of the plate, the process must be stopped, and the solution thoroughly washed off.

The only remaining process is that of fixing the image by dissolving out the iodide of silver. This may be effected either by means of the cyanide of potassium solution, used for the same purpose in the positive process, or by a saturated solution of hyposulphite of soda, the latter being by far the safer in every way. As soon as the iodide is completely dissolved, the fixing solution must be thoroughly washed off, and the plate dried and varnished.

Our negative is now completed, and we are naturally very anxious to see what sort of a print it will produce; but, as we are not yet provided with the requisite apparatus and materials, we must put off this part of our work for the present. It is hardly to be expected that we can go on always without failures from one or other cause; so, as we have now some little leisure, we will, at this point, proceed to consider some of the most common causes of failure, both in the negative and positive processes; and to this subject we will devote our next chapter.

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**GAMES OF THE PLAYGROUND.**

**LEAP-FROG—FOLLOW MY LEADER—EAT THE BEAR—FRENCH AND ENGLISH—KING OF THE CASTLE.**

It will not take you long to master the mysteries of leap-frog, so you need not be disconcerted at the idea of another game. You can penetrate into its most subtle secrets in a lesson, so that I can confidently recommend it to you as marvelous in its simplicity. Only do not attempt to participate if your dorsal membranes are at all enfeebled, for you will suffer if your back be not fully capable of bearing the burden that leap-frog will impose upon it.

If you are curious as to the precise nature and weight of this same burden, you will soon be satisfied when you have the ponderous weight of young Tomkin Stout on your back, and you reel for the first time under the infliction of his mighty figure.

If the weather be cold and frosty, you will be glad, believe me, of an opportunity of indulging in an exercise of this description, even if it seem frivolous to one of your intellectual capacity.

There are few rules to hamper you, even if there be some method required in the practice of leap-frog.

You can call into action any number of players, so that whether there be few or many, you can derive equal enjoyment, and certainly infuse as much vigour, as well as fun, into the pastime.

When you have decided on the numbers most convenient, you will then have to select some one of you who shall bear the first brunt of the attack. By this I mean that one of you shall undertake the responsibility of giving the first "back," for which purpose he will have to place himself in position.

It is not a graceful attitude, some of you may possibly venture to assert, but then you have evidently never graduated in this special exercise, so that I can afford to treat your deprecations lightly, making due allowance for the ignorance you exhibit; you will have to be careful when you do get thoroughly settled into the posture usually considered most advantageous for the purpose of giving a back.

In the first place you will have to take care of your head—that it is not so obstructed as to prevent the player that leaps passing over your back without being able to clear it at the full extent of his legs.

Beware, when you hear the cry of "tuck in your tuppenny" for the expression, though coming under the denomination of slang, yet presents a warning to you that you shall get your head well under you, and compliance may save you a concussion that you will remember for a week or a fortnight.

When you have arranged yourself, and are quite prepared for a back, you will stand with your hands firmly placed on your knees, as a support, your head inclined downwards, and your shoulders raised so as to allow an extension or reduction of the height of the back to suit the tastes of the leapers.

We will suppose, then, that there are eight of you, and that you have offered or been selected to give the first back. Down you go, and in a minute you find that you have formed a vehicle for the other seven to exhibit their saltatory accomplishments.

First you have had number one vault gracefully over you, as you stand bent to receive the weight of his hands and body, and in due succession the remaining six have, more or less ably, performed the same experiment, demonstrating respectively their skill or incapacity.
Meanwhile, after having first succeeded in safely accomplishing his initial leap over your back, number one himself forms down, to present his back for those that follow, and so each in order undergoes the same operation, until all seven have enjoyed themselves at your expense, and there are no more leapers left to complete the first round.

Then, again, of course you join the body of leapers, and in your turn take your share of the saltatory, while the rest are engaged in performing the most convenient and quick ways of breaking up the amusement.

So the sport goes on merrily, without intervals, for it is self-supporting, and as each round is accomplished, the game recommences, until either time expires or exhaustion produces a cessation.

It is best perhaps, though, that there should be penalties as well as rewards, so that it can be arranged that a player who does not succeed in going clean over should stand on one side, as practically out of the game, while obviously the best player will enjoy the reward of being left by himself when all the others have been withdrawn.

There is an honest as well as a malicious way of playing leap-frog, as in almost every sport under the sun; so that do not let me be told that you have not been properly directed into the right path.

If your are leaping, do not, as is the vengeful manner of some, dig your knuckles into an unoffending back, but put your hands down flat, as you ought to do; nor press all your weight down, instead of endeavouring to accomplish your jump with ease and with the least possible discomfort to him over whom you have to pass.

Remember that the good man is merciful to his beast, and avoid such malicious annoyances, as contrivances unworthy of a British boy or a British game. And when you are giving a "back" shun equally all schemes that may injure or annoy. You will see some wilful spirits shrink, and even withdraw their backs when the leaper is in mid air, so as to bring him to the ground in a manner more sudden than that anticipated in the legitimate course of the game.

It is glorious fun, and the laugh may be hearty enough at the time, but a broken arm or a sprained ankle may change the mirth into sadness, and a fractured or distorted limb may be the sorrow of a lifetime.

I want you all to be brave and fearless, not headstrong and inconsiderate. I want you to enjoy yourselves right well, but not at the expense of others. So play the game as it ought to be played, for love, and not to foster petty spite.

**French and English.**

This is an even a more ancient game than some of you will imagine, although the name it enjoys at present has been modernised considerably since the time when it was played in the days of Grecian splendour. You will see readily that the antagonism that used to exist between Englishmen and their French neighbours on the other side of the Channel has furnished the title for the game as it is known to us in this year of grace 1873.

I question whether there has ever been a playground that has not known this special amusement. It is here that the boy of strategy and courage assumes, as if by divine right, the command of one or other of the contending forces, and it is here in this small sphere that hero may, and does often, develop the germs of a prominence which makes him famous in future years.

Do not accuse me of exaggeration, for I have heard often how Sir Henry Havelock, the saviour of our Indian possessions, in his school days, in my native town in Durham, was always elected the commander of the one side, French or English, an outward and visible sign to me always of the lead he took in the after days of his life. For there is more philosophy in the conflict than you may think.

It is not the force that you instil into the fact of pulling a rope, but the manner in which it is done. You require more than sheer strength, for by watching your opportunity and giving your time, as did Edgar of Ravenswood, in Scott’s novel of the “Bride of Lammermoor,” you will be able to spy out the weakness of your adversaries, and scheme for victory as if you were more than a mimic general in a mimic war.

First of all you will have to procure a good stout piece of rope, such that you can pull with all your might, without a chance of its giving way and precipitating you backwards at an unpleasant rate.

You are now so far prepared with all the materials that you can require, that you may prepare your forces, and select your soldiers. You will first naturally have to select two of your number to act as captains, the one as commander of the French, and the other of the English army.

You may think it a trifling matter, this choice of leaders, but you will soon find yourself very much mistaken, for a wise general will so arrange his plans, and calculate his times, as to overpower an array of greater physical powers than his own.

You will have to arrange your different players either by lot, or so as to render the two sides as equal as possible; and when all this has been satisfactorily settled, you will be ready to commence action at once.

First, though, you will have made a line, to form the point of contention, and this can be done easily enough, either by cutting one in the turf, if you are in a field, or merely marking it, if you are in the playground. When you have progressed so far, and arranged your two sides, holding tightly each end of the rope, you will have an opportunity of enjoying the fun to your heart’s content.

"Now comes the tug of war," and you will have to strain every nerve, and never flag for a moment, or you will produce the discomfiture of your side to a certainty.

If your captain be an old tactician as well as a wise general, you will be able to comprehend his signals, and so aid to develop his schemes without the slightest delay.

The great secret, of course, is to know when to slacken your hold, and when to use all your united strength together to the best advantage.

If your opponents are headstrong and rash, and waste their strength by furious pulling at the first, you will have a fine chance if you only bide your time. You will husband your forces, if you possess wisdom and experience, and you will find, you may be sure, that you will be rewarded with success.

Even a ruse of giving way, you will discover, is not thrown away, for this often imposes the foe with a feeling of security that must be fatal sooner or later. Perhaps your opponents, blindly secure that they have the victory in their hands, for a moment lose their presence of mind, and are leaning forward or are too much in a reclining attitude. Now is your chance, and you want a long pull, and a strong pull, and a pull all together. Your adversaries taken suddenly off their balance, waver, and over they come across the line, as easily as if they had done the act voluntarily, instead of very much against the grain.

When once moved, indeed, a side rarely escapes, if the opposition be wisely led. You may rely upon it that decisive action is the great secret of success; and to succeed it is necessary that the soldiers should act at once in response to their captain, and all like a machine, or the indecision of one
may overthrow the whole plan. You will discover for yourselves the various artifices that are likely to succeed, but there is one that rarely fails. It is to delude your opponents by again giving them the confidence that they are overpowering you, and to trade on this delusion. You can pull well together, and even afford to allow them to secure some advantage in the shape of ground, and then, when they are not quite so much on the alert, by a preconcerted signal, slacken the rope all well in time together.

You will succeed in this artifice more often than you may think, and it sadly disconcerts your adversaries. Down they will go with a run, and immediately they are down you will be able to utilise their helplessness, as well as the certain hesitation of some, to drag them over the line.

You must be careful to make your capture complete, though, for unless the whole of the side are thus brought across the line you cannot claim the honours of the day.

I have told you two devices that are usually employed, but there are obviously many others that will occur to you in pursuit of the game. I know it will give you plenty of amusement if you only enjoy the fun with a little of the zest that I used to in the days of old. I know, though, as a strange coincidence, whether out of respect to the national vanity, or by insensible magnetism, the English used invariably to prove the conquerors. I hope it will always be so with you when the time comes.

FOLLOW MY LEADER.

You may term this merely a modified form of the game I have already described under the title of Hare and Hounds, but it differs materially, for all that.

Here everything depends on the player you select to act in the position of leader, for it is on his shoulders that the burden of the exercise will rest.

You may be sure that if the leader be a capable player, as well as a lively soul, you will have no lack of fun and amusement, so choose him advisedly, for your own interest.

When he is chosen, you will have to arrange yourselves behind him in single file; and now will commence your share of the sport. You will have to do whatever he does, and go wherever he goes, or you will be mutilated in certain penalties that have been previously arranged. Indeed, unless you have some rewards for merit as well as recognition of mistakes or inferiority of play, you will find that any game will flag.

You can derive any amount of amusement from this sport, provided that, as I have said before, your leader be gifted with a lively temperament.

If you refuse to follow him at any point, you will have to go to the end of the line, and there you will have to rest under the inglorious designation of the "ass."

Disabuse your mind, though, of any prepossession that the work is light, for you will soon find unmistakably that you have been grievously in error.

If your leader chooses to take his way into the most objectionable localities, you are bound in honour to follow his example. If he takes you through ditches and ponds, over gates and stiles, through hedges, and into the most inconceivable difficulties, you have no resource but to follow him or to subject yourself to the utmost rigour of the law.

He may take you into the most exalted positions, and you may have to exert yourselves to the utmost to imitate his powers of climbing, vaulting, running, or jumping; and under the pain of bearing the stigma inseparable to the title given on failure, you must continue the same feats as your leader as long as the game lasts.

You can arrange your distribution of prizes to the most successful player to suit your own tastes and inclinations, and, if preferred, you can also fix a time for the duration of the game, if you are averse to its continuance until either the leader is compelled to give up, or he has succeeded in outmanoeuvring those who have acted as his followers.

In any case you will, under circumstances ordinarily favourable, have an amusement that will cause as much fun and give you as much excitement as many others more highly classed among the sports of the playground.

BASTE THE BEAR.

This may be considered a version of king of the castle, with properties of a different character.

In the former it is a castle represented by any rising piece of ground that has to be defended, while in baste the bear, the position for defence is merely a circle marked in the ground.

Only, in the latter, the bear has an ally in the person of a keeper, who acts after the fashion of the jackal to the lion, and furnishes food for the bear in the shape of any prisoner whom he may be able to capture.

But first of all you will understand that in the circle before mentioned, if you have been chosen to officiate as the first bear, you will have the privilege of selecting your own keeper, though this concession may not prove of any material advantage to your cause.

You will have to kneel down, then, on your hands and knees, in the circle which forms your place of imprisonment. Bound your waist you will have tied a rope which is usually about four feet in length, and forms the communication between yourself and your keeper, who acts as a kind of guard outside your prison.

Meanwhile, the other players have duly prepared their handkerchiefs, and likewise tied the knots, for the purpose of commencing the mild species of castigation which is inferred in the title of "basting the bear."

On your back the blows from these knots will fall, if you allow your persecutors to come within reach of your body, or your keeper is not vigilant enough to keep them sufficiently at bay. You have a double safeguard in that if you can touch any of the players so as to retain a tight hold without yourself passing out of the magic circle, and without removing from your position of all-fours, you can secure your release and the substitution of the captured player as the imprisoned bear.

Or, if even your keeper can on your behalf manage to touch any of the players in a similar manner, without dragging you out of your circle, his powers of procuring your freedom are equally valid, and another bear takes your place, with the same privilege of selecting his own keeper.

It is difficult at times to achieve this release with any degree of ease, for the players are usually on the alert, and as wary as you, so that sometimes the game goes on merrily enough, the blows falling thick, if not heavily, on the back of poor unoffending bear.

In some places I have seen the privilege of a great coat granted to Master Bruin, as a protection against this shower of knots, but this necessity should not be required if the game be pursued, as it should be, for mirth and fun alone.

I would not give a farthing for the boy that could not undergo this mild chastisement without a murmur. Nor, on the other hand, would I say a word for the boy that would seek to infuse animosity into the process of basting to satisfy a feeling of malice or wanton disregard of others.

"Baste the bear," well, I say, and give him a jolly good time of it, but do it properly, and do not go beyond the Rubicon of honour and propriety, even in this small matter.
JOINERY AS A RECREATION.

By Ellis A. Davidson, Author of "Drawing for Carpenters and Joiners," "Drawing for Cabinet-Makers," "Happy Nursery," etc.

TO MAKE AND CARVE A BOOK-CRADLE.

This useful little article of furniture is, in its general form and construction, extremely simple, and the work in it is not too heavy to be carried out by our fair readers as well as by the rougher sex. I have, in fact, seen many such sides may be square at top, with just the corners cut off, or they may be curved, as shown in Fig. 1. They are to be attached by means of hinges placed as in Fig. 2, so that the screws in the one leaf of the hinge may be at right angles made by young ladies, for their own use, for presentation to friends, or for sale at fancy fairs.

We will, in the first place, take the object in its simplest form, and for this the wood—either oak, walnut, or mahogany—should be half an inch thick, and six inches wide, but of course the proportions and sizes may vary to suit the wishes of the amateur joiner.

The length of the base or tray may be twelve or fifteen inches, and the height of the upright sides seven or eight inches; these to those in the other. The hinges too should be such as have a "stop," and that cannot be opened wider than a right angle; the sides when so placed, fold inwards, and thus the cradle can be easily packed away in a portmanteau or box, enabling the student who comes home for a few weeks, and the young lady who goes on a visit, to take the neat little article with them in which they may place the few favourite books which are amongst their most valued traveling companions.
The edges of the sides may be rounded with a plane or file, and smoothed with a piece of glass or sand-paper; the finger-holes should be cut out with a gouge, and finished with the half-round file and sand-paper.

The whole may then be French polished, but this is not at all necessary; in fact, oak never looks so well French polished as when simply oiled and well rubbed. If it be desired to slightly darken the oak, a small quantity of burnt umber (bought in powder at colour shops) may be ground up with the oil; but it should be very little; or some of the staining referred to in a previous article may be used.

The oil should be rubbed over with a piece of flannel, and allowed to soak in, then a very hard brush, such as the common nail-brush, should be used; and this should be worked with what our grandmothers used to call “elbow-grease,” until not a particle of oil remains on the surface; then the whole should be rubbed with a piece of woollen cloth, rolled up, the end of the roll being used. This rubbing should be repeated from time to time, and a beautiful soft gloss will be the result, which is by far superior to the “cabinet makers’ shine” of French polish. If by any means you have applied too much oil, and there is a chance of soiling the edges of the books, the evil may be cured by laying a sheet of blotting paper over the surface, and working over this with a warm flat-iron: this operation never fails to effect a cure.

And now, having described the article in its simplest form, let us proceed to the construction of one of a handsomer character. I purpose making this of oak, tho’ the dimensions to be about the same as in the last, excepting as far as the sides are concerned; and it is intended to carve these, they may be five eighths or even three quarters of an inch thick.

“But,” you will say, “I can’t carve; I cannot even draw.” Well, I am sorry for the last circumstance, and I advise you to begin as soon as you can to practise that beautiful art; and in “Cassell’s Drawing Copy Books” and “Popular Drawing Copies” you will find quite sufficient material for study to enable you to copy or even design any object, such as the one now before us. But the fact is, that in the present instance we cannot wait until you can draw, so must help you over the stile in the best way we can.

Well, then, in the first place, take a piece of thin paper, as transparent as you can get it, lay it over the copy (Fig. 1), and trace over the whole design, both the external and the internal outline. You need not outline the shadows, which are merely done in order to bring out the form; but the leaves and stalks must be carefully gone over in all their detail. When this tracing is completed, place it on the table, the drawing downwards, and rub over the back with red chalk.

This red chalk, called “red drawing chalk,” may be purchased at artists’ colour shops, at a penny per stick, enough to last for a very long time. Hold it between the finger and thumb of your left hand, and, with your penknife, scrape it so that the fine powder may fall on the paper; then, with a piece of wool or rag, rub it all over equally, so that the whole surface may be reddened.

In the same way, rub a little whiting or white chalk over the piece of oak on which you are intending to operate. You are not required to lay on a regular “coat of paint,” but just to whiten the surface; and this being done, place your design on it, the red side downwards, fasten it down with a couple of tacks or drawing-pins (being careful that these are not so placed as to injure the design), then, with a blunt point, such as the top end of a darning needle, a crochet needle, or even a very hard pencil, go over all the lines of the drawing, pressing rather heavily, and by this means, when you lift the paper up, you will find the whole design transferred in red lines to the whitened surface of the oak. Now, with a pen dipped in common writing ink trace over the design, making it as correct as you possibly can. When the ink is quite dry, rub away as much of the whiting as you can get off.

It will make your work much easier if your piece of oak is screwed down to a larger board, by which you will have a stronger hold on it.

In order to make this arrangement, do not cut the side to the required form at first, but leave it in its rectangular shape, and in these spare corners you will readily be able to plant a couple of screws, and a couple more may be placed just below the bottom edge, not passing through the oak, but just allowing the edge to be clamped down by the heads of the screws—round-headed screws will be the best for this purpose, as the under-side of the head is flat, and thus takes a better hold on the edge than those usually used.

And now for the tools that are to be used for the carving operation. These are simply chisels and gouges of the smaller sizes. If those which you have are too large, you can purchase some smaller ones, specially adapted, called “print-cutters’ tools”—they range in price from 3d. to 6d. each. You only want very few, one of say ½ inch, one ⅛ inch, and one ⅛ inch; one gouge of ¼ inch, one of ⅛ inch, and one of ½ inch; and one or two bent tools like Fig. 3, which will be found very useful in getting the ground nice and flat.

These print-cutters’ tools are just the thing for ladies, and, when placed in the dainty little rosewood handles (1½d. and 2½d. each), and kept in a nice little box, their ends stuck in corks, they seem really to invite the fair hands to grasp them. But there is a special way of grinding these tools for carving, which is different from that adopted in regard to those used by carpenters and joiners.

In the first place, the sharp edge is not kept at right angles to the other edge, but is ground slantingly, and the tool is sharpened from both sides instead of from one only; both these differences will be readily understood from Figs. 4 and 5. The gouges are sharpened externally on the usual oil-stones, and internally by means of a “turkey slip,” which is a thin
COLOURING PORTRAITS.

By the Author of " Harmonious Colouring as Applied to Photographs," " The Art of Miniature Painting," etc.

PRIMARY COLOURS—COMPLEMENTARY COLOURS—CONTRASTS.

AFTER describing the origin and nature of colours, my last paper concluded with a good and simple plan, whereby the student might familiarise himself with the range of effects obtainable by the mixture of different pigments in varying proportions. We must now proceed to consider the optical principles arising from the facts then advanced.

Primary Colours.—The simple, elementary, or primary colours, of which I spoke in my last paper, differ very widely from the pigments which represent them in the painter's colour-box. The blue, red, and yellow of the spectrum are absolutely pure, whereas our blue, red, or yellow pigments boast a mere approximation to purity. The purest blue we have is ultramarine; yet this is largely adulterated with red. The purest yellow we have is gamboge, which is greenish; and our purest red (carmine) has a touch of yellow in it. There is a hint for you here which will be useful. In mixing a primary, to form a secondary colour, use those pigments which naturally incline to the colour you require. For instance, if you are mixing for green, you will easily understand that a greenish-blue and yellow will be better for your purpose than a blue or a yellow which have a tendency to red. Nevertheless, there are a set of invisible colours, which will not be found in shops, which no chemist can compound, but which every painter uses, wisely or ignorantly, with good or with bad effect, as the case may be.

These are those colours which are called up by the eye of the spectator when looking at a painting, the colours to which I have once before referred to as

Complementary Colours.—In a previous article it was explained how, in looking at one colour, the eye naturally calls up another colour, which is called its "complementary," and I then suggested a very simple experiment, by which this fact could be at once demonstrated. The colour looked at and the colour supplied by the eye, the complementary colour, are those which combine to form light in its primary, white, homogeneous, or colourless condition. Thus, green is the complementary of red, because the first, being composed of blue and yellow, red is the only primary colour remaining uncombined. In the same way red and yellow, mixed to form orange, have their complementary in blue; and red and blue, being mixed to form violet, have their complementary in yellow.

There is a very suggestive and instructive experiment which the student of colour would do well now to perform. It is a
very simple one, which will interest and amuse your friends, and also show you very clearly and curiously the optical effect of complementary colour. Place a sheet of clean white paper on a table, which must stand opposite to one of two windows, admitting the sunlight in a diffused condition. Hold a piece of brighly-coloured glass—say red—so that the light passing through it falls upon the paper. Take some object that will cast a distinct shadow and so place it on the paper that its shadow falls on the patch of coloured paper, when you will see that where it falls the paper appears to be no longer red, but green. If the glass be green the shadow will be red; if blue it will be orange; and so on; the shadow being always the complementary of the colour thrown by the piece of glass. The only condition required for the success of this experiment is, that the paper on which the coloured light is thrown be also illuminated by the white light from the second window.

In referring to the white formed by complementary colours in their combined state, it must be understood that the colours in that use of the word refer to are those of the spectrum, not mere pigments, which are so lamentably deficient in purity and intensity when compared with those of the spectrum, that red, blue, and yellow pigments form, when mixed, not white but something very like black.

Still, the same principle plays a most important part in the effects obtained by the painter with his colours. To impress this upon your mind try another experiment. Cut four pieces of brightly coloured papers of the same size—one yellow, one ultramarine, one green, and one orange. Draw in the centre of each one a figure, like Fig. 1, or some simpler or similar shape. Now get a fifth piece of paper, and let this be of a rather light neutral grey: white and black mixed will give you the shade. Place the grey under the blue, and you will see that through the pattern you have cut out it appears as if you had carried a wash of red and yellow over it. Place it under the yellow paper, and the grey will have a violet tinge. Under the orange it will appear blue, and under the green red. Place a piece of grey paper under each, and let your friends look at them. They will find it difficult to believe that the colour of the pattern, on each of the brightly-coloured grounds, is the same, until you remove the grey papers and show them together, apart from the primary colours.

The use of this knowledge to the painter or colourist is easily to be seen. When the colour-maker has done his best to render the primary pigments he sells as pure and brilliant as possible, and yet fallen so woefully short of the beauty, purity, and intensity of Nature’s colours, the artist can so arrange his colours and hues that the eye of the spectator shall add some of Nature’s red to his artificial red, blue to his blue, and yellow to his yellow. The full success of the above last-mentioned experiment will depend entirely upon the brilliancy or purity of the red, blue, yellow, and green papers.

Contrasts of Colours.—The fact that the eye, on seeing one colour, calls up another colour which is complementary to the first, gives rise to a very intricate and complicated series of considerations in regard to what are termed contrasts of colours. Viewing a number of colours at one time one modifies another in the eye of the spectator, producing what, for the sake of distinction, has been called Simultaneous Contrast. Viewing colours one after the other, each is modified in the same way, but to a different extent, and this is called Successive Contrast. Looking for some length of time at one colour, and then turning to another, the complementary colour called up by the first is added to the last, producing what has been termed Mixed Contrast.

We have, then, these three kinds of contrasts to bear in mind when we are making compositions of colours for works of art, and upon these facts rest all the numerous harmonies, contrasts, and degrees of relationship in colours, forming a subject of great importance, but far too intricate and complicated for the beginner to attack. It will be sufficient for our present purpose if we consider some of the practical results of such contrasts. Suppose the eye, having been strongly affected by looking at green, is turned to look at a group of the following colours, viz., violet, red, green, pale blue, yellow, black, and white. Now, note the effect of the complementary colour of green as affecting contrast. The white becomes red, the black takes a tone of purple, the yellow becomes orange, the orange becomes scarlet, the violet becomes purple, and the light-blue violet. A landscape having a preponderance of too bright a green in it, would, in this way, call up red in the eye of the spectator, and thus the blue of the sky would, for a time, lose its purity, the snowy clouds would lose their silvery brilliancy, and the whole tone and expression of the painting would suffer change and deterioration. It often happens in painting that, having laid in some tints with great purity, freshness, and brilliancy, and afterwards burried long on a more powerful mass of colour in another part of your work, you suddenly find the part first done looks so dirty and so wretchedly dull that, full of despair and dissatisfaction, you put down your brush. Yet, coming to the same canvas after rest, with a fresh eye, you are most agreeably surprised to find the good qualities you thought you had obtained in the part first painted are really there. The explanation is, of course, now understood. The painter’s eye, having seen one colour for a certain length of time, added the complementary of that colour to the work first done, and so utterly spoilt its effect. In colouring any portion of your picture, to which the eye of the spectator will be first attracted, and on which it will naturally rest longest, you must, therefore, remember this law of contrast, and act accordingly. On the palette, your pigments may seem, and be exactly right; but if you overlook the effects of contrast, they may, nevertheless, look anything but right in your painting. Let me give another illustration. Suppose yourself to be imitating one of the pieces of yellow paper with the cut-out pattern on it (Fig. 1) and the grey paper under it. If, ignorant of this law of contrast, you painted simply what you saw, you would use violet instead of grey, and be puzzled to know how it was that you did not get an effect more closely resembling that of your pattern. Whereas,

* The reader who desires to carry out this study more thoroughly should consult the work on Colour by Professor Church.
THE AQUARIUM.

WATER BREATHING—EVAPORATION—VEGETATION—POLLUTION OF WATER.

T such places as Brighton, where the coast-line and the water are chalky, many fishes are met with, but not many species of sea-anemones—the latter being animals which dislike chalk. Going out of Britain, and no further than the Baltic Sea, the conditions become altered by another circumstance, namely, the small quantity of saline matters (compared with most other seas) found even at its most southern and saltiest point, at Kiel. The Baltic Sea contains no animals (or but very few, if any) which are not found in Britain, and though of late this sea has been found to contain a greater variety of creatures than was formerly supposed, yet a large number of species, and even whole genera of British species, are there absent, and they are usually much dwarfed, and have to be introduced into the more saline waters of the German Ocean and of Britain with much caution, and some cannot bear the change under any circumstances, but die.

The Baltic Sea is practically tideless, but this does not seem to affect the animals. This last point is named, as it will be reverted to. It is indeed a matter so well known to almost every one, that the characters of the plants and of the animals of various seas all over the globe are so much varied by temperature, by density and varying rapidity of the flow of the water, by the nature of the sea's bottom, by the amount of light reflected by the colour of that bottom, and of the hue of the coast-line, and by other causes, known and unknown, and that these variations extend to the increase or decrease of species, to changes of form, colour, and texture and to every conceivable and inconceivable alteration, that it is needless to dwell further on them for the present purpose. Enough, however, has been said to lead to the important fact, that whenever any creatures, whether of seas or of rivers, have to be kept under circumstances of captivity, it is necessary to give them the general circumstances of their original habitat. But it is equally essential to know that it is not necessary to give them those circumstances in an imitative manner. Thus, if animals be brought from the deep sea, it is, as far as experience teaches, unessential to keep them in water brought from such a source; it may be, even for deep-sea animals, drawn from close to the shore, in a shallow place, so long as it is pure and good, and not greatly different in density from what sea-water should be normally. It need not be taken from any sea at all, indeed, for it may be made artificially by the solution of certain salts with fresh-water. The vegetation needful for the food of the plantating animals, and for the purification of the water, will answer perfectly well if brought from other places than where the creatures came from, and it may be, in some cases, vegetation of another kind than that they have been accustomed to, or the marine vegetation may be such as has not been got from the sea in a grown-up state at all, but be grown in artificial sea-water from the spores or seeds which are ever invisibly contained in the air everywhere, waiting to be developed visibly whenever the circumstances for such development occur. Then, also, it is unnecessary when attempting to keep such animals and plants, to associate them with the rocks, sand, shingle, etc., coming from the same places as the vegetation and creatures did, and it is not even needful to have the same kinds of stones and sand, etc., or further still, they may, in numerous instances, be dispensed with altogether. Further, it is scarcely necessary to say it is needless, even if possible, to control temperature as it is controlled in the sea; and very important is it to understand that animals which in the actual ocean are always, and almost exclusively, found between tide-marks, and which therefore in a state of nature are left uncovered by water at regular intervals and submerged at others, can in captivity in aquaria be maintained with no apparent loss of vigour, when they are always under water and never subjected to tidal influences.

It is the same with fresh-water animals also. All these conditions which have been named—of varying degrees of saltness of sea-water, and of the more slightly differing foreign matters in fresh-water, and of the temperature, motion, tides, light, vegetation, and of the nature of the substances over which the waters flow or rest—though so important that some of them cannot be overlooked, yet they are of the nature of secondary and non-essential considerations, and the primary essential and indispensable conditions may be reduced to only two; namely—

1. That the animals have sufficient air for breathing, which air must be absorbed by sufficiently pure water.

2. That the creatures have a sufficient quantity of proper kind of food.

* As one proceeds northwards up the Baltic, the water becomes still less dense, and, mingled with animals which are truly marine, others are found which are as truly diastatic, both living together perfectly well.
The first of these two conditions is afforded by the everywhere-present atmosphere, which combines with water at ordinary pressures in open vessels, at a ratio which varies with the water’s temperature, and with the mode of its exposure of surface in proportion to its bulk. Atmospheric air consists of oxygen gas, nitrogen gas, and carbonic acid gas (with traces of others) in certain proportions, and in a state of mechanical mixture, not in a state of chemical combination, and, as the nitrogen is not readily absorbed by water, it follows that the air in solution in water is much richer in the beneficial oxygen for the aquatic animals than is the air breathed by terrestrial creatures.

But if water-breathing animals (i.e., creatures not possessed of lungs for air-breathing) be in the water, it is not sufficient for them that the water absorbs air from the atmosphere, because such atmospheric air, no matter in what abundance it may be taken up, cannot do that which it is the special province of vegetation to effect—namely, to decompose and cause to be innocuous the poisonous carbonic acid gas which is being constantly given forth by the breathing of the animals, and is mixed with the water. The carbon might certainly be removed by contact with such a substance as lime, which would then be converted into carbonate of lime, or chalk, but the water would in that case be again poisoned. Therefore, the presence of living aquatic vegetation is the only convenient means of providing, so far, for the healthy existence of living aquatic animals, and that such vegetation will always make its appearance in water by the action of light has already been explained.

The second of the two conditions can be still more easily provided, as for such aquatic animals as live on vegetable food there are the plants which are constantly growing in the same water as the creatures live in, or, if that be insufficient in amount, or be not of the right kind, it is almost always easy to obtain occasional supplies from the sea, or from ponds or rivers. And as for the creatures, whether marine or fresh-water, that live on animal food, it happens that human beings eat the same kinds of food that animals can be fed upon in captivity with safety, and hence such food can always be obtained. The number of animals that feed upon vegetable food is much less than those which live on an animal diet, and still fewer are those which are known to exist in captivity on a diet which is composed of both vegetable and animal food.

It is often and truly said that no substance whatever is ever absolutely lost, but is only changed in form or position, or both. It is equally true that no water on the face of the globe is ever lost or ever changed, using the word “change” in the sense of complete renewal after destruction. We are all so much in the habit of lavishly using so abundant a thing as water, and of throwing it away when done with or sullied, that we get to think that it is spoilt, and so get rid of it. None of it is lost, however; it is only lost for a certain purpose and gained for another. If one stands by the sea-shore, and takes up a glass of water from the sea, and then pours it back again, it is quite obvious that the sea is not deprived of even that small quantity. But if the glass of water be taken inland—no matter how far—and be then thrown away, or spilled, or evaporated, or be allowed to be absorbed, or be disposed of in any mode whatever, then, still, it ultimately finds its way back into the ocean, possibly not for years of time; however, or possibly its re-entrance is difficult to be even theoretically traced. Its evaporation is mentioned, and that leads to explaining the mode by which the balance of saltiness of the sea is constantly maintained. Large quantities of water are being incessantly evaporated from the ocean and rising into the air in the form of clouds, and these clouds then discharge themselves over earth and sea in the form of rain.

Rain-water, however—though coming from the sea, where the water is salt—has fresh-water; and that is because, when sea-water is evaporated, the salts and whatever else it contains are left behind, and only the fresh-water escapes and ascends into the atmosphere. If the rain falls into the sea direct from the clouds, of course it enters it in a state differing little or nothing from that in which it ascended; but if it falls inland, it is always changed in character more or less before it gets back into the ocean, in the form of rivers fed by other rivers, or by brooks, ponds, springs, etc. It absorbs by solution whatever is soluble in the composition of the ground through which it sinks, or over which it flows, or where it is held, and thus becomes impregnated with all manner of foreign substances, sometimes being coloured by them, and sometimes not. Some of it is arrested by plants, and taken up into their systems, and again given out. Some of it is consumed by man and other animals, and employed as drink and as food, and then, after a series of complicated operations, it once more appears as water in a much modified state. Much of it is used for manufacturing purposes, and in this and in many other ways it may be for a time rendered poisonous to animal life; as when, for example, the refuse of some factories is allowed to escape into a river, all the fish within a certain range are killed.

But the amount of impregnation the water receives from foreign matters of any kind, whether poisonous or not, is so small in comparison with the entire mass of water—salt and fresh—on the face of the globe, and the means of purification are at work so largely and so constantly, that the amount of damage done to animal life by the presence in the water of that which is not chemically necessary for its existence, is relatively very small indeed, and general good health is the final result. Even mineral and other inorganic forms of impurity and mischief in their worst and most concentrated forms, are gradually neutralised and rendered harmless; but the sources of harm in arrangements where aquatic animals are kept in captivity are generally, and by far more largely, organic impurities—that is to say, impurities arising from animal and vegetable substances, either or both, acting together or separately.

Suppose I take a series of glassess, of various shapes and proportions, containing water (sea-water and fresh-water), and in some I put a portion of flesh, as butcher’s meat, and in others pieces of the flesh of fish, crustaceans, and molluscs, and in some more glasses various dead and not-growing forms of vegetation, as fragments of apple and potato, and of some fresh-water and marine plants, the consequence will be that the water in each vessel will in a short time become turbid, discoloured, and putrescent, and will give off bad smells. The speed with which this will take place will depend much on circumstances. If the water be frozen, decomposition will be arrested, and contrariwise; in proportion as the temperature is increased, the decomposition will be quickened. Then the flesh of molluscs, being very soft, will begin to decay sooner than the harder flesh of the crustaceans, while the crustacean flesh will decompose quicker than that of the fish, and the latter faster than the butcher’s meat. These relative degrees of quickness of decomposition, however, are only up to a certain point; and, when that is passed, there is but little difference. The same may be observed with the decay of the vegetation.
ALTHOUGH fern-cases of zinc may be considered the best and most durable, there can be no doubt that they are very much more difficult of construction than those of wood, especially to the amateur workman. It is also a fact that from the nature of the material employed—a stiff and rather a stubborn metal—the varieties of form are somewhat limited. In fact the ordinary square and octagonal forms of case are nearly the only ones which can readily be constructed. The chief difficulty which will be experienced by the tyro in constructing a metal case will be that of cutting the metal in bars, and retaining them in their positions while soldering the parts together. The mere soldering is easy enough, as we shall presently show, and when a case of the utmost durability is required, the extra expenditure of labour will be well repaid.

In starting to make a fern-case of metal it will be well for the tyro to commence by making the shallow tray for containing the earth—of wood—exactly as described for the ordinary wooden case, this tray should be lined with thin sheet zinc in the manner directed and indicated by Fig. 1 on page 119. In this case, however, the turned-up edges of the tray should be left wide enough to allow of their being turned completely over the edge of the wooden tray, to which it should be secured by means of tinned tacks. The zinc may be dressed down into its place by means of a hammer and a slip of hard wood, which should always be interposed between the hammer and the metal in order to prevent the latter from becoming in any way bruised and irregular. Of course a waste-pipe for the escape of the superfluous water must be soldered in at this stage, as it will be difficult to get at it when the bars are secured in their places.

The proper metal bars suitable for a case of this description will have to be procured ready-made, as they are manufactured by powerful machinery, and altogether beyond the power of the amateur to make for himself. The cost is, however, very trifling, not more than a few pence per foot, in fact as cheap as wooden bars, when they have to be purchased ready worked. The most usual form is that shown in section at Fig. 1, and for a square case, of course four upright bars will be required, the length of which will be determined by the height of the case.

The best method of proceeding will be to fit these bars at the bottom by slightly mortising them into the wooden frame for the depth of, say half an inch, this will keep them steady while they are being soldered into the zinc. In order to make a soldered joint, a soldering iron—or as it is technically termed a "copper bit"—will be required, and a small one of suitable size for this kind of work may be procured for about a shilling. Besides this there will be required a stick of soft solder, and a small quantity of hydrochloric acid or spirit of salts, which latter should be kept out of the reach of children, as it is very poisonous. It is as well, although not absolutely necessary, to have a small lump of sal-ammoniac, which is very useful for cleaning the soldering iron.

These little preparations being made, and the bars set upright in the base of the fern-case, the iron should be heated in a clear fire until it is found that it will readily melt the solder. The end should then be scraped clean or slightly filed, and placed upon the sal-ammoniac, when, if the solder be applied at once it will be seen that the iron becomes covered with the molten metal, and becomes what is technically called "tinned." This is absolutely necessary if a good joint is to be made, but it need not be affected every time the iron is heated, as the tinning will last for some time if it be not overheated and burned. The parts of the zinc which are to be soldered together should now be brushed over with the spirit of salts, when it will be found that upon the application of a drop of molten solder upon the point of the iron the parts becomes instantly united. The bars should be held in position for a few seconds, until the solder sets, or the joint will be broken. Of course the greatest care must be taken to set the bars upright upon the base, which can easily be done by means of a common joiner's square.

The next thing will be to prepare the bars which are to form the top rim of the case. These must be cut to the required length, which may be ascertained upon the rim of the base, and fitted to the upright, as shown at A in Fig. 2. For this purpose a small half-round file will be required, which may be purchased for a few pence. When fitted, each angle may be soldered as before described, but care must be taken not to leave any little lumps of solder in the angles, or the glass may be broken in fitting and glazing.

The body of the case is now completed, and if a square-
shaped case be desired, all that is necessary will be to glaze the frame already made, in precisely the same way as windows are glazed, securing the glass in its place with common putty, a square of glass of the required shape and size, laid in the rabbits, forming the top. In most cases, however, a hipped roof is preferred, and this can easily be made by the aid of the zinc bars before mentioned.

A frame of stout zinc turned up at one edge, as shown in Fig. 3, and of such dimensions as to fit into the rabbits at the top of the case, should first be soldered together, and the four bars which are to form the angles of the roof, should then be cut to fit it at the bottom, as shown in Fig. 4. The top angles should then be cut and fitted, as at Figs. 5 and 6, and soldered at every joint. The longitudinal bar which is to form the ridge of the roof must then be cut and fitted at both ends, when, if the points be well and neatly soldered, the roof will be complete and ready for glazing.

In constructing this part of the case, it must be remembered that the position of the bars must be reversed, that is to say, the moulded portion must be placed inside the case and the rabbits outside, or of course it cannot be easily glazed.

For cutting off all the zinc bars to the requisite length, a small sash saw should be employed; of course it will become very dull, and it will require sharpening again before it is in good order for wood cutting; but this is easily managed, and the joints are so easily and cleanly made, that it is very well worth while to employ a small saw in lieu of an ordinary file. The appearance of a case of this description is also much improved by the addition of a rim of perforated zinc, as shown in Fig. 7. The material may be procured at any zinc-worker's, at a very cheap rate, and it should be soldered to the upper part of the case. This imparts a finished appearance to the case, which will now be completed, except the decoration of the base, which may be effected by any of the methods before described. Of course the zinc will require painting, which should not be done until after the glass is placed in it.

Before concluding this part of our subject, and passing on to that of window-cases constructed outside of the house, we must call attention to a very pretty form of case for the decoration of the table. This may be termed the "gipsy" fern case, and is of the form shown in Fig. 8. It is triangular at the base, and consists of three bars crossed at the top. A basket is suspended from the centre of the case, and the base may be decorated with virgin cork or any other kind of rustio work.

The best material for a case of this description is zinc, and the rounded part of the bar should be kept outside and crossed at the top, as shown in Fig. 8. A very nice size of case is about two feet in height, twelve inches on each side for the base. Of course the details of construction are precisely similar to those that we have given above, and, if they be but neatly made, these are among the most tasteful and the most artistic forms which the fern-case may be made to assume by the tact of the skilful amateur.

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**PAPER-FLOWER MAKING.**

By Eliza Chardle.

The Dahlia—Stephanotis—Jasmine—The Larkspur—Lily—Pelargonium.

If you find that you require practice in the manipulation and adjustment of separate petals, I pray you make a Dahlia forthwith, for, as you will find anon, wide scope is afforded you in this branch of the art, a goodly number of petals are called for to form the imposing head of this handsome flower. It has the reputation of being one easy of imitation; on that point you must judge for yourselves, but methinks that the cutting out and the mounting of these many tens of petals is rather a
troublesome, not to say a slightly difficult task, to accomplish in a satisfactory manner, but when the work is achieved, then there certainly is something of which to be proud, and great results to exhibit. The dahlia hangs its head in a shame-faced manner, and one wonders at it, for it is undoubtedly one of the handsomest specimens in Flora’s capacious cornucopia.

You will find this a wide field with respect to size and colour, for few flowers vary more than the *Dahlia variabilis*. There is in the darkest purple and the richest violet, together with every shade of scarlet, crimson, and pink; while the dahlia of pure white or delicate yellow grows beside others streaked with all the variegated hues of the gaudy tulip. But beware of one false step you can take. If your imagination should prompt you to make a blue dahlia, do not be led astray, for this long-cherished desire of florists is still unfulfilled, and no blue dahlia has yet been born into this Mexican tribe of flowers.

The construction of the “heads” differ in some few particulars, but the same patterns for the petals serve for both kinds. From your own knowledge of the flower you will remember that some dahlias are formed in a very compact manner, every petal is rolled round, each one in itself being a little cell, the chief use of which seems to be that of affording a cozy and secret dwelling—place for those active brownies the earwigs, whose numerous families always haunt these flowers.

The other class of dahlias are of a different turn of mind; they do not adopt the aesthetic style to the same extent as do their brethren, they slightly curl their petals. I will initiate you in the individualities of both these sects.

In either case the head is a heavy one, and therefore requires a neck suited to its nature. Choose stout wire for the peduncle, and furthermore turn back one end of the wire, and wrap up the said end in paper, until a wee bulb, about the size of a nut, is formed. This arrangement will give stability to the whole, and will prevent the peduncle slipping away from and deserting the many rows of petals which it is called upon to support. We will take first the compact dahlia:

Cut out thirty petals after the pattern No. 1, and roll them tightly round the pin-tool. These are placed closely round the peduncle, and in this position they form the heart of the flower; in some dahlias these petals are green in colour; in others they are of the same shade as the flower itself.

Cut ten petals like No. 2. By the aid of the pincers draw the two extremities one over the other, and roll them slightly; then place two rows round No. 1.

Thirty petals of No. 3 are to be treated in the same way, and thirty petals of No. 4 require to be also dealt with.

Thirty petals of No. 5; these are the outside petals, and as such, they have their extremities only slightly rolled, and after mounting each petal must be bent back so as to part it at the base from the rest.

In constructing the dahlia of looser make,

You form the heart in the way already described, the thirty petals of No. 1 being tightly rolled and then set in due order round the nucleus of paper.

Petals No. 2 are rolled lightly.

Petals No. 3 have their extremities pulled slightly towards their respective centres, the top part being allowed to be rather loose.

Petals No. 4 have their edges just turned over.

Petals No. 5 (of which in this case only twelve will be required) must be ribbed lengthwise, draw the pin carefully down the centre of each, after which curl their edges slightly.

In mounting these congregations of petals, the chief care to be taken is, to distribute them equally; and to ensure this impartially, be sure that you turn the peduncle, very slowly, but quite as surely, while you are fixing the petals; then your flower will be round in form, and will not develop itself—as too many do in the unskilled hands of amateurs—into a one-sided deformity.

The calyx is a star cut in green paper.
Among the diagrams you will find some for Stephanotis and Jasmine, two flowers which are quite essential for the formation of a bridal bouquet; and who knows to what high attempts your ambition may not lead you!

Thick white paper you will require, and for each flower five petals. The stephanotis has one yellow stamen, while its companion has five small ones. The stephanotis has one well-defined line marked down the centre of each petal; the jasmine exhibits fainter veins.

In each instance cement the petals on to the vandyked edge of the tube before you make the tube itself into its sugar-loaf form; and then, holding the peduncle downward, slip on the said tube.

The calyx of the stephanotis is made like that of the primula, and is placed at the end of the tube, over where it is fastened on to the peduncle. The calyx of the jasmine is a small star, and is also fixed at a little distance from the petals.

I have placed among the diagrams patterns for the making of a very old inhabitant of British gardens, the Delphinium, so named from its resemblance to that imaginary creature the dolphin, which, together with griffins and other strange animals, figure so largely in heraldic devices.

The Larcepur—for so it is called in the vulgar tongue—is so light and pretty, and displays in itself and kins such a great variety of colour, that I feel sure you will admire your own productions if you make the trial.

"The tall-topped Larkheus feathered thick with flowers," are pyramidal in their growth, the buds appear at the top of the stem, while the flowers are, at their prime, at its base. Each "round" as shown, forms one flower, but as these are of different ages, different sizes are necessary.

For a single spike of larcepur you must cut out, in very thin paper, eighteen of the smallest size, twelve of the next, nine of No. 3, and six of the largest size. Take each round, and, placing it in the hollow of your hand, mould it with the end of your index finger. These flowers have two or three little stamens, but no visible calyx.

The flowers are mounted in rings of three round the peduncle, and the leaves are placed immediately underneath, to support the buds and blossoms; then there is another row of flowers upheld by another set of leaves, and so on until the thickly-feathered stalk is completed. The various sets of flowers must be allowed as to size and colour also—for instance, the eighteen small ones will make six sets, to be placed nearest the top—then will come four companies, then three, and lastly, the elders will form two rings round the bottom of the stem. The spray of leaf you see is one of the smallest sets, the leaves increase in size like the flowers they accompany. When the flowers are all mounted, give each one a little squeeze between your fingers, especially those which are supposed to be not quite wide-awake—that is to say, crumple and crush them gently and tenderly.

The Lilium lancifolium is a superb flower; it is as if rubies were studded all over its petals, and those petals were formed of pearl. Three petals of each of the two sizes make one flower, and they require opaque paper. Vein each petal strongly, with five straight lines down the centre, and from these let veins diverge in all directions. The three smaller petals are then covered with irregular dots of dark carmine-red, these dots should be thick and raised. The petals are then curled back by the help of the paper-knife. They are placed on the peduncle at exact intervals, the succeeding three being fixed so as to be behind and yet between the first. The stamens and calyx are usually bought.

The smart and fiery Tiger Lily and the delicate pink Lilium can both be formed from the patterns given.

Blue flowers are such rarities, that we must cherish those we possess, and not overlook the little fragile Nemophila—a very blue flower with a very white eye, and one round makes a flower. It is cut in white tissue paper, and then the edges—about half the depth of the flower—are coloured with powder cobalt, mixed with gum water.

Five small black stamens this flower possesses; usually there are many unopened flowers and buds of various sizes in the group, which of course do not require any stamens, but do require moulding. After the full-blown flowers are mounted, curl back their petals with a paper-knife.

There are yet many flowers waiting for our notice, but I think, as you have already made a variety, you will now be beginning to form your bouquets, and so it is high time to give some hints as to their grouping. There is as much art required in the arranging as in the constructing of flowers, and very much more study is essential than many people make, or even deem necessary, that is, if your flowers are to look to the best advantage. A judicious assortment of colours should be made. Not only is variety to be aimed at, but also a selection of such hues as will accord agreeably and harmonise one with the other. Your bouquet will look dull and heavy, however many gay colours you introduce, unless you contrive to put a white flower here and there. A yellow flower is likewise a great improvement and relief to the whole.

Variety of character is also noteworthy. A group must perforce look stiff if composed solely of flowers of formal demeanour. At the same time a company of drooping pendants will appear indeed sad and sorrowful, if put entirely by themselves. Then, be it remembered, that flowers have their proper seasons, and the bouquet on your table will look infinitely more deceptively—for, sad to say, hypocrisy is our avowed aim and object—if this fact be always borne in mind. The primula and chrysanthemum which enliven it during winter months will look quite out of their place if they venture forth in the summer time, and so in like manner the carnation, the campanula, the larkspur, and the nemophila, would appear intensely miserable if brought out in wintry weather.

One more important fact I beg of you to observe, and that is—that flowers have their different castes, therefore take care not to hurt their feelings by thoughtlessly mixing one with another. The aster would stare with surprise if it was put side by side with the polyanthus; the azalea would look askance at the primrose; the heavenly cactus would doubtless try to prick the presuming buttercup with its thorny stem, if you brought such a heterogeneous company into close contact.

No, do not attempt it. The flowers of the field look excessively pretty and bonny when kept strictly by themselves, but intersperse them among their proud and lordly kinsfolk from garden or conservatory, and, alack! the pretty Marguerite, with all her attendant nymphs from field and forest, appear suddenly bereft of half their colour and beauty, and instantaneously dwindle into insignificance.

Make haste—take them away, put them once more quite by themselves, and lo! they are again transformed into their pristine loveliness and simple elegance.

Odourless though it be, the pelargonium is a prime favourite in every home, be it cottage or palace. It came to us originally from the hot clime of Africa, but now it seems to be welcomed as a naturalised subject in our dominions. Nor can we wonder at the universal admiration which it excites, for assuredly no plant sets forth such blossoms, bright and gay, pure and delicate, rich and handsome. Nevertheless you would utter a groan of dismay if I said that I was going to describe all the beautiful varieties of these geraniums, seeing that there are more than six hundred!

Happily, that does not appear to be necessary, as it is more
in the colouring and the size of the flowers in which they vary.

At any rate, for to-day it will be enough if we take one, a sweetly pretty specimen, and after learning its construction, if you do but catch a glimpse of its fellows, you will be able to copy them.

Take paper of a delicate pink, and cut out three petals after the smallest pattern given in the diagram (1), and two like the larger one (2). Vein the smaller ones a deeper shade of pink, in the manner in which you see the flower marked in the picture. You will find that you require a finer pencil for this work than the one of cames' hair which you have hitherto used; so you must provide yourself with a sable brush for this and all work of a like delicate nature. Colour the greater part of the larger petals with the rich pink, leaving a narrow fringe of the original colour round the outer edges. Indent each petal with the ball tool. Take a square inch of paper of the same shade as the flower, and rolling it round the pin-tool, form and gum it into a tube, vandyke one edge, and into this gum each petal, the smaller ones preceding the larger ones. The original flower has not this tube, but, as in the case of the primula, before described, the natural appearance cannot be gained without it.

The stamens of polarginiums, which are about ten in number, generally have anthers, and are of the same colour as the flower. It is better to buy them ready for use; the cost is very trifling, and the general result better (3). Having fastened them on to a short peduncle, slip on the tube. The stamens should not emerge very far out of the tube; still, they should be distinctly visible, and five of them should protrude farther than the rest.

The calyx is cut in green paper after the pattern in the diagram, which represents the whole of it (4). When the flower is mounted, curl back the petals very slightly, or, perhaps I should say, bend them back, more particularly the dark ones. These flowers grow in clusters, or trusses, as it is termed, so that several blossoms are required for one stem, and you will perceive that all the flowers of one truss spring out of one part of the peduncle.

The buds of this plant do not show themselves very much; they hang their heads and keep usually under the shade of the flowers; still, one or two help to keep up the delusion. Two of the lighter shade of petals and one of the darker form a bud. The petal requires colouring, although only the wrong side is visible. These are moulded, and then placed to overlap one another, and arranged so as to look partially twisted. A calyx completes them.

In this way you can make very pretty plants of geraniums, if you possess the patience to form a great many trusses, and then mount them on to a tree, which you can buy ready to be made gay by your buds and blossoms.

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**CHESS.**

**The Value and Properties of the Pieces—General Maxims—Difficult Situations.**

By John Wisner, the English Champion.

The student has now before him all the rudiments of the game. He is in possession of all the necessary tools; the only question is how to use them. Having acquired the intricate materials of which the science of chess is composed, he is naturally anxious to apply those materials to workmanlike and scientific play; and, fortunately, it is in this respect that I shall be able to assist him most. If he has comprehended the elements that have gone before he need not fear understanding the practical application that comes after. The way to skilful chess-play is long, but theoretical teaching is almost as good as practical play.

It is usual at this stage of an elementary treatise to afford a collection of general maxims for the conduct of the play. I myself am not much of a believer in maxims as regards chess. In the art of war the mark of a good general is the knowledge and decision to depart at the proper moment from general rules. The same principle applies very largely to the game of chess. Yet it is not to be denied that general maxims have a certain value, though I shall prefer to illustrate them by examples of detail play. It is possible, for instance, to give the learner a general idea of the value of the pieces, so that he may not rashly exchange a superior for an inferior officer.

The pawn, in the first place, is the most humble and least valuable of the chess men. A knight, bishop, or rook, to say nothing of the queen, is not to be given up for one or two pawns, without special reasons for so doing. A knight is supposed in a general way to be worth about three pawns and the fraction of a fourth. A bishop ranks a little higher, and is worth perhaps three and a half pawns. Thus, the knight and the bishop are practically well-nigh of equal value, and in actual play are exchanged for each other with little regard for the theoretical difference between them. But fine players, especially in modern times, have a great regard for the two bishops, if they can preserve them both on the board, for two bishops are indisputably superior to a knight and a bishop or two knights. In the case of a single knight against a single bishop, the value is different. Indeed, in most positions the single knight is preferred, for he can leap to any square, whereas, a single bishop can run only upon the colour on which he was originally placed.

The rook is supposed to be worth about a knight and two pawns, or a bishop and two pawns. Perhaps he is a little more valuable towards the end of the game, when he is a most powerful piece, ranging in all directions and indifferently over both colours. But at the beginning of the game the case is different again. The rook is then difficult to bring into play. The pawns and pieces block his rectangular range, and it often happens that the game is decided before he can be of much use. In such a situation the sacrifice of a rook for a knight or bishop is often of great advantage, though in the vast majority of cases he is far superior to both. Nothing more than the vaguest general rule can be given for any of these values. The situation must almost always be taken into consideration in determining them. The queen is so far superior in ordinary positions to any of the minor pieces that she is very rarely indeed sacrificed for any single one of them. Speaking roughly, the queen is worth two rooks—a little more at the beginning of the game and a little less at the end.

In Staunton's "Handbook" the following estimate is given as to the relative powers of the pieces, the pawn being taken as the unit:

- Pawn : 100
- Knight : 305
- Bishop : 350
- Rook : 548
- Queen : 94
The calculation is a little fanciful, but expresses with fair accuracy the answer to the question at issue.

By way of showing, however, how much all matters of this kind depend upon practice, I will give a few examples of the manner in which the game may be won by sacrifices.

In the following position (Fig. 1) Black wins by sacrificing the knight for a pawn.

Here Black takes Q Kt P with Knight; the Q B P is almost compelled to retake, and the black pawn advances. This is the quickest, though not the only way of winning.

In Fig. 2 the rook may be advantageously sacrificed for a knight.

White plays R, takes Kt, check. And when the black pawn retakes, as it must do to avoid defeat, the single white pawn advances to queen long before any of its competitors can reach the same point. The two black pawns on the queen's side are stopped by the white king: the pawn on the king's side is too far away.

In Fig. 3 the queen may be profitably sacrificed for a bishop.

White, having the move, captures the bishop with his queen. Black has obviously no better move than to retake the queen. White then plays K to Kt 3, giving check. The youngest tyro can see that Black must move his king to rook square. White then follows up the attack by B to K B 6.

He now threatens mate by B to K Kt 7 ch., and then B to K B 6 dis., ch. and mate. In order to avoid this catastrophe Black must play his rook to Q sq. or 2 B sq., for if he move Q to Q 3, intending to take the rook when check is discovered, White defeats this object by P to K B 4, or wins the queen.

The game then proceeds thus:

**WHITE.**

Q B to K Kt 7, ch.

Q B takes K B P, dis. ch.

**BLACK.**

K to Kt sq.

K to B sq.

Black evidently must

Q B to K Kt 7, ch.

Q B to K R 6, ch.

**WHITE.**

K to Kt sq.

K to R sq.

The object of these moves on the part of White has been to win a pawn before winning his queen back again.

K B takes K B P

White now threatens instant mate by Q B to K Kt 7 check. The only move to avoid it is by Black retreating his queen to K B sq., giving it up for a bishop and remaining with a hopeless inferiority of force and position.

If the beginner find this rather a stiff example, he had better look at it repeatedly. It is full of instruction.

These examples will suffice to show how frequently in practice the strict theory as to the relative value of the pieces is modified.

Having said so much touching the powers of the pieces, it may be well to follow the general rule of supplying the student with some maxims as to the management of these forces and the general conduct of the game. Here, again, what I have to say must be modified by my previous remarks as to the
nature of these maxims. It is the essence of good play to so apply them in practice as to be able to discard them at the proper moment. We shall determine by examples of actual play how the general rules which form, for the most part, the essence of the game, may be profitably set at naught.

The primary rule is one that is rarely deviated from. Develop all your forces before commencing operations. Bring out your knights and bishops, castle early, and get the two rooks into co-operation. The latter portion of the foregoing sentence is especially important to young players. They are apt to neglect their rooks, and it is no uncommon event for a beginner to be defeated before his rooks have been even moved. Yet how can you expect to win when two of your strongest officers are left in complete inaction? It is tempting, no doubt, to get out a man or two, and then go upon an expedition with them. Likewise, it often terrifies an inexperienced adversary to see himself pounced upon ere the game has well begun. Yet the temptation must be resisted. The practised player will know how to take advantage of your indiscretion. He will quietly proceed with the development of his game; at the proper moment your impetuous onslaught will be rejected; and then his forces will move onward, never to retreat.

When your pieces are all in battle array, the best mode of employing them is to open a combined attack upon the king. Bring all your available strength to bear upon his majesty, and endeavour to break through his entrenchments. As the object of chess is to give checkmate, if you succeed in your assault upon the king, it matters not in what other quarter your adversary may make an impression. Fine players often carry on operations on the queen's side, or in the centre, knowing that no effective assault can be directed against the king; but this is merely an exception to the general rule.

The queen, being the most important piece, should not be brought into action too early. She is liable to be attacked by the enemy's inferior pieces, and driven back with loss of time. Alone, too, the queen can make no impression upon the serried ranks of the enemy. The queen should, for the most part, follow the other pieces into the field and supplement their movements. It follows, therefore, from the preceding general rule that she should in most cases be directed against the king. Also, she must not be removed too far from the centre of action. A good player will often, by the bait of a pawn or so, tempt his opponent to withdraw his queen from the main scene of operations, thus losing time and allowing the good player to accumulate an overwhelming force upon that main point. Fig. 4 is an illustration of this important general rule.

In this situation White began by moving Kt to K 4, attacking the queen; Black, instead of offering the exchange at king's fourth, as he ought to have done, greedily seized the exposed White, Q Kt P. The game then proceeded thus:

**WHITE**

1. Q to Kt P

**BLACK**

2. P to Q B 3

shutting out the Black queen.

3. Q takes R

Ho bites again, but it matters not.

3. Kt to K B 6 ch.

4. K to K sq.

Ho cannot take the knight, on account of the white queen

4. Q to K B 4

threatening mate by Q takes K R P.

5. B takes K R P

And it is evident that, do what he will, Black cannot escape immediate mate.

A few general observations respecting the king will not be out of place. As the king is the object of attack, it is evident that great care must be taken of him during the heat of the combat, when there are so many hostile pieces on the board ready to assail him; but when the field is clear, and few pieces remain, the king becomes an important fighting piece, and should be freely used of, especially in conjunction with the pawns.

It remains, before proceeding to practice, to say a few words respecting the pawns, and the "moral" rules which should guide the chess player.

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**CASTING.**

**CASTS FROM COINS.**

BY A. H. WALL.

**MEDALS, AND SEALS.**

Another of the innumerable ways of pleasantly occupying leisure hours is by casting, an art of varied usefulness, easily acquired, and very interesting. The instructions here given will include the modes of obtaining casts, or impressions, in different materials, from models in clay, sculptures in marble, and from other delicate works of art; and also those of casting from faces in life or after death, from plants, insects, fishes, and other natural objects; and we fancy some of our readers, whose daily duties are of a dull, uninteresting, null-horse round, will find this occupation delightful.

Casting, as you doubtless know, is an art by which many people live; still, it is none the less recreative; for, as Mr. Gladstone said, all recreation is but a change of employment; and, as Feltham said, many will "outrise the sun, outwatch the moon, and outrun the field's wild beasts," finding "mirth in vociferation and music in barking dogs," who, if they were compelled to perform such tasks continually, would pronounce them an intolerable burden. The secret rests entirely in the change, and there are many thousands of people who may find in casting a more complete change from their ordinary daily occupations than most other arts can afford.

The applications of this art, which was ancient in the days of Pliny, are numerous and important. It connects itself in so interesting a manner with other attractive pursuits, and affords such scope for the display of taste and intelligence in its decorative branches, that it is sure to become a favourite with those who adopt it. To the student of science and history it is especially useful. Many acquire for themselves a large collection of casts from fossils, rare animals, and curious illustrations of natural history; others devote themselves to making casts from the engraved gems and cameos of antiquity; amateur antiquarians use it for securing old engraved inscriptions, facsimiles of rare coins, medallions, and ancient royal and monastic seals. Lovers of art owe to its adoption casts of architectural masterpieces, models of famous buildings, busts, and statues; and lovers of home use it for the expression of their love in decorating rooms with ornamental moldings, brackets (Fig. 2), vases (Fig. 1), picture-frames, side tables, etc. To all these uses we will in these papers give attention,
and we hope to make our instructions so full and complete as to leave but scant room for the chances of failure.

To produce a cast, the first thing we require is the mould.

For a preliminary experiment, suppose we take a halfpenny, or some other coin of small value, and obtain a mould from it. This mould may be made of wax, modelling clay, metal, isinglass, plaster of Paris, or sulphur. As we are going to commence by obtaining a cast in the plaster, our best plan will be to make our mould in sulphur, as plaster should not be cast from plaster, as the same substances can seldom be prevented from adhering to each other.

Take a little sulphur—the common roll brimstone, quite a liberal supply of which may be purchased for a few pence—and melt it over a slow fire in a pippin or iron ladle. If placed over a fierce fire it would soon be rendered unfit for your purpose. Cut a slip of stiff writing paper about an inch in width, and long enough to go twice round the coin, round which it should be fastened tightly with a little gum. The paper being secured, rub a little sweet-oil over the coin, and take it up between your forefinger and thumb, so that the coin and paper form a kind of box, into which pour very carefully sufficient of the melted brimstone to cover the surface of the coin, turning it about gently while doing so, in order to insure its covering every portion of the surface. It should be just melted; if too hot, it will be thick. The cooler the sulphur is, provided it flows freely, the more perfect will be the mould.

This being done, place the coin on the table, and again pour over it as much more sulphur as will make the mould about a quarter of an inch thick. It will then be sufficiently strong. In a few minutes the hand of paper may be taken off, and the mould separated from the coin, when it is ready for the casting.

If this process has been properly carried out, a perfect impression of the coin should be obtained, sharp and distinct in every part, so that your cast may be, in everything, but material, an exact counterpart of the original. In holding the coin and pouring on the sulphur, be very careful to prevent it from touching the flesh, or a very severe burn will follow. Sulphur must not be poured upon silver coins, as it will tarnish them.

In melting the sulphur, be careful to keep the flame from it. Should it take fire, extinguish it by covering a saucepan over it; throwing water upon it might cause an explosion.

The next thing we require is some plaster of Paris. This is made by burning gypsum, or, as it is sometimes called, alabaster. Its price varies according to its quality. The coarse is sold at fivepence per bag, the bag containing fourteen pounds, and the fine at one shilling per bag; a superfine kind is sold at one shilling and sixpence per bag. The two former kinds may be obtained at most oil and colour shops, the latter from the plaster-figured mouldier. Where the finer kind is required, and you are unable to procure it, the coarser kind may be well pounded, sifted through a fine sieve, and put in an iron pan over a clear fire.

The plaster must be stirred with a long piece of wood until it begins to bubble like boiling water, and becomes so thick that you can stir it with difficulty. Then pour it out into your pan or roll, and allow it to cool. If you can purchase both the fine and the coarse plaster, you had better do so, as the above process is rather troublesome, and decidedly uninteresting. Good plaster of Paris is free from impurities, well burnt, ground, and sifted until very fine, and brilliantly white.

Take some of the fine plaster and mix it with clean water to the smoothness and consistency of cream in a basin, sprinkling in the plaster until you have sufficient for your purpose, and pouring away any water which may float above its surface. Stir it well together with a spoon (not an iron one) until you have the required conditions, removing any impurities or air-bubbles as they rise. If your plaster is not thick enough, defects in your cast will arise from air-bubbles. Mix no more plaster than necessary, as, being a species of lime, it is changed in its nature after it is wetted, soon becoming hard, and can only be restored to its former soft condition by re-burning.

Next you take the hardened sulphur mould of your halfpenny, carefully free it from dust, and with a piece of wool moisten it first with sweet-oil, but not so freely as to leave the oil unabsorbed on its surface. With a small stiff-haired brush work a little of the fluid plaster well and quickly into all the hollows and interstices of the mould, and over it pour as much more plaster as will render your cast the thickness you wish it to be. Then raise and tap it gently two or three times on the table to prevent holes forming, and secure a smooth uniform surface.

When the plaster has set, it may be turned out of the mould, trimmed with a knife, and put aside to dry. The time the plaster will require to set will depend largely upon the condition it is in. If newly made, two or three minutes will suffice; if older, it will set with greater rapidity; and if it is much older, it will set so rapidly as to be unmanageable. On the other hand, should it be very old, instead of setting rapidly, it will not set at all, and consequently, for the purposes of casting, becomes useless. You must never disturb the plaster after it has once begun to set. If you find the plaster you are using sets too rapidly, put into the water it is mixed with a little melted size or thin glue-water, about a table-spoonful to the pint. If the plaster is very new, and consequently sets too slowly for your purpose, mix it with warm instead of cold water.

If there should be any difficulty in separating the cast from the mould, hold the plaster downward in warm water for a few seconds, when a film of water will insinuate itself between the two surfaces, and tend to separate them.

Supposing you to have been successful in your first and very simple experiment, proceed in your next effort to operate upon a larger subject—say a medallion, such as the Italian image-sellers will provide you with for a very small sum. If there are any small holes in this, fill them up with a little plaster of Paris which has been allowed to partially set, and has then been mixed with a little more water. If the cast is disfigured—as the cheaper ones often are—with seams and rough projections, scrape them down; and if parts want smoothness, it may be obtained by using fine glass-paper. A useful tool for mending and scraping casts can be bought of artists’ colourmen, and most hardware and tool shops, for 9d. It has a spatula for mending at one end, and the other end is serrated for scraping. When you have got rid of the coarse rough surface and other defects of your cheap medallion (a better one can be purchased when the experimental stage has been passed), soak the back of it thoroughly with water, until it penetrates its thickness and displays a shining effect upon its face. Then cut slips of paper of the required thickness, and bind them round its edge, in the way already described. If, however, the medallion is larger, a stouter material will be required, and if it is square in form, flat pieces of wood will be required in addition to the paper. Melt the brimstone, and pour it over the medallion as you poured it over the halfpenny, but, as to handle so large an object might subject you to the danger of severely burning your hand with the brimstone—which should be used directly it melts—you let it stand upon the table instead of raising it in your hand.

The mould being dusted and oiled ready for use, and the plaster properly mixed—a little of the superfine and a little of the coarser, separately—pour in a little of the former first, and with the stiff-haired brush work it well into all the depressions of the mould. To do this, hold the brush upright, pushing and beating in the plaster with the points of the hairs. This must
not be done too leisurely, but quickly, in order that the mould may be filled with the coarsest plaster before the plaster first poured in has set. To make the plaster settle well down into the mould, judicious tapping on the table or bench will suffice. If your cast is intended for hanging against the wall, a piece of bent wire inserted in the edge of it, before the plaster is dry, will serve the purpose. The various processes by means of which these medallions can be painted, bronzed, polished, or gilded, will be given in a separate paper. They are all very simple, and easily mastered. Suppose you next try your hand at the casting of coins, medals, gems, etc., in sulphur.

Seals cast in sulphur are more durable than those made in wax, and for this reason are generally preferred by seal-engravers who desire impressions of seals to display in their shop-windows. Let us commence with one of these. In the first place we obtain our mould, substituting plaster of Paris for the sulphur. We next put our sulphur on the fire to melt, and directly it does so, we mix some pigment quickly with it to give our cast the desired colour. If it is to be a bright red, we use the English vermilion, rejecting the Chinese, which the sulphur would blacken, and using the English pigment as pure and brilliant as possible; if it is to be green, use verdigris. The colour of some ancient seals is very closely imitated by using sulphur which has been melted two or three times, when it assumes a peculiar warm grey hue, and, after it is cast, brushing it over with the black-lead brush your servant has been using for her stoves.

In casting coins and medals so as to secure impressions from both sides, we encounter some rather troublesome difficulties. Having obtained the two moulds, some fasten one a little distance from the other by means of a slip of stiff paper round their edges, and holding them vertically, pour in the sulphur or plaster through a hole in the paper, and, as it contracts in cooling, pouring in more. In this case the cast is always more or less defective.

The better plan is to cast them both sides at once with sulphur instead of plaster, and coat them with black-lead applied by rubbing with a stove brush. To obtain a bronze-like effect, glaze over them pigments mixed with a little spirits of wine—say dragon’s blood and yellow lake mixed.

For some purposes, isinglass is used in the place of both sulphur and plaster of Paris. The simplest and easiest method of doing so is the following:—Put isinglass into a little water—just sufficient of the latter to secure a strong solution of the former—and melt it over a fire. Clean the coin (supposing it is a coin), and with a camel-hair pencil—costing one penny—coat it with the isinglass while it is hot, and let it dry. When it is hard, raise it from the coin by inserting the point of a knife carefully between it and the metal; first, however, if necessary, trimming the edges, and doing so before the isinglass has grown hard and brittle. The film of isinglass will at once spring up, and you will find that you have a very clear and distinct, but more or less transparent, impression of the coin. If you wish this to be of any particular colour, or to resemble copper, you must mix a little pigment with the isinglass while it is still in solution; it thickens and grows hard very quickly. A little dragon’s blood mixed with yellow gives an effect very like that of copper, especially if you cover the back of it with gold leaf or Dutch metal. To do this you have merely to breathe for a little time upon the isinglass to soften it, and then lay the leaf of metal upon it with a brush, sold for that purpose at the oil and colour shops for a few pence. It will adhere at once.

These details are necessarily dry reading, and, in fact, most of the books hitherto published on recreative arts and sciences are dry.

A wag of our acquaintance asserts that the deserts of Arabia owe their existence to a learned dervish, who once carried into the East some works on recreation to relieve the heaviness of more abstruse studies; and, moreover, that a box of the same books having been lost at sea, dried up the waters for so many miles around that a tribe of ancient mariners, all wearing plaited breeches and broad-brimmed hats, colonised the land, which was afterwards called Holland.

We shall not conclude our first paper on Casting by casting the slightest doubt upon our friend’s assertions, but it must be clearly understood that we do not vouch for the truthfulness of his remarks. However, as we feel that an interval may well elapse to enable our reader to carry out the details of the lessons we have already given, for the present we shall put our pen aside, promising the reader that our future papers on this subject will be full of interest, and supply the material for carrying out to the fullest extent this, one of the most recreative of the arts.
WE have the flood stream again to contend with, but not having the strength of a harbour tide, we are confident we can overcome it, and we help the boat by pulling the weather oar for a time, until the wind settles to a nice breeze, when we lay it in-board, as not being longer required. The wind varies from west to west by south, and point, where the three rocks are marked (page 258), we stand on until we are well into the cove on the west side of it, and make a still longer board after going about, for as the coast gradually trends to the southward of west, we do not much increase our distance from it by so doing. At the end of our ninth board we are opposite the harbour entrance, but as the tide has

we find on our seaward board that we cannot lay a better course than south-south-west half west; this is, however, as much as we can expect, but as the wind frequently comes off land at or about sunset, we think it best to keep the shore on board, and tack after we have stood off about a quarter of a mile, and make a short board again towards the land.

We are now pretty close in under the shore, and can make boards of increasing length on the starboard tack, and by consequence shorter on the port, and having a nice fresh breeze, are working along shore in good style. Having weathered the first again turned, it is coming out against us, and as we approach the narrows of the entrance, we have to put our oars again into requisition, until we are abreast of the point, whence the wind is fair to our moorings, where, picking up our buoy, we make up our sails, and haul out our little ship to her old berth. Our return has occupied us quite three hours, for although we have had a nice breeze, the tide being against us has of course retarded us considerably whilst turning to windward.

On our two previous cruises, in regard to the weather we have had very little to complain of, for, with the exception of a few showers, it has been very fine. In such a climate, however,
as ours, the capriciousness of which is proverbial, we have to deal with the chances of wind and weather, and although no one in a small boat, who has a proper regard for prudence, would go to sea in a gale, or even hoist canvas in a heavy squall, he must make up his mind he will occasionally meet with disgraceful contingencies in his acquaintance with the salt sea waves.

Having entered on previous occasions so fully into the process of setting sail and taking our departure, it is unnecessary to repeat these details at the commencement of this our third cruise; in this cruise, however, our experiences will be somewhat different, as the method of going will be gone through under weigh.

The wind is off the land from the north-west, a light breeze, and smooth water, as a matter of course, from its direction. Our intention is to visit a cove about four miles to the south-west, and, after making some little stay, to return.

As we leave our moorings it is 10 a.m., and as the tide flowed until 7 a.m. this morning, it is now half ebb. As the current changes its direction of north-east to south-west at this period, we shall have a fair tide under foot, and it appears likely we shall make a good passage.

Both inside the harbour and in the entrance the rush of the ebbing current is not only strong, but in some places violent, and it is requisite to use much circumspection in shaping our course, that we may pass clear of sundry boats and small vessels at anchor, and also of the buoys oscillating to right and left as far as their chains will allow them, and half submerged by the rapidity of the stream.

When sailing in a light wind in the same direction as the tide the rudder has but little power over a boat, and it is therefore desirable if possible to keep out of the line of any obstacles, an oar should therefore be put out in time, for nothing can be worse than delaying that which is really requisite to be done, beyond the right juncture, as in such cases the most serious consequences may follow a collision, should it ensue. We are barely five minutes from our moorings to the entrance of the harbour, where the river falls into the sea under a high cliff on its south-west side, and a minute or two more sees us across the barrier of sand and gravel, which, running athwart the course of the stream, here materially reduces the depth, and causes heavy breakers in bad weather; continuing our course, we run out about half a mile, for the sake of getting a cowling, because the cliffs are lofty, and there is very little wind close under them, but at this distance, although the breeze is not steady, it is less uncertain than near the shore, where, from the effect of the high land, it will sometimes blow in flaws of opposite direction in the space of two minutes. As the wind is from the north-west, and our course is south-west, we have it right on our beam, and when the wind allows us to take it in this position, it is termed a soldier's wind, for what reason it is difficult to say, nevertheless it has this appellation. Such a wind permits a boat or vessel to sail in either direction, as long as she is at right angles or nearly so to the line of its course.

For the half mile we have run off the land we have had the wind abaft the beam or blowing diagonally from behind us, and we have therefore kept the plate in its case, but as our progress, now we have hauled up with the wind abaft or at right angles, is partly due to the lateral resistance of the boat, we increase this resistance as much as possible by lowering the plate. The clouds are gathering in over the land, and as they approach us a few drops of rain begin to fall, a change of wind or an increase of it may therefore be expected, and we hold ourselves in readiness to reef or haul down our canvas, as may be required, should we have a sharp squall.

We now take in a reef in the fore-lug, as I will explain by aid of the illustration on p. 324 (Fig. 7), which represents the lower half of that sail, the boom, and a portion of the mast, on a scale of half an inch to a foot.

Through the tack at the lower right-hand corner, as mentioned in another place, a loop and toggle or wooden button is placed. To reef the sail, one hand lowers it to the distance of the depth of the reef, whilst the helmsman hauls down the reef by aid of the aftermost piece of rope, termed a pennant, and secures it round the boom. The loop at the tack is to be passed through the cringle, which is hidden by the mast in the illustration, and the toggle being put through it, holds the sail down securely; the halliards then being again set up, we keep the boat on her course. As the shower passes, the wind comes off the land very fresh and more from the north or on the quarter, causing us to make great speed through the water. Notwithstanding our reef, we have rather too much sail, and accordingly we take in the mizzen, after which the boat steers very steadily, and we reach our destination in half an hour. Previous to our return we still find the wind very strong, and as we shall be close-hauled, we take another reef in the fore-lug, and also one in the mizzen, and then start for home. There is a considerable wash, and the spray flies over us, and we experience some heavy flaws off the cliffs, nevertheless, we make our passage back in five boards, occupying an hour and a half.

The following sketches represent varieties in the application of the log-sail, drawn on a smaller scale, namely an eighth of an inch to a foot, for the sake of placing more than one on a page, to afford facility for comparison. The first is a boat of fourteen feet length and five foot beam, the second of sixteen feet length and the same beam, the third of the same dimensions as the first but differently rigged, the fourth a pulling boat of twenty feet length and three feet ten inches beam, the fifth a skiff of fifteen feet length and three feet beam, and the sixth a lugger of twenty-four feet six inches length and seven feet six inches beam.

Fig. 1 is probably the most useful size for general purposes on salt-water as a single-handed boat, not being too small for safety, or too large to be easily handled by one person. She can be sailed either with or without the jib, at pleasure. A reef is shown in the jib, by which a second and a smaller one can be dispensed with.

The beam of both Figs. 1 and 2 is the same, namely five feet. The method of rigging Fig. 2 with a single mast and sail is not recommended in a general way, but only for sailing in fresh-weather rivers above tidal flow, such as in the upper waters of the Thames, where they have been coming into use for some time past. In these and other narrow waters the banks are often encumbered with trees, overhanging or growing out of them, rendering the space still more circumscribed; a boat, therefore, having no spar extending beyond either bow or stern, can stand close in, even to the very brushing of the bushes, if desired, and thereby make the best of the limited area in which she has to manoeuvre. The Thames boats are generally, say six inches narrower, and carry a somewhat smaller sail. The six inches less beam will, of course, give more speed under oars or in a light breeze, but the wider boat has greater power, which tells in her favour in strong winds, making her the safer craft of the two. The use of the centre-board or plate is fast becoming almost universal on the Thames, and the number of boats fitted with this appliance is continually augmenting. It is recommended for all the boats illustrated on the next page. The positions for the cases are shown by the dotted lines.

Fig. 3 is a boat of the same size as Fig. 1, but the fore lug is attached to its boom Chinese fashion, the boom running in front of the mast two feet; the sail is kept down at the foot by an inverted traveller, secured to the mast thwart, and a sling is made on the boom to receive the hook of this traveller. The real
Chinese lug is a sail of much more lofty form—or, as sailors would say, having more hoist—and the mast "taunter," it rounds in towards the peak, and has battens across it at intervals, to make it stand flatter, and which are undoubtedly very effective for the purpose. In addition to this, every batten has a rope or sheet, all which are gathered into two lots and spliced into two bowlines or short ropes, by aid of which the sail can be trimmed to any degree of flatness desired.

The pair-oar (Fig. 4) has three feet ten inches beam, and her rig is the same as that of Fig. 3. Being, however, a long and narrow boat, intended to be chiefly used for pulling, lofty sails would not befit her, and her largest sail is therefore of only a moderate size. A boat of these dimensions, which the writer is well acquainted with, carries her two sails in a good breeze with the weight of her owner only, requiring no ballast. She pulls also remarkably well under a single pair of sculls, and is a very pleasant boat to use on an estuary, lake, or at sea with the wind off the land and moderate. She is swift under sail, when not hauled too closely to the wind, but must not be expected to go about by the power of the sails alone, and must be brought round, owing to her length, by the assistance of an oar or scull. In short boards she can do little or nothing, but where she has not less than a quarter of a mile width of water to deal with, or a tide going to windward, she will travel over the ground with great speed, as long as there is not too heavy a wash for her.

We have in Fig. 5 a sculling skiff, fifteen and a half feet long, and three feet beam, with a Chinese lug, of a low and snug form in order that it may be safely carried. The weight of one person
is of course sufficient, if sitting down in the bottom of this boat, to enable her to stand up in such weather as it is fit to hoist canvas upon her, and as there are two reefs in the sail, it can be very much reduced, if necessary, in a fresh wind. Both in this and the preceding boat, it is desirable to sit down in close to the coast by boats of this size, by choosing settled weather for the trip, and she would be called a tub by comparison with the sculling outriggers of the present age.

Fig. 6 is a lugger, and her appellation gives name to the form of sails hitherto illustrated. She carries three working lugs, a jib, and a topsail over the mainsail. The lee or after edge of the fore lug reaches abaft the luff or fore edge of the main lug, consequently it does not appear in the illustration. The reader will perceive a dotted line running down the middle of the seventh cloth of the jib, counting from the bowsprit end. This is to show the size of a small jib, for use in strong winds. The shrouds and halliards, except the jib halliard, have been purposely omitted, to avoid a confusion of lines.

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CROQUET.

By CHARLES BLACK, CHAMPION.

SINGLE AND PARTNER MATCHES—TOURNAMENTS—TRIAL SHOTS—MALET MARKS—THE POSE.

The rules and instruments of the game have been now disposed of, and it is time to speak of actual play. Matches at croquet are either single or double-handed, i.e., are played between only two players, each playing two balls in rotation; or between sides of two players, each playing one ball. The former was the earliest form of the game, at least in England; but the latter affords such a much better test of a player’s skill, by giving him full command of the balls, that it is adopted for all the important matches.

The single-handed game may thus be regarded as the true field for the display of tactics, although the double game claims a greater share of attention, from the popularity which its very name of “partner” matches suggests.

It is now generally agreed that the most suitable number of balls to play is four, although a Nestor of the game adheres to his conviction that the “only scientific game” is played with six.

With four, the length of time necessary for a game is quite long enough, and the turns come in sufficient rapidity to prevent weariness.

Is there any reader who cannot recall the dreary time of waiting, while some good player was “having a benefit” among eight balls, and then his mortification when his turn did at last come, at finding himself twenty yards from any ball, and at having to relapse, after a wild shot, into ten minutes of quiescence?

Six shots an hour is hardly a fair share of the game. There is always a certain amount of patience required, as in billiards, to watch a good player scoring rapidly; but with four balls the odds are very much more in favour of your getting a rapid succession of turns than with six or eight.

In the face of this it would be better, at a croquet party where the laws only admit of one set of hoops, to start a game of four from each stick, as the increased vigour of play will amply compensate for the momentary clashing of rival interests which may occur at some hoops.

In private play both single and partner matches are of course formed by arrangement.

But to proceed to public contests.

There the players in single matches are drawn by lots in pairs, and then the winners are drawn in a second batch of pairs, and so on, till there are only two players left in to play the final rubber; the first draw being called the first round, the second draw the second round, and so on, till the final round, between the two players. In partner matches, the players are sometimes allowed to choose their partner before they enter, and sometimes put their names down singly, and are drawn in pairs; the former plan is the best to obtain good play, the latter the most successful in securing entries at local tournaments, as the chance of being misted with a “swell,” encourages many an outsider to enter, who would have no chance of being selected as a partner.

In addition to single and partner matches, prizes called “break-prizes,” are offered at tournaments, and are won in the following...
way:—A gentleman or lady is allowed to place his or her ball in front of the first hoop, and arrange three other balls in any position on the ground; they must then start, and make as many hoops as possible with the first-named ball, and the player who goes through most before making a mistake, i.e., who makes the longest break, receives a prize. The longest break on record is one hundred and thirty-seven points.

Handicaps are formed in croquet by giving bisques (a term already explained) to inferior players.

The players are arranged in classes, with a difference of a bisque between each, so that a player in the first class, if drawn with one in the fourth would have to give him three bisques.

These games, though of course no decisive test of a player’s calibre, admit of great tactical skill on the part of those giving bisques, and great discretion in the receivers, as to the proper moment at which to use their advantage.

It is, I conceive, the duty of good croquet players to enter for handicaps, if possible, and so give rising players an opportunity of meeting a tough antagonist on equal terms.

An admirable safety valve for any extra energy possessed by the players at a tourney is provided by addition and subtraction, which the typical loafer at public entertainments may also turn to advantage. It consists of having four shots at a row of hoops, planted in the ground, either separately or fastened together with iron, on either side of a stick (Fig. 1).

It can easily be set up at any moment on a lawn. The gentlemen then shoot at it from twenty yards, the ladies from fifteen yards, and count nine if their ball hits the stick, seven if it passes through the nearest hoop, five through the next, three through the next, and one through the last. If the ball strikes the wires between two hoops without passing through, the number of the outer hoop counts, e.g., if a ball struck the wire between three and five, the stroke counts three.

The result of the four shots is then added up, so that thirty-six is the maximum. The subtraction consists in deducting five for every shot that missed the whole erection.

At the All England tournaments a shilling is charged for each entry, and the three-fourths of the receipts are given to the highest scores, a fourth going to the lowest expenses; but it is a game which may be played without venturing any money, and it may often away a pleasant half-hour.

While speaking of public contests, it may be well to mention, for the help of aspirants to laurels, that the chief tournament of the year is held at Wimbledon in the early part of July, at which the gentlemen play for a handsome fifty-guineas challenge cup, besides second and third prizes, and the ladies for an elegant tea-service, with corresponding prizes.

The tournament being open to all comers, the winners are entitled to call themselves the champion and championess of England.

If you watch a professional billiard player on the eve of a match, you will see him advance to the table, and spin a ball up and down it, and his experienced eye tells at a glance the "strength" of the table.

In like manner, any prudent croquet player before starting in a game, will take care to make two or three "spits" and "rushes," and take croquet from one corner to another of the lawn on which he is going to play. This is all the more necessary, on grounds which are comparatively unknown to him, but even on familiar grounds it is advisable, as a shower during the night or a hot sun in the morning make a very perceptible difference in the rate of the speed at which the balls will travel over the ground, or, as it is briefly expressed, in the "time" of the grounds.

One has often practical experience of this in playing in July and August tournaments, when the lawns get visibly faster each hour between twelve and three in the middle of the day.

Judgment of strength is, as has been already said, the sine qua non of a croquet player, any elaboration of tactics being impossible without it; but in order to have an opportunity for displaying judgment of strength, there is needed a capability for making shots sometimes in order to obtain or regain command of the balls; so that preliminary practice had better be extended beyond learning the time of the ground to making a few shots, so as to "get the eye in."

It is wonderful how much difference five minutes’ steady practice at a few shots from five to twelve yards will make in the confidence of a player who may be a little nervous as to whether he is right on that day. So, if you are going to play a tournament, go early and get this practice before you are wanted to play, as your adversary will naturally object to your taking it after you are told off to play.

If you are taking part in a croquet party, and wish to be thought the "local swell," knock the balls about quietly beforehand, and get the requisite knowledge and confidence.

But now to work. We have spoken of the manner of achieving the various strokes needed in taking "croquet," but no hints have been given as to making a "roquet" (we hope our readers have not forgotten the distinction, vide p. 84).

Let roquets be divided into long and short, the former those effected from a distance of more than twelve yards, the latter those made at distances from one inch to twelve yards.

A doubt as to which is the easier will probably excite a smile of derision in our readers, and they will be surprised to hear that more matches are lost through missing the latter than the former.

The fact is, that no disgrace is felt at having missed a twenty yards’ shot, and so there are no nervous qualms while the player is taking aim; but often when there is six or ten yards, at a critical moment, disquieting thoughts arise, "What a booby I shall look if I miss this!" "Oh dear, I ought to be able to hit it! but"—the striker is doing his best to miss by giving
way to such childish fears. Be sure of your medium-distance shots, and you will be very soon one of the most dangerous players. How am I to be sure? is the answer. Well, listen. First as to the eye, which had better come first, as there is a general consensus as to which is the right method.

At the moment of striking your eye ought to be resting on your own ball, and not on the ball aimed at.

Take a good look at the ball you wish to hit; then carry your eye back to the mallet, and point it according to the line which this glance has given, and, lastly, fix your eye on that part of your own ball which the mallet must hit in order to drive it straight; be sure, finally, to strike this part with the centre of the mallet's face.

You can easily ascertain whether you are accurate in this last point by observing the indentation or discolouration which is made on the face of the ball by the ball.

On the mallet of a bad player the dark marks referred to may be seen all over the mallet's face, as much to the right as to the left of the centre; but a good player's mallet will present one round opaque mark in the centre, showing that the ball has been always struck true.

The necessity for looking at your own ball instead of at the object ball arises from their being nothing in croquet corresponding to the "bridge of the hand in billiards. A good bridge ensures the ball being struck correctly; but if once the mallet lose the guiding power of the eye it is odds on its either striking the grass or glancing from the ball instead of hitting it direct.

Lauthier, in describing the attitude of the body necessary for pull-mall, speaks of "raising the head without over losing sight of the ball" (referring to the ball which the player is striking).

The glance at the object ball must be taken rapidly in the case of long croquet, as it is difficult to keep a long line in the eye; and slowly and cautiously in short croquet, as the line is easily recovered at short distances; and short misses most often occur from careless and inaccurate aim.

As to the position of the strikers, we may truly say, "quot homines, tot sententiae," and when all the doctors are so much at variance, who is to say what is right? Of course we are all aiming at that ideal attitude, which can be so easily described as one that is at once elegant and effective; but that is the perfect form "in nebula," and of the imperfect and mundane forms, which is to prevail, the elegant or the effective?

If one gentleman prefers to stick the end of his mallet, handle into his waistcoat pocket, and run the risk of spinal dislocation every shot he makes; if another bends his knees, and standing a good yard off his ball sweeps at it as with a broom; if another wiggles his body in a way which suggests Japanese jugglers; and if any number choose to play with high shoulders—who is to interfere with the liberty of these estimable subjects of the realm, but, at the same time, who will imitate them?

Be warned in time, and before you adopt any particular croquet, begin with an easy attitude; anything overdone is sure to be wrong.

The great thing in most of the strokes at croquet is to preserve an even balance on both feet. This is not compatible, in the case of tall people, with the elegance which marked the attitude of the late Mr. Whitmore; he always rested his weight chiefly on his right foot, and stood with the ball which he was about to strike opposite that foot, or, at all events, nearer his right foot than his left; by these means he preserved an upright carriage. But in these days of three and three-quarter hoops, when short strokes require such intense accuracy, it may be doubted whether the high grasp of the mallet handle which perfect uprightness requires steadies the mallet sufficiently.

Listen again to old Lauthier:—"In order to have command of the ball, the player must settle himself well on his foot, put himself in an easy posture, so that the ball be opposite the left foot, and must not draw back his right foot too much." Oh, that we had a Lauthier to instruct our rising croquet players! We think him right about the left foot.

One fatal error is to stand with both feet too close together, as such an attitude promotes more than any that downward chop of the mallet so much to be deprecated, instead of the easy lateral swing, which is only to be obtained by a body poised evenly between legs a little outstretched, and arms working well from the shoulders instead of from the elbows. We are not anxious to press any definite model on our readers, as ours is a prejudiced view, inasmuch as we declared early for effectiveness, and it is hard now to retrace our steps and go in for elegance.

It is said that ladies do not regard croquet with the same affection as aforesaid—owing to the heavy mallets and difficult strokes requiring inelegant attitudes in comparison with the "pose" of an archeress.

In, then, how bow always used elegantly? Experience of many meetings hardly supports that view; certainly good attitudes at archery are exquisite, but how few and far between are they.

Even so with croquet, some ladies are notoriously inelegant, but many have appeared who combined the most dashing with very pretty "pose."

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FENCING.

BY MAJOR HOOG.

THE ASSAULT—CONCLUDING WORDS ON FOIL PRACTICE—RULES.

At the close of the last century there were two fencers who were famous for the grace and dexterity with which they performed the exercise of thrusting quarto and tiefce; one was the Chevalier St. George, the elegant mulatto, the other the famous Chevalier D'Eon; and they went through it together in the presence of George III.

The career of the latter beautiful fencer (the Chevalier D'Eon not his Majesty), was one of the strangest ever known.

He was born at Tonnuro in Burgundy, in 1727; became councillor of the parliament in Paris, entered the army, rose to be captain in a regiment of dragoons, and acted as aide de camp to Marshal Broylio.

In 1761 he was sent to London as secretary to the Duke de Rivernois, the French ambassador, and received the cross of St. Louis. At this time he had already become very celebrated for his skill with the foil.

When the duke left England, the Chevalier D'Eon remained in the character of minister plenipotentiary, in which he was superseded by Count de Guercly, to whom he was told to act as secretary.

D'Eon, naturally much offended, spoke his mind out some what too freely, laying himself open to an action for libel; and not appearing to receive judgment, was outlawed. He was also involved by this affair in several duels, a matter treated
very lightly by so excellent a swordsman; however, the pitcher is certain to go once too often to the well, and so it happened that in one of these encounters he was wounded, and those who attended him on the occasion spread abroad the report that he was a woman.

From that day forth the sex of the Chevalier D’Eon was a favourite subject for controversies and wagers, and some bets upon the question gave rise to a curious trial in 1777, after which he wore woman’s clothes.

Ruin by the French Revolution, she found her skill with the sword of the utmost service, as it enabled her to get her livelihood as a fencing-master, or mistress; and at public assaults of arms, her name was sure to fill the room. With age, however, came falling powers and poverty; and at last the Chevalier died in New Milman Street, London, May 21st, 1810.

Fence with as great a variety of men as you can, of course, always preferring those who are better than yourself, and avoiding Ferrailleurs.

The Ferrailleur is a man who, if he finds himself “bested” confines his attention to longing whenever you attack, so as to bring on a mutual hit, which he loudly claims as his. The term, by-the-bye, is rather obsolete, so if the dispute vexes warm call him Ferrailleur! in a supercilious tone: it may inspire awe.

Whatever you call him, don’t engage him; or if you do, never thrust unless in strict opposition; and endeavour to draw out his longs by feints. But, take him any way, he is a nuisance.

No hit is reckoned unless delivered on the chest from the neck to the waist.

This rule has to be sometimes altered, however, as men will occasionally seek to gain advantage in a match by contorting their bodies, or covering their chests with their sword-arm, which receives the thrust.

The absurdity of such a proceeding is evident, for the foil represents a pointed weapon which would pierce both arm and breast, and a hit from which would “count” on back or stomach intelligibly enough. Poor human vanity peeps out in everything, and there are some men who never can acquiesce gracefully in the advantages gained by another.

Beaten at chess, their heads were aching, or their thoughts occupied by some important matter foreign to the game.

Worsted at billiards, they lay the blame on their bad luck.

Touched in fencing, they deny the hit.

There is an amusing anecdote recorded of the lesson once given to a gentleman of this kind by the Chevalier St. George, the elegant mulatto spoken of above as having visited England and fenced with D’Eon.

A Parisian maître d’armes was jealous of the reputation as a swordsman which St. George had acquired, and on meeting him one day expressed doubts of his skill, finally asking with a sneer where his school was. “Under the arch Marion!” replied the Chevalier, readily, “I will meet you there at six o’clock to morrow morning if you like, and give you a lesson.”

The maître d’armes did not much like the idea of a public performance in the open air, but he was afraid of losing reputation if he sought to back out, so he went to the archway at the time appointed, and found St. George, who had just left a ball, waiting with a friend, foil in hand.

They began, and at the first pass the Chevalier sent his adversary’s blade flying.

“What do you call it?” he asked.

“Not at all!” replied the other, greatly mortified; “I must break my foil on your breast first!”

St. George smiled, and observed that a crowd was collecting.

“Death and fury! Corbleu!” cried the maître d’armes, attacking him.

A few more passes, and the Chevalier hit him so full and fair, that the foil bent double and snapped.

“No touch!” cried the maître d’armes.

Instead of answering, the Chevalier drew out a whistle, and blew it.

“Hulloa, Ramonet, come here!” he cried.

Ramonet, the black servant who always rode behind his cabriolet, came out of a hostelry hard by with an armful of foils, which he laid at his master’s feet.

“What are all those for?” stammered the maître d’armes.

“To teach you, monsieur, with the help of these light blades, that we ought to be polite to one another, and never to deny hits.”

And before all the laughing crowd he attacked him furiously, driving him through the street, and breaking foil after foil on him.

“Is that all?” he asked, as a blade shivered. “Is that all?” till the poor man fairly turned and ran.

Men habitually fencing together have been known to make themselves such a nuisance with constant squabbling over their disputed hits, that other members of the same school have at last persuaded them to settle the question of superiority with tinsacks soldered on to the points of their foils, and fencing in jerseys.

On such occasions we believe that few, if any, touches have been recorded at all.

Some men are put off their play when they find themselves engaged with a left-handed fencer, but there is no real reason why they should be. All you have to do is to watch the hill, feel the blade, and attack where you see an opening. Keep cool, and you will find that the parries required are precisely the same as on ordinary occasions.

Have nothing to do with the charlatantry of the art, such as seeking to disarm your opponent, the volt or springing aside, etc. etc. Nothing pays like steady fencing, and the acquisition of the utmost rapidity.

There are indeed a thousand combinations and intricacies, which are to be learned by an apt pupil who has the rare good fortune to meet with a talented instructor, but the more haste the worse speed is as true of fencing as of anything else.

When mutual hits occur, the hit is reckoned in favour of the fencer making the attack, provided the attack does not occupy an unreasonable time in its delivery. When mutual hits occur between the remise and the ripost, the hit is reckoned in favour of the fencer making the ripost.

The faults which fencers have to guard principally against in loose play are, closing upon each other, overlonging, pressing on the longs, repeating the attack without regarding the opponent’s ripost, and drawing back the arm to deliver the thrust.

We will conclude with a few general rules, which will pay right well for careful attention.

Engage out of the immediate reach of your adversary, and always cross his foil, if possible, in quarter or tierce; but your guard must be relative in height to his.

If your adversary will not cross blades, threaten him with the point, but do not longe under such circumstances, that is, out of opposition, unless you have a very decided advantage over him in reach.

If he raise his point, beat sharply, and longe. If you are the taller, attack; if the shorter, trust chiefly to the ripost.

Do not be discouraged when you find your foil jarred and crossed in contradiction, from your opponent having parried in an irregular fashion. With a little practice, you will see how to avoid his blade, and profit by the irregularity.

Whip along the blade in tierce, or wrench over it from the
engagement of quarto, when the adversary engages with a straightened arm, or attempts to arrest the attack by extending it.

Disengage into the opposite line when the adversary attempts to beat.

Yield the wrist and blade to his action, without quitting his weapon, when he attacks by encircling the blade, for by yielding the wrist, the foil is brought round to the original engagement.

Beat or wrench before riposting, when the adversary rests upon his longe.

Regain the position of defence immediately after the longe, whether successful or not.

Feign the semblance of disengagement, in order to observe your adversary's usual manner of parrying, so as to plan an attack upon him.

If he tries that upon you, adopt some particular parry in order to draw an attack founded upon it, which you will then be prepared to meet and turn to advantage.

All disengagements made under the wrist are more dangerous than those made close along the blade. It is easier to cut over the point when the adversary's guard is low and his point high, and your forte therefore near his faible. And it is easier to hit with a disengagement when your point is near his forte.

Watch good fencers whenever you have a chance.

THE MAGIC LANTERN.

BY SAMUEL HUGHLEY, F.G.S., &c.

SHADOWS—OMBRES CHINOISES—SHADOW PANTOMIME.

SHADOWS supply a varied source of amusement, whereby dreary winter evenings may be whiled away. Thus, we may produce hand shadows, shadows on the wall, multiplied shadows, moving shadows mechanical and human, such as the "Ombres Chinoises," and "The Shadow Pantomime."

Beginning with the most primitive method of producing shadows on the wall, we will see what may be done by the dexterity of our hands. Thus, we may produce shadow representations of the human form, beasts, birds, reptiles, fishes, etc., by the proper disposition of the fingers, the interlacing or overlapping of the hands, and the lengthening or foreshortening of the projected image, by placing the candle or other source of light to the right or left, or centre of the

readers to produce shadows of "The Curse" (Fig. 1), a fox (Fig. 2), bull (Fig. 3), rabbit (Fig. 4), goose (Fig. 5), crocodile (Fig. 6), snake (Fig. 7), and fish (Fig. 8). It should be observed that while in the fox (Fig. 2) means are taken to lengthen the image, by placing the candle behind the wrist; in Fig. 3, which

Fig. 1.

represents a bull, the fingers are curved, the palm turned inwards, and the candle placed before the wrist, so that the animal represented may appear in the shadow, with the muzzle naturally foreshortened.

Again, in the snake (Fig. 7) the fingers are kept flat and well behind each other, with the thumb curved, while the entire hand is rotated on the wrist, till the flat-headed character of that kind of reptile is depicted in shadow, the artificial aid of cardboard fans and a forked tongue adding greatly to the correct aspect when an undulating motion is imparted to the arm.

The eight subjects figured on this and next page may be taken as types of manipulation, and, with a little ingenuity, these may be varied to a considerable extent. I would here warn my readers against troubling themselves to imitate many of the impossible designs figured in some of the cheap shadow sheets, which, like "Peter Pindar's razors," are made to sell.

Fig. 2.
Riding.

By W. T. Bradwood.

FIRST PRINCIPLES—MOUNTING—THE REINS—SADDLE—STIRRUPS—WALK—CANTER.

All uses to which the horse may be put for the benefit of mankind that of the saddle has the pre-eminence. Driving should be a part of the physical education of every English lad, but still more so should be the art of riding.

Education for the saddle should precede, if possible, that of harness—for horse as well as man.

The former thereby is better mastered and taught his places; the latter learns to acquire nerve, control, and an insight into the ways and temperament of the animal under his charge.

What may have been the relative merits of England in the matter of horsemanship before the introduction of the thoroughbred we cannot practically determine, but at present, thanks to the turf and fox-hunting, she is fasci' princeps in the art. Whether in the sandbox or the cross-country seat, no Continental nation can show a horse to her; and when foreigners aspire to emulate the English turf, they are fain to retain the services of English jockeys and English trainers before they consider that they have the smallest chance of success.

France, though etymologically the birthplace of the chevalier or cavalier—who takes his title from the animal he mounts—can in these days display but a burlesque of horsemanship; and though one or two Continental nobles air their jockeyship with passable credit annually at Baden-Baden and such réunions of Continental racing, the whole force of foreign gentlemen who have the smallest pretensions to horsemanship would not compare with the first flight of the least pack of foxhounds, in Great Britain.

Even in the East, the birthplace of the horse, the natives, though in Arabia and Tartary fairly at least at rough riding and all more or less at home in the saddle, have no chance either on the flat, and still less cross country, with the elites of English horsemens.

Feats such as travellers relate of Arab horsemanship, of riding bare-backed steeds, picking up a lance from the ground at full gallop without dismounting, are after all more specimens of gymnastics on horseback than of real horsemanship.

Englishmen do not waste time in the practice of such mountebank tricks, unless for professional exhibition at a circus. And of the exhibitions at such a place, who perform their feats before a wondering audience, jumping through hoops, or balancing themselves on one leg upon a bare-backed horse equally trained for mountebank performance, the best would be at sea in the first half mile to hounds, or would be floundering all over the place in a flat race.

It is not with such tricks that we intend to deal here; but in good sound English horsemanship for English purposes—from the education of a child for what may be termed ordinary "domestic" horsemanship, to the practice of an aspirant for stoople-chose honors.

A child may begin to learn riding from the time that he has mastered his first spelling-book; but though the education may be thus early, it should not be taken to any excess, or it may stunt or deform physical growth.

Within due bounds it is not only healthful, inculcative of nerve and self-reliance, but valuable in after life. A boy that spends too many hours in saddle instead of running after hoop and ball, and using his muscles all round, will stunt his growth and deform his legs; and a girl may similarly cripple her growth, and contract a crooked spine.

With growing girls it is an excellent and safe practice to make them ride alternate sides upon a saddle constructed to shift its pommels either way, thus preventing them from cramping the subtle growing frame in any stunted one-sided posture.

First let a child learn how to take up the reins before mounting. They must be held in the left-hand, knuckles uppermost (not undermost, as in driving); then (if a single rein) divide the reins with the middle finger, the off- or right-hand rein passing between the middle and forefinger, the near or left-hand rein between the middle and third fingers, the thumb clenched below where the rein passes out through the top of the grasp.

If a double rein, let the snaffle be first taken up in the way just described, and then let the curb reins pass in a similar way on each side of the third finger; let the loop of the reins come out below the thumb, which thus divides the reins distinctly, so that the rider can discover which of the two to tighten when required, by drawing them through his left hand by means of the right. Then, with the reins in the grasp, it is safe to mount (or to take a hand up, if a lady or a lad too small to reach the stirrup.)

To mount, for a man, in the orthodox manner, place the left-hand on the pommel, then the left foot in the stirrup, then the right hand on the group of the saddle, and with a spring from the right foot, still on the ground, rise and settle in the saddle. Such information seems almost ludicrous in book work; and it is in case any aspiring reader should be really in the dark, and ashamed to display his ignorance, that we go into minute preliminary detail.

With a beginner it is best to give the earliest lessons without stirrups, this teaches him to use his lower limbs to cling to the saddle, while a man walking beside him can lend a hand to steady his balance if required. The canter (though an artificial pace in the horse) should be the first alteration of pace from a walk.

During early walking lessons let the pupil keep the toes in, the leg flat, the knee tight to the saddle, gripping the saddle with the side and not the back of the calf, as well as with the knee and lower portion of the thigh.

*The body should be square and upright, not stiff, as if a poker had been swallowed, but playing from the hips with each motion of the animal; shoulders square, not slouching; left hand down, just close to the pommel, right hand holding the whip (but uppermost), just in front of the right hip, ready either to use the whip if required or to aid the left by drawing the reins through the grasp or strengthening the pull when wanted.

A few days' walking practice, especially without stirrups, will do much towards bringing into play those muscles which give the power of grip on the saddle, and towards teaching the limbs instinctively to adopt the postures above indicated.

Now begin to use the stirrups. For ordinary riding do not thrust the foot "home" in the stirrup, up to the instep, but rest the ball of the foot on the bar of the stirrup. By this time, having learnt something of the grip of the saddle, the pupil will feel what length of stirrup he requires—and will first settle his grip, and then adapt the stirrup to the position of his foot.

If he has begun to learn with stirrups he will depend on them
from the outset, and ride either too long or too short (most
probably the former), and not having been obliged to rely upon
his grip, will take months, or even years, in feeling, if ever, what
position his legs gives him most power over his seat.

Riders who begin to ride with stirrups usually find that they
require to shorten their stirrups periodically, as they gradually
acquire a grip, with limbs more or less contracting in position
as they acquire the right use of them from day to day. Their
seat is thus continually shifting; and they no sooner think they
have acquired what they want, than they find that they can improve
still more with a shorter leather and consequently
stronger grip.

All this time is wasted, and the seat often spoilt permanently,
by allowing the grip to follow the stirrup in the first instance,
instead of making the stirrup follow the first acquisition of grip.

And now, with confidence inspired by the acquisition of grip
on the saddle, and with the feet in the stirrups, heels down,
toes out, it will be time to progress to a canter.

If the pupil be a child the teacher should ride or run along
side with a leading rein attached to the pony, in case the rider
should lack strength to restrain the pace, and pull up when
wished. Sit well up, "give and take" with the back at each
motion of the animal; keep the knees tight, and hold on by
themselves, do not seek to support the body by the rein—
which is meant to guide the horse and to support him in ease of
either step, not to support the rider.

By letting the body play gently from the hips with each
motion of the horse, that unsightly bumping up and down upon
the saddle, so conspicuous in the horsemanship of a "Moscowi,
will be avoided.

The trot, though a more natural pace to the horse, requires
for the sake of comfort, a less natural motion on the part of
the rider, and is therefore best postponed till the latter has
begun to feel more at ease at the paces of walk and canter.

In pulling up his horse from the canter be will always find
him subside into the trot as a preliminary to the walk, and
vice versa in most cases in commencing the canter. The bump-
ing up and down upon the saddle which even those few steps
at the pace engender, will at once enlighten him as to what to
expect when regularly adopting that pace, unless he learns
meantime to "rise in his stirrups." This means that his legs
should play from the knee joint in time with the trot, i.e.,
with each step of the horse—thus raising the body up above
the saddle as the horse makes one step, and lowering lightly to
touch the saddle just as he strikes the ground on the next step.
A very slight motion suffices, and it facilitates this motion, both
for man and horse, if the rider lets the small of his back play
in slightly as he rides, thus carrying his chest forward with the
rise, and bringing the centre of gravity (which before lay over
the back of the saddle when sitting still) forward so as to fall
more over the line of the knee and foot. If the rider neglects
to do this, the centre of gravity, being over the seat he has
just vacated as he rose from the saddle, causes the body to
hang back, and either lays undue strain upon the legs to lift it
up, or, far more likely, tends to make him remedy his balance
by the pernicious habit of supporting himself with the reins.

This play of the back should be very slight, and naturally
done; not a mountebank sort of bobbing in and out of the
stomach, but an easy and elegant play of the muscles of the
loins, giving and taking with the action of the horse, and thus
varying the position of the centre of gravity according to which
part of the body at the instant supports the most weight. A
practical illustration from an elegant horsesman would, however,
explain more in half a minute than this description can convey
to a tyro.

The rider must rise first sufficiently to allow for this play of
the centre of gravity; but he must not exaggerate the action
into a stand up and sit down again between each step of his horse.
The feel and play of his own muscles must guide him. As
before, a careful notice of the action of a good horsesman will
at once open his eyes practically to what here on paper may
seem a rather puzzling theory.

EGG-COLLECTING.

BOXES continued—BLowing—IMPLEMENTs—To watch incubation.

 Boxes of about the size we mentioned in our last paper
can be had of any collar and artificial-flower box
maker, at about five shillings per dozen, or they are
easily made. The wool used should be plain white: pink wool
is an abomination, it wearies the eye and often gives an egg
the appearance of being of a different tint from the true one.
In case the wool should sink down, owing to cold or damp, so
that the eggs become loose in the box, a warm before the fire
once every few months will swell it up in an instant.

When we first began collecting the system of blowing had
not got beyond the simple one of making a hole at each end
with a pin or a thorn, and so expelling the contents. This did
very well for small eggs which might happen to be perfectly
fresh, so that the holes need not be visible; but, for eggs over
so slightly incubated, the hole, at one end at least, had to be
enlarged; and if there was a chick inside of any size it was
generally hopeless to attempt to save the egg at all: in any
case the large hole at the end greatly disfigured its appear-
ance.

The next improvement was a very slight one, and consisted
in making both holes at the same side instead of at the end; by
this means they were invisible when the egg was placed in the

The plan now adopted is so simple, and possesses so many
advantages, that, like everything else, when we know it, from
the time of Columbus and his egg trick till now, the wonder
was that no one had ever thought of it before.

A single hole is made in the side of the egg with a proper
drill, or even a nail—anything, in fact, that can be trusted to
make a neat, unsplintered orifice—the fine end of a common
blowpipe such as watch-makers use is then introduced, and by
blowing through the other end, the contents will be expelled
and come streaming down the curve of the tube. For
traveling, of course, metal blowpipes are less liable to damage than
glass ones; but for home use, and especially when a large
number of eggs have to be blown, we should recommend the
latter, as metal tubes have a tendency to make the lips sore
after a time; and any one who has blown a hundred or so of
sea-birds' eggs at a sitting will find his mouth tired enough
without any additional troubles.

These blowpipes (Fig. 5), with drills (Figs. 1, 2) and other
implements, may be purchased for a very trifling cost at any
bird-stuffer's or dealer in natural history specimens in London,
and many of our principal towns. At the same time we must say that we are surprised to find how little the blowpipe system is known to many small collectors in the provinces, and for that very reason we have described it rather fully.

The orifice can be made of any size, though, of course, the smaller the better, as the egg may have to be taken up at some time to look at the particulars or reference number written upon it (of which we shall speak later on), and, then, a rough large hole has an ugly appearance, besides weakening the structure of the egg itself.

After blowing it is well to draw up a little water in to the blowpipe, and so rinse the egg out quite clean; it should then be placed with the hole downwards on a cloth to drain and dry, and especially whilst this is going on it should be most carefully kept from the light, otherwise the colours will fade. Continued extreme light is always prejudicial to eggs of colour, but when the inside is drying, a few hours will produce an effect which weeks would not cause at a later period, and, even with every precaution, some eggs fade terribly, and all do so a little in course of time. Blue eggs are especially liable to this, and where it is practicable, as with hedge-sparrows, thrushes, etc., we make a practice of renewing our series each season.

A bent wire may be made useful for extracting the embryo, and a pair of curved scissors (Figs. 3, 4) may be advantageously employed in cutting up any well-developed chick, but our young collector will but rarely meet with any egg requiring such surgical treatment at the commencement of his career.

In some works will be found instructions for more advanced collectors, and both illustrations and descriptions of the instruments that may be required for the finer operations of oology; but such a formidable array may possibly frighten our neophyte, and we have for the present limited ourselves to the enumeration of the few simple articles which we consider necessary, viz., a blowpipe, a drill, and a piece of wire. And as regards the "needful," we can confidently assert that there are, and need be no better blown specimens in any collection than some eagles' eggs which, under pressure of circumstances, we emptied by the aid of a round-pointed knife and a common tobacco pipe, the only implements we at the moment possessed, for on that memorable afternoon we had not the slightest idea of the luck that was in store for us.

But we admit having had a good deal of previous experience, and the moral we draw is—never from the first day of March be without your drill and blowpipe, as, when blown, the risk of breaking eggs is very considerably diminished.

Talking of risk reminds us of another danger to be obviated, and that is the chance of an addled egg bursting the moment the drill opens a passage for the foul gases within the shell, the result being an explosion, and a bespattering of one's clothes and person with a most unsavoury perfume. To avoid this, always hold a suspected egg under water whilst you make the first incision, although, as a general rule, the less sound eggs have to do with water the better, a great deal of the natural colour of many being easily washed off, and in any case the bloom of the surface is destroyed by washing, as that of a plum is by handling.

For those who enjoy the advantages of having large gardens or enclosures where there is little risk of intrusion from outsiders, there is a capital plan, easily carried out, for observing the nesting habits, period of incubation, etc., of such species as are partial to holes either in hollow trees or walls. The idea is based upon the tydlar, or bird-boxes, largely used in many parts of Scandinavia, for ducks and other birds to nest in; and for many species it would seem that any box, like one for pigeons, fastened up to a tree or a wall would be sufficient; but these
are hardly so well adapted for daily observation as the plan we are about to suggest, and, besides, there are some species much more suspicious of novelties than others, and loath to avail themselves of the facilities afforded them by such patent devices as cigar-boxes nailed to the wall, with a round hole cut out of the side for the bird to go in and out. Still, in spite of their artificial appearance, it is wonderful how soon even cigar-boxes will be taken up; but the collector must not be astonished if these "lodges to let" are not immediately snapped at.

For tits, and such like wall-nesters, it is no bad plan to remove a brick in an old wall, and insert in its place a wooden fac-simile, with a hole cut out, or if you can get a piece of wood with a knot in it about the size of a florin, and knock out the knot, so much the better, as the hole will then look much more natural.

Of course there must be sufficient space behind the wooden plate for the bird to make its nest, and a small piece bevelled off or scooped out will enable the collector to insert his finger-nail or the point of a knife, and remove the wooden plate in an instant, leaving the whole of the nest visible.

Visits to the nest should not in any ease be too frequent, nor made when the bird is on the nest, as otherwise she will probably desert it; but custom will even reconcile her to this, and we have seen a blue tit sitting peacefully on her eggs after the false brick was removed as composedly as any cage-bird.

But for observation without disturbance the following is the best plan we know:—Procure a stump or log, sufficiently hollow in the centre for a part of its length to admit of a nest; fix it up anywhere, with the solid portion downwards, and cut in the hole, a little above the solid part where the nest is to be, a round hole (A) for the bird to go in. The upper part of the trunk, from the nest to n, being hollow, you put in a plug or cork to exclude the light, sir, and rain from above, at the same time that by removing the plug you will, by the light from the orifice A, be able to see hereafter if the bird is on her nest or not, without disturbing her. Now saw through the log from B to C, make a small leather hinge at C, and a small fastening of leather or string at B (any loop over a nail will do), and you have a rude box, so much like a natural trunk that there will be no difficulty whatever in finding a tenant for it immediately. And it is astonishing how many species of birds, not usually hole frequenters, will avail themselves of these hollow trunks when provided for them, especially in a neighbourhood where there is an abundance of cats, those terrible enemies of small birds. Since we started this system, the increase in the number of our feathered friends is a source of great enjoyment to us. In our neighbours’ gardens scarcely anything is to be found breeding, owing to this feline plague; but puss is powerless against this ballot-box system, although she may still manage to pounce upon an unwary individual of the newly-fledged broods.

We know no plan which so well enables us to watch the periods of incubation, the changes of the young from day to day, the amount and the nature of the food which they require, and other details of bird economy; and until our readers have tried it, they can have no idea of the pleasure in store both for themselves and for their friends, who will soon be found to take a lively interest in visiting the homes of birds which before they hardly knew by sight; indeed, we have had to limit our "show-days," for fear of disturbing our pets beyond all endurance; and to say "no" to a pretty face and a pair of pleading eyes demands a great deal of moral courage. So the advice that we give to our readers is to start bird-boxes or logs as soon as they possibly can, for the spring season should not be allowed to go by without; besides, the birds will require a little time to look at the outside before they attempt to venture inside, just like the higher class of bipeds, when on the hunt for lodgings.

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CRICKET AND CRICKETERS.

By C. W. Alock.

BOWLING—MORE WORDS ON BATTING—THE CUT—HOW TO LEARN THE ART OF CUTTING—TOM HUMPHREY, CAYFYN, AND CARPENTER—TIMING THE BALL—THE HALF VOLLEY.

Much depends on the curve or spin that is imparted to the bowling, and your style of play will have to be so suited as to best frustrate the craft of the enemy who aims at your destruction. The intentional bias given to the ball in its passage from bowler to batsman must cause, at any time, more discomfort than is occasioned when no deflection arises from the course of the ball, as obviously with a spinning ball the batsman has a double risk to imperil his safety, in the pitch as well as in the deviation of the ball. The caution that I have before given you, to play steadily at first until you have become used to the peculiarities of the bowling, will help you here too, as you will soon be able to make allowance for the twist imparted to the ball, and you will be able to meet the bowler at his own game.

A left-handed bowler usually may be expected to break, or twist, from the off to a right-handed batsman, so that a rule may be granted as conclusive on this point, and you will at least have your weapons ready to your hand for this emergency. It will be like the telling of an old tale to some of you to reiterate the fact that with any of this style of curvilinear bowling, the
THE POPULAR RECREATOR.

great secret is to meet it and remove its sting before it has a chance of inflicting deadly injury. If you allow the ball to touch the ground, you give it an opportunity of indulging in its revolutions, as a billiard ball gains fresh gyrations the moment that it touches the cushions. You must "smother" it before you allow it a field for the practice of its vicious purposes, or you must play back, and rob it of much of its offensive action by the defensive policy of protecting your wicket with the full width of your bat. To smother it, though, you must see that you do not overdo matters, for if you have the slightest hesitation or doubt, I would advise you to play back rather than endanger your position by an erroneous idea of forward play.

I am not going to enter into elaborate details or repeat mathematical truths respecting the angle of reflection being equal to the angle of incidence, for a batsman will soon discover for himself the necessary laws that will guide him in respect to these matters, without the interference of abstruse arguments, however reliable and apposite they may be. You must meet the ball before it can rise so as to touch the shoulder of the bat, or you will lessen considerably your chances of success. Estimate, if you can, an angle of 45°, and you will find the best limit to guide you in holding your bat so as to avoid the catastrophe of a catch. Even then, you must keep your blade well forward, so as to prevent the possibility of the return of the ball into the hands of the bowler, with the object of keeping it as much as possible on the ground and out of the clutches of the eleven hungry fieldsmen who seek to secure your fall.

You will discover, in a very short time, the difficulties that surround you on this one point, so that you will not wonder at the careful manner in which I am seeking now to instil into your mind the best principles to be studied to achieve success.

In playing forward, too, you must look well after the possibility of the insidious "shooter," as that ball is termed which hugs the ground and at times settles the pretensions of the most accomplished as well as experienced batsman. What a category of errors has this same shooter had to answer for since the institution of cricket! Did you ever know a batsman who did not ascribe his collapse to this much-maligned "shooter," when the ball has hit the stump far nearer to the ball than to the base of the wicket? I should like to see every accident attributed to the shooter inscribed in a volume, and then calculate the number of victims who have unjustly maligned and wofully injured this same ill-omened species of ball. It may be that to some there is apparently no disgrace in having to succumb to a shooter; but the very fact that this excuse is made is sufficient to prove that the apologists themselves have not maintained their bat in that absolute perpendicular which is rightly said to be the main essence in the art of batting.

It is possible that some of you would like to play cricket with shooters omitted, on the same principle that some less expert players at billiards prefer to have the spot stroke barred; but you forget that the more the odds against a long score, the greater the glory of the achievement. Do not grumble at giving the bowler one chance more in a game where, of late years, he seems to have had a little the worst of the exchange. The most enjoyable feature of cricket is its glorious uncertainty, its varying phases, its multiplicity of incidents, its prevalent habit of occasionally upsetting the calculations of skilled prophets in the most tantalising manner. Why, it is this same eccentricity of cricket that at times puts the bad player on a par with, or in a position superior to, him of great attainments; so that there is some consolation for you after all. Only let the shooter have fair play when his time comes. He may do you many a good turn if you treat him well.

I fancy that by this time not a few of you are of opinion that I have written sufficient to demonstrate clearly the different phases of batting, as well as to show the principal measures to be studied in the opposite systems of attack and defence. You must remember, though, that there are many little intricacies in the method of handling the bat, which are essential to the entire development of a scientific display of cricket. In hitting a ball hard, or "driving," it, to use the recognised expression, you have by this time been tutored with patience enough to render you so far a perfect batsman, but you still have a few miles left before you can hope to reach the end of your journey. You have still to learn the art of "cutting," as the action of hitting a ball by means of the wrist is usually denominated. You have still to learn one of the most effective hits in the possession of an expert batsman, and you can never hope to attain your diploma for the college of batsmen, unless you have to some extent mastered this great necessity. To see Cañyn cut, in the palmey days of the brave old County of Surrey, is a treat still for the statisticians of cricket to recall with recollections of wonderment as well as congratulation. To see Thomas Humphrey, of the same eleven, perform the same stroke with as much precision, but with hardly an equal amount of elegance, was an event that cricketers who have now doffed for ever sock and buskin, love to revive with pleasure and delight.

I can recall as vividly as if it were but yesterday, the first appearance of Jupp and Thomas Humphrey—two professionals whose brave deeds for the County earned for them the distinctive title of "the Surrey boys"—at Sheffield, on the occasion of the annual contest between the important shires of Surrey and Yorkshire. It was a sight to gladden the hearts of those genuine sport-loving Yorkshiremen to see cut after cut from those Surrey experts, in spite of every precaution and device that could be conceived by the Yorkshire captain, and in spite of the best bowling that was then at the disposal of the larger county. To see fieldsmen after fieldsmen removed from other positions to strengthen the circle that was placed to prevent these brilliant cuts, and the batsmen still plying their work as merzily as if there could be no danger to fear, was something that the Yorkshiremen had never seen before and will never see again. "You may tell them," said a genuine northern enthusiast, "that I will give them ten pounds if they get 100 runs before they part." It was not a rash offer, for he knew them well, and they were not separated until they had scored forty-nine in advance of the number required.

Much of the efficacy of this hit depends obviously on the batsman's strength of wrist, but even with this faculty no great success can be achieved unless the eye be quick and the judgment ready to time the ball well as it rises from the ground.

There are two methods of cutting, known respectively as the "forward cut" and the "late cut," though the latter is the most efficacious as well as the most elegant, and likely to confer the greatest honour on the rising batsman. The forward cut resembles more the ordinary drive to the off, with a slight infusion of wrist, and indeed at times it puzzles the most learned observers whether to characterise those hits that pass just in front of point, as cuts or drives. You cannot mistake the true cut, though, for it is different in every way, and, moreover, its own special brilliance prevents the possibility of its identification or confusion with any other stroke. Watch any batsman who has acquired eminence in his profession, and it will not be long before you see the ball spinning with a velocity that you could hardly believe it capable of, through the slips, careerling past long-slip, and giving him a run, for which he is—\(\text{you can see he is—extremely grateful. If you have taken the}\)
trouble to watch minutely, you will have discovered the precise method in which this graceful stroke was accomplished, and you will be able to try a little of the same species of strokes on your own account. You will find that it will take time to achieve, just as surely as many other lessons that seemed as simple; and, so, I would advise you to set to work with energy, and continue resolutely until you have overcome the difficulty.

If you can learn at all from written precepts, you will do well to study the position that I give. Take notice that in this hit the relative uses of the two legs are reversed. To realise the cut proper you will have to make your left leg the pivot instead of the right, as is usual in most of the ordinary hits, and the right will have to be used, as occasion requires, to promote the correct timing of the ball. You will have necessarily to follow, as it were, the course of the ball, or rather to face it as you are in the act of hitting. I have told you that much of the secret of cutting consists in the judgment with which the ball is timed, and a few trials will convince you of the correctness of this assertion. If your eye and mind act well in concert, you need have little fear of failure, and practice will further enable you to make sure of your aim. It may be that you will never be so proficient as are some who have become almost representative batsmen by reason of this one hit; for to cut brilliantly demands that you should be able to calculate the time and rise of the ball to the nicest nicety, and flexiblity of wrist more than the possession of anything like herculean strength. It is a stroke, none the less, that you should cultivate and endeavour to master, although there are even reasons why it should be administered with caution and never abused.

There are some who will argue that much of the success of the batsmen who have identified themselves chiefly with the cut in the establishment of their reputation, is due to luck, and that cutting is managed rather by guess work and a certain amount of fortune in estimating the probable rise of the ball than by any genuine principle or any real calculation. They have a good case, too, in this respect, although on the other hand in cutting there is opportunity for just as much accuracy in hitting as there is in any other stroke on the list. It would not be cricket if everything could be reduced to an absolute certainty, so you must take your chance in this hit too, and approach as near as you can to the perfection that is unattainable.

You will find here that a heavy bat will seriously interfere with the success of your efforts, so do not be misled by the idea that an addition of a pound or two will avail to give you any advantage over the rest of your fellows. I know some young players who seem to think that it adds to their renown to wield a bat that more sensibly plodding souls reject on utilitarian principles.

In cutting you want a bat that you can raise with ease, not one that will cause the tendons of your wrist to ache for a week afterwards. You want a bat that you can command, so that you can slide your hands, if required, to the very end of the handle, for you will discover that sometimes you get a ball so wide that your fingers itch to smite, even under the direst risks, and your hands will insensibly glide along the handle until you have got the bat stretched to its farthest limit. It is the ball just outside the off stump, though, that you will find most available for cutting; and if you time it correctly you will marvel at the rapidity with which it glides away, twisting like a serpent, and leaving behind it a track such as no other style of hit has the power of producing.

There is a great consolation for you in learning this same secret of hitting, that even if your physical powers be less marked than many of your fellows, you will not be placed on any inequality in this respect. Some of the most noted instances of famous cutting have been batsmen of insignificant stature, so that you need not be deterred by any want of muscularity. Thomas Humphreys was as short as possibly a herculean figure could well be, and yet he was never excelled in brilliance of cutting. Caffyn was only a few inches taller, but his cuts are still quoted as the very quintessence of elegance and skill in batting; and Carpenter, whose fame was hardly inferior to those just mentioned, cannot be accused of possessing a herculean figure or any great excess of physical development.

It may be a theory open to contradiction, but I question whether, as a general rule, batsmen of inferior size do not excel in cutting, from the fact that they have such a disadvantage in length of reach as to make forward play and driving less within their sphere than within the scope of batsmen more gifted in size and dimensions of arm. So be of good cheer, Lilliput and Small-frame, and I warrant you that you will outdo Maximum and Hugecorps with the greatest ease, however deficient you may be in the matter of muscular advantages.

I want you to learn to time the ball first, for in this one point lies the real secret of all the brilliant hitting, either in the past or the present. Time the ball, then, so that you can calculate its course with sufficient certainty to know that it will bound well to the off; you will instinctively draw back as if you were preparing for the first attitude in fencing, and the bat will be raised up, straightened horizontally, instead of perpendicularly, as in the common order of events. You had better allow the ball to pass you rather than be anxious to anticipate its arrival. If you let fly too soon you are liable rather to retard than assist its progress, and unless the ground is such that the ball comes accurately to you, there is a great likelihood that you will find yourself placed in the ignominious position of succumbing to the dexterity of the fieldsman at point.

The manner in which you hold your bat, too, must be studied, or else you will inevitably be caught at long-slip, should the ball be suffered to rise to any elevation after its contact with the bat. Do not disparage the force of this advice, or you will suffer, believe me.

Do not forget to hit with the blade of the bat turned slightly downwards, if you wish the ball to skim along the ground instead of soaring to the sky. If you fulfill this injunction, and wait well for the ball, timing it with any degree of accuracy, you will have the satisfaction of witnessing the ball glide on its sinuous track, behind point, with a velocity that seems inexplicable. It will be useless for long-slip to attempt to prevent its passage, for it will be well out of his reach, though the glory of following it until it has realised four or perhaps six runs, will surely fall to his lot.

If you can cut well, you will have overcome one of the most difficult strokes that you will have to perform, so persevere, and do not despair, if you have to wait for success.

I warn you that an expert cutter is as rare as the Dodo or the Black Swan, so that you will have to bide your time if you are ambitions enough to aim at perfection in this graceful hit. The gods look down on a brave man struggling with adversity, and smile. The reflection may console you in the midst of your afflictions, so take it for what it is worth. "If at first you don't succeed, try, try again." There is another trite aphorism that may incite you, in that the race is not always to the swift nor the battle to the strong. You can cut, neatly, the puniest of you all as well the strongest; you will, too, with the best, if your heart is in the task.

Possibly the earliest ball in the experience of a cricketer is
that which is professionally known as the "half volley." The easiest, I affirm, provided that your bat is not out of the perpendicular.

Aye, there's the rub! Not out of the perpendicular! You will have to assume that every ball will come straight to the wicket, or you will feel the consequence. You have been ill-grounded in the requirements of your profession if you fail at this juncture. If you are always prepared for a straight ball, you will be better armed against the eventuality of one out of the direct line, and you will delight in the satisfaction that at least you can bend your body to a mighty heave, with the consciousness that even in case of failure your wicket will not be improperly exposed. With the half volley that aims directly at your middle stump, you will have to be cautious lest you play at all tardily, or run the risk of falling to the pernicious shooter. To some the half volley acts with the same effect as does a red rag on a bull. They will tell you that they only want one nice half volley at the start, to have their fortunes made for life. If you believe them, you will be under the impression that they only require this same ball at first to lay the foundation of a gigantic score. You may give them just what they desire, and it is not unlikely that their first hit transports the ball into another county. You give them a second, possibly of the same description, and there is the same great sweep of the arm, the same audible whirr of the bat, but the ball is this time not so mercilessly treated, and there follows that ominous rattle of the bail, which has sounded the death-knell of so many a cricketer. The ball has been slower, it may be, or their bat has been less straight, or the course of the ball has been too swift for the bat. You may be certain that they will have seen plausibly excuse in the ground, or other ingenious subterfuge; but you can attribute their fall, if you are versed in the game, to one or other of the fellings given above.

Do not be shocked if you find the veracity of the gentle cricketer a little out-of-bounds. You will soon get used to the excesses of the professed apologist. The cricketer is not yet born who is frank enough to acknowledge his own shortcomings, so you need not be on the alert for a discovery. Show me a batsman who ever recognised the justice of his sentence, when the umpire discharged him as having his leg before the wicket, and I will own a model cricketer!

"Why, the ball broke at least two feet!" I fancy some of you may have heard the retort of the dethroned one before.

Only prove to me the existence of one single performer honest enough to avow that he was out when a sharp snick at the wicket caused his dismissal, and I will recant all the heretical opinions that I now hold regarding the slight morality that pervades the whole of cricketdom.

But how fares the volley in the midst of all this atmosphere of excuse? I have told you that it should be the easiest ball of all to the expert batsman, and you will soon find that such articles are rare enough when you have reached the sublime altitude of one of the chief matches of the season. You will have too, to expend some judgment in achieving this hit, and you will have to depend greatly for your success on the decision with which you strike.

You must understand the half volley proper to consist of a ball pitched so far up to the batsman that he can reach it easily, without inconvenience, as it rises from the ground. It is the most brilliant, the most effective, the most many of all hits, if you have acquired the art of hitting it as it should be hit. You can put every particle of strength at your disposal in the manipulation of the half volley, and the firmer the stroke, the more accurate the timing, the greater the success that will attend your inspiration. The very idea of a half volley, to some batsmen, is enough to revive recollections of giant strokes that would seem incredible.

I wonder how many times it has been my fortune to see Mr. W. G. Grace revel in the half volley, or how often that prince of hitters, Mr. C. J. Thornton, ex-captain of the Cambridge University Eleven, has made history by the achievement of hits that have never had a parallel in the annals of the game!

It seems but one huge uprising of the whole frame, with such mighty batsmen, and the ball has sped into the next county, regardless of limits and boundaries that are sufficient to restrain the ambition of all ordinary mortals.

To make the half volley tell thoroughly it is essential that the ball should be hit at a certain time. You must judge the pitch so far accurately that the bat must meet the ball before it has a chance of rising abruptly, or to any height from the ground.

I need hardly tell you that any sudden rise of the ball will spoil the whole of your plans, so, on this ground alone, you will have to use all necessary caution.

There are other reasons, though, as weighty; and unless you allow the bat itself full opportunity for giving its best help to the force of the striker, you will find the impetus given to the blow greatly reduced. See, then, that the ball and the bat meet under circumstances most favourable to yourself, if you enjoy the enviable position of batsman.

You had better refrain from the hit altogether, and be content with playing the ball, unless you can make good terms for yourself. If you have made up your mind, and are bent on striking, get your body well set, so as to give a good swing to the bat, and avoid irresolution, of all things. A determined hit will often prevent a downfall, even if the ball should be thoroughly miscalculated, when a tamper would lead to inevitable rain.

The same remark applies equally to the half volley, whether it be on the off stump, straight to the centre, or directed towards the leg stump, though the circumstances may have to be slightly altered. The ruling principle is alike in either instance, that the ball should not be hit otherwise than at a certain height of the bat. Avoid hitting it too low on the face of the bat, for much of its rebound will be lost, unless it is allowed to get slightly above the level of the ground. Be equally cautious, on the other hand, against its contact with the bat above a certain height, as if it be straight, there is a chance that it may be seised by the bowler, or if it be on the leg stump, that in hitting you may give an opportunity for a catch either to short-leg or to long-stop. The intermediate course will be most serviceable, as you will soon discover. If you time the ball so that it meets the bat at about one foot from the bottom of the blade and just as it has risen about six inches from the ground, you will instil terror into your foes by the venom of your hits. You will astonish yourself, too, when you witness the herculean sweep that results from this same extension motion on a large scale. Only do not jump to the conclusion, in a moment of self-satisfaction, that every ball is a half volley, or your fate will be sealed. You will have another such opening soon enough, if you only wait patiently and resist temptation.

The memory of one half volley, treated as it should be treated, is pleasant enough to last some of us a life-time, so do not be disheartened if the impetus at first seems hardly enough. The recollection of one half volley, when George Anderson, of Yorkshire, was able to make a clean hit for eight runs on the Oval, still haunts me as if it were but the other day. So, half volley, hit of hits, I wish thee well!
HOME PETS.

BY W. A. BLAKSTON.

AVIARIES—OUTDOOR—INDOOR—THE BEST FORM.

Before crossing the threshold of the canary-room proper, I must notice one mode of canary breeding which, with some, may be considered the method, though fanciers of high-class birds ignore it, for reasons which must be patent to the deserving of a place in a treatise professing to be exhaustive in its application as any other method. It may be regarded as separate and distinct from cage management, but inasmuch as it is not the recognised thing among most superficial observer. Still, it has its charms, and is, in its way, very attractive, exhibiting the bird in a nearer approach to its wild state than when restricted to the confined limits of the breeding-cage. I refer now to the breeding of canaries in a large aviary, either indoors or out. Understand clearly, I do not wish to decry the aviary system, which, as one mode of bird management, has its advocates and is as much those who bred for defined excellence and the show-room, and is manifestly unsuitable for such a purpose, it cannot be recommended as a means of obtaining such; and I refer to it, therefore, for the sake of giving information to those who, without caring to enter very minutely into the details of what is and what not perfection, may find an interest in grouping together a number of birds for the pleasure, pure and simple, of
observing their habits and watching them rear their young, though indifferent as to the quality of their stock.

By no means do I wish to look at the canary from a fencer’s standpoint only, but as a resident alike of the simple cage which hangs in the window of the cottage, or of the more elaborate aviary which adorns the conservatory or finds its home in some sheltered sunny corner of the garden of the country-house, its occupants as happy, apparently, as the wild birds outside, free to come and go where they please.

The position of a canary aviary is of little consequence. It will do as well out of doors as under cover, and better, provided there be a reasonable amount of shelter to serve as a protection from prevailing winds or from snow, which might, by drifting through open wire-work, cover the ground, and so prevent the birds, ever dependent upon thoughtful care and attention, from procuring their food.

A word of caution here. Bear in mind that when you undertake the charge of any “home pets,” the responsibility attaching to a proper regard for its welfare rests with you, and ought not to be lightly thought of. Nothing can justify the neglect of creatures dependent upon you for the supply of every want. Get into the habit of attending to those wants regularly and thoroughly, and you will be spared the pain which must follow from seeing death the result of, to say the least of it, carelessness, if not culpable neglect. And where animal life is at stake do not leave too much to children, certainly not the exclusive management of any animal. They mean well, and would not wilfully inflict pain, but they are thoughtless, and are apt to put off doing at the right time something which ought to be done and then there results—I’ll tell you what results, and with the relative will leave this matter—which I am sure must commend itself to every one’s judgment—and pick up our thread again.

Not long ago I thinned out my own stock of breeding birds, keeping only a few pairs of valuable ones of certain favourite varieties. Every bird had a history. There was hardly a second-class one among them. Having moulded them and put them into their winter quarters, I gave the feeding of them to my youngest boy. There was little to do—nothing, in fact, but giving them seed and water—and, for a while, all went on very well. But a little irregularity, a little neglect, a little putting off attending to this and attending to that, and, all too soon the end came. One morning, when I went into my bird-room, I found every bird was dead. Empty seed-hoppers and dry water-tins spoke in bitter reproach, not to my little son, but to me. I have said my birds were valuable; but pecuniary loss should weigh as a feather in the scale against the death of any home pet which has a claim on you for every necessary.

To return. A canary aviary is better out of doors than in. The canary lives and thrives much better in a natural than in an artificial atmosphere. It is soon acclimatised, and fears no extreme, either of heat or cold. The pampered delicate-looking little songster of the dining-room, carefully protected from draughts and enclosed in a flannel nightcap at nights, is a very different subject from the hardy tenants of an out-door aviary. They know no asthma, and the snows and frosts of winter affect not them. They know nothing of the luxury of a little sherry in their water, and are content to secure a few drops as often as some thoughtful hand breaks the ice which seals their drinking vessels. Fresh air and exercise, plenty of both, with an abundant supply of food, enable them to stand our severest winters, at a time when their wild friends outside suffer from insufficient shelter and a short supply of provisions; and when the robin steals up to the window-sill to beg for crumbs, and other birds, naturally shy, impelled by hunger, frequent the haunts of man in quest of relief, the canary in his out-door home sings lustily one continued grace after grace.

The prettiest out-door aviary I have ever seen is in the grounds of John George Stephenson, Esq., at The Cleveleighs, Bishop’s Cleeve, near Cheltenham, and I am indebted to him for the following description of it, as well as for the illustration on page 337, which is from his pencil.

“The foundation is a circular brick wall enclosing a space of five feet six inches in diameter. This wall rises one foot from the ground, and is nine inches thick. Upon this is laid a circular frame-work of wood to receive the uprights. These are placed on the outer circumference of the circle, and are eleven in number, five feet six inches in length, four inches deep, and one a half inches in width. They are let into another circle of woodwork at the top, and from this springs a conical roof, supported internally by a score of light rafters converging to a common centre. These carry a lining of zinc, and the thatch, which is about eight inches thick.

“Half the aviary is boarded, and half walled. Three perches run round the whole of the walled portion or front, and several more are fixed in the space under the roof, where the birds always roost. The perches which run round the front are nailed to the inner side of the upright, and consequently, they are four inches from the wire. Each is a single long strip of some flexible wood. There used to be a tree in the middle of the aviary, but that I removed, as I found it soon became unsightly, and contracted the space at the command of the birds for exercise.

“Between two of the uprights, nearly at the back, the space is converted into a wired door, and a leaden pipe running through the brickwork renders it easy to supply water without entering the aviary, if desired.

“The seed vessel is at the back of the structure, and is constructed as follows. The whole affair may be said to be like a box with a glass lid and without a bottom, fastened up end-ways against the boarded portion of the aviary four feet from the ground. The seed is put into the box through a small door in the boarding, and the pane of glass, instead of fitting on the outside like a lid, is fitted inside, the upper end of the glass lying against the front of the frame and the other end receding nearly to the back. There is a small opening between the bottom of the pane and the frame through which the seed (which lies upon the glass) escapes as it is required by the birds. If filled with seed, this feeder will require no attention for weeks, excepting in very severe frosts, when, sometimes, the whole of the seed freezes into a solid mass, and, consequently, cannot descend as required. The sketch on page 339 will be more instructive than any explanation.

“I place a quantity of sand and old mortar in the bottom of the aviary every spring, when the annual cleaning takes place. The brickwork inside is whitewashed, and the wire and woodwork painted green inside and out. The paint, if allowed to get hard, does no harm to the birds, and I never have any insects. Earthenware, wooden, or zinc nests (I prefer the first), are hung on nails to the boarded portion of the structure, and the necessary building materials supplied.

“Under these conditions the birds give hardly any trouble. A daily supply of green food and water is really the only necessary labour, and the fresh air and exercise they get prevent many of the maladies which are so fatal to birds in confined situations, breathing an artificial atmosphere.

“I have had thirty-three birds in here during the winter, with no protection whatever, excepting a bass mat in very snowy or windy weather, and I have not had a single case of indisposition. Amongst these were some Norwich birds of very deep colour and a peculiar crested strain, and they are equally hardy with the ordinary or common kinds.

“The condition of the birds is very superior to that of those
which I have in my bird-room; the feather is much harder and
closer, and, altogether, the open aviary is a good and healthy
home for the canary.

"The disadvantages are—First, that you cannot keep any
different kinds pure and unmixed; and, secondly, the very ex-
traordinary way in which the hens will claim some one parti-
cular nest, and insist upon laying and sitting there in common.
I have had, several times, three hens sitting on one nest at the same time, one on the
top of the other, and when a practice is
not favourable to the hatching of the eggs,
or to the well-doing of the young in those
rare cases in which the squabbling of the rival
claimants allows the completion of the pro-
cess of incubation.

"I think that such an aviary as I have
attempted to describe would accommodate
100 birds well. It is placed in a sheltered
situation, being protected from the north and
east by a box hedge twenty feet high
and four feet through. The brickwork outside
is hidden with rockwork, amongst which Alpine
plants, and such ferns as will bear the sun,
are planted."

Structures less pretentious may be erected according to cir-
cumstances; but the fact being established that the canary
will stand the extremes of heat and cold of our latitude, the
rest is simply a matter of taste, pounds, shillings, and pence.
Such is the description of Mr. Stephenson's beautiful aviary.
I have seen it during the height of the summer and in
the depth of winter, and on each occasion its feathered
 tenants were in robust health. I may remark that although
the enlarged space and general surroundings of an open aviary
develop more of the natural wild character
of the canary than is seen in a small cage,
yet, long-continued domestication and arti-
ficial treatment have to a very great extent
altered its habits; and unrestricted as it is
in its larger habitation, free to choose the
snuggest corner for its nest, and in no
way interfered with in its domestic ar-
rangements, yet the mishaps incident to the
ordinary breeding-cage are common to the
aviary. Birds are as apt to neglect their
young in the one as in the other, and various
misadventures, to which reference will be made
in a future paper, seem to be the penalty we
have to pay in our endeavour to confine Nature
within fixed limits. "Thus far shalt thou
go and no farther!" is a truth deeply imprinted
on many of the marvellous works of Creation, and daily are we
reminded, by apparent trifles, of our ignorance and impotence.

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ROUND GAMES.

By James Mason.

ADJECTIVES—HAND—THE WITCH—WHAT IS MY
THOUGHT LIKE?—THE BIRDCASTER—JACK'S
ALIVE.

We had not been long together at the fifth meeting
of the Round-Game Club before some one proposed
that we should play first of all at Adjectives.

"How curious!" said David, "that is just what I intended.
I wrote a little story on purpose as I was waiting for your
arrival. Here it is."

"What part does the story play in the game?" asked Notes-
and-Queries.

"Well," said David, "you see, before each substantive in
the story is a blank; now these blanks are to be filled up with
adjectives furnished by you. You all name to me whatever
adjectives come into your heads, and I insert them in the
blanks exactly in the order in which they are called out."

"And after that?"

"And after that the story is read aloud; and it is great fun
to see what a strange mixture there is of adjectives and
substantives, and what nonsense the tale often becomes."

We began then furnishing David with adjectives, and he
noted them down in the blanks in his story. When enough
had been obtained, there came the reading aloud. The
tale went as follows:—

"A transparent man thought there would be much crowded
happiness to be gained by living in the hopeful country, and
the farther away from absurd cities the better. So he turned
his picturesque steps to the durable north, and travelled till he
 came to an unsophisticated valley, all the false hills around
which were covered with high-flown ferns. The new-fangled
inhabitants came out of their distorted houses to welcome
'Here is an unmistakable stranger,' said they, 'the first
we have seen for an agitated hundred years.' And—"

And thus the story went on. It became so ridiculous, that I
think it would be a shame to print it all. We enjoyed it
immensely at the time, but to set it down in cold printers' ink
—no, that would never do.

After David's tale was read, John Ferguson wrote one, and
we filled it up with adjectives.

Then the company seemed inclined to turn their attention to
something else.

"It is to be the game of Hand," said David.

"That is an old game," remarked the Laughing Hyena.

"As old as Herod," said Notes-and-Queries.

"I think we must choose sides," said Arabella.

"Yes," said the princess, "let it be the ladies against the
gentlemen."

That was decided on, and the ladies seated themselves at
one side of the table, and their antagonists at the other. The
"piece" with which the game was to be played was Emily's
silver thimble, it was just the right size to be easily held in the
closed hand, which is a great matter in this game.

"Let us draw lots," said Alice, "which side is to hide the
piece first."

"No," replied David, "we shall let you ladies begin."

Alice was the leader of the ladies' side. She took the piece
in her right hand, and held it up so that every one could see it.

Then she cried "Hands down!" and she and all the rest of
the ladies put their hands out of sight, and commenced "working
the piece," as it is called—that is to say, shifting it from hand
to hand.

Soon the piece had been worked so as thoroughly, Alice
thought, to mystify the gentlemen. "Hands up!" she called
out. All the ladies placed their closed hands on the table. The
top player on the opposite side—it was David—had now to fix
on the hand under which the "piece" lay hid.

"There are two things you can do," said Alice; "you can
either point at once to the hand in which you believe the piece
is hid, and cry out 'Hand!' or you can point to those you
suppose to be empty, and say, 'Take away that hand!' and
when most of the hands have been removed, fix on the most
likely-looking among those that remain."

"The simpler course is always the better," said David.
"Hand!" he added, pointing to Emily's little fist.

"How did you know the 'piece' was with me?" said that
young lady, as she delivered it up.

"I read it in your eyes," answered David. And indeed I don't
believe Emily's eyes could conceal anything, even from a less
acute observer than David.

The piece was now in possession of the gentlemen, fairly
captured by them. They worked the piece, and then placed
their closed hands upon the table, just as the ladies had done.
Alice failed to guess rightly who held it.

"The ladies must try again," said David; "only, Alice, you
don't guess this time—the guessing must be done by the player
sitting next you," that was Maggie.

The piece was worked; the hands were placed on the table;
and Maggie guessed. She succeeded; "more by luck than
good guidance," she said.

The ladies had now the piece again, and David, because
he had guessed rightly before, had the privilege of guessing
again.

Hand proved quite a favourite game; and one or two of us
felt rather sorry when Arabella interrupted it by asking if we
would like to see The Witch.

"Certainly," said David; "and what can the witch do?"

"You will see," answered she; "Emily will go out of the
room; we shall fix on a word; and on her coming in again she
will tell us what the word was.

Emily was banished for a few minutes; and we decided on
the word "Historic."

"Come in, Emily!" Emily came in.

"Now," said Arabella, "I want something for a wand. Oh, the
color will do nicely." Then she turned to Emily: "Here is
work for my trusty spirit (thump, thump, thump, on the
floor with the wand)—speak, and explain the mystery (a wave
of the wand)—tell us no nonsense (thump, thump, thump,
thump)—rather speak the truth—the truth (thump, thump,
thump)—calmly (thump.) Let us hear what you have to say.

"The word is 'historic,'" said Emily.

The exhibition looked so mysterious, for Arabella accompanied
her words with many wizard-like passes over Emily's head,
that Notes-and-Queries insisted on knowing wherein the trick
lay, for "I am sure it is a trick," said he.

"Find out for yourself," said Arabella, laughing; "we'll
play the Witch over again, with a new word." So it was played
a second time, but no one could do more than give a rough
guess in explanation of it.

Then Arabella told how the word was discovered by Emily.

"I addressed her, you would notice," she said, "in short
phrases, and each of the phrases you might have seen began
with a consonant. These consonants represented the con-
sonants in the word fixed on. I divided the phrases by waving
my wand over Emily's head or by thumping on the ground.
The thumps on the floor expressed the vowels one thump stood
for a, two for e, three for i, four for o, and five for u." "And is that all?" asked Notes-and-Queries.

"All," answered Arabella.

"Then let us play at What is my thought like?" said David.

During the performance of the game the witch had been moving
about the room; now we got chairs, formed a circle, and David
sat in the centre.

"I have thought of something," he said, "what is my thought
like? You must all answer in turn."

The princess said it was like "a squirrel;" Notes-and-Queries
held that it resembled "the Scottish bagpipes;"

"It is like a dark night," said Maggie; "Like a funny
story," said Tom; "Like the full moon," said the Laughing
Hyena; and every one else had some notion or other on the
subject.

"Now," said David, "what I thought of was the Multipli-
cation Table. You must now justify your similies or pay
forfeits. Princess, how is the multiplication table like a
squirrel?"

"Because it runs up high," answered she, sharply.

"Very good. And how—David addressed Notes-and-Queries
is it like the Scottish bagpipes?"

"Because it is—and Notes-and-Queries stopped short, as
if he had not made up his mind what to say.

"A forfeit from you," said David, "you must answer at once.
No time is allowed for manufacturing explanations.

"You might have said," remarked Alice, "because it is
a vexation; 'Multiplication is vexation, Division's twice
as bad'-you know the rhyme; and as for the bagpipes"—
she drew down her mouth, and gave her shoulders a little
shrug.

"Maggie," David went on, "how is the Multiplication Table
like a dark night?"

"Because it is hard to see through."

"And how, Tom, is it like a funny story?"

"Because it has a beginning."

"Poor Tom. So poor an answer that I think you should
pay a forfeit."

"No, no," said the princess; "it is as good as the others;
let it pass."

"How—and this was addressed to the Laughing Hyena—
is the Multiplication Table like the full moon?"

"Because it is useful in calculations."

Most of the rest of the answers were on a level with these in
point of merit; a few however were so miserably far-fetched
that those who gave them had to pay forfeits.

Some one made a movement as if to rise.

"Keep your seats, and let us play at The Birdcatcher,"
said David; "I shall be the Birdcatcher and you will be the
birds."

"I shall be a raven," said Emily. "And I a crow," said the
Laughing Hyena. And soon we had representatives of ravens'
crows, sparrows, turkeys, doves, parrots, and many others of
the feathered race.

"You have forgotten the owl," said David; "and there
must be an owl in the game."

"Let me be the owl," cried Tom; and no one objected.

"Now," said David, "I shall tell a story, introducing as
many birds as possible, and when I mention any one of you,
that one must utter his own peculiar cry. But does every bird
know his own cry?"

"I am not at all sure about that," said Notes-and-Queries;

"however, John Ferguson, bird-calls lie somewhat, in your
way, perhaps you will enable us to be true to Nature."

John, who is the only naturalist amongst us, and who is
interested chiefly in the picturesque features of natural history,
said he would give as many cries as he could remember. "The
raven," he said, "cries 'Cro-a-ak!' the owl cries, 'To-whoo,
to-whoo cold to, cold to!' the crow, 'caw, caw, caw!' the
magpie, 'Jack wants' his dinner!,' the cock, 'Cock-
doodle-do!" the duck, "Quack, quack, quack!" the goose, "Hue-s-s-s!" the turkey, "Gobble-olde-olde!" the sparrow, "Chipeipe!" the curlew, "Pe-wit, pe-wit!" the canary, "Pretty Dick!" the dove, "Chur chur, chur chur, love me and I'll love you!" the parrot, "Pretty Polly!" the wood-pigeon "You old fool, you old fool!" the yellow-hammer, "A little bit of bread and no cheese!" the chaffinch, "Some bread and no beer!" the——

"Stop, stop!" cried David; "thank you; you have given us more than enough. Let all now put their hands on their knees, for that is the proper attitude in which to play this game. It is clearly to be understood that whenever I name any of you, you are to utter your own peculiar cry, and whenever I mention the owl you must lift up your hands from your knees and hide them behind your back, so that I—and I'll be always on the alert—may not catch hold of any of them. Should I succeed in seizing a hand, the owner of the hand must pay a forfeit, and become Birdcatcher, whilst I take his place and imitate the bird he had the honour to represent. If I chance, however, to name the owl, and make no capture, I must pay a forfeit myself, and go on with the story."

"And when are we to bring our hands from behind our backs?" asked Maggie.

"At the mention of the first bird after the introduction of the owl. And when I say 'all the birds in the air,' you must all at once utter your respective cries. If you omit to do so you must pay a forfeit. Forfeits will be also inflicted on any one forgetting his cry, or giving it badly, or giving the cry of another bird. And I must pay one if I name any bird not represented here. These are the rules and regulations of the game."

"They are clearly understood," said Notes-And-Queries; "go on with your story."

"A boy," said David—standing up, and putting away his chair out of the circle—"went out one morning, before the cock (cock-a-doodle-do!) had crowed, to catch birds—all the birds in the air (general uproar: all the birds crying out) if he could. 'You may be very contented' said his mother, 'if you only capture a MAGPIE (Jack wants his dinner!), a CANARY (Pretty Dick!), and a SPARROW (chip, chip) I'd rather have a PARROT (Pretty Polly) than any of these,' said he. 'And what is the best way to catch birds?' he asked. 'Put salt on their tails,' said the mother. He went through a wood, and there he heard a WOOD-PIGION (you old fool, you old fool!) talking with a RAVEN (Caw-caw!) but they were sitting too high to put salt on their tails. Then he went over a moor and he heard the CURLEW (Pe-wit, pe-wit?), and in a field he saw some CROWS (Caw, caw, caw!), but they seemed shy of him, and flew away. 'It is difficult,' said he, 'to catch all the birds of the air (general uproar). I'll have breakfast!' So he sat down on the bank of a stream, and opened his wallet, and ate a piece of coarse rye bread, wishing all the while it had been a roasted DUCK (Quack, quack, quack!) Now there was an OWL (Tu-who, tu-who! cold toe, cold toe! All hands were placed in a twaddling behind the players backs, except Maggie's.) David caught Maggie's left hand between both of his. 'You must pay a forfeit,' he said, 'and take my place."

Maggie then became Birdcatcher, and David took to presenting the yellow-hammer, as Maggie had done. "Am I to continue your story?" asked Maggie.

"Oh, that is not necessary," answered David, "you may begin one of your own if you like."

She did begin one of her own, and made an excellent Birdcatcher; and so did Notes-And-Queries after her.

We then spoke of breaking up the meeting, and the court for the adjusting of forfeits was constituted, and everything was satisfactorily arranged.

We were in the hall, preparing to go away. Tom went up to John Ferguson with a piece of twisted paper in his hand. "Will you light that, please, at the lamp?" said he, "I am not tall enough to do it myself."

John lighted the paper.

"Now," said Tom, "the one in whose hand the last spark dies out must pay a forfeit." He then blew out the flame, and handed the paper to Emily, saying "Jack's alive!" "Jack's alive!" said Emily, handing the paper to the Langshing Hyena. "Jack's alive!" said he, handing it to Arabella. "Jack's alive!" said Arabella, handing it to David. "Jack's—why Jack's not alive!" said he, "I must pay a forfeit, I suppose."

Then we tried the game again and again—indeed, I give you my word for it, we stayed there playing at "Jack's alive" for more than half an hour.

And thus ended that evening.

BILLIARDS.

By A. G. Pathe, B.A.

LOSEING HAZARDS—SIDE-THE RULES.

ANY losing hazards require side, for the reason that the ball enters the pocket obliquely. Now, suppose that the ball has stopped on the spot marked n in the diagram (Fig. 1), which is eleven inches from the side cushion, and twenty inches from the baulk line.

Now, the only losing hazard possible off it baulk, is one into the top corner pocket, and this hazard requires a great deal of side. In playing this stroke, as much left-hand side as possible must be put on, this side will materially assist the ball in going into the left hand top pocket, in fact, on some easy tables it will often be observed that the ball in travelling up the table will strike the left-hand side cushion and yet afterwards go into the pocket, the side as is often observed, taking it in.

Of course, should the ball have settled on a similar spot on the other side of the table, the hazard will be into the right-hand top pocket, when strong right-hand side must be used.

Losing hazards can be made when the ball is rather nearer to the cushion into the middle pocket, but these, which are called "jennies," do not require so much side as many imagine; and we would recommend those really desirous of learning the game, to practise those long losing hazards into the top pockets before those apparently easier ones into the middle.

We consider that we have sufficiently advanced in the first principles of billiards to render it desirable to give a code of rules. The following set of rules for billiards have been revised for Messrs. Cox and Yeaman, the well-known billiard table manufacturers, and have been submitted to and approved of by the leading professional players of the day (1866), and are, in our opinion, far better than the modern rules called the championship rules. We have, however, made some slight alterations in them.
1. The game commences by stringing for the lead and choice of balls.*

2. The red ball must be placed on the lower of the two spots at the bottom of the table, and replaced there when it is holed, or forced over the edge of the table, or when the balls are broken.

N.B.—Breaking the balls is placing them as at the commencement of the game.

3. Whoever breaks the balls leads off, unless when they are broken by mutual consent, in which case the lead should be stipulated for, or strung for.

4. If a player makes one stroke in a game, he must finish that game, otherwise he loses it.

5. If the striker makes any points, he may continue his game until he ceases to make points.

6. If, when the cue is pointed, the ball should be moved without the striker intending to strike, it must be re-placed to his adversary’s satisfaction; and if not re-placed before the stroke be played, the adversary may claim it as a foul stroke.

7. If a ball springs from the table and strikes one of the players, or a bystander, so as to prevent its falling on the floor it must be considered as off the table.

8. If a ball runs so near the brink of a pocket as to stand there, and afterwards falls in, it must be replaced, and played at, or with, as the case may be.

N.B.—There is no necessity for challenging a ball. The umpire must decide whether the ball has stood or not.

9. If (as it may sometimes happen) a ball be spinning on the brink of a pocket, and although stationary for a time, afterwards falls in, in that case the hazard is scored, if the motion be not gone out of the ball at the time it falls into the pocket.

10. If a ball lodges on the top of a cushion, it is considered as off the table.

11. After the adversary’s ball is off the table, and the two remaining balls are either upon the line, or within the stringing dots at the upper end of the table, where the white balls are originally placed in leading, it is called a bank, and the striker who is to play from the ball circle, must strike a cushion outside the bank, so as to occasion his ball, in returning, to hit one of the balls in the bank, if not, he loses one point.

12. A line ball is when the centre of the ball is exactly on the line of the bank, in which case it is to be considered in the bank, and cannot be played at except from a cushion out of the bank.

13. All misses to be given with the point of the cue, and the ball struck only once; if otherwise given, the adversary may claim it as a foul stroke and enforce the penalty—make the striker play the stroke over again—or have the ball replaced where it was struck from the second time.

14. A person cannot score if he makes a foul stroke.

Note 1.—It is called foul if a striker moves a ball in the act of striking; or if he plays with the wrong ball; or if he touches his own ball twice in playing; or if he strikes a ball whilst it is running; or if he touches another ball; or if his feet are off the floor when playing. The penalty in all these cases is breaking the balls, and losing the lead.

Note 2.—Enforcing the penalty for a foul stroke is entirely at the option of the adversary.

15. If the adversary does not choose to enforce the penalty for a foul stroke, the striker may play on, and score all the points that he made by the foul stroke—which the marker is bound to score.

16. If the striker holes the white ball (called a white winning hazard), or if he holes his own ball from the white ball (called a white losing hazard), he gains two points: if he does both, he gains four points.

17. If the striker holes the red ball, he wins three; and if by the same stroke he holes his own from the red, he wins three more.

18. When the red ball is pocketed, or off the table, and the spot on which it should stand is occupied by another ball, it must be placed in the centre of the table, immediately between the two middle pockets; and whenever it is placed there it must remain until it be moved by being struck by another ball.

19. If the striker plays at the white ball first, makes a cannon, and pockets his own ball, he gains four points; two for the cannon and two for the white losing hazard.

20. If the striker plays at the white ball first, and pockets his own ball and the red one, he gains five points.

21. If the striker plays at the white ball first, makes a cannon, and pockets the red and white balls, he gains seven points.

22. If the striker plays at the white ball first, makes a cannon, and at the same time pockets his own and his adversary's ball, he wins six points; two for the cannon, and two for each white hazard.

23. If the striker plays at the white ball first, and pockets all the balls without making a cannon, he gains seven points.

24. If the striker plays at the white ball first, makes a cannon and pockets all the balls, he gains nine points.

25. If the striker plays at the red ball first, and pockets it and his own ball, he gains six points.

26. If the striker plays at the red ball first, makes a cannon and by the same stroke pockets his own ball, he gains five points; two for the cannon, and three for the red losing hazard.

27. If the striker plays at the red ball first, makes a cannon and pockets the red and the white ball, he gains seven points.

28. If the striker plays at the red ball first, makes a cannon, and at the same time pockets his own and the red ball, he wins eight points: two for the cannon, three for the red losing and three for the red winning hazard.

29. If the striker plays at the red ball first, and pockets his own and the white ball, without a cannon, he gains five points.

30. If the striker plays at the red ball first, and pockets all the balls without a cannon, he gains eight points.

31. If the striker, by striking the red ball first, makes a cannon, and by the same stroke pockets his own and both the other balls, he gains ten points, being the greatest number that can be gained by one stroke.

32. If the striker in taking aim, moves his ball so as to strike the ball he is playing at, without intending to strike, it is a stroke, and must pass as such, unless the adversary chooses to let him play the stroke over again.

33. If a striker, in the act of striking, moves his ball ever so little, it is a stroke.

34. If the striker fails to hit a ball he loses one point; and if by the same stroke his own ball runs into a pocket, he loses three points; that is to say, his adversary scores so many points. This is called a croup.

35. If the striker forces his own or either of the other balls...
over the table, after having made a cannon or a hazard, he

30. If the striker forces his ball off the table without striking
another ball, he loses three points.

32. If the striker plays with the wrong ball, and a cannon
or hazard be made thereby, the adversary may have the balls
broken; but if nothing be made by the stroke, he (the adver-
sary) may take his choice of balls the next stroke, and with
the ball he chooses he must continue to play until the game
is over.

N.B.—The playing with the wrong ball must be discovered
before the next stroke is played, otherwise no penalty attaches
to it.

33. No person has a right to inform the adversary that the
striker has played, or is about to play, with
the wrong ball.

39. No person, except the adversary, has a right to inform the striker that he
is playing with the wrong ball.

40. If the adversary does not see the
striker play with the wrong ball, or,
seeing it, does not choose to enforce the
penalty, the marker is bound to score
all the points that may have been made
by the stroke.

41. If the striker’s ball be in hand,
and the red and the adversary’s balls
within the baulk, he (the striker) cannot
play at them, except from a cushion out
of the baulk.

42. If the striker’s ball be in hand,
and the other two balls within the baulk,
should he strike one of them, without
first playing out of the baulk, the
adversary has the option of letting the
balls remain as they are, and scoring a
miss—of having the ball so struck re-
placed in its original position, and scoring
a miss—of making the striker play the
stroke over again—or of making it a foul
stroke, and breaking the balls.

43. If the striker’s ball be in hand, he
has no right to play at a cushion within
the baulk, in order to strike a ball that
is out of it.

44. If the striker’s ball be in hand, and
he, in playing from the baulk, should move his ball in the act of
striking, it is a stroke, although the ball should not go out of the
baulk; but the adversary may, if he chooses, compel him
to play the stroke over again.

45. If the striker’s ball be near the ball he plays at, and he
plays the stroke with the point of the cue, it is fair; but if he
plays it with the butt end, the marker must decide whether it
be foul or fair.

N.B.—The principle which ought to govern the decision
of the marker in such a case is this, namely, that the striker’s
butt must quit his ball before it comes in contact with the
other ball.

46. If the striker’s ball be on the brink of a pocket, and he,
in the act of striking, misses the hit, and drawing back his

50. If the striker, in giving a miss from the baulk, should
let his ball remain in the baulk, without it having gone out,
the adversary may either let it remain so, or compel him to
play the stroke over again.

51. If the striker, in giving a miss, should make a foul
stroke, and his adversary claim it as such, and enforce
the penalty, the miss is not scored.

56. No person is allowed to take up a ball without permis-
sion of the adversary.

58. If one of the players moves a ball by accident, it must
be replaced to the satisfaction of the adversary.

59. If, in the course of a game, a person takes up a ball,
supposing it to be in hand, the adversary may break the
balls, or have them re-placed to his own

60. If the marker or a bystander
touches either of the balls, whether it
be running or not, it must be re-
placed as near as possible to the place it did
or would, apparently have occupied.

61. If, after the striker has made a
cannon or a hazard, he takes up the ball,
thinking the game is over, the adversary
has the option of breaking the balls,
or having them re-placed.

62. If, after the striker has made a
miss or a coup, he takes up a ball, sup-
posing the game to be over, he loses the
game.

63. If, after the striker has made a
miss or a coup, the adversary, thinking
the game is over, takes up a ball, he (the
last striker) may have the balls re-placed
as they were, or break the balls.

64. If, after the striker has made a
cannon or hazard, the adversary, thinking
the game is over when it is not, takes up
a ball (whether running or not), he loses
the game.

65. If, after striking, the striker
ought or accelerate the running of the
balls in any way, it is at the adver-
sary’s option to make it a foul stroke,
and break the balls, or have them
re-placed.

61. If, after the striker has played, the adversary should
obstruct or accelerate the running of the balls in any way, he
(the striker) may claim the right of breaking the balls, or having
them placed to his own satisfaction.

62. No person has a right to offer advice during the progress
of a game. But
(1.) If a person be appealed to by one of the players, or by
the marker, he has then a right to give an opinion, whether he
be interested in the game or not; and
(2.) If a spectator sees the game marked wrong, he has a
right to mention it, provided he does so in time to be
rectified, but not afterwards.

63. No person is allowed to walk about the billiard-room
during the game, make a noise, or otherwise annoy the players.

64. When silence is demanded in the room, it is expected that
all persons will comply therewith.

65. It is expected that all persons in the room, whether they
are playing or not, will conform to the foregoing rules, in so far
as they relate to them respectively.
In accordance with our promise we now turn for a time from the subject of apparatus, and proceed to introduce the reader to our friends the butterflies at home in their native haunts. Now, what is a butterfly? This, on first thoughts, would appear to be a very simple question to answer; but it is by no means so easily disposed of; for, unless the presence of certain specifically-shaped plumules observable under the microscope on the wings of the males be regarded as deciding the point, it is difficult to give any single character which will separate them from the moth tribe. Butterflies are four-winged, scale-winged, harriellate (that is, tongued) insects, which have their horns or antennae terminating in a knob or club, though a few of them have the club prolonged into a hook; but some of the Forester moths (genus *Procritis*) and Burnet moths (genus *Anthroceria*) possess a similar peculiarity. Most butterflies are nipped in at the waist, but this character is not infallible. Butterflies fly by day, so too do a good many moths. Butterflies rest with their wings over their backs (with the exception perhaps of some of the Skippers, genus *Pamphila*, which rest with their hind wings in a horizontal position), but many moths also repose in a similar manner, and nearly all erect their wings in the process of drying them after their emergence from the chrysalis state. If, however, an insect possesses all the peculiarities of structure and habit we have named, we need not hesitate to set it down as a butterfly.

This family of insects presents to our notice some of the very handsomest of our four-winged feathered tribe; and as the members of the group not only fly by day in the bright sunshine, flitting from flower to flower in search of the hidden sweets, or from plant to plant, depositing the eggs which are to perpetuate the species, but as many of them are also conspicuous from their colours and markings, they soon attract the eye of the young, and it is therefore little to be wondered at that they are very popular with beginners.

Some of the species are abundant everywhere. Indeed, the large and small Garden Whites (*Pieris brassicae* and *P. rapae*), whose portraits we give (p. 346) for the benefit of those who are not acquainted with them, are a great deal too abundant in the...
very places where we least desire their presence. They may be regarded as semi-domesticated animals, for wherever man cultivates cabbages and turnips, there will these scourges of the kitchen garden dispute with him the possession of his property.

Birds will not take kindly to them as an article of diet, owing to a disagreeable odour emitted by both the caterpillars and the perfect insects; the only check to them is a little hymenopterous fly, which deposits its eggs in the bodies of their larva, where the future parasitic grubs find sustenance by devouring as they feed the less vital portions of their prey, until they have attained their full growth, when they eat their way through the skin of the victim, to spin little pale yellowish cocoons upon the surface of the dying caterpillar. Another of the genns, the Green-veined White (Pieris napi), so called on account of the markings on the under surface of the hind wings, is scarcely less common. It is a gastronomic peculiarity of the Whites that they flourish equally well whether they derive their nourishment from any of the plants included in the term “greens,” or whether their diet consists of mignonette (Reseda) or Tropaeolum (commonly but erroneously called “nasturtium”), plants so botanically separated from each other, and of such different flavours, that one is puzzled to account for the phenomenon.

The first butterflies to greet us in the spring are the hibernated Vanessaidea, a group which comprises the Peacock (Vanessa io), the Camberwell Beauty (V. Antiopa), the two Tortoiseshells (V. polychloros and V. urticae), the Red Admiral (V. Atalanta), the Painted Lady (Cynthia cardui), and the Comma Butterfly (Granta C-album). These, on the glorious sunny days which once upon a time used to enliven our English spring-time, here from their winter retreats to taste the joys of the genial March and April sunshine, which at this period of the year is rendered doubly grateful by contrast with the dreary winter season with which it has been preceded.

Who but the veriest cockney has not, at one time or other, met with in his walks abroad, or even in flower-gardens, the old name of the insect, the Grand Surprise, which is certainly far more appropriate than the Camberwell Beauty, by which the insect is generally known, a name which we suppose was bestowed on the principle of lucus a non lucendo.

V. Antiopa emerges from its chrysalis in the autumn months, but, like the rest of its congeners, reappears in the spring after hibernation. It is partial to over-ripen fruit, especially such as has fallen in autumn, and should therefore, where it
exists, be attracted in the spring by "sleepy" apples and pears, or by "sugar" (a compound concerning which we shall have much to say in a future paper), upon which this group of butterflies is decidedly "sweet."

The late Mr. Hopley once painted a couple of humorous sketches illustrative of the chase of the Camberwell Beauty. In the first, an excited entomologist is in full cry, heedless of all consequences; his eager eyes are fixed upon his game; his lips are compressed; every muscle is strained to the utmost; and though one can see he is ready to drop from sheer exhaustion after his hard run, he does not hesitate, in one last desperate effort to secure the prize, to dash into a stream, to the edge of which his "pretty dance" has led him.

The second represents him emerging from the water, into which, as might be expected, he has inevitably sprawled and splintered—but—with the treasure safely secured in his net, which he holds triumphantly above his head. The eager eyes are still there, riveted on the capture; but the lips are parted; the ducking is over; and no thought of future cold or rheumatism enters his head, as he pouts out one the word—"Bagged!" Poor Hopley! he was a clever artist and a good collector!

Everybody knows the Small Tortoiseshell Butterfly, with its gay tints of yellow, orange, and red and black patches; with its dark border, in which are arranged blue crescentic spots, and white conspicuous spots near the tips of the fore wings. This species, too, occurs from March to May in favourable weather, after its winter's sleep, and is by far the commonest of the genus. Its big cousin, V. polychloros, is by no means so common or so generally distributed. It is chiefly found in the South, in neighbourhoods where its food, the elm (Ulmus campestris) abounds, and is very sprightly on the wing. Though greatly resembling its relative, it is readily distinguished by its larger size and paler colours, as well as by having two (instead of one) black spots upon the inner margin of the fore-wing.

The Red Admiral is a handsome, military-looking fellow. In our humble opinion he should have been called the "General," for, with his glossy coat of black and scarlet bands, he certainly gives us the notion of being a gallant warrior rather than a sailor.

However, we suppose that he is "Admiral of the Red," and that his name is defensible on the score that he and others of his class are sailors prone to migrate, and are consequently often found at sea, though we believe that the term is really a corruption of "admirable."

The Painted Lady (not necessarily an importation from Paris) is another butterfly much given to roving. It has often been met with flying across the briny ocean in search of pastures new (just as if it could not get thistles everywhere!), until at last it has flaunted its colours (i.e. symbolically raised its flag) in every clime, with the exception of—as our friend Dr. Staudinger puts it—the Polar regions. It is a true cosmopolite, but peculiarly uncertain in appearance: in some seasons it is hardly to be seen, at others it is remarkably abundant. The insect, of which we give a representation on page 345, is, in shape, not unlike the Red Admiral, but the markings and colours are very different, the ground colour, printed pale in the figure, being pale orange, except towards the tips of the fore-wings, where the spots are white; the underside is very beautifully tinted with pink and other colours.

Last of this group comes the Comma butterfly, so called on account of a white or reversed C-shaped mark on the under side of the hind-wings; but it is badly christened, for there is another butterfly (Pamphila comusa) the Latin specific name of which is identical. The Comma is an unmistakable insect, presenting several differences from the rest of the Vanessa, the most striking character consisting in the margins of the wings being prolonged into several projections, giving the insect a look as if somebody, with more time upon his hands than brains in his head, had amused himself by notching the borders with a pair of embroidery scissors.

Its tints are not by any means so brilliant as those of its allies, the prevailing colours being deep fulvous and dark brown, but there is something about the creature that attracts attention and renders it conspicuous—probably its singular form.

The Comma appears to have entirely disappeared from the neighbourhood of London, where formerly, we are told, it was abundant; and, indeed, it is in few places common. The midland, northern, and western counties offer the best fields for a chance of meeting with it, but it seems to be dying out in most of its old localities.

ROWING.

By JAMSTON YOUNG.

THE LAWS OF BOAT RACING.

The following are the laws of boat racing as settled and approved by the Universities of Oxford and Cambridge, and the principal boat-clubs in London, on the 20th March, 1872—

1. All boat races shall be started in the following manner:—

The starter, on being satisfied that the competitors are ready, shall give the signal to start.¹

¹ The most satisfactory mode of starting boats is for the starter to ask the question, "Are you ready?" once; and, on receiving no reply, to say "Go." It is the practice for competitors, when expecting the
II. If the starter considers the start false, he shall at once recall the boats to their stations; and any boat refusing to start again shall be disqualified.¹

III. Any boat not at its post at the time specified shall be liable to be disqualified by the umpire.

IV. The umpire may act as starter, as he thinks fit; when he does not so act, the starter shall be subject to the control of the umpire.

V. Each boat shall keep its own water throughout the race; and any boat departing from its own water will do so at its peril.²

VI. A boat's own water is its straight course, parallel with those of the other competing boats, from the station assigned to it at starting, to the finish.

VII. The umpire shall be sole judge of a boat's own water and proper course during the race.

VIII. No fouling whatever shall be allowed: the boat committing a foul shall be disqualified.

IX. It shall be considered a foul when, after the race has commenced, any competitor, by his own, boat, or person, comes in contact with the one, boat, or person, of another competitor, unless, in the opinion of the umpire, such contact is so slight as not to influence the race.³

X. The umpire, during the race, shall caution any competitor when in danger of committing a foul.

XI. If the umpire, when appealed to, shall decide all questions as to a foul.⁴

XII. A claim of foul must be made to the judge, or the signal, to lie at the post with their cars or sculls reached out at full length over their stretchers, and there is no objection to their doing so.

¹ This law gives the starter power to recall competitors eager to steal a march on him, and get the best of the start. It frequently happens that, as soon as the words, "Are you ready?" are uttered by him, one or more bolt off, in the hope that the word, "Go!" will follow immediately. To avoid unfairness, it is proper to wait long enough, and to see whether any competitor attempts to move before giving the final signal.

² This law contains the vital principle of the new code of boat-racing rules, which is, that each competitor shall keep his own water and course from the beginning to the end of the race, in counter-distinction to the old plan of taking an adversary's water, either for the purpose of obtaining the better position, or of washing and bothering him. Endless difficulties arose from the old practice, and профессиональные соревнования in particular seemed utterly unable to comprehend which was, and which was not, their proper course, after water had once been taken during a race. The congress, which drew up the new code, consequently adopted the plan which was at once the simplest, the most easy of comprehension, and the fairest to all parties. At the same time, it must not be assumed that a quick starter is even now precluded from going in front of an opponent, and from stopping there as long as he can, do so without bringing about a collision; but, henceforth, he must allow his opponents to pass on that side.

³ An accidental touch of car or scull blades would not be noticed.

⁴ An appeal to the umpire can be made either by word of mouth or signal. It is usual, when a foul takes place, for a competitor to hold up his hand, as this action is generally accepted to signify that a foul is claimed. After passing the winning-post the competitor, before leaving his boat, should formally make his claim to the umpire by word of mouth. It should here be noticed that the person who has the sole power to decide questions of foul is the umpire; this renders the umpire absolute, and allows a committee no power whatever to re-open questions of foulings.

5 It was an act of questionable policy to insert, in the above rule, the words, "the judge or," for there can be no doubt whatever that any claim of foul ought to be made to the umpire himself, and to no one else. A majority of the congress, however, carried their point; the reason given for this injudicious enactment being that the umpire is often obliged to turn round without following a race to the end, so as to get back to the starting-post in time for his next race. Against this puerile argument it may safely be urged that an umpire who fails to follow out to the end any race in which a foul has occurred, and to hear what the competitors concerned have to say, fails most egregiously in his duty.

6 When a foul takes place, it is seldom that either the boat fouling or the boat fouled stops to appeal to the umpire otherwise than by signal; and it is just as well they should not, for if the boat fouled comes in first, there is nothing to adjudicate upon. It is the best plan not to give a decision upon a foul until all the competitors have passed the posts, and if a competitor who is fouled stops to claim, to order him simply to row on: he may yet come in first and win on his merits. Nevertheless, cases do occur in which the competitors are stopped by the umpire, and some or all of them re-started. The whole course must, however, be completed before a competitor can be adjudged to have won the race.

7 This rule refers to accidents occurring after the race has actually commenced.

8 This is a very salutary rule, and places it within the power of the umpire to disqualify a competitor who is accompanied by a boat, whether for the purpose of giving him an unfair advantage by "coaching" him, or by "washing," or obstructing an opponent. Of course, it is within the discretion of the umpire to decide, according to the evidence, whether such assistance or direction was or was not given with malice prepense, and also whether the competitor was accessory thereto or otherwise. There is, however, nothing to prevent a captured competitor from being replaced in his boat and set going again in pursuit of his opponent.

9 This and the succeeding rule render the umpire absolute in every thing connected with the race, and implicit obedience to him is imperative.
From king or queen and one small card play the small one. The old rule was "king ever, queen never," but the practice of the modern school is to play the small card in plain suits, except when an inferior honour is originally led, in which case it should be covered with the higher card. We may here remark, that if an honour is led, and you hold a higher honour, it is nearly always right to cover it. The principal exceptions are when you have a numerically strong suit—i.e., four or more—headed by a king or queen, and a queen or knave is led. Under these circumstances it is generally recommended to play the lowest of the suit second hand, and give your partner the chance of winning the trick, as by so doing you will retain the command over the original leader.

INFERENCE FROM THE PLAY OF THE SECOND HAND.

The king is played from one combination of cards only—viz., ace, king, etc.

The queen is played from three combinations, viz., (1) ace, king, queen; (2) ace, queen, ten; and (3) king, queen, etc.

The knave is played from two combinations, viz., (1) king, queen, knave; and (2) queen, knave, and another.

The ten is played from three combinations, viz., (1) a sequence of which the ten is the lowest; (2) king, knave, ten, etc.; and (3) knave, ten, and one small card.

The above rules apply to plain suits only. When trumps are led the play of the second hand will require some modification. Thus, with ace, king, or queen, and others, it is frequently good play to pass a small card originally led. Similarly with ace, queen, ten, etc., the ten should be put on instead of the queen, as in plain suits. Again, with king and another it is generally right to play the king second hand.

THE THIRD HAND.

The general rule for the third hand is to play the highest card you hold of the suit led, with the twofold object of winning the trick and supporting your partner, whom you assume to have led from his strongest suit. With two or more high cards in sequence, the lowest of the sequence should, of course, be played. Under certain circumstances, however, the third player is justified in finessing, i.e., in attempting to make a lower card do duty for a higher one, in the hope of an intermediate card lying to his right. Thus, with ace, queen, and others, he is fairly entitled to play the queen, third hand, it being two to one against the fourth player holding the king.

Many players, the old school especially, carry this principle to extremes, and finess on knave from king, knave, etc., or ten from queen, ten, etc., but this is diametrically opposed to the doctrines of the modern school, with whom it is an axiom that the only legitimate finesse in your partner's original lead is from the major tenace, i.e., ace, queen. Later in the hand, when it is obvious that your partner's lead is "forced," or when he leads a strengthening card, you may legitimately finesse more deeply, so as not to give up complete command of the suit, more particularly if you happen to be strong in trumps. When you hold the best card of the suit it is rarely good to finesse the second round, owing to the risk of the suit being trumped; but in many cases it is obligatory on the third player to finesse. For example—a leads the two of trumps, B plays the three, C puts on the king, and D drops the four. C returns the seven of the suit, to which D plays the five. A, now third player, has queen, ten, and six, and it is quite certain, from the fall of the cards, that the ace must be to his left with B. In this position the finesse of the ten is clearly compulsory; as if B holds knave in addition to the ace he must make the tenace, while, if he holds the ace only, A will be left with the queen. This situation is of frequent occurrence, but, for want of a little attention to the fall of the
Trick 1.

A leads from his strong suit of trumps. B, with king and a small card, puts on king, second hand.

Trick 2.

A properly finesse the nine. With such a strong trump hand the finesse would have been correct under any circumstances, but in the present case it is almost a certainty, as, if B had held both king and knave, he would not have played the king second hand. A has now all the remaining trumps, with the exception of the knave, which is clearly in D’s hand, since if C had held it he would have returned it according to the rule, instead of the two.

Trick 3.

C discards from his weakest suit.

Trick 4.

A leads one of his “long” trumps, in the hope of finding out his partner’s strongest suit from his second discard. C having discarded a heart to the previous trick, now very properly discards a spade, thereby clearly indicating that he has strength in diamonds.

Trick 5.

A plays to his partner’s discard. Having only two diamonds he leads the higher.

Trick 6.

C now leads his three winning diamonds, to which A discards two hearts and a spade, and of course wins two out of the four remaining tricks with his two long trumps. A and C thus make five by cards.

ANGLING.

BY GREVILLE FENNElL.

CLEARSING-RING—DRAG-HOOK—DISGORGEES—THE RACK.

In the absence of the clearing ring, the angler, being left to his unsalted resources, should lay down his rod, and pull the line in as far as he can from every available angle, with a steady strain, increasing the force by degrees. If the hook does not give, more pressure must be put on until the line breaks, which, if he is fishing with the fly or worm, it will do near the hook at the weakest part.

Should it be in a shallow stream he may go in after it, or get some countryman to release it for him. The clearing ring is a heavy brass or iron ring (Fig. 1), having a hinge on its thickest side, to open and permit of its encircling the rod or line when it closes by a clasp. To the clasp end a strong cord is fastened, and the rod being inclined with its point towards the water, the line kept tolerably taut, the ring travels at once to the hook, when the rod is raised again, and by a little working upwards and downwards of the machine, the hook is either forced from its hold, or is left in the detaining object, the rest of the line being saved. A. S. Moffat, in his “Secrets of Angling,” gives the following figure (Fig. 2). “It shows a much less costly and equally efficient contrivance, which any village blacksmith has skill enough
to make. It consists of an oblong iron ring, thick and heavy at one end, with an opening at the other, in which the line may be slipped, while a cord is attached to the eye b." The drag-hook is occasionally used for more desperate cases, and, let it be added, often follows the fate of the object it is sent to recover. Still, we have seen very heavy snags brought to land by its means, and thus impediments to the enjoyment of many released by the efforts of one.

It consists of three strong, blunt-pointed, iron hooks, placed back to back, forming a triangle, and embedded in a heavy piece of pear-shaped lead (Fig. 3). It is thrown over and beyond any object to which the line may be fixed, when the grapple lays hold of it and sometimes brings it ashore.

Its weight is a great bar to its common utility; this objection removed, it is certainly a most effective instrument in many emergencies.

We, however, use it more to clear weeds out of swims for roach fishing, and early in a summer’s morning to bring ashore night lines, which have been stealthily laid for trout and pike, under the pretence of “only just wanting an eel.”

By this method of clearing out a swim, a beautiful sandy or gravelly bottom may be reached, to which roach, dace, gudgeon, and perch will at once resort for securing themselves (a habit which they pursue, more or less, all the year round), and for picking up any insect food which may have been dislodged by the process.

Under any such circumstances there is sure to be a jack or two watching the smaller fry from the neighbouring weeds. Tench and carp, however, particularly the former, are disturbed by this preparation, and they will forsake the vicinity for weeks afterwards.

The disgorger is a simple instrument made of wood, bone, or metal, to remove the hook when too far in the mouth of the fish to permit of the finger and thumb laying hold of the shank. The notch is made deep in the material to guide the disgorger down the line, and the latter being held tight, with the fish in one hand, a little pressure downwards will in most cases detach the hook.

But at this form of disgorger often fails to arrive with any certainty upon the bend of the hook, particularly when it is much imbedded in the intestines of the fish, a disgorger has been invented with a short corkscrew-like turn at the end (Fig. 4), which twist, first surrounding the line, descends with unreeling certainty to the seat of attachment, when a slight pressure and a turn of the wrist is all that is required to bring the most obstinate hook into day-light again.

These disgorgers are readily made; any old iron skewer heated at the sharp point red-hot, and the requisite turn or two given to it sufficing for the purpose. (See Fig. 4.)

Note.—Always have your disgorger at hand; keep it by a string over a pocket in which it may repose, to be found when wanted. It is a most simple and equally important aid in angling.

Have we not, at least for a while, had enough discourse upon our tackle? Let us, therefore, come to the active pleasure of our theme. Not but that there is much of pleasure to be gained from handling over our lines and floats and flies, and here and there holding up some much-cherished hook with single gut or hair which, like “the riboned lion led by love,” subdues some monster to subjection, bringing back the whole scene of the past, the rippling waters, the nodding alders, the bluebell with perhaps the music of some distant mill keeping pleasant cadence with the greater melody of our own whirling winch.

But let us off to the river’s side, say to some old and sequestered bit of the sedgy Lea, and our bent be after the much-despised roach. For, unlike other essayists, who begin with salmon, we take it as the more natural order to commence with the lower order and commonness of fish. If we desired to justify the inversion of the general order of angling literature we would refer to the salmon-fishers themselves, not one of whom do we know who did not commence with the alpha of the art even lower than the roach, nay, amongst the sticklebacks, the stone-loucheys, the miller’s thumbs, and the minnows. We will, however, adopt a somewhat middle course, and take the most popular of all fish with the London angler for our first discursive, yet we trust practical ramble.

On our road down by the Eastern Counties rail we can afford to smile as the many recorded observations to the prejudices of the roach and roach-fishers occur to us. But we are proud to say that since the publication of our “Book of the Roach,” not a single observation to its disparagement has appeared. On the contrary, many writers have at length recognised the worth of the roach both as an angler’s and edible fish; and one of Her Majesty’s Inspectors for England and Wales (Mr. Frank Buckland) speaks of the work devoted to its history as an “admirable monograph, important to anglers,” and quotes largely therefrom.

But you will ask why we do not prefer the grander and broader Thames for our present object than the river Lea with its narrow course and of late much-decreased stream. Simply because angling in the larger river involves the necessity of a punt, and, more or less, one is forced to resign oneself to the superintendence of a third party—a fisherman whose anticipated notions of what is and what is not proper for the angler to do—attunes very inharmoniously with our notions of that liberty of mind and limb which we can secure at all times on the bank of a more comeable river like the old portions of the Lea.

Still, it would be a want of respect on our part not to tell our pupils something about roach-fishing in the Thames, and we can do it now in the railway carriage as we go down into Hertfordshire as well as at any other time.

In the Thames, as in one or two other rivers, angling for roach is reduced to a system, and it is but just to say that for delicacy of tackle and adroitness in managing it, for quickness of eye and lightness of hand, the London roach-fisher, whether of Lea or Thames, ranks highest among their brethren of the float. But, after all, their system is a narrow one, and its disciples go on from year to year, little heeding that there are other ways and other arts of capturing roach quite as remunerative in amount of weight, sometimes more so, and under circumstances and with accessories to which they are comparative strangers.

The Thames roach-angler gets off his chair in his office, takes

his traps in hand, and is whisked by the train in a short time to his favourite station, and in a few minutes more, if the boatman is alert, is on the water in a punt, and seated on a chair, perhaps the counterpart of that he left behind in him the City. While the boatman poles him along to the deeps, he puts his tackle together, and, by the time the swim is chosen and the punt fixed, is ready to commence operations.

His apparatus consists of a rod of about nine or ten feet long, light, and stiff, yet pliant; a running line of thinnest eight-plait, a hair or draw gut line below, about eight yards long, tapering from a triple twist to a single strand, or the grit of commensurate and gradual thickness; a long cork float, tapering off beautifully from the shoulder downwards to the sharp porcupine quill running through its length beneath the float, dotted at judicious intervals as we have before described, and a slender No. 9 hook—all most fine, delicate, and neat.

See, he plunges the depth with the utmost care, threads three lively tough gentles on the hook, completely concealing bend and barb, drops his line close in to the punt, and lets it travel down the rapid stream before him till there is a rod and a half's length of line between the float and top joint. The distance of the float's swim is accomplished in from half to three-quarters of a minute. When the line is at the end of the swim the float is arrested, the line below the float slants, the bait floats forward, and is actually further from the ground than at any part of the swim. It rises, therefore, upwards, and is suspended for a while some inches above the shelf which ought always to terminate a good swim. It is on these shelves the ground bait lodges, and the under current being checked by the rise in the bottom, gives to the fish that are collected a better chance of feeding quietly and afar from the punt; and it is at this spot, therefore, that punt fishers for roach so often in making a final strike, whether at a bite or otherwise, find that they have hooked a fish.

The puntman all this time is sitting across the well of the punt, dropping into the stream balls of ground bait (clay, bran, bread, and carrion gentles) at about every dozen swims. In these movements there is no variation save that of an occasional change of position to another swim. When a fish is hooked, the reel is wound up, and, if small, it is speedily drawn to the side; if large, say a-pounder—and a-pound roach is a goodly fish in the Thames and no despicable antagonist on a single-hair line in a heavy stream—he is played with extreme care, and being brought to the surface close to the punt, is deftly dipped out by the puntman with a landing-net, who likewise takes it off, drops it into the well, and re-baits the hook.

"And that is the manner of roach fishing in the Thames—a manner wherein," says an able writer, "the sport of angling is shorn of all its romance, delight, and pleasantness, save that which consists in the slaughter of fish, and which, in the second-rate minds who pursue it, constitutes its sole charm."

You will notice that the proficients who take delight in this style of roach fishing, as the float swims out from the punt, keep the point of the rod up, so that there may be only a single dip, if any, of the line in the water, and that shallow and small, and just behind the float, so that they are able to strike quickly.

A quaint writer tells us: "If you catch a barbel on your single-hair tackle, you will, if you are a wise and understanding man, not waste time in playing him, but pull at him boldly, if he comes up to the surface, and the puntman can dodge him out with the landing-net, so much the better. If your line breaks, thank Heaven it was not your rod, and that you are well rid of a knave. If, being ambitious and foolish, you will follow your own devices, in the hope of securing the heavy worthless brute, do so, and be filled with the fruit of them at his first push under the punt. You will certainly lose your expensive float, as well as hook, shot, and perhaps your temper—in which latter case you had better go home. If, after towing the lubber about for half an hour, you succeed in getting him at last, you may consider it equal to an hour's sport lost, and rejoice accordingly.

But how different do different minds view the same circumstances. This meeting with a leviathan—a fellow that was a fit adversary to try one's skill—would be looked upon by the Lea or Thames angler as a circumstance much to be desired, and the longer the play the longer the sport. It is indeed surprising the size and weight of fish that have been killed by a single hair-line. But in all cases in which the fish has fallen a victim to apparently insignificant appliances in regard to power I have invariably found that the rod—and those of Nottingham are most true in such a trial—has taken and given with the efforts of the fish, and, in fact, has acted in perfect union with the flexibility of the hair.

There is nothing, we maintain, that gives more satisfaction to the true angler than the overcoming of his prey by means which appear wholly unequal to such a consummation, and a man who has killed a four-pound fish with a single hair, which would sever in lifting a dead weight from the ground of two-thirds of that weight, may be justly proud of the achievement.

We indeed go farther, and maintain that the angler who had held such a fish in thrall for any appreciable time—has turned it once or twice, and thwarted its attempts for a while to escape—has gained more experience, although his victim may ultimately get away, than he who for a life perseveres with coarse tackle in taking fish whose strength is in an inverse ratio to the means employed.

There is one fact which may be given here, and will equally apply to all waters. If the first fish feels warm to the hand, you may be pretty sure of a good day's sport; if noticeably cold, do not repeat it until there is some cardinal change in the state of the water or the weather.

We now come to another sort of roach-fishing (and we here borrow from some of our own more expensive works), for which the angler enters no floating tub, to sit on a straight-backed chair, a nucleus for all the agues and chill rheumatisms that freight the exhalations from the river and the winds of evening.

With a long pliant rod and good running line, sound and strong gut continuation brown-stained, a light cork float, No. 9 hook, and well-secured tough red-worms, the angler strolls along the bank of some quiet river, like our old Lea, deep, yet not so broad but that he can reach at a moderate cast the middle of the stream. He is not particular as to depth, a guess within a foot is accurate enough. The worm is strung on fast foremost, and straight up the hook shank and gut, leaving bend and barb in their guileless nakedness.

Watch his course of action. It is still September, and the
first frost has not as yet crisped these waters. The roach are not huddled together in the deeps, but lying in parcels among the weeds, if one know where to light upon them. Across every patch of brown weed, in every free straight of water; between two such patches, does the angler cast, raising his line a few inches occasionally, and letting it sink back again, and drift round the waving tail of the weed bed at the will of the current.

There is a tempting looking swim more than half across the stream. He lets out more line yet, and taking the hook in his left hand, with an adroit underhand heave, pitches the bait right into the narrow gullet. The float rights itself, the next instant disappears, and then comes tumbling and floundering down stream, and with the set of the weeds, a noble roach, showing no end of fight, on the long line and supple rod.

He is safely bagged; the line tossed in again, and half a dozen of his fat companions, and a couple mayhap of perch and rudd, follow in quick succession.

Then there is a pause, and after three or so unfruitful swims the angler walks on to another cast. So the day passes, with varying issues for each hour and each stand. There is fresh rain, when the turbid waters have sunk perchance an inch, go forth with your gut tackle, a stout float that will breast the eddies erect, provided there is sufficient of avoirdupois of shot below, a somewhat smaller and finer hook than No. 7, and some clean simple paste of flour and water worked up tough with a little white cotton wool. Put a pellet of the paste as big as a large currant on the hook, then look out as you go along the river for small eddies, protected on their upper sides by stumps or promontories of the bank. Approach these with a light step, and dropping your bait therein, try your swims in each with varying depths between the bottom and two feet from it.

"Try also just within the mouths of ditches communicating with the river, shallow though they be. Noble fish are to be picked up in this way, both with paste, and red or lobworm.

"Roach are very gregarious. When once they begin to take to the deep waters, it is astonishing how they will crowd together. A cartload may be in a place you might cover with a lady's shawl. Paste in some waters, worms and gentles in others, is then the bait until the following August; the former used in small pieces when the water is clear, larger when it is thick."

plenty of exercise, good sport, a welcome break of rest and food; and, if a smoker, the meditative inhalation of the soothing Indian weed, and at the close of the day the tired and much contented piscator turns out upon the green a glittering heap of orange-eyed, bright roach, burned kindly rudd, perch striped and spinched like the chief of the Ojibeways, silver-sided dace, fat golden bream, and perhaps a logger-headed chub or two, all to be laid cleanly on some fresh cut sedges, and borne to the little hostelries that he has made his headquarters, for distribution (save the perch, in which his spouse delights) among the poor, the sick, and the needy of his little neighbourhood.

Compare these two modes of courting the appetite of the roach. A passionate votary of this latter mode of roach fishing tells us:—

"You are not to fancy that it is when the stream is clear and winds are soft, only, your work on the lesser river will be remunerative. Even when the water is full charged with rain, and thick with flood-born sediment, and the bosom of the Thames is deserted and desolate, and the citizen wistfully eyes his rod in the corner, and taps his weather-glass, you may by a little use of cunning, secure good sport."

"Mind, it is of no use in the world trying to do anything on the first or second day of a flood. Fish are sick, and will not feed. But about the third day, provided there has been no

An observant writer says: "I do not think much of gentles by comparison with paste, except in the Thames and in other swift streams. In the slow rivers of East Anglia roach do not seem to care for them, unless it is in July, offered singly, on fine tackle, without float, two inches below the surface, on sunny shalows. Earlier than July, and later than April, roach and similar fish should not be angled for."

We differ from many first-rate roach fishers as to the distance the bait should be from the bottom, when fishing a permanent swim and seated on the bank or in punt; many contend for four or five inches, according to the depth of the water, while others insist upon an inch. An inch is certainly getting very close, and it would seem like splitting hairs to suggest a yet closer approximation; but this we do, if the bottom be perfectly level, free from large stones, weeds, and of fine gravel or sand. Indeed, we would rather the bait slightly dragged, than not be close upon the ground. Some of the best anglers, in reply to this, tell us that roach can see better above than below them.

This may be so, or otherwise, but we have no proof that they are an essentially surface or midwater feeding fish. On the contrary, we have watched too intimately the habits of roach, not to know that roach, bream, and carp, very often, when they are actively on the feed, have their tails higher than their heads and their vision directed to the bottom.
WE have already had a few words to say upon flower-boxes from the gardener's point of view, we now take it up from the joiner's, giving the technicalities omitted from the previous articles.

It is scarcely possible to think of a more graceful or more refined decoration to a house than a well-arranged flower-box on the sill of each window. The placing and culture of the plants may be well made over to the ladies, but at least they can expect of their husbands, sons, or brothers, that they should provide the boxes; and for doing this is not the reward great indeed?

We are invited in the morning to see how well the flowers are wholesale warehouses, where the people are often glad to get rid of them at a mere song, "as the saying is."

Let us assume for our present purpose that the box we are about making is to fit a window three feet wide, and, before commencing, we must call attention to our sketch of the finished object (Fig. 1).

From this it will be observed that the box represents a garden wall, made of rough, or rusticated stones, with a square pier at each end.

Now it will be seen that these piers, being three inches thick, take up a portion of the width of the front, and project also a little beyond it, outside the width of the window opening. This

Fig. 1.—Window Box.

will be better understood from a, Fig. 2, which represents the plan of the box.

Cut the back to the proper length, keeping it, of course, a trifle smaller than the width of the window, but cut the front four inches shorter, for it will be seen that the piers at the angles are three inches square each, and as of this thickness one inch is outside the length of the box, two inches of the thickness of each pier will be deducted from the length of the front and of the sides; the back being, therefore, three feet, the front will be two feet eight inches long. The width of the box from front to back is to be eight inches, and as the pier at the angle encroaches on the sides in the same degree as on the front, their width will be reduced to six inches. The back corners are to be dovetailed together in the manner shown in former papers.

Having cut the corner piers to the proper length—say eleven inches—the next object is to attach the sides to them. We say "the proper size," but what that is to be must be left to the taste of the amateur joiner; the piers should, however, be carried about one inch below the bottom of the box, and

23
slanted off at their lower end. This is to allow for the slanting surface of the window-sill, which is "weathered" so that the rain water may not lodge on it. The box therefore rests on its lower edge at the back, and on the two feet formed by the ends of the piers in the front. There will thus be a small space between the front of the box, and the sill on which it stands.

Now, in order to fix the front and sides to the piers, nail against the inner sides the two strips of wood one inch square, the nails running in the direction indicated at A and B. These nails, must, of course, not be on exactly the same level, or they would meet in the pier and cause bending.

Against these strips the front and sides are now to be nailed, as shown at C and D; the sides having been previously dovetailed to the back. It must be remembered that the parts must fit well together, and that the work must be strong and durable, as the box has not only to stand all sorts of weather, but is kept filled with damp mould, which is very likely to cause the wood to warp, and burst the box.

Having thus built the walls of the box, nail a strip of wood one inch square all round the inside at the bottom. This is to form a strong ledge, E F G H on which the bottom is to rest. The whole of the inside should either receive two or three coats of good paint, or, better still, you may give it a couple of coats of tar, which will effectually prevent the rotting of the wood.

The mere construction has up to this occupied our attention, we will now proceed to speak of the decorative part of the object. First as to the front. Although the box is nine inches deep, the front should be eleven inches, and the whole length having been divided into an odd number of parts, the divisions are to be sawn down, the alternate pieces being removed; thus giving the embattled form to the upper edge, this may be further improved by nailing additional strips cut in a bevelled fashion, on the tops of the pieces, this will be readily understood from the sketch.

Next take four strips two inches wide, half an inch thick and exactly of the length between the piers. Plane off, or "bevel" the edge of one of these, and nail it (with inch "sprigs") along the lower edge of the front.

Then divide the other three strips into eight or nine equal parts, saw nearly through the divisions; bevel the edges of the strips on both sides, and bevel also both sides of the divisions. This, too, will be understood from the sketch (b). Two of the strips should be like our illustration, and the strip between them should be divided, so as to "break joint," that is, the joint should meet the middle of the spaces of the other strips, and should not coincide with the joints.

The pyramids on the tops of the piers may either be made of single blocks, or may be made up of several pieces, according to convenience.

The box is now to be painted. It certainly should not be (as window boxes often are) green, but a good grey stone colour will be a nice quiet tint, and will show off the green leaves to advantage. The whole of this part of the matter may, however, be left to the taste of the maker.

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**SKELETON LEAVES.**

By Eliza Cheadle.

**FEEN BLEACHING—TO MAKE A GROUP FOR A SHADE.**

"Why did you not tell us this before!" say you in grumbling tones, "and then we could have put them into that dreadful tub, and all the disagreeable process of maceration would have been finished at once."

Good people all, the fronds of ferns have not attained their
SKELETON LEAVES.

proper age at the same time as have the leaves of ordinary trees, and also, ferns cannot be skeletonised—bleaching is the only process through which they have to pass, and, let me tell you, if they pass through that unseathed, you may consider yourselves clever people for enabling them to do so. For, as with the holly leaf, many persons there are who, after vain attempts, finally relinquish the hope of ever accomplishing a perfect specimen.

When the back of the fronds are covered with seeds, then set forth to gather your ferns; eschew hart's tongue and the like strong ferns, as unsuitable for your purpose, but particularly favour delicate species, like the elegant Adiantum or well-known Maidenhead, the oak and the beech, and other varieties. They must now be dried; lay them out very exactly, between sheets of blotting paper, and then press them with weighty books. When they are quite dry you may prepare to bleach them.

You will find that the fronds of ferns are much more delicate things to deal with than are the leaves of trees. Of course, the length of the sprays being so much in extent of that of a leaf adds to the difficulty of management; but apart from that, they are very much more brittle, they are apt to snap apparently without the least provocation. For this reason I should advise you to have as little to do with them personally as you possibly can, neither handle nor touch them if you can help it; use a long piece of cord on which to float them when they are being transferred from one place to another, and when they are dry, a pair of forceps will be less liable to injure them than your fingers.

You will require a jar of moderate dimensions in which to place your specimens; curl the longer fronds round, so that they may run no risk of breaking or injuring their lengthy spines, and in the centre arrange the small sprays. I would not put too many, for it will be far more difficult to take them out unhurt than it was to put them in.

Now pour in the proper proportion of solution of chlorid of lime, namely, one table-spoonful to two quarts of water; that being done, cover over the mouth of the jar and set it in some warm corner. But keep your eye upon it; watch your specimens very closely and carefully.

A couple of days' incarceration will be quite long enough to turn the most delicate from green to white—it may be some will change more quickly than that, but directly you perceive that a frond is transformed into a snow-flake, lose no time in abstracting it; transport it without delay into a shallow basin of tepid water, for ferns become so brittle as to be comparatively useless if they are allowed to remain in the bleaching liquor after they themselves are bleached. Nay, they will not escape with their lives, for the solution destroys them altogether if they are left too long in its strong waters.

Sometimes, with large and handsome sprays, a difficulty occurs, the tip is bleached and ready to be taken away, while the other end is by no means as forward. What is to be done?

How is the one half to be saved from destruction, and the other to be perfected?

Take the whole frond out into the shallow basin before mentioned, and divide the fern, letting the bleached part remain, and putting the other back again until it has finished its transformation. The two halves can very soon be made one again, by uniting them with gum-arabic after they dry. You will see by this that it is better to be content with shorter fronds, and aim at perfection of beauty rather than at superiority of size.

In the same way in which you washed your skeleton leaves, the ferns also require to be well cleansed from any lingering suspicion of chlorine which may be lurking about, therefore, they must be allowed to remain some hours in the tepid water, and that must be changed several times before you can presume that they are fit to be dried.

Place them on a sheet of blotting paper, and straighten out all the little crumple with the point of a pin, then put that sheet between two others, and as before, press them under books. Let them remain in strict privacy until you want them for the bouquet, for the air which is essential for the expansion of the green frond, makes the white one shrivel and curl. And here let me mention, that, perhaps when you come to mount them you will find that they adhere to the paper—do not in your haste, try to peel them off, but press your thumb-nail on the back of the paper, and you will find the fronds will drop away.

I hope that you are not affronted at these simple suggestions, but I find that a knowledge of what are called trifles helps more to complete success than people are generally inclined either to think of or to allow.

Now let us turn to the grouping, of which there are several designs to be discussed. We will speak first of that which is to our mind the easiest of accomplishment, although, let me premise, the mounting of these frail specimens is at any time a troublesome task, and one which requires dexterity and delicate manipulation; an art, therefore, which needs practice to make the artist perfect.

As most if not all your leaves are without stalks, and as the stalks of some of the seed vessels, the poppy in particular, are sure to be too short, the first thing to be done is to prepare substitutes for them.

Some people bleach stalks on purpose, but they will always be brittle; and wire covered with paper, which has also been used as a substitute, will surely be detected. The best plan is, to gather branched twigs from the hedges in the winter time—or at any season I dare say you will find hardened ones for your purpose—also the stems of Canterbury bells will be a help, paint these over with white oil colour, and let them thoroughly dry, before you begin to tie your leaves on to them.

The next thing to be thought of is the stand; a round one of walnut wood you must order, with a groove an inch from the edge, in which the protecting shade must rest, for these frail beauties must be placed in a glass case. Cut, in stiffish cardboard, a circle which will fit in that on the stand, marked round by the groove. Buy or beg a large bung cork about three inches in diameter, and shave off its edges in a gradual slope, leaving no hard or square ridges, which would considerably mar the after effect.

Fasten this on to the centre of the cardboard, by passing threads across it systematically, marking it out into quarters, but do not squeeze it too tight; or you will warp the circle. Now for some wadding to put round, between the edge and the monster cork, fill it in evenly under the threads, and lastly put one thin layer over the whole.

When the slope from the centre down to the edge is quite even and gradual, when every side seems alike, then the mould is perfect, and may be crowned with velvet—choose a dark colour, raven black, royal blue, deep crimson, or sombre green—the darker the shade the whiter will look the transparencies which rest upon it.

Cut a circle of velvet an inch larger in diameter than that of the cardboard, and round its edge run a strong thread, do not be in a hurry to fasten it off, for you will most probably have to draw and undraw again and again, in order to smooth the down or alter the wadding.

When the cushion looks shapely, fasten down the velvet by lacing it to and fro underneath, but not too tightly, be it understood, or you will injure its constitution. Lastly, secure it to the stand by glue.

Now you must look for a couple of bradawi's, one large and one small, and with these tools you must ruthlessly spoil the
present beauty of your cushion by thrusting them through the
velvet down into the cork, a hole in the exact centre fitted for
a large twig, another here, and a smaller one there, up and
down and round about, but not any close to the edge.

It is time to put together what you wish to exhibit in your
group. The arrangement must depend greatly on your own
taste and sense of beauty; but I can offer you a few hints. The
stem in the centre should be the highest, and that should be
three inches lower than the shade. The lighter and more fragile
leaves should be placed high, and the larger specimens left to
guard the base.

Secure the leaves to the whitened twigs by winding fine sewing
cotton round and round, and should that show, paint it over
with Chinese white. On some fasten one leaf below another, on
others make a little cluster; and let me whisper to you, that we
are not at all particular in these cases, for we often arrange that
two leaves of quite a different species should apparently grow
on one stem. When the twigs are sufficiently ornamented, dip
one end in strong gum, and then put it in the hole, where it will
remain quite secure. Begin at the centre, and work round and
round from it. You must introduce different kinds of seed
vessels, by way of variety, and when all the holes are filled,
you must put the finishing touches.

Take the forceps, and with them place single leaves here and
there, wherever there is a gap which wants filling up. The
sheeny seed vessels of "Honesty," are excellent for this, so are
the broad leaves of the Magnolia, if they are arranged at the base,
and that is the place for the heavy thorn-apple. Here
too, in a lowly position, must the ferns lie, for I regret to say,
if they have no support they invariably curl up, and do no justice
to themselves or to any one else; but, after all, they look very
lovely lying on the dark velvet.

Your work is all but complete, and you should now have
such a group as we have shown at pages 249 and 397. Go
a length of chenille round the edge of the glass shade, by
way of keeping out the dust and forming a pretty finish;
then put it over the fairy bouquet, and carry it in triumph to
whosoever you love best.

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DRAUGHTS.

By George Frederick Pardon.

THEORY OF THE MOVE—THE SECOND POSITION.

It is often important towards the end of a game to ascertain
whether you "Have the Move," that is to say, whether you
occupy those squares which enable you to fix your adver
sary, man for man, on every available square. The first moves of
a game do not immediately affect its ultimate fate, but when
there are only few men left on the board, it is of the utmost
consequence that the player should know whether or not he Has
the Move. Here, for instance, is a simple example (Fig. 1).
White having to play can fix the black man; but Black, even
with the move, cannot prevent his opponent from crowning
his man.

White's first move is 30 to 26; Black can only move from 4 to
8; White then advances to 23, and Black to 11 or 12, in either
of which squares he is fixed by the man moved from 23 to 19.
The whole secret of the First Position, as shown in my last
article, depends on the fact of the attacking man Having the
Move.

Well, how are we to ascertain whether or not we Have the
Move? There are several ways, and perhaps the easiest is

Fig. 1.

THEORY OF THE MOVE—WHITE TO PLAY AND WIN.

Now play them as you please, and you will find that either
playing first has the move.

Another plan which, like the above, holds good with any
number of men on the board, is this:—When you wish to
know if any one man of your own Has the Move of any man of
your adversary, examine the position of both, and if you find
a black square on the right angle under his man you Have the
Move. For example, you have a white man on square 30, and
he has a black man on square 3.
It will be seen that the right
angle is in a black square between 31 and 32.
Or, if your man
had been on 29, the right angle would have been found
on the black square between 30 and 31; or, if it had been on

Fig. 2.

THEORY OF THE MOVE.
square 31, the right angle would have fallen on the black square in the corner, and the move would have been with your opponent.

A third plan is to count the men and the squares. If the men are even and the squares odd, or if the squares are even and the men odd, you have the move. With even squares and even men, or with odd squares and odd men, the move is with the other side. Place a white man on 32, and a white king on 28; a black man on 19, and a black king on 25. We reckon the squares; from 26 to 28, the squares are odd and the men even; and so also from 32 to 19; five squares each, and two men each, therefore, the side whose turn it is to play has the move.

This having the move, is so essential an element towards the end of the game that it must be even further exemplified.

Has the player who begins the game the move? the men and the squares are both even, and thus the second player has the move; but it is of no consequence at that stage of the game. If the players continue to give man for man, the move belongs to each alternately; and till some error is made the move cannot be forced. The diagram (Fig. 3) will, perhaps, better illustrate this.

All the men—both black and white—on columns a b c d are to be added up, and if the total is odd, the side having to play has the move. If no men are on the lettered squares, then take the figured, 1 2 3 4; but do not combine the two. We have an example of this plan in Fig. 4.

If we apply the rule we find that White has the move, there being nine men—an odd number—on the columns a b c d.

When you have the move the plan is not to exchange, as, if you do, you will generally lose. In the above position White would force the win:

<table>
<thead>
<tr>
<th>White</th>
<th>Black</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>12</td>
</tr>
<tr>
<td>30</td>
<td>6</td>
</tr>
<tr>
<td>24</td>
<td>10</td>
</tr>
<tr>
<td>21</td>
<td>13</td>
</tr>
<tr>
<td>25</td>
<td>9</td>
</tr>
<tr>
<td>32</td>
<td>6</td>
</tr>
<tr>
<td>25</td>
<td>9</td>
</tr>
</tbody>
</table>

And now what has Black to do? Move as he may he must lose a man; and there are but two squares—15 and 11—into which he can move. Therefore White wins.

To regain the move, change man for man, so that only one capturing piece remains on the board. Fig. 5 is a good example of this.
THEORY OF THE MOVE—TO REGAIN THE MOVE.

White having to play, wins by moving 24 to 19, when Black must take—15 to 24; and White retakes—29 to 19—and fixes
the man at square 12. The capturing pieces are 15 and 28,
and, as only 23 remains on the board, the move is changed.
This theory has been shown by various writers—Martin, Payne,
and Paterson, among others. (Fig. 5.)

The Capturing Pieces must be in different columns, in order
to effect a change of move, and it often happens that a single
exchange of men alters the move from one to the other player.
This could be shown in a score of diagrams; but enough has
been said, I think, to prove the value of the theory, and the
importance of its application.

We see this plainly enough in the First Position; but it is
exhibited even more distinctly in the Second Position. It does
not, it is true, very often occur in play, but the principle
that governs it is essentially the Having the Move; and is
therefore, a proper corollary to what has gone before. The
forces are equal, and at first sight it would seem that either
side playing first must win. Place the men as in the last
diagram (Fig. 6).

SECOND POSITION.

The Black men are moving downward, and the White upward;
and if the moves of the solution be followed, it will be found
that White wins perfecly.

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LEGGERDEMAIN.

By A Professional.

THE CALDEON TRICK—THE CYLINDERS—THE JOINED STRING—THE CUPS AND COVERS.

T is a great mistake to suppose that conjuring tricks are only
intended to amuse children. Conjuring is not only itself a
science—a much neglected one—but is a combination of
many other sciences. Some tricks are performed by means of
chemistry; some by means of electricity; some depend upon
mechanical contrivances; some are only to be explained by
the simple but not universally understood principles of hydro-
statics.

Had the Atlantic cable been secretly laid down a hundred
years ago, and brought out as a conjuring trick, the world
would have been divided into two classes—1. Those who obstinately
denied the fact of any instant communication with America
ever taking place at all; 2. Those who believed the fact, and
attributed it to supernatural agency. Is the world much more
enlightened now than then? We fear not. So-called modern
spiritualism is somewhat in the position of what we have sup-
posed the telegraph would have been in if its secret had been
the property of but a few. And, even now, we doubt if the
majority of people in this country believe the fact that the
result of the Oxford and Cambridge boat-race, which takes
place, say at eleven o'clock in the morning, is known in New
York before eight o'clock in the morning of the same day.
Even while we write we feel that many will say, “Of course he
means the other way.” We do not. We maintain again, that in
England a man may breakfast say at 9 o'clock, go out after he
has finished, and witness the race at Putney, and on the same
day a man in New York may breakfast at 9, and at the same
time, read an accurate account of the race in one of the New
York papers.

There is a conjuring trick which is performed by means of
the electric telegraph, which consists of a glass bell hung
to a string suspended from the ceiling. This bell answers all
sorts of questions.

The trick which forms the subject of our engraving (p. 361) is
one that was performed many years ago by Professor Anderson at
Covent Garden Theatre, and at the time made a great sensation.
The performer first fixes on the stage a tripod somewhat similar
to the one generally used by gypsies to hang their kettle on.
He next shows to the audience an empty caldron, and then
takes it to a small chain hanging from the top of the tripod.
He next brings on to the stage several large buckets full of water.

When we come to examine the theory of the Losing Game
we shall still further discover the value of The Move.

Enough, however, for the day.
neath the stage exhaunts the air from the end of the hollow tube, which fits into a small round hole in the floor, the water instantly rises up through the handle, through the chain, runs down the hollow rod, and continues to flow so long as any water remains in the caldron.

The pigeons are introduced by means of the lid. The inside of the caldron is usually of black tin. Now, some eight or ten pigeons are concealed in the lid, but the black piece of tin which keeps them in is made to fall by turning the handle of the lid, and fits exactly in the bottom of the caldron; both being black, it is of course not noticed. When, therefore, the lid is taken off, the pigeons immediately fly out. It must be borne in mind that a pigeon, though apparently a large bird when flying, can be put into a very small space.

We will now describe how to make, out of pasteboard, a very admirable trick, and one which has not, to our knowledge, ever been exhibited in public, but the conjuring table that we have described is necessary for its performance. The conjuror first places on the front part of the table a good-sized sheet of paper—the thin whitish-brown paper used by linen-drapers to wrap small parcels in—is best for the purpose. He then advances to the audience, and borrows from them four or five handkerchiefs, and taking them in his hand, so that all can see they are not changed, proceeds to fold them carefully up in the paper, previously turning up his coat-sleeves, to show that he does not make away with them by that most generally suspected but rarely used means. He then places the paper parcel containing the handkerchiefs on the ground, in front of some one of the audience, with the request that he will watch the same.

The conjuror next hands round for inspection two empty pasteboard cylinders, one of which acts as a cover to the other. These cylinders are about a foot and a half long, and about two inches and a quarter in diameter, and are covered over with either coloured or gilt paper, which gives them a very pretty appearance. The conjuror places them one on each corner of his table, and points with his wand to the parcel containing the handkerchiefs, and informs his audience that he will cause the latter to leave the parcel and to enter into the empty cylinders. He now takes the cylinder, the cover of course in his right hand, and the other one in his left, and, showing first one empty and then the other, puts the one over the other, and places it by the side of the paper parcel containing the handkerchiefs.

He now takes up the small paper parcel, and squeezing it up very tight into a ball, shows that the handkerchiefs must be gone; he again takes the small piece of paper tight in his hand, and touching it with his wand, which he takes from his pocket, opens his hand, and lo! the paper itself has disappeared. He now touches the top of the paper cylinders with the wand, and says, "Pass!" Then opening them, the first thing that appears at the top is the pocket-handkerchiefs previously borrowed, neatly folded up and scented, underneath them come the piece of paper which previously had enclosed them, and which some one will very likely recognise by a large ink splash on it. The conjuror now takes a small plate, and again tapping the cylinder with his wand, pours out a whole heap of sugar-plums, which, if the audience be composed of children, will probably call forth more applause than any other part of the trick. The next point is—How is this done? Like all other good tricks, the explanation is very simple.

First, how are the handkerchiefs got out of the parcel. The paper, as we said, is placed on the table near the front, i.e., just in front of the small trap-door. Now, the confederate underneath can, of course, hear all that goes on, and the conjuror always uses the same words, i.e., he lets his confederate know beforehand at what words to quickly open the trap-door, put his hand up and reach into the folding paper, snatch the handkerchiefs, and re-close the door like a flash of lightning, though without the slightest noise. Now it is evident that in order that this may be done without its being seen, it must be at the exact moment when, in folding up the paper, it is raised sufficiently high to hide the hand.

The proper way, therefore, to fold the handkerchiefs up is to fold across first one side of the paper and then the other, and, by keeping down the front part, to cause the paper to rise up high enough to hide the hand coming through the trap. Care, too, must be taken to fold the paper naturally, that is, although it is empty, yet to make it look as if something were inside it. In order to do this properly we would recommend any one, before he exhibits this trick, to get two pieces of paper the same size, and to really fold up a few handkerchiefs in one, and then to practise folding up the other paper to look like it.

We will now call attention to Figs. 1 and 3. Fig. 1 represents the cylinder which is given to be examined, and Fig. 3 the cover, which, it will be observed, is made rather larger at the bottom, to facilitate its being put over the other. But what is Fig. 2? Fig. 2 is a small round pasteboard cylinder, that fits tight inside Fig. 1. Now, when the conjuror, standing behind his table, shows first the cover empty, and then the cylinder about to be covered to be the same, while he is showing the latter he allows the former to rest for one instant over the small round trap-door, and in that instant the confederate opens the same and pushes up the small pasteboard cylinder (Fig. 2), filled first half full of sweetsmeats, then a piece of paper exactly the same size, and containing exactly the same marks (purposely made) as the paper in which the handkerchiefs were wrapped, and lastly, the borrowed handkerchiefs, which, by means of being first damped with a little scent and afterwards smoothed and folded with a warm flat iron, are made to look as if fresh from the hankins's hands. The conjuror, as soon as he feels Fig. 3 safe in the cover, pinches the latter, to prevent the small cylinder from falling out, and quickly places it over the cylinder, which the audience have previously examined, and pushes it well down, thereby causing Fig. 2 to fit inside Fig. 1.

It will be observed that Fig. 2 is made a little small just at the bottom, or it would very likely catch in covering up Fig. 1. The trick may now almost be said to have been completed, but the performer must recollect first to delay the examination of the cylinders by the audience long enough to give his confederate time to fold up the handkerchiefs; and not to be in too much of a hurry to show the paper empty directly he has safely got the things into the cylinders. In fact, as we have said before, he should allow sufficient time to elapse between the "critical moment" and the "dénoncement."

Of course the paper is got rid of by palming, and is placed in the pocket when the wand is taken out.

The trick can be done without any palming at all, if the performer is not up to that most difficult of all pieces of sleight of hand. In this case no paper must be placed in the cylinders, and the small paper parcel, after having been squeezed into a ball, must be thrown to the audience to be examined. It is important, in making this trick, that cylinder 2 should fit very tight into cylinder 1. Should the handkerchiefs be rather large, and stick, and the inside cylinder not fit tight, it would very likely happen that the cylinder might be pulled up in taking them out. On the other hand, if it does fit very tight, the cylinders can be handed to one of the audience to be opened, but of course the eye must be kept on the person; it will, however, almost always be found that the unexpected rush of sugar-plums is sufficient to divert attention from any close scrutiny.

We will now describe a trick which requires no apparatus and very little sleight of hand, and which we will designate—How to cut a piece of string and to make it perfect again by
blowing on the knot." The string is held apparently carelessly between the thumb and finger of each hand, and some one is requested to cut it in the part stretched. The two ends are then tied together in a small knot, and the knot placed in the folded hand. On blowing on the hand and pulling the string through, the knot has disappeared. This trick, which, when well done, is really more effective than many would imagine, instead of the string being cut in the middle, only a very small piece has been cut off one end. The ends C and A, Fig. 5, are now tied together in a small knot, not too tightly, this knot will, of course, slide along the string. When, therefore, the knot is placed in the hand, and the string pulled, the knot remains behind, and must be got out of the way while the person is examining the string to see where it has been cut.

![Fig. 5.—The string trick.](image)

The cylinder trick also deserves mention. Fig. 2 represents the string in the form of a cylinder, or tube. Fig. 1 represents the tube when slit down the middle, and Fig. 3 shows the parts over. The string is then tightly wound back and forth, as shown in Fig. 4, and the tube is thus formed. The tube is then cut exactly in the middle, and the parts are brought together as shown in Fig. 4. The person, who is requested to cut the tube at any point, will find that the parts do not separate, if cut exactly in the middle, for the string is wound so as to form a knot in the middle of the tube. The knot is then tied firmly, and the tube is placed in the hand. The string is then pulled, and the knot will be found to have disappeared. This trick is very effective when well done, and depends entirely on the way in which the string is folded. Fig. 4 represents the string before it is cut; the join, or rather the folds at A are hidden by the right-hand finger and thumb, and the folds at B by the left-hand finger and thumb. The person is requested to cut the string in the part stretched between the two hands, viz., in C. Immediately this is done, leave go of the parts held between the left-hand finger and thumb, and let them fall, but keep tight hold of the parts in the right-hand finger and thumb. Fig. 5 represents the string after it has been cut, the part A being of course carefully concealed between the right-hand finger and thumb. Now it will be observed that another good trick can be done by means of some small cork balls and three cups or covers.

First show all three covers empty, then take up a small ball and place it first in the hand, and then under one of the small covers, by sliding the cover down the hand. One ball must be placed under each cover by this means, and the three covers arranged side by side on any ordinary table.

You then touch the three covers with your magic wand, and, lifting the two corner ones, you show them both empty, but on lifting up the centre cover, behold! all three balls are there! This trick, which requires great practice, is done as follows:
You have altogether four balls, one of which is concealed in the hand at starting. On taking up the first ball between the finger and thumb of the hand that contains the concealed ball, you palm it into the other hand—i.e., you retain it in the first. When, therefore, you slide the cover down over the hand, it being an empty one, of course, nothing goes under the cover, though apparently, if the palmning has been well done, you have placed a small cork ball underneath it. You have now two cork balls concealed in one hand; on taking up, therefore, the next cork ball in the same hand, you have to pass it really into the other hand, and with it the other two balls. You now take up the middle cover, and, sliding it down over the other hand, of course, all three balls go under it.

The remaining ball, of course, is palmed, as the first one was, as round as possible, first with an ordinary penknife, and then burnt in the flame of a candle, and quickly blown out, which has the effect of rendering them perfectly hard and smooth.

The advantage of their being cork is that they do not make any rattling sound on being placed on the table.

GAMES OF THE PLAYGROUND.

BY C. W. ALOCK.

KING OF THE CASTLE—TIP-CAT—THRAP.

FANCY that most of you will know this game by heart, so that it will require little explanation.

It is an amusement that will warm you in the cold days, so that it has its uses, like other things of greater importance.

Any mound or piece of rising ground in the playground will serve to represent the castle. You can select your king by vote of the people, if you are republican, or by unanimous consent, if there be any of you deemed superior to the rest. He stands upon the mound, and immediately announces his royal position by the proclamation that he is the king of the castle. At once come cares of his high office, and he realises the force of the statement, “uneasy lies the head that wears a crown;” for his kingdom is so soon gained than he is subjected to a series of persistent attacks from all sides, with a view to his immediate dethronement.

Obviously the aim of the players is to secure the deposition
of the king from his advanced position by pulling or pushing him down so as to secure his displacement in favour of another candidate, and he will find it difficult enough to maintain his position. It is not as if he had only one opponent, but he will be surrounded on all sides, and he will indeed be lucky if he succeed in warding off the attacks for any length of time.

He can only, though, be ousted by fair pulls and pushes, and it is illegal altogether to catch hold of his clothes to secure his removal from the throne.

In the case of violation of this rule the player so offending must sit down upon the ground; while, in the event of success, the player who secures the dethronement of the existing monarch becomes in his turn ruler of the castle, and subject to the same continuous attacks as was his predecessor. In fact, the throne is never vacant while the game lasts. "The king is dead! long live the king!"

TIP-CAT.

If you are in need of an amusement that will necessitate the full development of your reflecting faculties, I would advise you to abandon all idea of finding any sport in the humdrum exercise of tip-cat. Indeed, I will go further, and recommend you at once to fly at higher game. You will find that the creative brain will discover so field for its talents, and that there is hardly, in the whole category of pueller recreations, a more simple and unpretentious affair than is tip-cat at its best.

Perhaps, though, it is not the only one that can be classed under the same denomination, you will say, and you are right. It is this same simplicity and absence of all technicality that chiefly recommend the games of our British playground, so that, after all, tip-cat has its advantages and its uses, the same as cricket, football, croquet, and other pastimes of a far more ambitious and pretentious character. You will at least respect the name of tip-cat when I tell you that it is not a parens in the rank of games, but a venerable exercise of illustrious parentage and high descent.

You may smile at the idea that it can lay claim to be, in some degree, the foster-parent of the greatest pastime of our British Isles, that cricket, which the author of "Tom Brown's School-Days" says "is more than a game; it is an institution as dear to Englishmen as hallowed corpus or trial by jury." It was the old amusement of "cat and dog," or tip-cat under a more respectable title, that first overshadowed the diffusion of cricket; so that I must ask you to be respectful, if you please, when you mention the subject of a game that can boast so exalted an offspring; whether its descent or parentage, though be illustrious or otherwise you will find, if you are only moderate in your desires, that tip-cat will furnish you with some little excitement, unless you belong to the order of insatiables.

It is not an exercise that will warm you in mid-winter, when the snow is on the ground or the frost-king reigns supreme, but it will do well enough to while away the time between school hours, when you are only left loose for a little spell of fresh air, and that terrible ogre of a school-bell is on the watch for your annoyance. You will not require a luggage-van for the carriage of your implements, for your wants will be confined to the cat, which is represented by a small piece of wood sharpened at both ends, and a stick made not unlike those shapely instruments provided for the defence of Policeman X and his trusty colleagues. When you are equipped with these ligeous appendages, you will be fully attired; and, provided that you have duly engaged an adversary with whom to compete, you may as well go through that inevitable British ceremony of toasting for innings.

Meanwhile, though, you have marked a small ring or circle in the ground, in much the same manner as the "home" in rounders, as well as a line about three or four yards distant, for purposes which you will soon discover. If the spin of the coin has been in your favour, you will naturally choose to take the innings, and you will take up your position, stick in hand, close to the circle previously marked in the ground for your benefit. Your opponent on the other hand has, as his arms, the cat itself, and for him is reserved a station at the line before mentioned, which, it as well to remark, is technically known by the title of "offing." At this offing there stands your adversary, and his duties are much the same as the feeder in rounders, though here he is termed "pitcher," and his work is not quite so onerous. You will have to be careful, I warn you; for if he succeeds in pitching the cat into the ring that you are protecting, your reign will be over, and your deposition will secure his advancement. You may take some little consolation in the reflection that this feat is not so easily accomplished, for the cat is a volatile little creature, and its springs are not remarkable for consistency in any degree. It is necessary, to secure your deposition, that the whole of the cat shall remain in the ring, or the attempt at the "home" throw will have been unsuccessful. If your opponent has succeeded, as I have said, you will have to cede the stick to him; but if, on the other hand, he has failed, you will have your revenge in the following manner. You will stop down for the purpose of hitting one end of the cat with your stick, and, as it rises into the air, of propelling it as far as the force of the stroke will allow. It is this tipping the one end of the cat that gives the name to the sport, and you will be surprised when you see how the cat jumps, or rather at the marvellous distance that the cat will compass in its flight from one of these blows. Should the cat be altogether outside the circle, you have the privilege of three strokes, but if any portion should be either over or on any part of the ring, your number is reduced to one shot, and your chances considerably reduced.

I will grant that you have struck the cat, though, and that you have some reason to be pleased with the success of your first effort. You will now have to use your brain as well as your eyes, for you have to name a certain number of sticks lengths as a specific measurement from the centre of the ring. It is here that you may fail; for if the number be less than what you have given, your innings will be over, and your opponent will go in. It is here too, though, that you have an equal chance of success, for, if the number be greater, you may add the amount to your score, and this score will decide the result of the game when you have each reached so far as the luxury of a double innings. So much for the profits; now for the penalties. These are much the same as in rounders; for the only mistakes that can be made are in missing the cat when in the act of striking or in being caught when the blow has been struck.

You must not think that this is the only method of playing tip-cat, for there are varieties and differences in it as in most sports. In my younger days it was customary to decide the measurement by jumps; and I question whether this is not the better plan, as it produces much emulation to achieve the distance within the prescribed limit. I have seen tip-cat, too, pursued under the influences of a larger area of ground, with the ring or circle of vastly increased dimensions, and the difficulties of the game generally enhanced. I have indulged in it also under a regular arrangement of players, with sides duly formed, and as a pastime governed by specific laws. It may be that it resolved itself then into a mere imitation of rounders, as it was undoubtedly with similar organisation of players, similar formation of ground, and similar penalties;
but I believe that it was the best species of tip-cat that it was ever my good fortune to meet, and I beg to register my vote and interest therefore as emphatically on the side of tip-cat revised and enlarged. Of late I fear that tip-cat has lost much of its ancient popularity, or that its influence is not so widely felt in the neighbourhood of the playground as of old. I have seen it myself, and recently too, but it has not been in aristocratic districts or in the hands of respectable personages.

If you were to force me to a more detailed account, I should have to own that it was in the odorous alloys that encircle the great theatre of Drury Lane, and that it was practised there by youthful gymnasts not the most delicate in attire, and certainly not blessed with an exuberance of shoe-leather. You can see it for yourself at any time, I have no doubt, in the neighbourhood of St. Giles, on the broad pavement, if you choose the correct place and hour; but you must be careful and circumspect in your movements, for in the hands of the ragged gamins who affect the game in those quarters, the cat flies slowly and noislessly; and many an old gentleman of timorous habits and insufficient disposition has had good reason to curse the hour when he became forcibly acquainted with the missile yeclipt the cat. Do not be disheartened, though, I beg, from this lugubrious picture. I am looking on the dark side of what should be bright enough in every scene; so, take tip-cat on its merits, and you will plump for it, I guarantee you, as heartily as we, who are now in the sere and yellow leaf, used to in the brave days of old.

TRAP, BAT, AND BALL.

It may be that the game of trap-ball is not so popular as it was, and that, like many other kindred pastimes, it has faded somewhat with the efflux of time. I will admit that, even now, it is not seen in practice so often as it was; and that it has given way to a more energetic order of sport; but it is a pleasant amusement none the less, and will serve its purpose well when more active recreation is out of the question. Again, you will have to go through the inevitable process of tossing, for it is necessary, in the proper interests of the game, that the players should be divided into two distinct sides, as in countless other British amusements. It is necessary that there should be some feeling of honest rivalry to give a fillip to what would otherwise be possibly dull and uninteresting, so that the toss is after all an essential evil, and must be endured. It is best that there should not be more than four or five of each party, or you will find that the innings follow each other too closely, and are of rather too brief duration to be productive of much excitement. If you want to make the game brisk and lively, you should have in all ten players, who can field and travel after the ball like lightning, and you will, under these circumstances, find trap-ball as merry and as jolly as the best of you can desire. If you have won, it will be natural that you will elect to handle the bat, or you will belong to very different order of being to those that I have met in the course of a lengthened experience. I have mentioned the bat, for it is usual to have an instrument fashioned after the manner of an ordinary bat on a reduced scale, though, in many cases, a stick well rounded is used to serve the same purpose. The trap is made of wood, in a form not unlike that of an ordinary shoe, the indentation representing the heel being completely filled by a wooden wedge, so arranged as to move on a pivot, the other end balanced just above the instep of the shoe. When everything is arranged, the side having the innings take the bat in order, each trying to make the largest score, as at cricket.

The ball, for the first time mentioned, is placed in the heel of the shoe, resting as in a cup, the striker standing with his bat in hand. To secure a good stroke he hits the narrow end of the wedge smartly with his bat, and as the ball mounts into the air, he strikes as hard as he can in a given direction, the object being to prevent a catch as much as possible. It will be seen, therefore, that the out-side are equally on the alert, as, should the striker hit the ball so that it is caught before it touches the ground, he is out, and the next of his side takes his turn with the bat. He may be out, too, if he hit the ball outside the prescribed limits; but generally it is the better plan to dispense with this provision, and give the striker the benefit of the whole ground, instead of cramming his strokes by the infliction of a penalty.

The striker, then, has made his first hit successful, and nothing has occurred to secure his dismissal. So far, so good; but all danger is not over yet. It is now the turn of the fieldman, and to give him every chance, the trap is turned broad-side round, so as to present its full face, for purposes to be explained. The player who has fielded the ball has now an opportunity of distinguishing himself, for he has to take the best aim that he can at the trap, and on his success hangs the fate of the striker. Should he succeed in hitting the trap itself, or even in placing the ball within the length of a bat from it, the striker is out, and his place must be ceded to another. If, on the other hand, he should fail—as in all likelihood he will during his novice—it devolves upon the striker to make an estimate of the number of bats' lengths that separate trap and ball. It is then a question of measurement, for if the number given covers the actual distance, the striker has the felicity of scoring the same to the credit of his side, though, proportionately, a failure causes his dismissal and cession of position.

So the game progresses, without intermission, until either one side or the other has won, the old order giving place to new, until each party has had one or two innings, as the case may be. It may be that you have hardly discovered yet the manner in which the game is decided, but be patient, I beg, until your turn has come. By this time each party has had a double innings, and the verdict has not yet been given. You will find now the advantage of the accuracy of measurement that I referred to before, for the score of each party has to be computed, and if computation proves you to be the weaker side, you will have necessarily to go to the wall. You will be able to discover more interest in the game when you have got into full swing than would appear probable at first sight. It is not an amusement that will send the blood coursing through your veins, but it will give you an appetite, and prevent the formation of cobwebs in your manly frame. It should be the aim of you all to merit that same epithet of "manly," so do not be disturbed at its use to you by anticipation. It should always be the boy acting father to the man.

KNURR AND SPELL.

Do not smile with incredulity at the mention of a game that of late has assumed a certain air of mystery in the regions of the South at least. In stern reality there is such a game, and one that used to be very popular among those of us whose lines were cast in the hardy district of the North. Do not sneer at it because it has not travelled into your favoured quarters, for it is still a recreation much practised in Yorkshire and in other counties, where, possibly, civilisation does not progress so fast, even if their name for attachment to every species of sport ranks highest of English shires. So listen while I initiate you into the mysteries of a game that is simpler, perhaps, than any of those that you affect most yourselves.
It is after the manner of tip-cat and trap-ball in its main features, though the implements are of a slightly different description. It has the advantage of a simplicity unknown in other more highly-favoured amusements, and it can be learned without any great loss of time, or without necessitating any very great tension on the brain. It requires, though, a quick eye, as does cricket, as well as an arm that can strike, and a little discrimination in the method of applying the blow. It is not Goliath that will make the most successful player, as you will find, but David, who knows how to wield his sling, and has learned by practice the best manner of casting the stone. There is one essential difference between knurr and spell and trap-ball, in, that while the latter gives scope for much enthusiasm by the division of players into two separate parties, the former reduces the excitement by pitting all the strikers against each other, and thus introduces a large amount of self into the competition. It is thus a question of individual glorification, and the striker who achieves the longest and hardest stroke has the satisfaction of being the sole hero of the sport; instead of sharing the glory with other companions, as is the case in cricket, rowing, foot-ball, and in many of the most manly of our British playground games. The implements that you require are, first, a bat made specially for the game, secondly, a ball of wood and about the size of those used at cricket, and, lastly, a trap such as that used in trap-ball.

The bat is an ingenious weapon, of marvellous form; but you will soon discover that it is judiciously framed, and you will soon learn that its capacities for driving are almost boundless. The handle is made of good stout cane, so as to increase its repercursive properties; and I warrant you that as soon as you have mastered a little the secret of timing your hits, your own powers with the bat will surprise you. You have no opponents in the field on the alert to catch the ball, so that you have no cause to be nervous about the result of your strokes or the direction of the ball. You have merely to place the ball in the trap or on the pivot end of the wood that forms the substitute for the trap, and then to brace up your energy for the stroke.

You will have to hold the bat at the end where it is encircled by the string, and then it will be your own fault if, after you have lifted the ball from the trap, you do not send it well into the centre of the next parish. Every chance has been given you, and the bat itself should help you to distinguish yourself for ever. It is impossible to impart the secret, or what is more generally known as the knack, of hitting, or I would gladly aid in promoting your advancement. You may ridicule me if I repeat the old adage that it is practice makes perfect, but I assert none the less that experience alone will make you a prominent notability in even so small a world as that of knurr and spell, or, as it was formerly called, "Northern spell."

I have not told you though, yet, the process that takes place after you have all of you had your turn with the bat. A cord is fastened at one end of the trap, and as soon as you have had your stroke, the cord is adjusted to the ball, the distance of the hit being easily measured, as each yard is distinctly marked on the cord itself. You can thus arrive without any difficulty at the respective value of the different strokes, and, by computation, at the hero of the most successful blow, the winner, of course, being he who has driven the ball the greatest number of yards. Only do not be disheartened if you are not the absolute winner at first. There is a little nicety required in your mode of hitting, and you will not be long before you become acquainted with the secret. You will have to hit the ball as much as possible with the flat face of the bat, or you cannot be answerable for the eccentricities of its course. You will have to hit, too, well with your shoulders, or you will hardly get sufficient force into the stroke. Hit as hard as you can, and do not be afraid of lifting it, and you will find that you will at least not be the last, even if you are not the very first of the competitors.

You can see the game almost on every ground devoted to pedestrianism in Yorkshire.

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COLOURING PORTRAITS.

By the Author of "Harmonious Colouring as Applied to Photographs," "The Art of Miniature Painting," etc.

WATER-COLOURS (continued)—CONTRASTS OF TONES—SHADES AND HUES OF COLOUR—HARMONIOUS COLOURS—SCALES OF COLOURS—GUM-WATER—WASHING—HATCHING—CROSS-HATCHING AND STIFFLING—FLUSH PAINTING, COLOURS FOR, AND MODE OF EXECUTION.

CONTRASTS OF TONES.—Tones of colour, meaning various degrees of lightness and darkness, have contrasts of their own apart from those of their colours, and these must also be considered by the young colourist who really desires to excel: and I believe, with the old saying, that, if a thing is worth doing at all, it is worth doing well. If you take a piece of cardboard, and divide it into ten parts, each part a quarter of an inch in width, and then colour every square with a wash of Indian ink, each one a shade darker than the other, so that the surface gradually grows blacker, that surface will no longer appear flat, you will, on the contrary, have an effect of roundness like that of a column. Moreover, where the light parts touch the dark parts they will seem lighter, and where the dark parts touch the lighter will appear darkest, producing a fluted effect which was not intended. This, again, is an element of power in the hands of the colourist who understands and knows how to use it; while, in the hands of the ignorant, it becomes an element of trouble and perplexity.

Shades and Hues of Colour.—Where one colour is modified by the presence of another colour in some slight proportion, it is usually known as a hue of that colour. Where a colour is modified by the presence of black it is, for distinction’s sake, called a shade of that colour. Some confusion may arise from neglecting these definitions.

Harmonics of Colour.—Colours have what are termed Harmonics of Contrast and Harmonies of Analogy. In the former, colours are siftly combined so as to produce a good and powerful general effect by their action one upon another, and the result is richness and brilliancy. In the latter case a rich but a quieter and less gay effect is sought by giving all the colours a tendency to take one peculiar hue. In the former, gaiety, clearness, and lightness, are the dominant impressions, an effect of pure daylight and a clear atmosphere. From the latter comes a degree of sombreness and gravity, with an effect allied to that of evening, when every object is bathed in the rich golden or rosy glow of the sunset, and the picture is made up of bright hues instead of pure colours.

Scale of Colour.—The gradations of a colour, from its lightest to its deepest effect, produce what are termed scales of colour. Of such a scale the colour, in its greatest purity
and intensity, is regarded as normal, and its degradation with black, or its weakening with white, in gradual degrees, form a series of tones and shades, which constitute its particular scale. These scales, of course, vary with the purity and intensity of the normal colour.

I think I have now said as much as I need say to a beginner on colour in its more scientific and theoretical aspects, and we may now proceed to carry out these ideas in practice.

Starting with a fair knowledge of the optical principles to which I have called your attention, you will find the various effects of good colouring more readily attainable. Let us go back to the point at which I diverged, in order to explain these principles, and proceed to take our first lessons in water-colours.

We have our brushes, our pigments, and our selected and prepared photograph all ready (see page 187), but there are two things wanting, namely, a little good gum-water, expressive more or less of the surfaces in the forms represented. These lines should not be too close, nor too fine, nor too distinct.

The best way of conveying an idea of the mode of placing these lines is that used by Mr. Gullick, who says:—"If we suppose a number of threads, arranged like a stave in music or the strings of a harp, and held between the light and some irregular and rounded object, the shadows of the threads would follow the depressions and elevations of the surface on which they fall, and illustrate the practice to which we allude, and which is carried out to perfection in line engraving." The objection to this process is the effect of hardness and polish it gives. You may see this in most modern woodcut portraits. To avoid this adopt the form of hatching shown in Figs. 5 or 6.

Cross-hatching is a modification of this process, adopted to avoid such faults, in which the modelling effect, being still pre-

![Fig. 1](image1)

![Fig. 2](image2)

![Fig. 3](image3)

![Fig. 4](image4)

![Fig. 5](image5)

![Fig. 6](image6)

![Fig. 7](image7)

THE USE OF THE BRUSH—CROSS HATCHING AND STIPPLING.

and some of the clarified ox-gall sold by all dealers in artists' materials.

To prepare this gum-water, take one ounce of the best gum arabic; procure it from the chemist, and select the cleanest and whitest piece; reduce it to a coarse powder, and put in a clean vial enough of it to fill a third part of the space, fill up the bottle with distilled water, and place it in a moderately warm place to dissolve, giving it an occasional shake to accelerate the process.

To prevent cracking, when the gum is applied with your colour, a few drops of glycerine—bought at the chemist's—may be added—about a dozen. The gum should be previously strained through a clean piece of flannel.

We require in addition to the above a glass of clean water; and we may remark that neither spring water nor water having a mineral character should be used if you wish some of your most brilliant or delicate colours to retain their full power.

Water-colours are applied by three processes, technically known as washing, hatching, cross-hatching, and stippling. The first of these, washing, we have already explained on page 220.

Hatching (Figs. 1, 2, 3), a variation of the word "etching," is a process of working with short lines running in directions served, the lines are crossed at various angles more or less sharp, and thus destroy, by their reticulations, that extreme smoothness and hardness, which is, in face painting, more expressive of marble than the yielding softness and transparency of flesh. Some dexterity of touch is required in hatching, in order that the lines may not commence with too strong a depth, nor end with a blot; a light, free, feathery, and almost imperceptible touch, is the thing required, and it usually comes with practice (see Figs. 5, 6). You should always allow the lines first made to be quite dry before you cross them.

If the lines are too strongly marked, a coarse rough effect is obtained, but if the hatching or cross-hatching be well done, there is a subtle delicacy in the blending of the tints, a mellow richness in the melting colours, and a general effect of clearness, brightness, and transparency, which you will be sure to appreciate.

Stippling (Fig. 4) is the process for evening up imperfect washes of colour, and obtaining the more refined and delicate blendings of tints in minute passages. As hatching consists of lines, stippling consists of dots; and as the former must not be too fine or hard, so the latter must not be too small nor too distinct. Stippling is sometimes used alone, the size of the dots being varied in the way you will best understand by examining a
portrait engraved in dots, and sometimes it is blended with hatching and cross-hatching, to give finish and neatness to the execution. The dots, as we have called them, must not be all of the same size or shape.

The general effect of stippling is to give evenness to the surface, to increase the refinement of the modelling, or rounding out (see remarks on half tints, light and shadows, on page 18), and to modify effects. Stipple a little cool colour where the warmth is too great, or a little warm colour to destroy coldness, and so on.

To further illustrate the above explanations we append half a dozen small diagrams.

If in cross-hatching the lines are crossed too nearly at right angles (Fig. 7), an effect of network is produced which is very displeasing to the eye, and destructive of all natural effect.

**FLESH PAINTING.**

We now begin our work. Before applying colour to the photograph, brush a little clean water over the surface, and when it is dry pass the tongue over it, or, if you object to this plan, carry a little ox gall over it. The tongue is, however, the better. Fasten the print to your desk with drawing pins; then mix a little cobalt, and add just a touch of Chinese white to it. Wash this over the whole of the flesh shadows. Wash a little vermillion and rose madder over the cheeks and lips, and apply it delicately to all those parts of the face which are more or less pinky, such as the nostrils, the chin, the forehead just above the eyes and the upper eyelid, parts of the ears, the fingers and knuckles. This done, take a little Indian red, with a touch of carmine in it, and pass it over the cast shadows (see page 108) over the dark line between the lips, the hole of the nostril, the under edge of the upper eyelid, and the lines between the fingers.

When all this has been done, it is a good plan, if the print is on albumenised paper, to burnish it. This is done by placeing the print, when the colour is quite dry, face downwards on a clean piece of plate glass, and rubbing the back over the part coloured with an agate burnisher, or the rounded edge of a strong small vial. If the print is on plain paper this will not be required.

Then mix on your palette a little rose madder, vermillion, and new sienna (A), allowing the one or the other colour to predominate, according to the nature of the complexion you have to imitate. When mixed, this tint—a favourite one with a most accomplished photographic colourist, Mr. Lock—is washed over the whole of the flesh very lightly, very quickly, and with extreme care, so as not to disturb the colours already applied.

When this wash is quite dry proceed then to even it up by stippling over it, a little of the fresh tint, a little of the blue, the rose madder, and vermillion, or the Indian red, according to the requirements.

Then, with a few tenderly-applied hatching touches, proceed to strengthen all the tints, working round the lights with the general or local flesh colour (A), to give them brilliancy and the forms roundness, working over the darkest shadows with the Indian red and carmine to destroy their blackness and coldness; working softly and tenderly over the edges of the shadows with a little raw sienna and cobalt, and with the same mixture giving coolness to all those flesh surfaces, which should appear to retire from the eye.

Hatch the same tint over the eye and its socket, over the flesh where it blends with the soft outlines of the hair, along the outline of the lower jaw, over the ear—if the portrait you are colouring is not one in profile—and on the “white” of the eye, just under the upper eyelid.

Next take cobalt with or without a very slight touch of carmine in it and hatch this with the same delicate scarcely perceptible touches over the temple, and between the corner of the eye and the nose, where, the skin being thin, the purplish or bluish tint of the veins beneath is perceptible. Work this also over the whole of the lower part of the face, over the back of the hand, and stipple it into and along the extreme edges of all the shadows. Use it at the corners of the mouth and under the lower lip, down towards the pinky hue on the chin, with which it should blend and become lost.

With pink madder strengthen by hatching all the rosy hues of the flesh, softening and blending them into the other tints with light dexteroius fairy-like touches of your soft brown sable. With a little vermillion go over the lower lip, and with a little carmine touch the upper.

Over the edge of the hair, but not at the extreme edge, work a little indigo with a minute touch of Chinese white in it. In adding white to your colours always add as little as possible. It is merely intended to give a degree of covering power for the purpose of removing hard edges and blackness (which is fatal to brilliancy and purity of colour), and, if possible, it should always be dispensed with. As a rule the more transparent the colours you use the better; with dark photographs a little of that body or opaqueness by which white gives cannot, however, well be dispensed with.

Put in the pupil or black of the eye dark and sharply defined, with indigo, outline the iris of the eye—that which gives it colours, as grey, blue, brown, or black—with the same colour, sharp, clear, and distinct. Colour the iris, if light blue, with cobalt and white; if bright blue, with cobalt pure; if darker, with cobalt and indigo; if grey, with black, white, and indigo; if brown, withumber burnt or raw according to the colour of the eye in Nature. For darker eyes Vandyke brown, or black and burnt sienna may be used. Over the “white” of the eye work a little cobalt.

Proceed to strengthen with a little Indian red or madder brown all such lines as those of the eyelids, the lips, the outline of the nose against its cast shadow, using a little gum-water with your colour—very little. You may now with advantage once more burnish the face and hands.

To finish the flesh, all you now have to do is to study Nature, and continue to soften, refine, strengthen, and model out your head and hands by hatching, cross-hatching, and stippling.

The velvet softness given by the imperceptible covering of downy hair; (2) the beautiful transparency which becomes so charmingly conspicuous in a blush; (3) the wonderful variety of subtle tints, tones, and colours, all mingling and losing themselves one in the other, yellowish where the bone is near the surface, bluish where the delicate tracery of the veins appear, greenish here, violaceous there, pearly in these parts, rosy in others; (4) The degrees of projection and retirement relative to the various surfaces; (5) the proper degrees of darkness in the cast shadows and their unity of depth and colour indicative of the strength and character of the light by which the portrait is illuminated.

Bearing all these things in mind, and, if possible, consulting Nature as you do so, in order to understand and appreciate them more thoroughly, you must now depend entirely upon yourself, for—at least in print—your teacher can do no more for you. If, however, you require any further explanation, or find difficulties which I have not anticipated, write; the editor of the *Popular Recreator* will forward me your letters, to which I shall have pleasure in replying.

In the next paper I shall take up the subjects of draperies and backgrounds.
TOY-MAKING AND TOY-GAMES.

THE POPGUN—THE PEA-SHOOTER—THE BOOMERANG—THE CATAPULT—HOOP.

THE greater part of this paper is going to be devoted to the description of some warlike boys. How my military ardour rises at the thought of it! You will be pleased to observe that I have some military ardour; in fact, both on the spear and spindle side of the house, I come of a warlike race; and if ever any one by nature inherited a pugnacious disposition, I did. Thrashing, and getting thrashed, flinging stones, shooting with popguns and pea-shooters, firing at birds with catapults, practicing with slings, blowing up miniature fortifications with gunpowder, often obtained on the sly—so my early holidays were passed. You may wonder why, with this turn of mind, I even write of anything else than warlike boys; but you know, my friend, we must have variety, there is war one day and peace the next; popguns on this page and something very different in the next article. Is not the world wide enough for everything, and are not all things interesting in their way?

Let me first tell you how to make a Popgun. Get a branch of an elder-tree, and cut it from it a straight piece six or eight inches long. Then extract the pith from the inside, so as to make a hollow tube open from end to end. The tube should be afterwards bored, in order that its sides may be quite smooth and even. Now get a ramrod of iron, or cut one out of hard wood, of the shape shown in Fig. 1. The part indicated by the letters a b is intended to keep the ramrod from going the whole length of the gun. The complete gun—at least a section of it—is shown in Fig. 2.

The pellets which compose popgun ammunition are made of moistened tow or paper. They should not fit the barrel loosely and easily; not from that, they should require some ramming to get them in. When you are going to commence firing, take a pellet and force it into one end of the gun, say that marked c in Fig. 2. Ram it through the gun to the end d; now insert a second pellet at c; drive it also through the gun, and it will force out the first pellet with a loud pop, and with considerable violence. This is in consequence of the compression of the air between the two pellets. The imprisoned air struggles to get free, and makes its escape by the only means possible, by driving out the first pellet. Some boys, in order to add to the force and noise, blow into the barrel just before stopping it up with the second pellet. The blowing must take place just before, or the labour will be thrown away.

After the firing of the gun, the first pellet being shot off, the second is found at d. A third is now inserted at c, and, being rammed through, the second pellet is discharged, and so on, as long as your ammunition lasts, or you continue in a popgun humour.

You may also make small popguns of quills. The pellets for these are cut, by means of the quills, out of either raw potato or raw turnip.

The popgun of elder wood described above is a simple article of home manufacture; but many different styles of guns are to be bought in the toy-shops. Some are made in the form of canons, others are like pistols; and I saw one the other day shaped like a musical instrument of the flute order. This last, however, was in bad taste; popguns should be like popguns.

Before going on to a new subject, I may mention that the airgun depends on the same principle as the popgun. It is a much more formidable weapon, however. By means of it one may discharge bullets with a force very nearly equal to that of gunpowder.

The new subject is the Pea-shooter, and there is not much to say about it. It is a metal tube, through which a pea is propelled by the force of the breath. That force is considerable, in consequence of the contracted channel in which the air blown from the lungs is made to flow. The toy is allied to those long tubes of cane in use among some savage tribes mentioned in a former article, through which arrows are shot with such cleverness as to kill birds and other kinds of game.

A boy with a pea-shooter and a bagful of peas should not be at a loss for amusement, or of the means of making mischief, if he be that way inclined. For example—but do you think I am going to encourage your mischievous propensities! If so, you are much mistaken.

Battles among boys with pea-shooters are rather good sport. The combatants separate into two parties, and fire away till one side or other comes to the conclusion that

"In all the trade of war no feat
Is nobler than a brave retreat," says the writer, and flies before the enemy. In these bloodless engagements one may either fire peas in volleys, a whole mouthful at a time, or one by one. In the latter case the mouth should be kept always full of peas. Volley firing is rather an extravagant expenditure of ammunition, but if the moment for it be well selected, it seldom fails to produce quite a panic in the ranks of the foe.

The Boomerang or Bommerang—it does not matter which way you spell it—is as curious a toy as there is in the whole catalogue. You can buy it at most toy-shops. It is a curved piece of wood, a little rounded on one side and flat on the other, and looks a very simple and unattractive article. You see it represented in Fig. 3, but it possesses some singular peculiarities. When held horizontally in the right hand, and thrown by bringing the arm backwards, it returns, after a considerable flight, to within a yard or two of the thrower. You can also make it fly along the ground, touching the surface and rebounding, just as a small flat stone does on the water when one plays at "Ducks and Drakes."

The boomerang is a weapon used in war and in the chase by the natives of Australia. These aborigines employ it with such skill that by its means they can kill an enemy hidden behind a tree. According to the angle at which it is thrown so is its course; and some one, alluding to this fact, in connection with its use by these uncivilized people, says:—"The most singular curve described by it is when thrown into the air at an angle of about 45°, in which case its flight is always backward, and the native who throws it stands with his back instead of his face to the object he is desirous of striking."

In the Philosophical Magazine for July, 1852, an interesting notice appeared relating to this subject. "If a common Manilla or palm-leaf hat," says the writer, "having a low crown, and the margin of the rim sharply turned up about half an inch high, is thrown into the air with the cavity of the hat upwards, it returns back towards the thrower like the Australian boomerang. The angle at which it returns depends on the angle at which it is thrown, and if the angle be sufficiently acute, it will fall some distance behind the thrower."

The experiment depends upon the position of the hat, for if thrown with the cavity downwards, it will alight in the direction in which it is thrown, and will not return. A paste-board disc with a turned-up edge exhibits the same peculiarity as a hat.
You may make a little model of the boomerang for indoor amusement very easily. Take an old playing card, or a business card, and cut from it a piece of the size and shape shown in Fig. 3. To use it, lay it on a book, so that one of its arms may project about an inch over the edge. Hold the book slightly inclined upwards in your left hand, and strike the projecting arm of the boomerang a smart blow with the end of a pencil (see Fig. 4), or hit it away from you by means of the forefinger and thumb; it will go whirling through the air, and then will turn and come fluttering back, to land at your feet.

To throw the real boomerang successfully requires practice and the employment of much patience. When you exercise with it you should do so in a large free space, where there is no danger of your hurting anybody or damaging anything. There is no saying what harm such an eccentric weapon might do were one not to take all necessary precautions.

It is not a great many years since the Catapult was first introduced. The inventor, like so many others who have benefited humanity, is lost to fame. I have done what I could to find him out, meaning to give him honourable mention in these pages, but without success. His invention speedily became very popular, and is likely to continue so, at least in country districts, for the catapult is a forbidden thing in London and other large towns. There is much to be said by way of recommending it. It is a powerful instrument, and one by which we can take a pretty exact aim. It is good for shooting at cats, and rats, and birds, and squirrels; and it is not a conspicuous weapon; and it makes no noise, by which to scare game away.

Catapults are to be bought at the toy-shops, but you may manufacture one without much trouble. Cut a cleft stick, you will see what like it should be if you look at Fig. 5. The stick should be altogether six or seven inches in length; the distance between the prongs A B should be about three inches. Make a slit at C, and another at D, extending no farther down the prongs than you see in the figure. Now, in these slits fasten two strips of india-rubber about six inches long; these are to form the spring of the catapult. Bind the wood firmly with strong string, so as to keep the india-rubber fast in the slits. To the ends of the india-rubber strips fasten an oval piece of leather—an inch and a half or so long by one inch broad—upon which to rest the missiles you are going to fire. The complete catapult is shown in Fig. 6. For ammunition you may use round pebbles, bullets, or clay marbles.

Every game has its season; winter games are not those of spring, and those of spring are not to be played in summer. The temperature rules in our amusement as in so many other things, and our sports change as the year rolls on. You would not, for example, dream of playing at marbles with the snow on the ground, or of trundling a hoop in the midst of the dog-days.

It is the latter sport I am going to speak about just now. Listen, then, whilst I unfold the mysteries of the Hoop and Hoop Games. Hoops are of two kinds, some being made of wood and others of iron, the former being driven with a wooden stick and the latter with a curved piece—I can’t call it a stick—of iron. Iron hoops are more common than wooden ones. They go along more easily, and, being a luxurious age, they have on that account been received into special favour. In the good old times—"there were giants in those days"—boys and girls thought nothing of the exertion of trundling a wooden hoop, and iron ones were never dreamt of. Many, in out-of-the-way districts, manufactured their hoops out of those which girded some old cask; and perhaps these half-civilised playthings were infinitely better for them than all the exquisitely-finished articles you can buy in the toy-shops. From well-remembered experience I give my vote in favour of wooden hoops, as being in every way pleasant to play with than those of iron.

The hoop is best in a state of simplicity, and is not capable of adornment to any extent. Some are in the habit of fastening several pairs of tin squares to the inner part of the hoop, in order to produce a jingling noise as they drive it along, but it does not strike me that this invention will ever become popular.

In trundling the hoop you will find it difficult to make it go straight forward, without turning to the right or left. This is partly because of the unevenness of the ground, but it chiefly arises from the impossibility of always giving straight blows with the stick. You may give a straight blow twice or three times in succession, but you cannot continue doing so.

Trundling the hoop with no other object save that of exercise is a delightful amusement in cold weather, but there are several hoop-games out of which one can get a great deal more entertainment than out of that solitary pastime.

There is the Hoop Race to begin with. How much excitement there is in this game you will never know till you enter upon it. There may be any number of players; the more, in fact, the merrier. Some object is fixed upon as the goal; the signal is given, and off the players go. Whoever reaches the goal first is naturally the winner. The hoops should be as nearly as possible of one size; if any of the party have small hoops they should be allowed the advantage of a few minutes’ start, as a large hoop goes over the ground a great deal more quickly than a smaller one.

The Hoop Steeple-chase is a variety of this game. You decide on a course across country, over fields and meadows, fixing on any prominent objects in the landscape to serve as boundaries. According to the rules of the steeple-chase, the hoop must be trundled to the goal, and must never be lifted and carried, except over such obstacles as hedges, dykes, and ditches. The hoop for this game should be large and heavy.
THE SILK WORM—ITS PRODUCE—FOOD—TO KEEP SILK WORMS.

These interesting larvae, though cultivated extensively in foreign countries as a mercantile pursuit, are at present only reared in this country as a source of amusement; and, generally, the silk from the cocoons spun by the insect is wasted, or rather so wound as to be useless; but there is no reason why, however small the quantity may be, that it should not be so wound as to form the nucleus for that which may be usefully employed, nor why some of our readers should not accumulate sufficient to make a handkerchief, or even a dress, from the produce of silk worms reared by themselves.

The culture and management of these remarkable caterpillars, and the observation of their wonderful growth and transformations will be found a source of gratification to all true lovers of Nature.

Some idea of the immense trade carried on in silk may be formed from the fact that it appears by the circulars of the leading brokers in the trade that the stock of silk in the London warehouses on the 30th of April, 1873, was considerably over 4,585,000 pounds, the value of which would certainly not be over-estimated at £5,000,000 sterling; and the average deliveries from the warehouses are about 500,000 pounds per month; and as each pound of silk would require nearly 3,000 worms for its production, it would require many millions of worms to supply one month's deliveries from the London warehouses.

It will, therefore, be some time before any effect can be produced on the market by silkworm culture in this country, especially as in addition to what is done in England, a large trade is carried on not only in France, but in Germany, Italy, and Spain.

It is the opinion of some persons that the rearing of silkworms in England might be carried on so as to become an established trade; but at present we only deal with it as a recreation, leaving the supply for mercantile necessities to come, as at present, from China, Japan, Bengal, and Italy. Bengali “Surdahs,” “Cosumbusars,” “Commercology,” and “Radinogaes,” the Chinese “Textileas,” “Taysamans,” “Yunnan,” and “Cantons,” the Japanese “Mybash,” “Ida Bricks,” “Oshmes,” “Achezans,” and “Mustahs”—all of which barbarous names represent different descriptions of silk, most if not all of which, we believe could be surpassed by English silk, when reeled with English intelligence.

The silkworm has been described as the only tame caterpillar; and most of those naturalists whorear caterpillars for the sake of observing their transformations, are aware of the necessity of confining the ordinary caterpillars with a gauze or other covering, to prevent them from crawling away; the silkworm, however, never gives any trouble in this respect, and will always be found where it is left, only crawling from one leaf to another.

The first thing to be considered in rearing silkworms is how to procure a supply of food. The leaf of the white mulberry is the best; but as these trees are at present rather scarce in this country—though they thrive well here—we presume most of our readers will be compelled to resort to the black mulberry, which will be found a very good substitute; but we should recommend any one who thought of growing a considerable quantity to procure a few young white mulberry trees.

If any one can only procure mulberry leaves from a distance, they may be kept fresh for some time by wrapping them in stout paper or linen, and burying them in a damp shady place about a foot below the surface of the ground, so that they may be dug up as required. Care should be taken not to give the worms leaves that have rain or other water upon them, as the moisture is highly injurious; and whenever it becomes necessary to gather leaves during rain, they should be carefully wiped, so as to remove as much of the wetness as possible.

If mulberry leaves cannot be procured the worms will feed upon lettuce leaves, or even dandelion; and it has been said, that when fed on lettuce leaves, if kept in a warm temperature, they will produce cocoons equal to those of worms fed on the mulberry leaf, but the mulberry leaf is evidently their natural food, for when kept for some time on lettuce, if once they taste the mulberry leaf they will starve rather than again feed on the other.
The eggs from which the silk-worm is produced are about the size of a pin's head, and the worm, when it first leaves the shell, is almost black, and about a quarter of an inch in length. As soon as mulberry or lettuce leaves are placed near it will begin to feed, and will crawl on to the leaves, so that it may easily be taken up. A sheet of stout paper should be procured, on which to place the leaves and worms; and, if practicable, this should be placed on a sloping board, having a small ridge at the lower end, the excrement from the worms will then roll away from them, and may be swept away with a small brush.

A square net, sufficiently large to cover the worms, with meshes large enough for them to crawl through, should next be provided, also two small sticks about two or two and a half feet long, and in the sticks two small tin tacks should be partially inserted, so as to leave their heads projecting, one near the top of the stick and the other about on the centre, the distance between the tacks being about equal to the width of the net, but rather less. By taking up both sticks, and inserting the heads of the tacks between the corresponding meshes of the net when spread out, and then turning both sticks towards the centre of the net so as to roll a portion of the net round each stick, it will be seen that the net can be raised by the sticks, in the same way as the flags sometimes carried in procession with two staves. A net with the meshes the actual size shown in Fig. 2, but about two feet in length by one in width, will be suitable for the earlier stages of the worm's growth. Fig. 1 shows a shape of net which would be produced by ordinary netting, and which would be found practically useful, but the inconvenience, though trifling, of the tendency to contract in the centre may be avoided by using one made as shown in Fig. 2. This net is made by beginning with one loop for the corner, and then increasing one loop in each round, till the requisite width is obtained; then continuing with the same number of loops, but dropping on one side and adding on the other, until the entire intended length is netted, and then by dropping one stitch in each row on the side opposite to that which was increased at the commencement. These nets may be made of fine sewing cotton.

When a fresh supply of food is required this net should be carefully laid over the board, and fresh leaves placed upon it, the worms will then leave the old half-eaten leaves and crawl through the openings in the net on to the fresh leaves, and as soon as they have done this, the net with the leaves and worms on it should be raised by the two sticks, taking one in each hand, and carefully laid on another paper; should any of the worms happen not to have crawled through, they should be carefully taken up with a feather or a small piece of paper, and laid on fresh leaves with the others.

In about four or five days from their hatching, the worms will undergo their first sickness, or change of skin, when they will remain perfectly motionless, with the head slightly raised. In the course of two or three days the worm will emerge from its first skin, and after it has done this, it will become lighter in colour, and begin to eat voraciously. When they are undergoing this sickness it is better not to disturb them, and to place the leaf or paper on which they may have fixed themselves carefully aside until the change or moulting of skin is entirely completed. Fig. 3 shows the appearance of the worm previously to and after the first moulting. In order to supply the worms with food after they have crawled through the net, a second net will be necessary, similar to the first; the two sticks, however, will be sufficient, as after the net with the worms and leaves on it has been removed, as before described, the sticks can easily be disengaged from the first net without disturbing the worms and leaves, and with this object in view the heads of the tacks should be small enough to pass exactly through the meshes of the net. The second net should then be carefully placed over the worms, and fresh leaves strewn on it; as soon as the worms have crawled through the second net on to the fresh leaves, the second net should be removed in the same way as the first, and the first net can then be cleared from the debris of leaves, and will again be ready for use.

After the first moulting or change of skin the worm will increase in size until it is about three-quarters of an inch in length, and in about four or five days after the first moulting, the second sickness will commence, when the worm will again cease to feed, and remain motionless, with the head slightly raised. This takes place four times during the time the insect remains in the caterpillar state, and on each occasion it becomes larger and whiter, and its appetite increases. Figs. 4, 5, and 6 represent the appearance of the worm during these stages. Fig. 6 representing the worm during the last moulting.

After the fourth moulting the worm increases in size for about ten days, until it is about three inches in length, as shown in Fig. 7, after which it diminishes in size, and assumes a yellowish hue, and as soon as this is observed, small bushes about a foot or so in height should be placed near the worms, when those which are ready to spin will crawl up, and spin their cocoons in different parts of the bushes. Fig. 8 shows the arrangement of the bushes, which may be conveniently adopted, the lower end of the bush being inserted in a Hung or suitable piece of wood, and a small flat board being laid upon the top of
the bushes to keep them spread out and steady; but if the
twigs can be made to stand steadily without the board at the
top, there is no absolute necessity for its use.

In about a fortnight from the commencement of spinning, the
worm, having first turned into a chrysalis, emerges from this
cocoon, in the shape of a moth, and the cocoon becomes what
is called in the trade a "pierced cocoon." But there is no neces-
sity to leave the moth thus to emerge. In about a week from the

commencement of the spinning, the cocoon may be removed from
the bush, and, by gently shaking, the sound will at once tell
whether the chrysalis has formed; should there be no
sound from a gentle shake, the cocoon should be left for a day or
two; but as soon as there is a gentle rattle, the cocoon is ready
for reeling, and when four or five cocoons are ready they should
be immersed in warm water rather more than lukewarm, but
not too hot, as too great a heat would destroy the chrysalis.

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PHOTOGRAPHY.

BY J. C. LEAKE.

FAILURES, AND HOW TO OVERCOME THEM.

The saying, that "to err is human," is certainly more true of
photographers than of most other persons. When we hear of
a photographer who never has a failure, we can readily
guess he never really succeeds, and we conclude that what he
calls successful work many others would condemn. In truth, from
the very nature of the work, all photographers must sometimes
fail; and the successful worker is not he who never, as he says,
makes a mistake, but he, who, failing, resolutely sets himself to
conquer and overcome every difficulty. The oldest and best
photographers fail in their work sometimes, and therefore the
tyro need not be discouraged at repeated disaster; and although
for the sake of clearness in our instructions, we have not intro-
duced the subject in the preceding articles, there can be no
doubt that in following out our directions many failures have
been met with. These we shall now describe, and, with the
disease, we shall prescribe the remedy, so that whenever failure
is met with, it may be successfully overcome.

In endeavouring to discover the causes of failure in all pho-
tographic processes, it is of the utmost importance to proceed
systematically. It is of no use whatever, if, for instance, we are
trying to take a negative, and find that the plate darkens all
over, to at once prepare another plate in precisely the same
manner. The proper method will be to carefully ascertain the
cause of the failure, and, before preparing a second plate, to try
to remove its cause. Above all, it is necessary to be cool, and
to work on a definite plan; when each failure or defect over-
come or remedied will be so much clear gain in the way of
practice and experience.

With these few observations, we may at once pass on to con-
sider some of the more common failures which are likely to be
met with in the practice of the two collodion processes before
described.

The tyro in photography will most probably be first troubled
with imperfect negatives or positives, in consequence of having
given an improper exposure in the camera. As we have before
remarked, the question of exposure is one all-important, and it is
only to be ascertained in every case by constant practice and
observation.

We will suppose in the first instance that the operator is about
to produce a collodion positive—the first process described in
this series—and that the plate has been exposed in the camera,
and brought to the dark room for development. We pour over
it the developing solution, and instantly—almost before the
fluid has covered the plate, we see the image flash out and as
quickly disappear behind a veil of greyish fog.

Upon fixing the plate with the cyanide solution, we find that
the impression is barely visible upon the surface, and very thin
and faint, even by transmitted light. This is the result of
over exposure. We will now try a second plate, and as we gave twenty seconds to the first, which was very much over-exposed indeed, we will try this with five. Upon developing this, we find that the picture comes out very slowly, and that it is impossible to bring out the deeper shades at all. We have now erred in the other direction, and our picture has not received sufficient light in the camera. The remedy in both these cases is obvious. We expose a third plate for ten seconds, and the result is perfect. In all cases, however, it should be remembered that of the two evils under-exposure is the worst. If a picture has received rather too much light, the development may be arrested by washing off the solution, but nothing can be done with one which is under-exposed.

Another frequent cause of failure is the appearance of spots in the plate, which of course spoil the picture. In the course of practice the tyro may expect to meet spots of every possible shape, size, and description. Some will be opaque, some transparent, some round, and some with long and too well-defined tails, which are known to photographers as "comets." These latter seem to have a perverse fancy for coming upon the end of the sitter's nose, or in one eye, or some other place equally important; in fact, the whole family of spots photographic are an unmitigated nuisance.

Happily, however, the remedy for these is simple in the extreme. It may almost be laid down as a rule, that all spots, of whatever description, are caused by dirt in some form. Dirty glass, a dusty camera or operating room, a dirty collodion bottle with fragments of dried collodion hanging about its neck, a developing glass which has not been properly washed out before use—all these are causes of the defects mentioned. Of course, the remedy is cleanliness in every particular, and when this virtue is practised habitually, away go all the spots, faster than the celebrated serpents at the word of the renowned Saint Patrick. Remember, though the photographer's mortal enemy. Therefore, dust everything before use—lens, camera, plates, dark room, and everything else which can be dusted; and remember that the expenditure of a few minutes thus will save hours of labour and vexation of spirit.

It will sometimes happen that after dipping a plate in the bath, and leaving it for a few minutes, it will be found upon development to be streaked in the direction of the dip. The lines will be nearly straight, semi-opaque, and are mostly very fine.

A very simple remedy for this defect is that of reversing the position of the plate during the sensitising process. After the plate has been immersed for one or two minutes it should be placed upon its side upon the dipper, and replaced in the bath until the sensitising process is completed.

It is a good plan to move the plate about in the bath while it is being sensitised, as this will facilitate the escape of the solvents from the collodion film, and probably save any trouble from the streaks before mentioned.

As we have previously insisted upon the importance of obtaining a perfectly even film of collodion, we need not mention defects from this source, but will content ourselves with remarking that this is a matter of the first importance.

To the unclean photographer there is another source of trouble, which consists of large opaque stains, starting from the corners of the plates, and sometimes reaching nearly or quite over the whole extent of its surface. This kind of stain shows, when the fixing process is completed, as a white mark, being solid at the angle of the plate, and radiating from the corners somewhat in the shape of a feather.

This defect can nearly always be traced to dirty fingers. The dirt is brought by the fingers to the corner of the plate, and carried by the silver solution in various directions, causing the stains by the precipitation of the silver. The remedy for this is, of course, soap and water.

Always wash the hands after developing a plate, and before commencing to prepare another, and be especially careful to thoroughly cleanse them after contact with the solution of hypochlorite of soda, as the smallest trace of this salt will cause infinite trouble, should it be brought in contact with the sensitive films of collodion. Similar marks may arise from the accumulation of silver in the corners of the slide where the plate is placed, and the holder should always be wiped dry with a fragment of blotting-paper after every exposure of a plate in the camera.

Lines caused by irregular development, are, of course, easily remedied, and it must always be remembered that the developing solution must flow in an even wave entirely over the plate, in order that they may be avoidable.

Only one other defect likely to be met with in general work need be mentioned at this stage; but it is one by no means uncommon, and frequently rather troublesome to remove. This is a general darkening over the entire surface of the plate, and is technically termed "fogging." Even to the experienced photographer this defect comes like a nightmare; for one can scarcely tell from whence it comes or whither it goes. There is only one plan of determining the cause of this trouble, which we will now describe.

It must be remembered that fogging may arise either from the action of light upon the sensitive surface, or from a defective and improper condition of the chemicals; and that it is as frequently caused by one of these as by the other. The first thing to be suspected is the yellow window of the dark room. Prepare a plate with the light entirely excluded from this, and by the light of a small candle placed in the farthest corner of the room. When sensitised, place it in the slide, and draw the shutter half way up. Now remove the covering from the yellow window, and set the slide up so as to expose half the plate—at a distance of about twelve inches—to the yellow light for a period of four or five minutes. Again cover up the window, and develop the plate as usual. If the plate remains unchanged over its whole surface, the yellow covering is sufficient, but if the exposed part is at all darkened, more thicknesses of yellow calico or paper must be added until all light is excluded. Next examine the camera, and be certain that no light can possibly find its way into that, or to the slide which carries the plate—and if the fogging still continues, when all chance of light reaching the plate has been excluded, it may be concluded that the fault lies with the chemicals.

Sometimes a freshly-iodised collodion will not work clearly in a very bright light, and a drop or two of alcoholic tincture of sodium must be added to turn it to a pale yellowish colour. But most frequently the fault is caused by the bath being slightly out of condition. Try the effects of about five drops of pure nitric acid to each pint of solution, which will in most cases at once set matters right. It must always be remembered that fogging is more frequent and troublesome in hot weather than in cold, and that during a period of great heat a much larger proportion of acetic acid is required in the developer.

These defects overcome, the tyro may rest assured that the worst of his troubles are over, and that the long list of evils to which these branches of photography are heir is nearly exhausted.

"And pretty well time!" we hear one pupil exclaim: "we have taken our negative, and are waiting to know how to print it."

"All in good time," we reply. You may not always succeed so well as at first you have done, and then this chapter of failures will be useful. But you shall be taught how to print your pictures upon paper in our next article.
THE AQUARIUM.

BY W. A. LLOYD.

DECOMPOSITION—PURIFICATION—TO MAKE AN AQUARIUM.

NOW, decomposition in the sense I have last mentioned merely means to resolve organic substances into their primary constituent and harmless inorganic parts. In this world many thousands of living creatures—human beings and other animals—are every minute being born, and many thousands also every minute die; and it is necessary to get rid of the remains of the latter as quickly as possible, and in a manner which shall be in the smallest degree offensive to the health of the survivors. Therefore, the moment there is the cessation of the existence of what Dr. Southwood Smith termed "the mysterious principle called life," in any animal or vegetable, Nature commences to restore its component parts to what they came from—so much carbon, so much nitrogen, and so on; and this goes on till all the soluble parts are dissipated.

The instrument used by Nature to effect these changes is oxygen (the gas which I saw rising in visible bubbles in my bird-cage glass, though it is not necessary that it be visible when it does its work), combined with a certain temperature and with water. In very cold countries oxygen has but little power to decompose organic matters, and thus, in Siberia, an elephant (or "mammoth") was found, in the last century, which had been buried in ice for very many hundreds of years, and yet with its flesh in a state fit to be eaten by dogs. In some hot countries, too, but which are very dry, as in Upper Egypt, oxygen has so little power of decomposition that organic bodies—animal and vegetable—remain unchanged for centuries. So also, if oxygen be withdrawn, organic matters never decay. Food, both animal and vegetable, is thus preserved for periods indefinitely long, in any temperature, in tins from which the oxygen has been removed, but if the smallest pin-hole be made in the tin, so that oxygen comes into contact with the food, decay immediately sets in. This oxygen, in the atmosphere around us, though so constantly being used all over the globe in enormous quantities, is never exhausted, but is re-supplied from living plants, which separate it from what is breathed by animals; and so the balance is always kept up, and the supply can never fail so long as animals and plants exist. But suppose I go back to my vessels of water containing decaying matters. All of these are dropping to pieces, and smelling very offensively—that is to say they are being mixed with the fluids, and small particles are being constantly
given off into the surrounding air, and they come in contact with one’s olfactory organs. If some of the jars or bottles be stopped up, so that no air (i.e., no oxygen) can enter, the decomposing process will be partly or wholly arrested, and, as no decaying particles can get out, there of course will be no smell. With the others it will be found that the decomposition will be most active, all the other conditions being equal, in the vessels which have the smallest vertical depth and the largest horizontal surface area, because the oxygen has a greater space on which to operate at one time, and it therefore does its work quicker than in the vessels which are tall and narrow. Consequently, while in the broad and open vessels the decomposition has got to its greatest height, and has got to smell as offensively as possible, that in the slender and high vessels has not arrived at such a pitch of extreme nasiness of odour.

By-and-by, however, all the open vessels, one after the other, will illustrate the saying, that “when matters have got to their worst, they will begin to mend,” and they will gradually cease to smell because there is less and less matter to be dissipated by oxygen. Then, as decomposition ceases, the water begins to get clear, and the limpidity will be re-established in the order of the largeness of exposure of the water to air in comparison with its bulk. If the vessels which were closed by now have a little air allowed to enter them, the decomposing action will recommence at the point where it was arrested, and will follow the other vessels at an interval corresponding to that of their being closed, and, that interval passed, the water in them will also become clear, and nothing will be contained in any of the vessels but transparent and, in most cases, colourless water, with such substances as bone, coal, woody fibre, etc., that which fluid does not dissolve. All else will have been dissipated into gaseous by oxygen gas, and the water will be in the same condition as before the experiments began, and in diminished quantity, if the evaporation has been compensated for.

It must, of course, be understood that this is a mere theoretical illustration to show the operation of a general law. In practice such an experiment would hardly follow the course just stated in the order of time, unless very great and needless care were taken in making all the circumstances of measurement of bulk surfaces of water, and of kinds and quantities and shapes of the organic matters put into it, so precisely in conformity with the result to be obtained. But that would not affect the general law. A story is told of a coachmaker having been desired to make a carriage which should last twenty years, and he so exactly calculated all its parts that during that time no repair was needed; but at the expiration of the twenty years—exactly to a moment—every portion of every part of all the various materials instantly crumbled into dust. In theory, such a feat would be possible if all the conditions could be known, just as an astronomer can calculate to a second the time of an eclipse years before it occurs, because he has to deal with what are called “known quantities”; but the coachmaker’s result would be impossible in practice, because he cannot pre- reckon the effects of accident; he could only calculate with a more or less wide approximateness, by skilful adjustments of various materials.

It may perhaps surprise some of my readers if they are told that this process of decay or decomposition just described is precisely the same as that of burning by fire. Take an organic substance, as a piece of tissue paper, for example, such as a bank note. If kept dry, it will not decay for a period which may be almost indefinite; but if put in water, it will lose cohesion and fall into pulp, and gradually decay or be oxygenated; but if put into fire, it will be instantly burned, or be oxygenated in a moment (all the more quickly because of its thinness, or in other words, because of its great surface exposure in comparison with a thicker paper), for fire is in such a case only a means of causing the paper to be dissipated more rapidly than in the other case. It is merely an extension of what I have stated about the speed of decomposition being dependent on temperature—not taking place at all below freezing point, and increasing as the heat rises above it. Therefore, the hotter a fire is the more rapidly will it effect its changes on matter, i.e., the quicker it will oxygenate, because the increase of the heat of the fire depends on the supply of oxygen to it. In London, near some of the docks, is, or was, what is called “The Queen’s Tobacco Pipe,” a fiery furnace into which is thrown all manner of articles condemned to be destroyed for various reasons. The things consumed are hams, tobacco, and other forms of organic matter, animal and vegetable, and so forth. If thrown away and allowed to decay on the surface of the ground, these substances would slowly decay, or be oxygenated, and in the process would give off unpleasant and poisonous smells. To bury them would be inconvenient, and if cast into the adjoining river Thames, the free oxygen in the water would more speedily convert them into their primary constituents than if allowed to rot in a more or less humid atmosphere, but the operation would be tedious and expensive; therefore it is quickly oxygenated by fire, and to expedite the process still more, the chimney-shaft of the furnace is made very high, so as to increase the “draught” of the fire, or, in other words, to increase the supply of oxygen, and so to dissipate, or oxygenate, the substances to be volatilised quicker than in a fire not stimulated to great heat by increasing its oxygen supply.

It is the same with inorganic matters. Thus, we all know how iron, when kept dry, does not rust, that is to say, does not oxygenate (rust being only oxide of iron), and is not gradually lessened in bulk by the “rusting” which takes place when the oxygen contained in water is brought into contact with it. The contrary is interestingly shown in Dr. Price's Technological Museum in the Crystal Palace, where a razor-blade of polished steel is placed, untrusted, in water which has been deprived of its free oxygen in solution—not, of course, of its oxygen in combination. But in some parts of London may be seen iron house raiings (a specimen is also in Dr. Price's gallery) where vertical bars of that metal are near their base eaten away like a mere thread, and that is because rain-water runs down them, and settling at the bottom for a time long enough to allow the free oxygen in the water of successive falls of rain to oxygenate or dissipate it at the point with which it is longest in contact. By increasing the activity of the oxygenation, i.e., by using fire as a medium, and so increasing the speed by which oxygen and iron may be combined, such fire, if it be hot enough, could in a few minutes oxygenate the iron as much as the rain-water could oxygenate it in many years. More than that, it would be possible to take the same quantity of iron, and pulverise it so finely, that it would be instantaneously burnt or oxygenated by coming into contact with so much heat that it would be a flash-light can give out. Still further, it would be possible to convert the iron into a powder so fine that the mere heat of the friction of letting it fall through air would set it on fire, and consume it, or oxygenate it, in an instantaneous flash. And it must be remembered that such pulverisation is merely an infinite extension of surface, causing an inconceivably rapid oxygenation, on precisely the same principle that the oxygenation or consuming of organic substances in water was speedily or slow as the oxygen-absorbing surface of the water was large or small, as has been described, and just the same that the oxygenation of a given mass of water was slow, and the fishes
in ill health, in the figure at page 188, and on the contrary
quick, and the fishes healthy, in the figures at pages 245 and
246. "Burning" is the term given to the consumption (or
oxidation) of substances in a furnace at a high temperature
by means of fire; and "cremoscasis" is the term given by
the late Baron Liebig to the consumption (or oxidation) of
substances in that furnace at a low temperature, and without
any fire, known as an "aquarium."

All this time, however, my imaginary vessels—once containing
clear water; then containing the same water pervaded by foul
smells and foul colour; and then (always the same water) in its
state of original limpidity—have not been idle, for, if exposed
to daylight, vegetation has begun to form in them, and sup-
posing that the light has fallen equally on all the vessels, and
that their walls are of equal translucency, the vegetation in the
sea-water will generally be found to be in a state further ad-
vanced than in the fresh-water vessels. Something more than
that will have taken place: animals will have appeared. They
may be, perhaps, so small as to be seen only with the moderate
power of a compound microscope; possibly they may be large
enough to be observed with a pocket lens; or they may be large
enough to be distinguished by the unaided eye. In either
case, however, the vessels have been converted into veritable
self-supporting aquariums.

Now these experiments, costing for their performance but a
few pence in money, have led to the knowledge of a number of
precious laws, which may be summed up thus (please observe
that I am very fond of summing-up judicially):—
1. Water is practically indestructible.
2. The waters of seas and rivers, and of wherever else it
is found in Nature, is never destroyed or changed, but only
changed in form and position.
3. It needs also no change in artificial arrangements termed
"aquarium."
4. It, or rather any visible or invisible organic matter in it, is
purified, or resolved into its harmless elements, and dissipated,
by contact with the oxygen contained in atmospheric air.
5. The speed of this purification partly depends upon the
extent of the exposure of air to water.
6. The rate also depends on temperature.
7. Purification, in the sense here used, does not mean absolute
chemical purity, which is the exclusion from water of all sub-
stances whatever in a free state, leaving the fluid consisting
only of the combined oxygen and hydrogen of which it is com-
posed; it refers, on the contrary, only to the absence of an
excess of detrimental matters.
8. The fitness of water for the purpose of animals which
breathes in it (and not the creatures which merely swim or
otherwise move in it, wholly, or in part) further indispensably
rests on the presence of living aquatic vegetation in it.
9. This vegetation need not be planted, or otherwise visibly
introduced, as at ordinary temperatures it will make its appear-
ance under the action of light, from the unseen germs every-
where contained in water or in the atmosphere in contact with
it.
10. Such vegetation can be controlled in amount, and some-
times in kind, by regulating the temperature of the water, and
the admission of light to it.
11. The bulk of vegetation needed for this purpose in aquaria
is most exceedingly minute in proportion to the bulk of the
animal life which it assists in maintaining in health, and yet
without such assistance the animals cannot live.
12. Animal life, of a more or less microscopic kind, will
appear in the water, coming in a quasi-spontaneous manner,
as the vegetation did.
13. Water, whether fresh or salt (in various combinations
and proportions of the two), as found in a state of Nature, is
not always immediately fit for aquarium purposes, though the
same water in seas and rivers may sustain animal life quite
well.

I hope I have not been tedious in being thus careful to lay
down physical and chemical laws so clearly, that (should I
but be understood in my explanations, and in those I shall
afterwards offer) if my readers cannot successfully manage an
aquarium they will be so helpless and witless as to lose them-
sesthes in a sentry-box.

But I put it to every one, whether it is not more pleasant, as
well as more intelligent and complimentary to people's under-
standing, thus to appeal to them and to get them to compre-
hend primary laws, and to apply them in a step-by-step manner,
never taking a single step forwards until the step passed over
is quite mastered, than it would be to be empirical, and to tell
folks to do or not to do certain things without giving reasons
"why." The most perfect man or woman is he or she who
goes through life perpetually asking "Why?" There is no
pleasure in the world equal to the clear acquisition of know-
ledge, and the next greatest pleasure is to impart knowledge in
such manner that the teacher, in his anxiety to be clear and
full, actually wrestles with himself to cause his readers or
listeners to have upon the surface of their minds a perfectly
exact reflex of his own and of all that it contains.

Very well, then, suppose that a person of not large money
means wishes to keep animals in aquaria. The first thing to
be done is to select vessels in which the largest number and
variety of creatures can be the most permanently maintained
in comfort at the smallest cost. It will be found that the simplest
form of vessel is a cylinder, as it has but one curve, and has a base
more or less flat, the upper end being open, or loosely covered.
The best place for a first experiment in aquarium keeping
is a room which is cool in summer, and which can be
warmed moderately in winter, and having one window facing
due north, as such an aspect gives, in the greatest perfection,
the all-important requirement of daylight without sunlight. If
a northern window cannot be commanded, then some combina-
tion of north with east, or with west, may be made to do.

A window facing due east is also tolerably good, as one gets
in it only the early morning sun. Due west is undesirable, as
the hot afternoon sun in summer shines much on it, and, of
due south is worst of all. If, however, no other than these aspects can be obtained, the light and heat must be
tempered by blinds placed inside of the window, or outside, or
both. In such a window then fix (if it has not already a broad
shelf) a shelf running along it at a height of three or four feet
from the ground, firmly supported beneath. A non-slicky
table standing on good legs is excellent, especially if it has a
drawer to contain a few aquarium implements, but whether
table or shelf, the length may be about four and a half or five
feet, and the width about eighteen inches. If the top of it be
of wood which is not eighty, as plain deal, or even painted
deal, cover it with oil-cloth, as no satisfactory natural history
work can be carried on in conjunction with slovenliness. Poor
as a church mouse a naturalist may be, but untidy in his
person or in anything connected with his favourite pursuits
he never can be, unless there is something about him morally
wrong. For the same reason he will never choose, if he is an
aquarium naturalist, to keep animals in sight, or even out of
sight, in vessels of a domestic character, unless for very tem-
porary purposes.

I do not know exactly why it is, but I detest seeing aquatic
animals or plants in such a vessel as a foot-pan, even though
it may for some purposes answer better than a regular scientific-
looking glass vessel. So, too, in my poorest days, when I
bought confectioners’ glasses in which to keep my specimens, I always left out the domed and handled glass covers, and substituted, at a sacrifice of pence, the really not so good simple flat glass discs which I have described, to keep out dust and retard evaporation. The glass covers reminded me too much of barley-sugar and bull’s-eyes, and were altogether horribly “shoppy” looking. One who is not particular about these things will, if he is a boy, grow up to revile the Queen by sticking postage-stamps upside down on letters, or will commit some other enormity.

Cover the board with oil-cloth, therefore, if it wants covering at all, but do not choose oil-cloth which imitates marble or the graining of wood, and you will thus avoid the implied mean falsehood of using a cheap material which pretends, or allows to be supposed, or which even suggests, that it is a more expensive one.

Then take four cylinders of clear white colourless glass—A, B, C, and D. I say four, because no one with the necessary zeal for aquaria will be contented with fewer than these. All four are twelve inches in diameter, and A and D are fifteen inches high, while B and C are six inches high. A is for freshwater fish, and has a vertical depth of twelve inches to give space for the active movements of the fishes, with a height of three inches above the surface of the water, that they may not spring over, as they are very apt to do. D is similarly arranged in all respects, and for the same reasons, for marine fishes and actively-swimming crustaceae, as prawns. B is for sea anemones and madrepores, and contains about four inches of vertical depth of water, as these creatures, not being active, and not needing much vertical space, and being in effect fixed to one spot, cannot rise to the surface of the water for air, and so the surface must be brought down to them. C is for marine crustaceas, as hermit and other crabs, also for the same cause requiring large horizontal surface space rather than great vertical space.

To set up these four vessels as aquaria, proceed thus:—Get four round pieces of green-baize, each twelve inches in diameter, and place them in a row on the shelf, or table, where the glasses are to stand, and place the glasses on the baize. This is because if the glasses were to stand directly on the oil-cloth, its sticky surface, combined with the weight of the glasses, would cause them to adhere immovably; whereas, it is desirable to be able to turn them round easily for examination. The baize, therefore, will stick to the oil-cloth, and the glasses can be smoothly turned round on the baize. Then get some nice shingle, of the size of peas (great coarse, angular shingle in small vessels looks ugly), and wash it many times in running water (fresh) till quite clean. Obtain an equal quantity of fine sea-sand, and wash that similarly, and mix the two together. If properly washed, and the fresh-water drained from it, a handful of this thrown into a tumbler of clear water should instantly subside and leave no cloudiness. It is better to mix the sand and shingle thus, as the animals in each glass can then have both together. Spread this on the bottom of the vessels to the depth of one inch. Get some bits of rock (granite will do very well) and place in each glass firmly, so as not to topple over. Do not
cement it in, in any way, and avoid attempting any cockney grotto work.

The rock in D might stand an inch out of the water, and present a little plateau half an inch above it, for a blemmy—a small fish so called—to climb upon and rest in the air, as it is fond of doing. Similarly you might leave a little rockwork out of water in C for crabs.

The fresh-water of A is of course easily obtained. I have not satisfied myself that one kind of water—as spring, or rain, or river water—is better than another, but perhaps it is best to avoid "hard" water, because the hardness consists of foreign substances in solution, with which it has come in contact. In those times of cheap excursions to the seaside it would be hard if one could not get the six or seven gallons necessary to fill B, C, and D, and an equal quantity to keep as a reserve. It may be brought from the sea in new and well-washed large stone bottles; never risk any which have held anything else. But large glass vessels, well-wickered, such as the carboys in which acids are conveyed, are the best of all, because the contents can be seen, especially if the glass be clear. They should be well washed out if they have contained acids, or anything but sea-water.

Fill these three sea-water cylinders to the height indicated, and cork up the rest if it be quite clear and free from smell. If not, expose it to air till it becomes sweet, and then cork it.

If, however, real sea-water cannot be got, or is troublesome to obtain, artificial sea-water can be made thus:

- Common table salt, 33 ounces
- Epsom salts,
- Chloride of magnesium, 200 grains
- Potassium 40

Dissolve these in one gallon of fresh-water, and it will eventually perfectly well sustain the lives of marine animals in health, even though only four of the ingredients of real sea-water are present, out of several more. Marine salts procured by evaporation from sea-water is also obtainable, but only that which professionally is made for aquarium purposes, and even then with much caution. The specific weight of a solution of salts in this amount of water will be found to be about 1.026, supposing fresh-water to be 1.000; or, in other words, there are present twenty-six parts of salts in solution in every thousand parts by weight of water, as indicated by a little instrument called an "hydrometer," made of glass or vaseline, having marked upon it the various figures corresponding to densities.

If the water be real sea-water, it should be maintained at about 1.026 or 1.027.

Specific gravity balls in pairs, one of one colour to sink, and one of another colour to float, or used singly, are far too delicate in their action for amateurs to use; and this
I say, though it was I that first introduced them into use, in 1855.

Put the covers on the glasses, and expose them well to the light to vegetate. Even the artificial sea-water will vegetate, as my bird-cage glass did, if time enough be given it, but it will be much accelerated if a little real sea-water—half a pint or so—be added to the artificial. If even that small quantity cannot be got, then a small sponge or a bit of clean linen dipped in some well-to-do aquarium, and sent by post in a moist state, and then washed out in the artificial sea-water, will assist in the growth of plants, which must be present before animals are introduced.

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ROUND GAMES.

By James Mason.

THE THREE WORDS—RHYMES—SHADOW BUDD—"WHAT'S THE PRICE OF EARLY?"—BUFF WITH THE WAND.

This was the sixth meeting of the Round-Game Club.

"A penny for your thoughts," said John Ferguson to Maggie, who was looking somewhat grave.

"I was wondering what game David was going to propose to begin with," answered she.

"The game of The Three Words," David called out, from the other side of the room, where he was standing talking to the Princess and Notes-and-Queries; "if you will all sit down I'll explain it to you.

We all sat down round the table, and David produced a number of slips of cardboard, which he distributed, giving three slips to each player.

"You might have saved your cardboard," remarked Kate; "paper would have done as well.

"True enough. But I am in an extravagant mood this evening. Upon these slips of cardboard you must write three separate words, nouns or adjectives, which you please. When you have done that give them back to me."

The words were written, and the slips returned; David shuffled them, and then redistributed them, giving three to each as before.

"Write a stanza of poetry," said he, "introducing the three words you have got. Here is paper for the purpose."

"Why," said Notes-and-Queries, "this is not unlike the game of Nouns and Questions which we played at some little time ago."

"Must it be poetry?" asked Alice; "if so, I am afraid I must invoke the assistance of some Muse."

"No, no; poetry isn't at all necessary. You must give us rhyme, in company with reason if you can; without, if you cannot."

We had no limit assigned to us in point of time, so everybody wrote on till he had finished his task. Then the cards were handed to David, who opened them in any order, and read their contents aloud.

"This one," he said, looking at the first, "has reference to some young ladies. The words which the writer got were 'half,' 'grace,' and 'songs.' He writes:

'Where'er I think upon the grace
That unto her belongs,
I fancy would give her name a place
In half a hundred songs.'"

"That's a big number," said Emily; "he must be pretty enthusiastic about the lady."

"The second piece," David continued, "is not in a sentimental vein at all. The words are 'taller,' 'sky,' 'ass.' The verse is:

'Once on a time an ass concluded
The heavens were not so very high;
'Were I,' he said, 'a little taller
I easily could touch the sky.'"

This was held to be better than the former piece; and John Ferguson remarked, by the way, that, to speak in parables, there were some asses even now-a-days, who thought the sky no distance off.

I need not tell of the rest of the papers; how one stanza was made to contain the words, "hour," "jewel," and "ink," another—"thoughts," "pretense," and "patient," a third—"white," "fortune," "noisy," and so on.

The last had just been read, when the Princess remarked, "The difficulty I find in such games as this is that I can't think of rhymes that will suit."

"That is," said John Ferguson, "because you do not practise writing verses; if you did you would soon have the whole rhyming dictionary at your finger ends."

"Well," said the laughing Hyena, "if we are going to have many more poetry-games the sooner we have it so the better. One can't do without rhymes very well.

"Rhyme the rudder is of verse,
With which like ships they steer their courses,'
as everybody says."

"Let us play at the game of Rhymes," said Notes-and-Queries; "I have thought on a word, and it rhymes with spite."

"Is it far above the level ground?" asked Arabella.

"No; it is not 'height.'"

"Is it what people should do and don't do very often?" asked Kate.

"No; it is not 'right.'"

"Does it come after sunset?" this was Tom's question.

"No; it is not 'night.'"

"Is it what Emily's eyes are?" inquired the Reporter.

"No; it is not 'bright.'"

"Is it one of the five senses?" asked the Princess.

"No; it is not 'sight.'"

"Is it one's state of mind when one's hair stands on end and one's knees knock together?" asked the Laughing Hyena.

"No; it is not 'fright.'"

"Is it 'tact'?" exclaimed Emily.

"You are out of order," said Notes-and-Queries; "the rule of the game is that you must never mention the word, but only tell what it meaning is. I must name the word, but not you. However, the word is not 'tact.'"

"Is it what one would like to see on a dark night?" Alice asked.

"No; it is not 'light.'"

"Has it got life?" was Maggie's question.

"Notes-and-Queries thought for a minute what word she could be referring to; then he said, "No; it is not 'mite.'"

"Is it what one sees many an example of in warfare?" inquired David.

"No; it is not 'fight.'"

"Is it, then, to 'quote'?" asked John Ferguson.

"Yes," answered Notes-and-Queries; "you have found it out at last; it is 'cite.'"
“Oh,” said the princess, laughing, “did I not ask if it was sight?”

“Yes; but though the sound be the same, there is a vast difference between c-i-t-e and s-i-g-h-t. You wanted to know if I had thought of one of the five senses.”

“I see,” said Kate, “that the principal player in this game must be very quick at guessing what is meant by the descriptions of the words.”

“No,” said Notes-and-Queries, evidently pleased at having an indirect compliment paid to his ability, “it does not require cleverness at all. You just need to keep all your wits about you, for if once you get flurried you never can find the words you want.”

It was suggested by somebody that we might have introduced forfeits into the game; when Alice said she had seen it played often with forfeits. “They were imposed,” she said, “if anyone named a word instead of giving a meaning, or gave a meaning that had been given before, or proposed a word that was not a rhyme. And the leading player paid a forfeit if he did not guess the words that were alluded to in the questions addressed to him.”

“Words of one syllable will do best for the game of Rhymes I think,” said David.

“Yes,” said Notes-and-Queries; “they are the easiest; and, for a pastime, that is an important consideration.”

“The next game,” said David, rising from the table, “is to be Shadow Buff.”

Whilst Notes-and-Queries was enlarging, for the benefit of the rest of the company, on the fact that Shadow Buff was a game of the same class as Blind-man’s Buff, and speculating as to the probable date of its invention, David and Tom were fastening a white sheet to the window-curtains. I do not think the operation improved the curtains, and am decidedly of opinion that they might have found a better way of hanging up the sheet. However, they fastened it, as I have said, and then pulled it this way and that way, and at last coaxed it into presenting a fine smooth surface to the room. Then Tom set a footstool on the ground, a yard or so from the sheet, and David lifted a little side table and set it down some distance behind the footstool, and placed on the table a large lamp.

By this time Notes-and-Queries had unburdened his mind of all his information and conjectures, so he turned round.

“David,” said he, “do you propose making me Blind-man?”

“Yes, if you care to accept the post.”

Notes-and-Queries rose, and took his seat on the footstool in front of the screen, with his face turned away from the rest of the players.

All the lights were now put out, except that of the lamp on the table behind Notes-and-Queries. The players one by one marched between the lamp and his back, and it was his task, as Blind-man, to recognise them by the shadows they threw on the screen. He was not allowed to look round in the least degree, but had to keep always staring straight forward.

Emily went first. By way of disguising her appearance she had fetched Maggie’s muff, which she placed on her head like a tall cap. She passed undiscovered, for Notes-and-Queries guessed her shadow to be that of Arabella. Next went John Ferguson, with a three-cornered paper hat on his head, which he had dexterously manufactured for himself. He too was guessed to be somebody else. After him came Maggie, with an old newspaper thrown about her for a shawl, and that proved quite an effective disguise. Alice followed, with a plaid thrown over her head, to conceal her long hair, which would have betrayed her, and the plaid became her sweet face very well. Then Tom hopped past. Then the Laughing Hymena tried to get past, stooping, and leaning on a stick, but Notes-and-Queries named him. “You should have hidden your long nose,” he said; “I made you out at once by means of that.” Come here; you must take my place, whilst I join the rest.”

The game went on now with great spirit, and we played at it till David’s shadow was recognised. When that happened, he proposed that instead of continuing Shadow Buff we should play at another game. And that was to be “What’s the price of Barley?”

“I shall be,” said David, “the conductor of the game, or as is respectfully called, the Master.”

“Some of us do not know the game,” remarked Kate; “you must describe it.”

“That is easily done. I, the Master, will give a name to each of you. The names will be simple words and phrases relating, at least in a sort of way, to the barley-market. When I name any of you, you must answer ‘Yes, Master,’ if you don’t, you must pay a forfeit. Then I shall ask, ‘What’s the price of barley?’ to which you must reply by quoting one or other of the prices agreed upon as names at the beginning of the game.”

“And what are the names to be?”

“Emily, you will be Jack; Arabella will be What; Mary will be How Much; Alice will be Too Dear; Kate will be Falling Market; Maggie will be First Rate; John will be Very Cheap; Notes-and-Queries will be Nonsense; you, Hymena, will be Half-a-crown; Reporter, you will be Ten Shillings; and as for you, Tom, you will be Sixpence.”

The game now went on.

“Jack!” said David.

“Yes, Master!” Emily answered.

“What’s the price of barley?”

“Sixpence,” said Emily.

“Bread!” Tom shouted out.

“You must pay a forfeit,” said David; “you were to say ‘Yes, Master!’ when I named you, not when any other person did.”

“Let me off this time,” said Tom; “I did not quite understand that.”

“Falling Market!” David went on.

“Yes, Master!” said Kate.

“What’s the price of barley?”

“Half-a-crown.”

“Very cheap!” said David.

“Bread!” cried John Ferguson.

“What’s the price of barley?”

“Ten shillings.”

“Ten shillings! Nonsense! Too dear!” exclaimed David.

“Yes, Master!” said the Reporter, Notes-and-Queries, and Alice, all together.

“What’s the price of barley?”

The Reporter and Alice said “Sixpence;” Notes-and-Queries said “Half-a-crown.”

“How much?” said David.

“Yes, Master!” answered the princess.

“What’s the price of barley?”

“Sixpence.”


Thus we played at “What’s the price of Barley!” but I think I have set down enough of it. It is a good game, and is very interesting to play at, at least we found it so.

“Let us have a real blind-man’s game,” said Emily: “the blind-man in Shadow Buff was not blind at all.”

“What then, my dear child, is it to be?” David asked.

“Buff with the Wand,” answered Emily.
"That is what is sometimes called Blind-man's Wand!" Emily nodded.
Notes-and-Queries agreed to be Blind-man, so he was blindfolded with due care.
"Give me a cane for a wand," he said.
Emily brought one and gave it to him.
The company, holding each other's hands, formed a ring, and began dancing round him to the chorus of a popular, though by no means a classical song. When the chorus came to an end we stood still.
Notes-and-Queries held out his wand. "The player to whom it happens to must take hold of it," he said.
It chanced to be John Ferguson; so he seized the end of the wand.
"This is," said Notes-and-Queries.
"Not so fast," cried David; "the proper way to play the game is for you to give three cries, left to your taste and discretion, and for the player who holds the other end of the wand to imitate them as well as he can, but in a feigned voice. Should you find him out, by his not disguising his voice properly, he must take your place."
"Is that the way?" said Notes-and-Queries. Then he put his two closed hands to his mouth, and began hooting like an owl, in a most unearthly fashion.
John Ferguson did his best to imitate him.
Then Notes-and-Queries gave the cry of the Edinburgh fishwives, "Ca-ner-a-ner-a-oo" and John repeated it.
Last of all, Notes-and-Queries cried "Coal!" in his deepest bass voice. John Ferguson, who is a light tenor, made as low a growl as he could in imitation.
"John Ferguson!" exclaimed Notes-and-Queries; "one can tell you by your voice, disguise as you may. You can't touch that note," and our antiquarian friend pulled the handkerchief from his eyes, and looked as gay as a chalkline.
John Ferguson became Blind-man now, but he did not prove so quick at discovery as his predecessor. He failed several times to find out who held the end of the wand. Then Maggie was Blind-man, and then David, but I can remember no incident of their adventures in that capacity worth setting down.
That was the last game of the evening.
"It is a fine moonlight night," said David, as he stood at the door, and the members of the Round-Game Club passed out. "I hope you will have a pleasant walk home."
"I am sure of it," said Maggie. "Good-night!"

CHESS.

By John Wismer, the English Champion.

GENERAL OBSERVATIONS RESPECTING THE PAWNS—MORAL QUALITIES REQUIRED IN CHESS—TIME.

The young player will do well not to neglect the pawns on account of their comparative weakness or the simplicity of their movements. Struck by the complicated movements and large powers of the superior pieces, he is apt to suppose that the pawns are of little value or that their management involves no difficulty. Strange to say, the conduct of the pawns is amongst the most abstruse branches of chess. No part of the game is more difficult to master; on none does the issue of the battle more frequently linger. With fine players the contest between the superior pieces often fails to prove decisive. Neither party can make an impression upon the other till the pieces are exchanged, and the field remains clear. It is in such a situation that the timely advance or favourable position of some unheeded pawn determines the fate of the battle. Good players make great use of their pawns in the attack, often sacrificing one in order to gain corresponding advantages, or putting them forward in order to break up the adverse entrenchments. Above all, the privileges accorded to the pawn of being exchanged for any piece whatsoever when it reaches the eighth square, imparts a high degree of interest to its movements, involving extreme subtleties of strategy and depth of calculation. A situation is shown in Fig. 1.

Here the forces are exactly equal, and the position of the pawns is similar; but the situation of the black king determines the battle against him, provided it be White's turn to move.

WHITE.

1. P to Q Kt 7
2. P to Q 4 Kt 7
3. Q to Q 5 Kt 7, ch.

By interposing his queen White not only covers the check of the black queen but gives check at the same time himself. It is evident that the queen must be exchanged.

BLACK.

1. P to Q 4 Kt 7
2. P to Q 4 Kt 7
3. Q to Q 5 Kt 7, ch.

The other pawns now march on; but, the beginner must observe, the white pawn has been transferred to the king's file, so that when he reaches the eighth square he checks the black king the moment he becomes a queen.

5. P to Kt 6
6. P to Kt 7
7. P to Q 7 Kt 7

It is evident that the king must move out of check, and then the white queen attacks the black pawn, and wins it.

The primary rule to be observed by the young player, in the guidance of his pawns, is this—Take care of them. Your adversary should never be allowed to snatch one unawares. Fine players often give up a pawn, even at the beginning of the game, but never unless they expect some counterbalancing advantage.

If you can establish your pawns in the centre of the board, say at king's fourth and queen's fourth, they will exercise a very restrictive effect on your opponent's game. Be careful, however, not to so establish them until you are ready with plenty of support, for your opponent may often get up an embarrassing attack upon two pawns so placed. Do not push your pawns too far in the early part of the game; they become weak, and are liable to be broken up and captured. Moreover, the enemy's pieces may often get behind your advanced array, and assail your king at a disadvantage.

A "passed" pawn is often of very great service. A pawn is said to be "passed" when its march is not opposed by any adverse pawn, either on the right or left hand or in front.

In the next diagram (Fig. 2) the white pawn, on the Q R file, is passed, since it is not opposed in any way by a black pawn. On the other hand, neither of the black pawns are passed, since the first that advanced would be captured by the single white pawn. In this instance White wins by aid of his passed pawn, though the forces are equal. If Black, having the move, march his king to assail the Q R P, White attacks the black pawns with his king, captures both, and then queens his K P.
White.
2. P takes P ch.
3. P to Q 3
4. P to Q R 6

White queens his pawn first, and wins easily.

Avoid doubled pawns whenever possible, that is, do not, if you can help it, suffer one of your pawns to be brought up the same file as another, through the capture of a man. Nevertheless, doubled pawns are not always disadvantageous, if they be united with others. Be careful of advancing your pawns on the side on which you have castled.

The good habits and moral qualities which the chess-player should endeavor to cultivate are not less important to him than the scientific principles upon which the conduct of the game is based. As a bad attitude at the wicket militates against the cricketer, a bad "bridge" against the billiard-player, so a slovenly, hesitating, or noisy demeanour over the chess-board is prejudicial to the attainment of a fine style. The good player is known by his conduct as well as by his strategy. He does not hover with his hand over the board, first thinking of moving one man and then another; he does not finger the squares to see the effect of certain moves; he does not spend long in deliberating when there is but one move that, consistently with the laws of the game, he can possibly make; and, though good practitioners often lose their temper, it is a great advantage to a chess-player to be able to keep it.

First amongst the good habits to be cultivated by the beginner is that of scrupulously guarding his play according to the rules of the game. It follows, as a corollary, that he should insist upon his adversary doing the same. Unless this condition be observed it is idle to attempt to become a chess-player. It would be absurd to attempt to practise in the clubs. Hard as it may be at first to abide by a stipulation of the rules, which in a certain case may entail the immediate loss of a well-contested game, it is better to sacrifice a little for the sake of gaining much. In the end this strict attention to rule will become a confirmed habit, and great will be the gain thereby. Your style will more rapidly improve; the game will prove a pleasanter recreation; all squabbles will be avoided. One rule in particular is the stumbling-block to almost all beginners. It is that which stipulates that, if you touch a piece you must move it, and that on the square on which it is placed it must remain. So long as you have not quitted your hold of the piece you may play it to any square within its range; but, having touched it, you must make some move with it; and having removed your hand you cannot select another square. This ordinance causes more trouble to the tyro than all the rest. In "drawing-room chess" no heed whatever is commonly paid to it. The pieces are fingered, moved, and removed, without stint. Yet, not the less must the learner overcome the difficulty. He can never play well unless he does; indeed, all good players will insist upon the observance of the rule. If the touch and move principle be mastered there will be the less difficulty in averting such slovenly habits as hovering and hesitating with the hand over the board, fingerling the squares, and the like.

You must necessarily be a poor player at first; therefore, do not refuse to accept odds from a superior antagonist. You cannot expect him to feel any interest in a combat which, on even terms, must end in your easy defeat, nor will you improve so rapidly. He will not put forward his full strength if he can beat you without trouble. Some players think it "disgraceful" to take odds; this is foolish. Chess is not usually played for money; but the practice of the metropolitan clubs of playing for a small stake has this advantage—the weak members gladly accept all the odds they can get, and ask for more than they can get.

It is worth while saying a word as to the time to be spent over an ordinary game. I have, of course, no data for laying down a precise rule, since a game of ninety moves must last longer than a game of fifteen. Still, a fixed number of moves should be played in an average time. Now-a-days, the style of play is much quicker than it formerly was. I believe that in the early part of the century the play was rapid; but the great matches between Labourdonnais and Macdonnell introduced a heavy cumbersome style, which grew gradually worse, until the tournament of 1851, when it culminated in unprecedented performances. One competitor, as I have elsewhere remarked, spent two hours and a half over a single move, and made a bad one after all. One game lasted two whole days. On another occasion both players fell asleep, and peacefully lingered, goodness knows how long, until awakened by a friendly hand. The period from 1851 to 1857 was the period of slow play. The advent of Morphy inaugurated an era of improvement, for the American master's style was rapid. The British Chess Association rendered still greater services by enforcing the use of sand-glasses in all important matches, each player being allowed a given time, measured by the sand-glass, in which to make a given number of moves. This rule has been followed ever since, to the great benefit of chess. Moreover, the time
limit has been gradually reduced, producing a more and more rapid style of play. Perhaps the culminating point of speed was reached in the late match between Mr. Bird and myself, both players, and especially Mr. Bird, being usually far within the limit of fifteen moves an hour allowed to each. The beginner, however, need not guide his movements by the statistics of match play. He should conduct his game steadily, not hastily moving in an apparently simple position, nor spending too much time over a complication. He should look to his opponent’s game as well as his own, and consider not merely what he himself can do, but what his adversary can do also. Chess will be pleasant, and the practice improving, if an average of about an hour is devoted to one game. Such an average will alleviate unbearable tedium and destructive carelessness.

It is, perhaps, idle to recommend you to keep your temper when losing; that depends upon the kind of temper you may happen to possess. But, at any rate, do not be discouraged. Play the game you have lost over in private; note where your opponent played well, and where you played badly. Chess is a game of great mental activity. Trouble and perseverance are necessary to play it well. Nor is it a disadvantage that so much pains should be required, for, in these civilised times, no game is worthy the name of pastime which depends too largely upon chance, or which may be learned in a day.

It is now the turn for the advanced amateur to claim a little attention. Accordingly, I submit to him what was, under the circumstances, one of the finest strokes of play on record. In the spring of 1859 Mr. Morphy played at New Orleans six games simultaneously against as many amateurs, winning them all. One of these games was played as an Egan Gambit, and, after the twentieth move, the situation stood as in Fig. 3.

Here, in support of what I have previously remarked, the young player may notice the strong position of White’s rocks. Black’s Q P, on the other hand, has not even been moved. Mr. Morphy won by the following brilliant manœuvre:

**WHITE**
21. B to K 8
22. Q takes R
23. Q takes Kt P ch.
24. P to K B 6

**BLACK**
21. Q takes B
22. Q to K 2
23. Q takes Q
24. Q takes K Kt P ch.
25. K takes Q
26. K takes R
27. R to K Kt sq.

and wins.

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**WINDOW GARDENING.**

*By J. C. Leake.*

**OUTSIDE WINDOW-CASES—THE WINDOW GARDEN PROPER.**

ALTHOUGH the light and portable cases which we have already described are in the nature of things the most popular and common, in consequence of the case with which they are made, as well as the cheap rate at which they may be purchased, there can be little doubt that those of a more permanent character, and which can be fixed in the window, are, when properly arranged and well managed, by far the most effective. The ordinary cases can in most instances only be employed for the cultivation of plants of the fern tribe, while the window-garden, properly so called, is quite available for plants of every description.

We can conceive no better plan of window decoration so effective as that of outside cases, which at once furnish an elegant system of floral decoration and a window-blind of the best and prettiest description.

To the amateur it may appear rather difficult to construct a window-case suitable for the purpose, but it is in reality no more so than the cases which we have already described; and in many instances, where the shape of the window is favourable for the purpose, an outside case can be made with less trouble than an ordinary independent and movable one.

Of course it will be best to commence with the simpler forms, and we will therefore describe one of these first.

We will suppose that it is desired to fit a case to an ordinary window of about three feet in width, and that it is proposed that the case should be, say, fifteen inches inside measurement, from back to front. It will be found that the brick-work surrounding the sash frame projects about five inches, and that the stone sill gives a projection of three inches more. In order, therefore, to get a clear width of fifteen inches inside the case, it must be made to project beyond the stone-work.

The best method of proceeding will be to make a box of exactly the length necessary to fill up the width of the window. This box, which will correspond with the base of the fern cases already described, must be well and strongly put together, and it should be made of wood at least one inch in thickness. When put together it should be tried in its place, so as to ensure its being of the exact size, as it will have to serve as the groundwork of the other portions of the case.

It will now be observed that in order to bring this box to a level, and to make it rest upon the stone window-sill, some wedge-shaped blocks will be required, and these should be allowed to project nearly to the outer edge of the box, and the ends be shaped as shown at A in Fig. 1. When the box has been fitted as described, it may be removed to the bench, as the whole of the case will have to be fitted together entirely independent of the window.

The next matter will be to ascertain the height of the meeting bar of the sash above the box, as this will, in most cases, determine the length of the bars. It is as well, where practicable, to make the point of junction of the two sashes the top of the case, as the bars will not then obstruct so much light. We will suppose that the height of the sash-bar is three feet from the stone sill; in this case the length of the four angle bars required will be, of course, three feet, less the depth of the box, say five inches. Allowance must, however, be made for the tenons which will have to be made at the top and bottom, as in the ordinary sash-case.

It must be determined by the constructor of what size he would like to have the glass; but when it is not required above three feet square, we should advise that one square only be employed for glazing the front of the case, as the effect is much more light and elegant than when bars are employed. If it be determined to glaze the front in one square as just
suggested, only four bars will be required—two at the front and two to fit up to the sash frame. The two angle bars which are to form the front of the case, will require to be rabbeded as shown in Fig. 2, so as to receive the glass which is to form the front and sides of the case. The bars which are intended to fit up to the sash frame will only need to be rabbeded on one side, as indicated in section at Fig. 3.

The top frame will require to be made somewhat differently to the other parts, as provision must be made for the escape of the rain-water. The better plan will be to allow this top frame to slope slightly outwards; an inch of slope will be ample. The two ends and the back, which will have to stand next to the sash bar, should be rabbeded to receive the glass; but as it is desirable that the top glass, which forms the roof, should extend to the outer edge of the case, which it could not do if the rabbeding was continued all round, the front bar must be thinner than the others by the depth of the rabbeet.

It will now be observed that when the glass is placed in position it will overlay and entirely cover the front bar, and will allow of the free escape of the rain-water. This top frame may be fitted together by halving one part into another, or by the ordinary method of tenoning, as described in former articles; but it should be remembered that as the case will be exposed to strong winds and storms, it is necessary to screw the angles well and firmly together. Of course the bars should be tenoned and wedged into both the top and bottom of the case, and this part of the work should also be well and strongly executed.

The only remaining operation in order to fit the case for glazing, will be that of bradding slight fillets of wood, both upon the bottom box—upon its top edge of course—and upon the top frame, in order to complete the rabbeds all round, and retain the glass in its place. It is a mere matter of form to observe, that as a rule, it is better to construct the case so as to allow of its being glazed from the inside, as it would be difficult in many instances to do this from the exterior. The roof must of course be made to be glazed from the outside, on account of the arrangements for the escape of water.

The framework of the case will now be complete, and before glazing it should receive one or more coats of good oil paint, both in order to preserve the wood and because the putty will adhere better and retain the glass more firmly in its position. When the position of the window will allow of it, the case should be fixed before glazing, as there will then not be any danger of breaking the glass. The glazing is to be effected in the usual manner, with common glazer's putty; and it will be better to brad the glass in than to trust altogether to the strength of the putty to keep it in its place.

For an ordinary-sized case the common sheet-glass will answer every purpose, and up to three feet square that thickness known as "thirteen-ounce" will mostly answer perfectly. When the case has to be fixed in any very open and exposed situation, or the size of the squares exceeds three feet, it will be advisable to employ sixteen or even twenty-ounce sheet.

The fixing of the frame should be effected with care, and it is better to employ screws than nails for this purpose. If the bars next to the sash-frame be well screwed into it, and the box securely fixed to the wooden sill, there will be little or no danger, but it must be remembered that the weight of earth and garden pots containing plants will be considerable. In some cases, where the projection over the sill is of greater extent than ten or twelve inches, it is desirable to employ brackets to support the outer part of the case, but for one of the dimensions above given this will not be necessary, if the bottom box be well put together and properly supported by wedges.

It is always advisable to line the bottom of the case with zinc, in order to prevent the water from running down the walls; and when it can be conveniently done, a waste-pipe, for the escape of water, should be carried from the bottom of the tray.

Of course, the case may be decorated in various ways; but upon this we must defer our remarks until our next article.
purplish-violet, but the rosy pinks and pure whites, or a combination of the two, are quite as pretty; when of those colours the petals are all alike. You see that the flower is funnel-shaped, and that it has five petals; the shape of the two lower ones differs in a slight degree from the three upper ones, so that you are prevented from cutting them in one piece; then the up to that part where you see a + in the diagram (Fig. 2), mould the corolla into its proper form, and then it will be ready for mounting. The stamens are twice in number those of the petals, are of the same colour, and are very irregular as to their lengths—one is always in advance of the others. I shall suppose that you buy them, for you can get four sets

![Fig 3.](image1)

THE RHODODENDRON.

![Fig 4.](image2)

middle petal (Fig. 1) is marked with another colour, short splashes of black down the centre, in the manner you will there perceive.

Each petal has a well-defined line marked down the entire length of its centre.

In some instances the edges of the petals are fringed as it were, full and crimped. I do not think that you have as yet been told how to get this effect. Fold the petal in two parts, making use of the line which you have just made, and then press the edges—no more—between a piece of crape. When the petals are ready, gum the two sets together from the base for one penny like Figs. 3 and 4. Slip on the corolla, and cover the stem very neatly. There is no calyx to this flower, so I hope that there will be no untidiness at the back of it.

And now that each separate flower is finished, mount them on to the parent stem. These flowers grow in clusters, consequently a great many of them have to be fastened on at one point. Let the stem of the middle flower be the longest, so that it will tower above its companions, and have the others in proportion, for on the making of these trusses depends much of the general natural effect. When each cluster is complete, cover the whole of the peduncle.
THE

Popular Recreator.

A KEY

to

In-door and Out-door Amusements.

That bow, if kept always strained, would lose its spring, and probably snap. Let it go free sometimes."—Aesop.

Vol. II.

Cassell, Petter & Galpin:
## CONTENTS

### ANGLING

- Beach Fishing—Roving vs. Sedentary—Baits—Two Styles of Angling—Ground Bait—Preparations... 13
- The Perch—Habits—Feeding—Best Ways of Fishing—Baits—The Extremes... 120
- The Pike—Trolling—Spinning—The Hooked Fish—Baits—To Extract Hooks... 101
- Spinning—Flights of Hooks—Leads—Baits—The Club—Wariness and Defeat... 241
- The Dace... 319
- Barbel—Bream—Gudgeon—Carp—Teach... 349

### AQUARIUM, THE

- The Popularization of the Water—Examples—Glass Globe—Goldfish—The Burning Candle Oxygenating... 87
- Hamburg Tanks—Experiments at the Crystal Palace—The Jack Tank... 113
- Importance of Circulation in Water—Warington's Trout—No Necessity for Change... 170
- Episode of the Barber of Frankfurt—Art Eaters—Sir J. G. Dalzell, Dr. Bowles, Mr. Jenner Weir, Miss Blanche, Mons. St. Hilaire... 218
- Collecting Vegetation—Success—Old Ideas on Aquaria... 270
- A Few Words on Sea Weeds... 332

### ARCHERY

- Introductory—Historical Notes—Crack Shots—The Precision of the Long Bow (Ancient)—Greek, Persian, Cretan, Roman, and Norman Archers... 1
- Archery v. Cricket—The Bowstring—Substitutes for Use of It—The Eildon Tragedy... 93
- The Implements—Stringing the Bow—The Five Points... 129
- Old-Dean Custom at Harrow—Roving—Flight Shooting—Turkish Contests—Extending the Flight of the Arrow—A Sultan's Shot—Cross Bow—Hunting—Directions—Chamber Prac... 152
- Keeping a Length—Toreau Shooting—Notes of the Old Reading Club... 182

### BAGATELLE

- Tables—The Balls—Holes... 230
- The Cannon Game... 238

### BEZIQUE

- The Game—Variations—Scores—Pokerets... 147

### BILLIARDS

- Rules of Play... 44
- Losing Hazards—Giving a Miss—Examples... 111
- Losing Hazards (continued)—Winning Hazards—Spot Stroke—Cannons... 206
- Accuracy of Play—All Round Cannons... 259
- Cautions... 356

### BIRD—COLLECTING AND SKINNING

- Making a Collection—First Commence—Inquiries—The Bird to be Chosen—Preparing to Skin... 25
- Skinning—Preparing to Stuff a Bird—Preservatives—Arms—Corrosive Sublimates—Use Thereof—Cautions... 97
- Dissection—Examination—Food Notes—Suitable Birds for Skinning—Beginner's Difficulties... 156
- The Corblini Process—Preserving in Spirit—Setting Up... 213

### BOATS AND BOAT-SAILING

- Varieties of the Lug Sail... 8
- Varieties of the Spissel... 109
- Canoe-shaped Travelling Boat—Mudgig Rig... 314
- Bermuda Boats—The Gaff-sail and its Applications... 351
- The Cutter... 358

### BUTTERFLY AND MOTH COLLECTING

- Early Species (continued)—The Brimstone—The Orange-tipped—Wood Argus—Holly Blue—Green Hairstreak—The Swallow-tail—Dragons of Collectors... 31
- The Chase of the Fritillaries... 69
- The Copper Butterflies... 152
- The Blues... 167
- The White Admiral—The Purple Emperor... 255
- The Marbled White—Black-veined White—Meadow Brown—Greyling—Blighted Clouded Yellow... 305
- The Hairstreaks and Skip... 353

### CANOES AND CANOEING

- Canoes and Materials—Woods, etc... 78
- To Build a Canoe—Making and Rigging Up—Convenient Contrivances for the Canoeist... 103

### CARD GAMES

- Oribage—Vingt-et-Un—Speculation—Matrimony... 274
- La-Pope Joan... 335
- Cassino—"Allard Smith"... 367

### CASTING

- Casting Leaves for Ornamental Purposes... 17
- Casting Brackets, Vases, Wrests, Busts, Decorative Ties, etc... 105
- Hands—Fart—Busts—Decorative Ties... 187

### CHESS

- The Laws—A Good Game—Sample Games... 106
- The Simpler End-games—King and Queen, or Bishop, or Two Bishops, or Two Knights against King... 210
- Endings of Games with Pawn—With Pieces and Pawns... 300
- The Openings... 361

### COLOURING PORTRAITS

- Water Colours (concluded)—Draperies—Jewellery—Backgrounds—Landscapes and Picturesque Effects—Draperies... 46

### CRICKET AND CRICKETERS

- Last Words on Batting—A Good Runner—Run the First Run Sharp—Stoker Loss—Their Effect on the Field... 26
- How to Make a Bowler—Early Practice in Bowling—A Uniform Action and one Delivery—More Encouragement to Bowlers—Faults to Avoid... 102
- Experiments in Bowling—How to Hold the Ball—Excess of Bowling—The Requisite for a Good Bowler—Patience and Courage... 65
- The Last Words on Bowling—Never Despair—"Head Bowling"—The Accuracy of Bowlers—Encourage your Field... 365

### CROQUET

- The Croquet Derivations—Opening a Game—Six-Hoopy Setting—The Break... 316

### DECALCOMANIE

- Picture Decoration—Transferring—Imitation of Sèvres... 85

### DIAPHANIE

- Imitation Stained Glass... 295

### DRAUGHTS

- The Theory of Exchanges—The Single Corner Game... 29
- Openings—Laird and Lady... 76
- The Single Corner—The Cross—The Whittier... 164
- The Glasgow, the Souter, the Will of the Wise, the Witch, and the Alliance Openings... 209

### EGG-COLLECTING

- The Etern—Rock—Herons—Long-eared Owls—Tawny Owl... 5
- The Missel-thrush—Song-thrush—Blackbird—Starling—Hedge Sparrow—Long-tailed Tit... 89
- Titmouse—Robin—Carrion Crow—Rook—Crow—Magpie—Jay—Wren... 142
- Skylark—Titlark—Tree Pipit—Rock Pipit—Whistan—Stonechat—Whinchat—White Owl—Short-eared Owl—Kestrel—Sparrow-hawk—Hobby—Wood-pigeon—Turtle-dove—Cook... 206
- The Cost—Moorhen—The Wagtail—Chaffinch—Brambling—Greenfinch—Crossbill—Linet—Goldfinch—Bulfinch—Hawfinch—Sparrow—Bunting... 205
- Woodpigeons—Cuckoo—Bedstart—Nightingale—Warblers—Swallows—Shrikes—Shrikes—Wild-ducks... 371

### ELECTROTYPEING

- The Lead Tree—Quantity—Intensively Arrangements of Cells—Use of Electrotype... 52
- Elastic Moulds—Copying Blocks of Statuette—Preparo the Mould... 81
- The Malleable Mould—A Better Plan—A Cast in Plaster—A Cast in Wax—To Prepare the Figure—The Copper Mould—Divided Moulds... 177
- Electro Deposits from Natural Objects... 374
CONTENTS

FENCING.
The Broadsword—Ancient Weapons—the Sabre—Infantry Sword—The Single-stick—Positions—Sabre Practice 10
Broadsword Practice—The Cut—Guard—Thrusts and Parry 65
Loose Play—Rules—The Bayonet—The Bayonet Exercise—Bayonet Exercise Drill 151
Concluding Words—Cost of Implements 186

FIREWORK MAKING.
Introductory—Historical—Preparations—Squib-making—Paper-rolling—Rummaging—Compositions 282
Snakes—Gold-rain—Star-lights—Blue-candles—Crackers—Wheels 289
Wheel-blocking—Quick-match-making—Rocket-cases 289
Rockets 321
Lamp—Rocket—House—Courtyard—Chinese Fliers 363
Pigeons—Chinese Trees—Phosphates 379

FLOWERS, HOW TO DRY AND PRESERVE.
The German Plan—Another Way—Mounting 194

FORTS.
... 383

GAMES OF THE PLAYGROUND.
Base-ball—Preliminar... 116, 314
Base-ball (continued)—The Rules 346

GOLF.
History of the Game 198, 235

GYMNASTICS.
General Aspects 158
Exercises in Detail—The Leaping-pole—Leaping-ropes—Simple Gymnastic Apparatus for Home Appliances 351
The Giant-stride, or Hurdy-gurdy 373
Exercises on Fixed Parallel Bars 351

HOME PETS.
Canaries 285

INDIAN BADMINTON, OR LAWN RACQUETS 324

JOINERY AS A RECREATION.
To Make a Small Step-ladder 41
Old Boxes, and how to Make a Pedestal Writing-table of them 83
Old Boxes, and how to Make a Drawing-room Cabinet of them 159
How to Make a Dog-kennel 239
Models for the Mantelpiece or Table—How to Make a Model Lodge or Toll-house 399

LA CROSSE.
La Crosse and its History 277

POTICHEMANNI.
The Decoration of Glass—Initation Sevres, Japanese, and Chinese Ware 134

QUOITS AND BOWLS.
... 61

RIDING.
Mounting—The Seat—The Reins—Paces—Stirrup Management—Maxims 3
Hunting—First Ponies—How to Ride to Hounds—Duty to One's Neighbours, Onself, and Horse 67
Behaviour of the Hunting-field 118

BOUND GAMES.
Boutis—Rimés—Characters and Predictions—The Woodman—The Feather 21
Cross Questions and Crooked Answers—Acting Rhymes—The Ten Birds—My Lady's Toilet or Twirl the Trencher 73
The Letter Game—Transposition—Buff and Fright—"She can do little who can't do this!"—The Indian—Blindman's Buff 131
Picture Gallery—What was he?—How, when, and where?—The Scissors 204
Counting-out Rhymes—The Grasshopper and the Ante—I Love my Love with an A—"Thus says the Grand Muff"—"Simon Says"—Hunt the Ring 286
Definitions—The Old Family Coach—Post 342

SILKWORMS.
The Process of Reeling 136
A Simple Reeling Machine—Rapid Increase of Silkworms 197

SKATING.
The Troubles of Beginners—Lady Pupils—Blind Guides—Russian "Coach" 50
Russian "Coach"—Skating in Holland—Few Words on Skates—Old Skates—The "Ace"—The Screw and Buckle Skates 95
The Inside Edge—Primary Education Completed—The Forward and Backward Roll—The Inside Backwards—Hunts as to Safe and Unsafe Ice—A Narrow Escape 123
Race-skating—The "Runners"—A Race-meeting in the Park—Hints for Fast Skating—The Best "Time" on Record 193
The Outside Edge—The First Lesson in Figure Skating—Its Difficulties 355

POLO, OR HOCKEY ON HORSEBACK 277

EXPLAINED—Five Golden Rules 180
Elementary Figures—The Eight—The Three Degrees—Three—the Rose 257
Simple Figures—Outside Edge Backwards—Backward Rights—Edges—The S—The Q—Combined Figures 382

SKELETON LEAVES.
Decorative Designs—The Leaves—The Ivy Cross 33

SPRAY WORK.
Ordinary Spray Work—Coloured Flowers—Nature Printing 146

TOYS.
Whip-top—Peg-top—Humming-top—Whirligig—Globe Top—Flying Top—Chameleon Top—French Top 376

TOY-MAKING AND TOY-GAMES.
Aunt Sally, or Baton, or Pitch-club—Cat and Mouse—Cleat Stick—Chinese Junk 99
Soap Bubbles—Light—Jew's Harp—Bottle Imps 155
The Magic Fan 179
Magician of Morocco—Dancing Highlander—Apples Woman—Pegasus in Flight—Steady Tar—Quintain 390
Dice, or Knuckle-Bones—Gobble Game—Duck, and Drake—Bird Whistles—Common Whistle—Squeakers—Squirt—Whalebone Cross-bow 526

WINDOW GARDENING.
Inside Case for a Bow-window 34
Completion of the Inside Case 191
Plants for the Purpose 331

ZETEMA.
Description of the Game—Varieties of Play—A Source of Amusement 125
THE

Popular Recreator.

ARCHERY.

By Maj. Hough.

INTRODUCTORY—HISTORICAL NOTES—CRACK SHOTS—THE DRAWING OF THE LONG BOW (ANCIENT)—GREEK, PERSIAN, CRETAN, ROMAN, AND NORMAN ARCHERS.

THE origin of archery has been traced to the porcupine. Some remote progenitor of Colt or Whitworth, it is suggested, observed that animal, when more than usually fretful, shoot its quills, and never rested till he had contrived some method of doing something equivalent, so he invented the bow. The principal objection to this theory is, that the porcupine only casts its quills when nobody is looking; at least, no credible witness has ever yet seen the performance. There
can be no doubt, however, that bows and arrows have been in use from the very earliest pre-historic times. We have the testimony of the caves to the fact that, unimaginable ages ago, man-like kindred marrow-bones, and used arrows to procure them; and some of those pieces of chipped flint, euphoniously termed works of art, found in the drift, are declared by the learned to be arrow-heads.

Ismael was an archer; so was Esau, and a successful one too; Paris must have been an erring marisian, to hit Achilles in the heel; or if you suspect that chance guided his shaft to the one vulnerable spot on his enemy's body, you cannot depreciate the skill of Aster, who made the famous king of Macedon his butt, for that Greek archer named his shot beforehand, shooting on the arrow, "To Philip's right eye," and he pierced it.

Claimants who had disappeared for so long, that even their little dogs failed to recognize them on their return, often used to prove their identity by stringing and using their own peculiar bows, left behind when they started on the expedition in which they would most need them, and which nobody else could bend. Ulysses improved upon this performance, by having a little battus amongst his wife's suitors.

The Persians were famous for their horsemanship, their archery, and their versatility. To illustrate the success they attained in the two latter accomplishments, we may mention that, on the authority of two Persian writers, a Persian archer, named Arish, clambered to the top of a mountain, and shot an arrow to the banks of the Oxus, more than five hundred miles off; the arrow, which was discharged at sunrise, not falling till noon. The Festival of the Arrow is still kept on the date of the fest, the 13th of October, to commemorate the event, which secured a large tract of country to Persia, in pursuance of a treaty with the invading Scythians, to the effect that Persia should have all the district to the north-east over which an arrow could be shot from Demavend. If their riding was as good as their other two accomplishments, they must have been grand horsemen!

The Cretans, though not so famous for truth-telling, were skillful bowmen, making it a rule that their children should commence practice at seven years old. The Parthians were famous for their accurate shooting while riding at speed—and an art which modern cavalry have never been able to acquire, and archery practice rarely being effective in action.

The Romans never cultivated archery to any great extent as a military exercise, though individuals acquired great skill in it.

The Emperor Commodus was fond of displaying his wonderful shooting in the amphitheatre. Lions, panthers, tigers, and every other species of game, he slaughtered in hecatombs, the first wound (we are told) invariably proving mortal. "A panther would be set upon a criminal in the circus; but no sooner was the animal crouching for his fatal spring, than the imperial bowman discharged an arrow, which saved the culprit, and laid the beast lifeless upon the sand. A hundred lions or bears were introduced at once upon the arena, and with a hundred shafts he laid them prostrate. With arrows having heads of a semicircular form he frequently amputated the neck of an ostrich when running at full speed, and so instantaneously that the bird did not know what had happened at first, but ran on several paces as if still living."

Julius Aframans aver that he has often seen one Syrmus, a Scythian, let people shoot at him without wearing armour, depending for his defence on his own bow and broad-headed arrows, with which he met those coming towards him midway. Perhaps Baron Munchausen's feat with the cannon balls was taken from this account, which, however, though wonderful, is by no means incredible.

The Welsh were great archers. Gildas Cambrensis says that their arrows have pierced oaken panels four fingers in breadth; and on the authority of William de Bressa, a Norman knight engaged with Fitzammon in the conquest of South Wales, he relates that a mailed horseman had his hip nipped to the saddle by a Welsh arrow, and, wheeling round, had the other similarly fixed. In the same battle another soldier was shot through armour, hip, and saddle, the arrow killing the horse.

It is not certain that bows and arrows were much used in England before the Heptarchy; but the Saxons killed one another with them, and the Danes, their successors, were very decided archers. And yet the English were utterly overwhelmed by the Norman long-bow, which shot arrows with a force and to a distance of which they had no previous idea. Having once discovered its powers, however, how kindly they took to it we all know. The love of archery became the ruling passion of all classes. Every peasant had his bow hanging over the chimney; while to the country gentleman it was what the double-barrel is now. And if to this universal taste we owe the seemingly incalculable spirit of poaching (which causes so much crime amongst our rural populations), over-preserving, and the foreign traffic that we cannot enjoy a fine day without seeking "to kill something," we are also indebted to it for our liberty, our nationality, and our free institutions. National prejudice apart, we may fairly assume that our forefathers were the most formidable bowmen the world has seen. It is true that the tribes of Arabia established the empire of the Caliphs with the bow; but what did they eat? It was against the flower of French chivalry that the English archers prevailed. They overran France in the reign of Edward III.; they conquered it under Henry V.; they made one of the French kings (John) prisoner at the Battle of Poictiers, and forced another (Louis XI.) to pay tribute to their own monarch, Edward IV.

But the English and Eastern archers were once matched, and with what result? Richard Courte de Lion, with three hundred of the former, sustained the charge of the whole Turkish and Saracen army.

We are very sorry for the necessity, but real we cannot write about archery without mentioning Robin Hood. What with novels, and plays, and burlesques, and ballads, and mutual benefit clubs, and fancy dress balls, he is not a novelty, and we almost wish he could be made a myth of, like Tell; but there can be no doubt of his reality; and he was such a famous archer, that his career must be shortly sketched. His real name was Fitz-Oooth, but the Fitz was dropped, as it often was, and Ooth became Hood. He was born early in the thirteenth century, at Loxley Chase, near Sheffield. He was descended from Gilbert de Gaunt, Earl of Kyns and Lincoln, and was next heir to the title of Earl of Huntington, by the female line, when John Scott, the tenth earl, died in 1257. He does not appear to have had any property of his own, which, at this distance of time, appears to some admirers a sufficient reason why he should take that of other people. It is very likely that he was badly and unjustly treated; many families about that time were at any rate, he took to the woods, as robber and poacher, and gathered together a band of two hundred picked men—first-rate archers every one of them—and ranged the forests in the north of England. In the rising headed by Simon de Montfort, in Henry III.'s reign, to enforce the recognition of Magna Charta, Robin Hood certainly fought on the popular side; and if it is true, as has been suggested, that his outlawry was owing to that fact, we ought not, perhaps, to grudge him the popularity which has lasted for so
RIDING.

BY WAT. BRADBURY.

MOUNTING—THE SEAT—THE REINS—PACES—STIRRUP MANAGEMENT—MAXIMS.

We must now give directions for the lady equestrian, who demands her own column.

To mount: whereas the gentleman takes the reins first in his left hand, the lady must, before she mounts, take them in her right, and stand with her back close to the saddle (on the left or near side of the horse, of course), her right hand on the pommel, her left arm leaning back upon the croup of the saddle. She gives her left foot to her cavalier or groom, and with a spring from her right foot, and a judicious lift from the hand holding her left, she rises and seats herself on the saddle; then places her right leg over the left-hand pommel, and adjusts her foot in the stirrup. Once in the saddle she should transfer the reins to her left hand, in a grasp similar to that laid down for the other sex. She also should begin to accustom herself to a

peculiarly interesting, because the power of arrows against defensive armour was so thoroughly tested in it. King John of France, aware of the formidable character of the English archery, ordered a body of 300 picked men, in complete armour and splendidly mounted, to disperse a body of archers at the head of a defile, and make way for the rest of the army. This chosen body obeyed their orders with great spirit and resolution, and were annihilated; half of them fell in the passage, and the other half on deploying.

In a battle with the Scots at Halidon Hill, in 1402, the Earl of Douglas, exasperated by the murderous effect of the arrows upon his troops, charged the English archers at the head of a body of knights and nobles, armed cap-a-pie. He seemed himself invulnerable, being clad in a suit of armour, which had taken three years in making; but it was not thick enough to keep out the English arrows; he was pierced in five places, and all who rode at his back were killed or taken.

If these narratives of the prowess of English archers all came from English witnesses we might well suspect partiality, but they do not. Philip de Comines asserts that the English archers excelled those of every other nation, and this gave their armies an enormous advantage. The French depended chiefly on their men-at-arms; the Scots on their pike-men; and both were often overthrown by the arrows of their enemy before they could get to close quarters; and this accounts for the enormous disparity in the losses on either side in those battles where the English were victorious. Even at Agincourt, where the supply of arrows fell short towards the close of the fight, the English only lost about a hundred men, while that number of earls and barons alone fell on the French side, besides dukes, archbishops, fifteen hundred knights, and thousands of the rank and file. It sounds incredible, but it is well authenticated.

In Henry VI's reign, an English captain, named Berry, with a party of eighty archers, was caught in the open by a body of two hundred French lances. He drew his men up in the usual form of a hearse, with their backs to a hedge, so that they might only be charged in front, and they beat the cavalry off with their arrows.

And about the same time a French captain, Guon de Coling, with one hundred and twenty lances, was repulsed with loss by sixteen or twenty archers, under Sir William Old, whom he naturally expected to cut to pieces. There is nothing in the annals of rifle-shooting to beat these two instances of the power of the long-bow in the hands of old English archers; and though arrows have been superseded by conical bullets as instruments of destruction, and Archery is now cultivated only as the most healthy, elegant, and interesting summer sport, in which ladies and men can take an equal share, it adds much to that interest to consider that the weapons we wield so peacefully won for our country the position that she holds.
walking pace, and then to a canter, long before she thinks of a trot. The latter pace (though till mastered a girl cannot be considered anything of a horsewoman) should come far later in her education than in a man's. A canter is essentially the ladies' pace, and the chief desideratum in the action of a lady's horse. Just as we recommend young growing girls to be compelled to ride (if they ride much) on alternate sides of the saddle, so, for the same reason, we discourage trotting as much as possible in unset girls. Not that when mastered there should be much one-sided work in the action, but the ordeal of mastering it may entail a certain amount of one-sided strain.

First, as to the actual seat of a girl on horseback; however unalluring it may be to say so, three women out of every four who may be seen riding in Rotten Row have bad seats, and the cause is usually to be ascribed to one origin—to too much reliance on the stirrup, and, as a result, a fondness for too short a stirrup. The tendency runs in the reverse extreme in the men; their bias, as we have shown, is to ride too long. But both faults arise from the same cause, viz., too great reliance, at first starting, on the stirrup; though the difference of the posture of the two sexes in the saddle leads to a different manner of each of relying on the stirrup.

It does a girl (as well as a boy) a world of good to take the greater part of the earlier lessons at walking pace, without stirrups. This teaches her to acquire her seat and balance distinctly and naturally; to sit down well on her saddle, not to prop half her weight by her left leg, but to secure herself by a grip of the pommel with the hollow of the right leg, behind the knee. Then, as she settles to her seat, the converse happens to her that befell the boy. The latter learned to bend his legs to acquire his grip, then the stirrup was fitted to the length of his grip. The girl learns to let her left leg hang nearly straight down the saddle, sitting herself so far on the saddle as to keep her balance either way. Then, when she has settled to her seat, let the stirrup be adapted to the natural posture of the left leg. Thus let her next progress to a stirrup; but only so that she can use it on the canter, or when out for a ride; but let her be still compelled, will or will not, to ride a certain amount of walking-pace without the stirrup. She will thus learn to keep her weight in saddle; to use the stirrup as a security for balance only, except in trotting.

The absence of this mode of education of most girls on horseback leads them, from the first, to place too much reliance and so to throw too much weight, in the stirrup. This tugs their leg, and they feel themselves that they are really hanging on the side of the horse, and not sitting on his back, but still they dare not sit away from their cherished support. They remedy matters by shortening their stirrup, and sticking their left leg and foot out at a distance from the saddle, so as to force themselves back into the saddle; there they sit—too often crouched—backs round, but for the support of stays, both knees humped up to their noses, weight hanging in the stirrup, exposing themselves to a certain fall if the stirrup should give way, and a very probable one if the horse should shy or start suddenly to the right or off side.

The evil of this posture becomes still more apparent at the trot. The shorter the girl's stirrup is the more she is forced on to the croup of the saddle, and the more her knees are bent towards her chin. When she essays to rise in her stirrup to the trot, she tries to do the whole work with the stirrup-leg, and thus, apart from her bunched and cramped position, is produced that ugly semi-lateral crab-like roll which characterizes so many women who flatter themselves that they have learnt to rise in the stirrup to the trot. So they do, too literally, rise in the stirrup only, on which so large a proportion of their weight hangs; whereas, if they had learned to sit down fair in the saddlo with a natural balance, they would then use both legs in rising. The greater work should be done with the left leg, but the right leg, over the pommel, should still do its share, and so assist to keep the body moving up and down in a straight line, instead of wriggling like a cock-screw. The body also should play gently forward and back from the hips, in the same manner as prescribed for a man, so as to bring the centre of gravity forward, over the legs, as the body rises to the trot.

Short stirrups, and the ungainly action which they produce among ladies, injure the horse as well as rider. The wriggling moves the saddle, and produces sore back in many instances, and inasmuch as the short stirrup forces the weight back upon the crop, it plays there upon the most movable part of the saddle, that has no lateral support from the withers of the horse.

This criticism of female equestrians of the present day may seem to be rude, yet it is none the less candid. A glance at any practised female rider who has learned properly, and rides long, will show how the huge gulf that exists, in elegance as well as security, between the seat with long and with short stirrups. Between average and superior female equestrians there is a wider gap than between the same among men. The man who relies on his stirrups, and rides long, may preserve an elegant seat and upright carriage of body for park riding; and it is not till he essays to cross country or to ride a restless horse that the insecurity of his seat betrays itself. The woman who trusts to her stirrup, and who therefore rides short, betrays her insecurity by the very inelegance of her posture and action. When we consider that no costume better sets off a female figure than that of the riding-habit, the only explanation why female vanity does not seek to remedy its own too frequently marred elegance in the saddle, must be that incautious early training at home has stereotyped and ignorance blindered the eyes to the shortcomings referred to.

The time will arrive when the lad will be able to control his pony without the leading-rein; the young lady will consider herself competent to ride alone, with a groom at an orthodox distance in the rear; and the more adult pupil will be bold to forsake the riding-school, and to pioneer for himself along highways and byways. Then let each bear in mind certain aphorisms, due to the well-being of horse and rider alike. Always "feel" your horse's mouth; do not hang on by the rein, but touch lightly. If a horse is a sling, he will want to stop when pulled at; if high-couraged, then the more you pull at him the more he will want to pull at you. A light bridle-hand implies constant and instant communication between horse and rider, to direct and control. A heavy hand is like a constant cry of "Wolf!" it leaves no margin for direction when really required. Further, in the event of a stumble or a false step, prompt and timely support from the reins aids to shift the horse's centre of gravity further backwards, and so to save a fall. When you pull up do so with a firm and steadily-increasing pressure of the rein; not with a jerk—the latter spoils the horse's mouth and manners also—though you really do not seek to lift the horse's head high up, but simply to afford him a support to his neck when outstretched in his effort to save his balance. A stumbling horse at once drops his head and neck; this eases the weight on his shoulders, and so aids his recovery. When the neck has reached its full stretch the support of the rein is of value, to keep the weight of the neck to the back, instead of letting it once more hang from the shoulders, before the horse has fully regained his balance.
Do as you would be done by, viz., do not rattle along hard roads, still less loose stones; even if the horse is not your own, you cause him pain. If you want a horse to last you, use him fairly; a trot or gentle canter is pace enough on hard macadamised roads. The trot does not cause so much concussion to fore legs—unless the animal is artificially high-schooled—as a much slower canter does. If you want to go faster, look out for turf or a soft piece of riding-ground.

Do not let a horse catch cold any more than you would yourself; if he is in a perspiration, and you have to stop, keep him moving gently till he cools, or have a rug put over him.

Don't give him water when he is hot; it will cause him to break out in unsightly lumps, and perhaps worse may happen.

Don't be in a hurry downhill; at anything approaching a steep gradient pull up and walk, or you may both come to grief.

Don't be so vain and foolish as to keep working a horse up slyly with spur or whip, and holding him, in that he may show his action (ladies are often the greatest culprits at this, for they can spur unseen); those who understand horses will at once "spot" you, and set you down a fool for your pains.

On the same principle, do not fret a horse with the curb, so long as you can ride him on the snaffle.

Look out where you are going; don't be star-gazing; and if a brickbat should lie in the middle of the road, don't ride at it—for choice.

If you put up at an inn, and have no servant with you (this does not refer to a lady), see your horse fed—trust not ostlers; they are as wise in their own generation as the unjust steward, and will not hesitate behind your back to rob Peter to pay Paul.

If you have a horse that will canter with the wrong leg (i.e., left) foremost, hold him short by the left rein, so as to bring his right shoulder forward, then touch him with the spur, and he will probably break into the right pace.

If he "shies," coax, and even lead him up to the object of his terror, that he may smell at it, and so reassure himself. Do not lose your temper with him, that only adds to his fright.

If a horse bolts, and bores his head down to get the reins free, try to get his head up by sawing his mouth with the snaffle, and then hold at him. Anyhow, do not lose your presence of mind, nor seek to throw yourself off; sit tight, and pay extra attention to guiding him in his career; though he cannot, perhaps, be immediately stopped, he may be steered.

If a horse has a trick of taking the bit in his teeth (i.e., of taking the cheek of the curb in his mouth), pull it out with a lateral outside motion of your hand, low down on the rein, and in future ride him with a lip-strap.

This latter appendage is usually a safeguard.

Many horses that have no vicious intention of bolting learn the trick of protecting themselves from the pain of the curb, by picking up the cheek of it with their lips, so that one side of it lies against their teeth.

Because you may have learnt decent equestrianism, do not fancy yourself immediately knowing in horseflesh, nor be keen to do a deal on your own account. If you do, you will before long find yourself " done," unless you know very well with whom you are dealing. Better trust to some decent dealer, and let him have his profit on the transaction, as an insurance for fair play.

See that your saddle fits your horse, is well stuffed, and does not press on his withers. Every horse is not comfortable in every saddle, any more than you would be in everybody's clothes.

If your horse has any tendency to sore back, see that the saddle (after the girths have been slackened) remains on his back till he is cool.

Use a bit suitable to your horse's mouth and manners; half his manners, and with them half his value, lie in his mouth.

Do not be pig-headed and opinionated in your dealings with your grooms; if you try to show that you know too much, they soon find out how little you know, and treat you accordingly. At the same time, be your own master, and let them see that you mean what you say, or they will soon master you, and your convenience and your horses' comfort will suffer accordingly.

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**EGG-COLLECTING.**

**THE RAVEN—HERON—LONG-EARED OWL—TAWNY OWL.**

E will now proceed to give notes on those species of birds which he may find breeding within a radius of about thirty miles from London, and we will take them as far as possible in the order of priority in which they breed, putting aside, of course, the abnormally early broods of thrushes, blackbirds, sparrows, etc., of which we hear and read in exceptionally mild winters.

It is difficult to draw a hard and fast line in any case, especially as old birds, as a rule, nest somewhat earlier than younger members of the same species; but, as a general rule, birds of the crow family are supposed to be the first which repair to their breeding places.

Every one must be well aware of the noisy assemblages of rooks in February, when the tall trees are perfectly leafless, but the earliest of all the genus to make its nest is the raven (Corvus corax). Spite of the predacious nature of this bird, and well as we know all the mischief it is in the habit of committing amongst our young lambs on the fells and along the wilder portions of our coasts, where it still exists in sufficient numbers, we own to feeling a sneaking weakness for the very few pairs which breed within our thirty-mile radius; and we cannot bring ourselves to divulge the exact spots in which we have actual knowledge of two pairs being even now (March, 1873) performing the duties of incubation. If it were merely a question of egg-taking we might run the risk; but, as amongst collectors of British killed specimens a local example of this species would have some value, we fear that any precise information might be the death-warrant of a bird which, in our immediate neighbourhood at least, is at present far too scarce to do any serious
amount of damage which would not be more than repaid by the pleasure afforded to the naturalist who may chance to be attracted by its shrill croak or bark. In these inland situations the nest is invariably constructed on some tall tree, and from its bulk is generally visible at a considerable distance: it is composed of twigs, and warmly lined with grass, wool, and rabbit's fur. On our coasts and islands, and in the mountains, the nest is generally placed in an almost inaccessible rock; and further protected by some overhanging crag; indeed, we know few nests more difficult to harry than that of the raven. Its olive-green eggs, streaked and blotched with ash brown, sometimes to the number of six, though generally not exceeding four or five, may be looked for towards the end of February, and we confess that the sight of the little patch of colour afforded by a clutch reposing on their warm bed, as we swung into our first raven's nest on a chill misty afternoon early in March, when all around was grey and dreary, caused us a pleasure which brighter coloured eggs in the full blaze of sunshine have since failed to give.

But we need not say more about this bird, for it is not very probable that our collector will open his first season with its eggs, so we will pass on to the next in order of priority, the rook (Corvus frugilegus). There is no need to tell our readers where to look for the nests of this familiar bird, which is to be found from the very heart of the metropolis to the most sequestered country house, wherever there are trees suitable for its noisy colonies. The old and well-known nest in Cheapside has been deserted for some years, though remains of it may still be seen; probably it was built by some misanthrope, whose progeny could not endure the continued solitude—for there is no room for a colony—and so they moved to where there was more society; anyhow, their place knows them no more. In Gray's Inn, the Temple, Lincoln's Inn, in fact, wherever lawyers most do congregate, the caw of the rooks rises above the busy hum of the city; but who would dare the wrath of the Benchers by venturing to bird-nest within those sacred precincts? We confess to having never so much as seen a rook's egg from anywhere within the sound of Bow bells; and, it may be a morbid curiosity, but we must say that we should like to do so, although its principal characteristic would probably be dirt from contact with the sooty feathers of the parents, and, most certainly, any one who climbed for it would come down as black as a sweep.

In the country there are but two difficulties to be overcome, consisting in the fact that most rookeries are situated in private grounds, the owners of which do not like the birds disturbed; and in the height of the trees in which the nests are generally placed, so that those who are not good climbers had better get some lad to go up for them, although, as a rule, the trees are not difficult after the first branch is reached, as it may be climbed by the help of a rope thrown over it. It is, however, an affair for a light weight, as the boughs on which the nests are placed are not, or at least do not feel, very strong, and, having been brought up to the sea, we can positively affirm that there is nothing to be met with aloof so trying to the nerves as a visit to an average rookery in a clump of lofty oaks on a brisk windy March day. No, we do not positively revel in the sensation of dangling with the topmost branches, although we do enjoy dangling over a cliff at the end of a rope, so we will not laugh at any one who chooses to remain at the foot of the tree.

One of the largest rookeries we ever visited was in Ireland, the nests being placed in sycamore trees, sometimes not ten feet from the ground, and nowhere more than five-and-twenty. It is needless to say the site was a very secluded and well-protected one, and also that there was no other and loftier timber for the birds to choose. This happy colony rarely suffered from the usual declination of rook-shooting at the end of May, for the owner would not permit wanton slaughter, and the natives in general entertained a strong prejudice against young roots, and could not be persuaded to eat them. Those of our readers who do ascend to the nests themselves, will find them formed of sticks, and bound together with clay, the lining being composed of roots and dry grass—wool we never remember to have found, although that material is largely used by the carrion crow, as we shall have occasion to state hereafter. The eggs, generally four or five, are subject to a good deal of variation, but they are generally of a greenish or bluish ground colour streaked or spotted with ash-brown.

Our next species is a member of a very different family; it is the heron (Ardea cinerea), a bird which was far better known to our ancestors in the palmy days of hawking than it is to us. In those times it was protected, and there was a heavy penalty even for taking its eggs, but now it has only its own wariness to depend upon to enable it to avoid the vengeance of the fisherman and water-bailiff, who grudge it a share in the proceeds of the stream. Still there are many gentlemen's seats where this bird is protected, at least within the confines of the domain where it nests; and the lists recently published of the existing heronries in Great Britain and Ireland, show that there is scarcely a county which, even at the present day, cannot boast of one or more. In this country trees—it does not much matter of what species—are generally selected, but instances are known in which rocky ledges by the sea or loch side are frequented year after year, whilst on the Continent there are several well-known heronries built in positive precipices, the most notable of these being near Lucerne. The nest is at first a very flimsy structure of sticks; and that of a young couple just setting up house-keeping is frequently so slight that the eggs can be seen through the interstices, but as it is resorted to and additions are made year after year, it becomes in time a wide-spreading structure, and one not easy to get round as to have a look at the contents, added to which there is the pleasant possibility of a young heron making a target of your nearest optic the moment your head appears above the edge, and so scoring a bull's eye, much to your detriment. This as a warning to visitors in April; but in the middle of March, when the herons begin to lay, there is no danger of finding anything but three or four bluish-green eggs, for the old birds never attempt any hostiles measures, and it is but seldom that they will remain on the nests long enough to afford a good view to the stranger.

The nearest of the heronries in the "home counties" is at Wanstead Park, near Sevenoaks, in Kent, where the birds are, or were a few years ago, most carefully protected by the proprietor; added to which the position selected precluded the possibility of much disturbance even from the Whitechapel "roughs" who frequent the district on Sundays and holidays. The nests were placed on lofty and slender yew-elm trees, growing in a boggy island, only accessible by means of the keeper's boat; and, confiding in their secure position, the birds show little alarm at the appearance of visitors on the opposite bank, whence they may be observed with great ease. They used to be no difficulty for any naturalist in obtaining leave to view the heronry; and a few eggs could generally be obtained from the keeper, although any disturbance of the birds by strangers was naturally deprecated. At the commencement of the season, before the birds began to sit, there are comparatively few to be seen, the greater part being away fishing, but when the young are hatched the appearance of the heronry is most animated and interesting, and we should advise any real
lover of birds to defer his visit till the middle or end of April, unless indeed he can arrange two visits.

The heron is a somewhat capricious bird, and though large and old-established colonies are rarely abandoned without some evident reason, yet it is not so with some of the younger members, who seem to have a passion for roaming; and it is hard to say when and where a collector has not a chance of dropping upon an outlying colony of some three or four pairs, although in the following year the spot may prove deserted in its turn in favour of some other.

An instance of this occurred to ourselves only a year or two ago; and the nests being placed in a wood of spruce and pine trees, we were unable to find the exact spot for ourselves, in spite of all our endeavours, and finally had to appeal to the laughing keeper who had challenged us to hit off the spot if we could without his assistance.

Again, we pass to a very different family of birds, although the species which we shall take first is to be found nesting in much the same class of trees where we have just left the last-mentioned heronry. We refer to the long eared owl (Asio otus), a bird which is really far more common than it appears to be, and, for the ignorant persecution of the gamekeeper, but few fir plantations with trees of any size would be without a pair or two. Yet, in spite of its misfortune in being chased in the catalogue of "vermin" to be ruthlessly destroyed whenever a chance is afforded; it is, as we have said, far from uncommon, and in some districts it is really much more abundant than those better-known species, the tawny and the barn owl.

Fortunately for some of our feathered friends, the British gamekeeper, as a rule (though of course there are some exceptions), has not much idea of any means of destruction beyond the gun and the trap, with perhaps a little poison; and any bird which does not offer itself a prey to these, has a fair chance of escape. This is not a noisy owl at night, and does not draw attention to its presence by hooting, like the tawny owl, nor by uttering diabolical shrieks, like the barn owl; and in the day-time it requires a keen eye to distinguish it where it sits erect on a branch close to the trunk of a spruce fir, and thrown into the deepest shade by the dense foliage.

Again, the nest has nothing to distinguish it, for it never makes one for itself, but deposits its eggs in any old nest of crow, wood-pigeon, or magpie, and as frequently as anywhere in the old "drail" or "cage" of the squirrel, a trifle of repair and lining being the extent of the labor furnishing to which it goes.

Now let any one enter a fir wood, and after contemplating the numbers of old nests of all kinds, and the masses of fallen boughs and epinches, which look like nests, he will certainly agree with us that the chance of hitting upon the one which contains the eggs of this owl, is a tolerably remote one.

The first thing is to look out for the "casting," those pellets, consisting of the undigestable hair, feathers, and bones of its prey, which, in common with all raptorial and some other species, this bird ejects through the bill. When these are found fresh in any quantity the nest actually occupied will not be far off. It does not, however, follow that it is in the very tree at the foot of which the castings appear, for that may be the favourite resting-place of the male owl, and as you peer into the shade, and agitate the branches, a hissing noise will be heard and a pair of bright golden eyes gleam down from what you had hitherto passed over as a broken branch, and which, after erecting a pair of ears, sits noiselessly to some other covert.

Mark this tree, and now begin a careful and systematic examination of all those in the vicinity; you may have a few unavailing climbs, but, after all—dr-trees are pretty much like going up a ladder, with the addition of having your hair brushed as effectively as if by machinery at the same time, and before long you will probably hear an angry hiss closer to you than the previous one, and you may find a disc-shaped visage in rather too close proximity to your own as you rise to the level of the nest which contains the sought-for prize. Take care now, and swing yourself well above her, so as to protect your face and hands, for although she will perhaps not wait for your coming if she is merely sitting on eggs, yet if there should be young she can be both bold and vicious, and her sharp talons are not to be despised. In any case, she will not persist in remaining long, and as she takes her departure, by no means so silently as her mate, for her temper is considerably ruffled, you examine the contents of the nest—white shining eggs, perhaps to the number of five (the most we have ever known this species to lay), often there are but three or four.

In ascending trees, we have been accustomed to use the case of our binocular, which forms a capital receptacle for any eggs, and is not much of an impediment when slung closely to the body. If you wish to take extra precautions, you can lower the sling-case with a piece of twine, for these eggs are the fruits of hard work, and are to be respected accordingly. With regard to this owl, its long ear-tuft will prevent it being mistaken for anything else; a good plan also for finding the nest is, when opportunity offers, passing some hours in the fir woods and tracing the old birds to and from their abodes, but this is not always easy, and care, combined with patience, in the day-time, will generally prove sufficient.

The tawny or wood owl (Strix aluco) known to most residents near large and old woodlands as the "hooting" owl, is another early breeder, and its eggs may be found from the middle of March onwards deposited in the hollow trunk or branch of some decayed tree. Like all owl's eggs they are pure white in colour, and as a rule are more than usually round in shape; nest there is but little or none, the decayed wood of the hollow hole forming a sufficiently soft couch for them.

As it is a thoroughly nocturnal bird, there is but little chance of tracing it to or rousing it from its hiding-place, so that a sharp look-out must be kept for any hole which exhibits signs of having been frequented; a visit to the woods in the evening will assist in narrowing the limits of the area to be examined, as the hooting of the male bird and the reply of its mate are sure to betray their presence. The nest is not invariably in holes of trees, but, like the preceding species, it sometimes selects an old nest of some other bird, and on one occasion we know of a clutch of eggs being found on the ground on the sloping and rather rugged side of a Welsh valley.

The eggs are generally laid in completions, and after two have been incubated for some time, two more are laid; we have even heard of yet another pair of eggs, the result being that the nest contained a pair of nearly-hatched owlets, a pair of younger ones, and a pair of eggs at the same time; but no such luck has ever come within the range of our personal experience, and two is the largest number which has rewarded us on any single occasion.

It may be as well to remark here, that although as a rule all the birds which we have hitherto named are single brooded, yet if their eggs are taken, or the first sitting abandoned for some reason, they will very frequently lay a second time, and eggs may be obtained very much later than the dates we have named for the commencement of incubation. We take the earliest date, because it is much better to be a little too soon than too late, for the nests of the two species of owl especially require looking for, and are not to be walked up to in the course of any ordinary country ramble.
Fig. 1, A LUG SCHOONER, TWENTY-FIVE FEET SIX INCHES LONG AND SEVEN FEET SIX INCHES BEAM.

This boat may be termed a lug schooner, as she has the appearance of a schooner at first sight, yet both her fore and mainsails are lugs. As her rig requires a main boom, a deeper form of hull has been given her, to afford greater stability to sustain it; and it is recommended to make her a half-decked boat, with side decks and water ways, and a cuddy forward, forming a small cabin. This might be eleven feet long, and yet leave sufficient space to stand in front of the main thwart, to do anything which might be required. Boats of this rig are not often met with in England, but are occasionally seen on the French coast. The chief recommendation of this rig is that the sails not being attached to the masts, but the yards alone, they are removable without unbending any of the gear. The mainsail is hauled out on the boom in the same way as the jib on the bowsprit, being hanked on to a traveller, as shown in the illustration. To reef, the hook of the traveller receives either cringle on the leech or after edge of the sail, whichever may be required.

Fig. 2, A PILOT GALLEY, TWENTY-EIGHT FEET LONG AND SIX FEET BEAM.

This class of boat is much used by pilots, and, when of the above width, is termed a galley, but if under six feet beam, she should be termed a gig. These long boats vary much in their dimensions at the different ports. Some are very lightly constructed, for swift rowing; others stronger yet not heavily built, to both row and sail. They usually set a powerful lug sail, which, as the tack is a fixture for the time, must be lowered and set on the other side of the mast when the boat is put about. This is the class of lug-sail which is so dangerous, and which I have previously mentioned as always to be avoided by amateurs, for if taken aback, the boat cannot be relieved of the pressure of that part of the sail before the mast, and many upsets have occurred in consequence from time to time, attended often with the most serious results.

Fig. 3.—WAVENET BOAT.
Fig. 2.—PILOT GALLEY.

Fig. 3, A WAVENET BOAT, FOURTEEN FEET LONG AND FIVE FEET TWO INCHES BEAM.
A sketch of a boat with a rudder of a peculiar form appeared in No. 416 of the English Mechanic. Fig. 3 represents a boat fourteen feet long and five feet two inches beam, with a single working lug sail, and a rudder of a similar form. This rudder has more the appearance of a paddle than a rudder, and reminds us of the form of helm represented on ancient coins and sculptures of Greece and Rome. It rests in a crutch inside the stern post, and as this crutch passes through a metal plate, and has a round stem, it can, of course, turn right or left as required. It is recommended for such boats as have canoe or wherry sterns, and is used for sailing in narrow waters, enabling them to go about much quicker than with the ordinary rudders. A rudder, as usually fitted, has no control over a boat unless she is in motion, but it is evident that as this rudder can be used as a paddle or an oar, the boat’s head can be turned by it even if she is at rest. It is said they are found only on the Waveney. A steering paddle would, I think, be a more correct name for it than a rudder.

Fig. 4.—A SPRIT-SAIL BOAT FOURTEEN FEET LONG AND FIVE FEET TWO INCHES BEAM.

This is a sprit-sail boat of the most useful size for general purposes, and drawn on a scale of a quarter of an inch to a.
THE POPULAR RECREATOR.

foot. She has three sails: a jib, mainsail, or, as some call it the foresail, and a sprit mizzen. The spar which crosses the sail in a diagonal direction is termed the sprit, and gives name to the rig. In Fig. 5 is shown the arrangement for the main sheet, consisting of a bar of ½-inch iron, galvanised, termed a horse, securely attached to the knees at the transom close to the stern, by nuts and screws on the turned-down ends. There is either a figure of eight crook or a thimble placed in this bar to receive the sheet and blocks, which can thus traverse to and fro when the boat is put about. The advantage of this over other methods is, that the sheet takes care of itself in going about, and that the jib only requires attention. The jib is extended by a galvanised iron boomin. I have shown reefs in the jib, but a small-sized one, as marked out by the dotted line, is the preferable arrangement. Fig. 6 is the best arrangement for setting up the sprit, and retaining it in position; this is done by a tackle purchase, consisting of a single block. A piece of rope five feet long, after it has been spliced, encircles the mast head, resting there on a shoulder; at its lower end the block is spliced into it. A ring or hoop on the mast receives the end of the rope or fall, which has an eye spliced into it; this is lashed to the ring or hoop five inches from the end of the eye, and the heel of the sprit being inserted, the sprit can be set up with great facility, and be kept from slipping down by delaying the end of the fall to the pin in the thwart provided for the purpose. Many small boats have nothing of the kind, merely a loop, termed a snorter, on the mast. This frequently slips down, requiring re-adjustment, and

is on this account a constant source of annoyance. It is the custom to wet the mast to prevent the snorter sliding down, but, as it constantly dries, this is an ineffective plan, and nothing but the tackle can be confidently recommended. I have illustrated it on a larger scale, without the hoops on the mast, as it can be thus much more clearly delineated.

If a centre-plate is added to this boat, which I strongly recommend, it should be placed in the position marked by the dotted lines, which represent the case or well. This is an improved form of board or plate, and is sloped at the after end to bring as much of the board or plate towards the stern as possible, which will give easy steering, whilst the shortening on the top saves some little length of encroachment on the space of the stern sheet. The position of the thwarts should be as follows: from the front edge of the stem to the middle of the first thwart, 1 ft. 6 inches; from the same position to the middle of the second thwart, 4 ft. 9 inches; from the middle of this thwart to the middle of the third thwart, 3 ft. 6 inches. The after part of the case will thus project behind the after thwart seven or eight inches, which is necessary, in order that the lateral resistance may be thrown sufficiently aft, if the thwarts be placed at the distances here mentioned. In river sailing, or where short boards are necessary, involving constant tacking, the mast should be stepped through a hole in the front thwart, and in this case the jib should not be used. This arrangement will be found an excellent one in narrow waters, and also when trailing lines in lake or estuary fishing, and I daily find it most convenient.

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FENCING.

BY MAJOR HOUGH.


W e have treated hitherto of the thrusting sword, and the rules for its use only; we now come to the consideration of weapons which are used simply for striking, or for both cutting and thrusting, as well as of those where the point alone is employed, but which are wielded with both hands.

An old proverb avers that rage strikes, but revenge stab. It has also been asserted by several writers on the subject that men in a state of barbarism hit only, and that the practice of thrusting at their enemies is a distinguishing mark of civilisation. Now, whether Englishmen are more passionate than revengeful; or whether the savage instinct is still strong in them, it is certain that they or some Richard Coeur de Lion's partiality for a good downright blow; and in establishing a fencing school or gymnasium it is astonishing how much more readily men will take to boxing or stick-play—which represents the broadsword—than to the foil; though, when they have once made a certain progress in the art of fencing proper, they perceive that to prefer the other exercises is much like taking to rounders rather than cricket, or choosing bagatelle before billiards. One great reason for this prevalent taste is doubtless this: that many men cannot take pleasure in any contest unless there is a risk of pain or loss in it. They must either have their purse or their cuticle at stake, or they are unable to feel the requisite interest. Now, the thrust of a foil does not hurt, a blow from a stick does, even through the leather.

There is this to be said, however, for the broadsword, that it is a far better exercise for those who have never learned fencing, who have no means of getting lessons from a good master, and no patience to practise book rules together for a sufficient time before taking to loose play. For men to fence together with foils, knowing nothing of the art, cannot be too
strongly deprecated. The difficulty of unlearning all the bad
habits they must necessarily acquire will be almost insuperable,
and it will prove poor sport besides. But with the broadsword
it is different; if the combatants will observe certain simple
rules, which we will give, they may set-to as often and for as
long they please without learning any faults which a few good lessons
with the foil will not at any time eradicate.

To give a detailed account of all the various swords used in
different countries—the Malay kris, the Japanese, the Burmese,
and Afghan weapons—would lead us too far, and prove tedious
to all but a few very enthusiastic amateurs. Great has been
the ingenuity displayed in some swords, such as making
them with hollow backs containing quicksilver, which, being
dashed to the end when a blow was delivered, added greatly
to its force.

The curved scimitar of the Mameluke is also suited to an
ingenious description of attack. It is dangerous for a horseman
to give point with a straight sword as he meets his enemy, for
the weapon will pass right through and become encumbered in
the body, leaving him disarmed. But the Arab cavalry rider
rides upon the foe with his scimitar offered at the throat in the
position of thrusting, and slies his head off by the curve of
the blade, without any cutting action. But our hobby is getting
the bit between his teeth; let us confine ourselves to our own
country so far as we can.

The swords of the Anglo-Saxons were long and heavy, and
their hilts often rich with gold and silver. They were of
various kinds, some two-edged, other pointed. The swords of
the later Saxons were like the Danish, short and curved. The
"saxen" or Saxons was shaped like a seythe.

The ancient knights wore two swords, one at their sides, the
other fixed to their saddle bows; they also carried a dagger,
called a "misericorde," because they put their defeated enemies
out of pain with it.

The two-handed sword must have been a tremendous weapon
in the grasp of a man who could wield it, so long as an adver-
sary did not get within the point; then it is difficult to imagine
how the winner continued the combat, unless he struck with
the hilt.

When men were covered with armour, iron-plated, as ships
are now, it was the crushing and not the penetrating power of
a sword that they had to look to. Brawling and smashing, not
cutting and thrusting, was the true vocation of a flower of
chivalry. Therefore, we find that for actual battle, where the
combatants had all their paraphernalia on, weapons of a down-
right hitting character were much in vogue. There was the
mace, a species of iron staff, one variety of which was called a
"gisarme;" there were "mells" or "mellots," instruments
weighted with lead, the ancestors of those modern aids to murder
which are so curiously called "life-preservers."

There were several kinds of battle-axes—tools which were
much like ordinary axes, only with longer handles and broader
stronger blades. Pole-axes, much the same things, were so
called as being the weapons of the Poles. The battle-axe was
always considered a royal weapon, and was carried as such at
the funerals of kings. It is somewhat curious that the North
American Indians should have invented a similar instrument,
the tomahawk.

Grose, in his "Military Antiquities," gives drawings of a very
great variety of these weapons.

To return to the sword. Toledo, Milan, and Damascus were
the most celebrated for the temper and workmanship of their
swords, and of these the Damascus blades bore away the palm.
They were so flexible as to admit of being bent double, so that
point and hilt might be confined by a ring.

The sabre was formerly a curved sword, but it now indicates
a dragoon's cut-and-thrust sword, whether straight or curved.
The broadsword is an original weapon of Scotland; it is some-
times called a "back sword," as having but one edge. It is
basket-hilted, and is chiefly used by cavalry and the Highlanders.

Among the few to which sword-blades are subjected, in
order to prove their flexibility and elasticity, is that of bending
them into a curve by pressing the side of the blade against six
or eight pegs or stout nails driven into a board in such a
manner that, when in contact with all the pegs, the middle of
the blade may be bent six or seven inches from a straight line
drawn between the point and the hilt. The temper is also
proved by striking upon a table smartly with both sides of the
blade, and by severe strokes with the back and edge upon a
block.

The blades provided for the English Government are of a very
high degree of excellence. When the wild horsemen of India
get hold of a British sabre they consider that they have found
a prize. They set it in a pomme1 of their own fashion, give it
a razor edge, and carry it carefully in a wooden scabbard. And
if it falls again into an Englishman's hands, he marvels over
the superiority of Asiatic steel. The swords served out to
drummers will cut through an officer's tailor-provided blade.

The British infantry regulation sword is a very good weapon
to ward off a cut at the head from a mounted soldier, or to put
aside a bayonet thrust, but it is not the best adapted for single
combat, and there are not many instances on record of its having
been so employed. There are some, however, and the story of
one of them is so romantic, so like a scene from the days of
chivalry, that we are tempted to repeat it here.

In the battle of Castella, fought in April, 1813, during the
Peninsular war, the French endeavoured to storm certain
heights which were held by the Allies.

"Their light troops," says Napier, "spread over the whole
face of the sierra, and, here and there attaining the summit,
were partially driven down again by the Anglo-Italian troops;
but where the main body came upon the second battalion
of the 27th there was a terrible crash. For the ground,
having an abrupt declination near the top, enabled the French
to form a line under cover, close to the British, who were lying
down waiting for orders to charge; and while the former were
unfolding their masses, a grenadier officer, advancing alone,
challenged the captain of the 27th grenadiers to single combat.

"Waldron, an agile, vigorous Irishman, and of boiling courage,
instantly sprung forward, the hostile lines looked on without
firing a shot, the swords of the champions glittered in the sun:
the Frenchman's head was cleft in twain." Then, but not till
then, the musketry opened on both sides.

What a study that would make for a picture! The hostile
troops pausing at half pistol shot, their arms ready but lowered,
and the two combatants between them. Surely, well done, it
would want a little raffling in front of it at the Academy
Exhibition!

The single-stick, which represents the broadsword, as the
foil does the small sword or rapier, is an ash plant, picked and
baked, with a little peg driven through at the handle end to keep
it from slipping through the guard. This used formerly to be
made of wicker work, but is now generally of buffalo hide,
which lasts almost for ever, while the baskets are soon
knocked to bits.

Defensive clothing is not of so much importance as in
fencing; the only disadvantage of dispensing with it altogether
will be a few stinging cuts, raising weals, and possibly causing
a slight abrasion of the skin, with the exception, indeed, of the
face, over which a mask must be worn for the protection of the eyes, which might possibly receive injury from an unlucky blow.

But most people, unless they are sailors, prefer their cudgelings tempered, and wear fencing jackets, all of leather; thigh-pieces, gloves, and a different kind of mask to that used against the foil, rather a helmet with wirework to guard the face than a mask. The said wirework may be of the simplest construction, and the meshes large, for it is the blunt end of a stick merely

that has to be kept out, not the sharp point of a broken foil. In learning the sword exercise, the first thing to be practised before a weapon is put into the pupil's hand, is

**THE POSITION.**

Assume the military attitude of **attention**, i.e., shoulder and body square to the front; heels in line and closed; toes turned out at an angle of 45°; arms hanging easily from the shoulder; hips rather drawn back, and the breast advanced, but without constraint; the body straight and inclining forward, so that the weight of it may bear principally on the fore part of the feet; the head erect, but not thrown back, the chin slightly drawn in.

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**FIRST POSITION IN THREE MOTIONS.**

**One.**—Move the hands to the rear, the left grasping the right arm just above the elbow, and the right supporting the left arm under the elbow.

**Two.**—Half face to the left, turning on the heels, so that the back of the left heel touches the inside of the right heel.

**Three.**—Bring the right heel before the left, the feet at right angles, the right foot pointing to the front, and the weight of the body resting on the left leg.

**SECOND POSITION IN TWO MOTIONS.**

**One.**—Bend the knees gradually, keeping them as much apart as possible, without raising the heels, or changing the erect position of the body.

**Two.**—Step out with the right foot about eighteen inches in line with the left heel, the weight of the body remaining on the left leg; the right knee easy and flexible.

**THIRD POSITION IN TWO MOTIONS.**

**One.**—Incline the right side to the front.
Two.—Step out smartly to the front, about thirty-six inches, the knee perpendicular to the instep; the left knee and foot kept straight and firm, the heels in a line, the body upright, and the shoulder square to the left. From the third position the pupil must practise springing up both to the first and second positions.

FROM THE SECOND POSITION.

Single Attack.—Beat the ground smartly with the right foot.
Double Attack.—The same, twice, first with the heel, then with the flat of the foot.
Advance.—Move forward the right foot six inches, then bring up the left.
Retire.—Move the left foot lightly to the rear six inches, the weight and balance of the body being and continuing to rest upon it; then move the right foot back the same distance, and place it smartly upon the ground.

You may easily practise the cuts, thrusts, and guards by yourself, if you have the regulation target drawn on the wall before you. It should be of good size, and so placed that the centre is about the height of your breast. It may be roughly chalked on the wall of a garden or an outhouse, or drawn upon calico and hung up. Though the stick is employed for loose play, it is well to go through the practices with a real sword, that you may learn to strike with the edge not the flat of the blade, and may also perceive practically the necessity of guarding with the forte, and striking with the faible of your weapon.

Of course the target merely shows you how to form the cuts, not exactly where to cut, as that must depend on the opening afforded by the adversary. Cuts 1, 3, and 5 can be directed at any part from head to foot on the inside; cuts 2, 4, and 6 on the outside.

Take up a position in front of the target.

ANGLING.

BY GREVILLE PENDLE.

ROACH FISHING—ROVING v. SEDENTARY—BAITS—TWO STYLES OF ANGLING—GROUND BAIT—PREPARATIONS.

The general rule in the Lea, where a position is taken up on the bank, the fisher often adhering to it from morn till night, is to let the bait just touch the ground; but we have frequently found that they will take it at certain times much better two or three inches from it, at others they will not touch it unless it is motionless on the ground. You must therefore use your own judgment according to the feeding of the fish, for they do not feed in all waters, places, and times alike. Generally, however, you take the largest fish with the bait on the bottom.

Although we have given our opinion of our preference for the roving over the sedentary style of roach-fishing, the larger proportion of London anglers who essay the bank, take up their quarters, as above stated, at some well-trieden spot, and there, seated on their square baskets, made on purpose for stool and pannier, watch their float throughout the day. Even when such a practice is pursued, we would warn the angler, upon first arriving at running water that is new to him, against at once plunging down at the first likely swim that presents itself. We are equally assured of the imprudence of those who, while pursuing this particular mode of angling, are constantly changing from one place to another. What we recommend to the angler for roach is to walk quietly along the banks with the rod, line, and plumb in his hand, trying the depths carefully here and there, and remarking the more attractive spots, and after this is done, say for half a mile—if his permission to fish extends thus far—he can select that which he considers the best according to his judgment, and then take up his station. Then let him throw in some ground-bait, and not get shifty if the roach do not come on the feed as quickly as he desires. He should recollect that roach, particularly when on the feed, are constantly swimming in shoals up and down the stream, and that they will find out his ground-bait after a time, and there remain or continue to visit the place occasionally. Should he quit his station, they may arrive at the very time he is absent.

We are the more impressed with this systematic course of conduct when the sedentary mode of bank-fishing is pursued, from repeated trials in company with other anglers. The fidgety and erratic fishermen, having tried here, there, and everywhere, have got a roach or two out of this swim, and one or more out of that, and thus persuaded themselves that they were doing wonders, and that their baskets would rival those of men they saw fixed and almost motionless between their favourite elders; but the arrival at the inn or railway station has dispelled this delusion, and he who took his time in the selection of his swim, and then was constant to his choice, has almost invariably beaten his cotenuch's brethren, both in weight and numbers. Of course, there are exceptions to this rule; the water may fall or rise, and thus alter the set of the swim—a most important consideration; for if, for instance, the float is carried backward into shoal water, or towards or into a bed of weeds, the angler would scarcely be justified in adhering to the place under such circumstances.

If, therefore, the angler elects to take a roving commission, let him do so in its entirety, fishing in the manner we have pointed out, which will be seen to differ materially from the mode as pursued at some isolated swim.

Should, however, the angler wish to pursue the sedentary style of roach-fishing, there will be found nothing more instructive to a young beginner, than, by permission, to get sufficiently near, and patiently watch the operations of a good angler and an inexperienced companion catching roach from a punt or river's bank. At first he will be struck with the fact that the one takes more fish than the other, and he marvels that each, having the same description of tackle, bait, and depth of swim, the one is ever the master. They change seats and rods and, still the same result. Surely, he thinks, they would, at least, have the same number of bites, although they did not catch the same number of fish! So they do; but both the tyro and the observer fail to detect what the well-practised eye of the master acts upon and profits by. But the problem, in the
THE POPULAR RECREATOR.

observing mind, is not long unresolved. He feels, and mentally
admits his ignorance and want of experience; and, convinced
that there is something in it, soon becomes as skilled and quick-
eyed as the preceptor, and in turn, good-tempered it is to be
hoped, teaches others the same, who are equally puzzled for a
time at the apparently extraordinary results.

Roach seldom attain a weight exceeding a pound and a half.
A few, however, have been caught of two pounds and a little
over; and the largest known roach is one we presented to
Mr. Toole for his collection at the Rye House, Hoddesdon, which
weighed two pounds nine and a half ounces, with two others, re-
spectively two pounds four ounces and two pounds four and a
half ounces. The largest roach shown at the opening of the
Fish Department of the International Exhibition of 1873 was
two pounds four ounces.

Mr. Francis Francis, in a "Book on Angling" (Longman &
Co.), speaks of an annoyance which every roach-fisher must
have experienced, and partly provides a remedy.

It is very common to find the gentle blown by the fish over
the shank of the hook, and some way up the gut. If the gut
is very fine and "drawn," the action of constantly drawing
back the gentle, or tearing them off, is very liable to pool and
weaken it.

When two or more gentle are used, the upper ones are seldom
much injured, and can be drawn back over the hook with
advantage, the gentle for the point being renewed. Thus, a good
deal of trouble in re-baiting is saved, which in very cold weather,
and when the fish are biting rapidly, and perhaps gentle scares
are very desirable. To facilitate the return of the gentle, two or
three turns should be given with the tying silk on the gut just above the shank, which will likewise preserve
the gut at the place it is most liable to injury from constant
wear and tear, which, moreover, renders it necessary that the
hooks should be prepared some time before using, that the
varnish may be perfectly dry, hard, and impenetrable.

The gentle bred from bullocks' liver are the best, being
shiny, yellow, and, by a little keeping in bran or sand, become
clean and tough. The chrysalis of the gentle is at times
tempting; indeed, it is preferred by the French angler; but
you must not strike roughly with it, as it is tender, and
falls off.

It is possible to overload the hook. When you suspect this to
be the case, remove all superfluous skin, put on a smaller hook
and bait, with but a single gentle, attached only by the skin, at
the blunt end of the creature, which will thus be permitted to
wriggle as he goes down the swim, and you may profit for a
time by this dainty. After a while, however, the fish may get
cunning, and take the gentle off the hook; then put it on in
the usual way, or try paste, or fish shallower or deeper, or
let your float travel farther down the swim, or let the bait lay
altogether queascent on the ground, but do not blame the fish
for want of appetite until you have exhausted every device you
can think of.

Should gentle or paste not be successful, try worms; the
tail of a large lob is often a most killing bait for the heaviest
roach, or if you are sufficiently fortunate to have a kettle of
fresh-water shrimps, which are attainable in some waters with
a gauze landing-net, put one, two, or three of these on, they
are occasionally a sure lure, when all others have failed.

There are other baits, as silk weed rolled up in a pill, pork
rind, greaves, coloured pastes, etc., but we have never found
them of any use when those before-named have been rejected;
however, it is well to be acquainted with them, as others may
be absent.

Every angler of experience must have noticed the great
disparity of the takes between those apparently fishing in the
same style, with similar tackle, and on the same waters, if not
in the identical swims.

The better to illustrate the suggestions which here arise, I
would instance the take of fish made by a gentleman with
Bailey of Nottingham, consisting of 160 lbs. of barbel, chub,
perch, and roach, which took place at Sonning-on-Thames on
the 12th of May, 1873, one rod only being employed.

On the following day another gentleman and his fisherman
occupied the same pitch, and their bag was at the general low
average of our metropolitan or suburban anglers, although he
apparently fished just in the same manner as his more fortunate
predecessors.

It may be said that Bailey's customer caught all the fish that
were to be had. Not so. For the same fisherman returned
after a few days, and greatly exceeded the weight above men-
tioned; nor did it seem much to matter where he went within
a mile of Sonning up or down from that village.

This apparent anomaly it is my object here to reconcile.

In the first place, it is generally admitted that one of the
greatest recommendations of the Nottingham style, or long
travelling line fishing, is to seek or visit those fish with your
lure which are too bashful or cunning to wait closely upon the
angler.

In a word, the angler must present the carefully baited hook
for their acceptance, without letting the fish know by his pre-
cence that his accepted enemy, man, is at the other end of
it.

It is, therefore, necessary to have in one's mind how far off
or within what distance this power of visual or other sense
of the fish is active, and therefore detrimental to the angler's
success.

It is equally obvious that sitting down quietly and as low as
possible, whether on the bank or chair, or the reverse of this,
must determine the question to a great extent.

Now we are greatly impressed with the fact from close
observation that the Nottingham fishermen, or those who ex-
plicitly follow their mode, are most scrupulous in an adherence
to the unobtrusive side of this rule, which, if it be necessary in
the long line style of angling, must be incontestably so in our
antiquated mode of Thames angling.

The gentleman who followed Bailey I take as my type of those
who fancy they do all that is needful, and wonder yet
that results are so disparaging; yet he apparently implicitly
followed in the formula of his Nottingham predecessors, and
naturally expected a similar reward.

But, unfortunately, and doubtless unwittingly, he fell into
two capital errors, either of which we are disposed to pronounce
fatal to his expectations.

The one—neither he nor his fisherman was seated in the
punt. On the contrary, the angler not only stood up, but he
stood erect on the head, the highest part of the punt, flush with
the gunwale. There he showed a tall and prominent figure,
rod threateningly in hand, which, being clear of the sur-
rounding bank and its foliage, was as defined as possible
against the sky-line, and indeed must have exposed his figure
to the fish, free of any background, at least as low as his waist,
thus permitting the fish, although driven much lower down by
such exposure (if they remained within ken at all), an
opportunity of tracing bait and line, and rod and arm, to the
shoulder of an enemy.

Would not this be enough to account for a lack of sport, if
there were no other facts wanting?

The frequency of this cardinal fault on the Thames and other
rivers must excuse the length of these observations.
Well, thus exalted, and although handling the Nottingham tackle with great ability, the fish would not bite, and the angler desired his man to throw in a good handful of chopped worms as far up and above the punt as he could.

This was done, and mistake number two committed.

The worms, from their slight specific gravity in comparison with the water, were caught by the current as soon as they reached the surface, the set of which current, made more divergent by the pitch of the boat broadside on, were carried far on both sides instead of into the angler’s swim, and which, sinking but gradually, either drifted far and wide or were seized by small fish long before they got to the bottom, where the larger fish contend for the prize.

But we shall be told that this is a close approach to the Nottingham style of ground-baiting with lob-worms.

Yes, we admit it; but with so slight a difference that it may account for a really important secret being so well kept to the advantage of the fishermen of the Midland Counties and their obedient pupils.

Our meaning will be at once apparent when we give the following directions for ground-baiting with worms and gentles in a rapid stream.

Take from 400 to 500 lob-worms, the larger and fatter the better; kill these by throwing them a few at a time on the ground or a flat pavement; if of ordinary worms, more will be required. Do not wash or cleanse them in moss or anything else, as this removes their rankness and consequent attractive savour, which quits the worms and is carried a long distance down the stream. Chop them up into pieces about the fourth of an inch in length, cast them as you do so into a receptacle of silver-sand in preference to any other, and stir them well up therein.

Thus, the moist exudation from their bodies will cause the sand to attach itself to each piece, and admit of worms and sand, when wanted, being gently pressed into an adhesive ball with the hand; this is of importance. The semi-buoyant principle of the worms is thus counterbalanced by the sand, which is far heavier than water, and the two, thus mired, should be thrown a few yards above where you purpose fishing, and in the exact drift of the stream, where it will sink like a shot. In a few minutes or so after reaching the bottom the ball will break up, and even with the force of a strong current will be retarded, by the friction of the gravel, from travelling but slowly, and that of course in the direct line of the swim.

When carrion gentles are used for ground bait it should be remembered that they do not possess any adhesive characteristic.

The gentles should therefore be thoroughly sprinkled with a solution of gum-water, such as is purchased in bottles at the stationers’, and then the gentles mixed with the silver sand. The sand will then cling to the gentles, and permit of a ball being squeezed together too large to be taken advantage of by small fish in its descent.

In the absence of silver sand, marl or clay may be used, but silver sand is far the best for the purpose, as its specific gravity is heavier than most subtitutes, it is clean to handle and semi-transparent.

The fishermen may obtain sand by washing almost any description of earth, which can be done by pumping on a tub of any light marly soil, when the lighter and opaque material will be washed away.

The above observations apply to ground-baiting for one or more nights previously to the fishing, as well as an occasional refresher while doing so.

But without ground-baiting in some way, the angler for barbel and roach can expect to do little or nothing, and where fish congregate there most other fish, attracted by the smaller fry, which keep for the most part a respectable distance, will be found. Indeed, “the metropolitan angler,” as observed by Blaine, “would as soon think of fishing without baiting his hook, as he would wet his line without first drawing the fish together by baiting the ground.”

In the oft-frequented waters within large towns the fish resort to certain holes, spots, or swims, in expectation of these matters so frequently offered them, in the same manner as the gold-fish at Hampton Court, or the trout at the head of a lake, come to be worm-fed at an accustomed hour; and thus the habit of preparing the ground for the fish is kept up, and it is in vain to expect good sport without it. Do not therefore, despise and pass a well-trodden spot among the weeds, thinking it barren.

The same reflection applies to fishing from the bank where few frequent, and the waters are frequented by punt anglers, who ground-bait the centre and bed of the river. Where such does not obtain, there very often the bank anglers find greater success than those afloat.

But always mind that the principle of ground-baiting is to attract and not to glut fish, and that the bait on your hook should be of a more tempting and superior quality to the offal.

There are several ground-baits which should be enumerated. Bran and clay ground-bait is the most simple. The bran should be the largest and coarsest obtainable, and the clay should be the cleanest, not to soil or mar the glitter of the particles, which are the chief and only attractions of this kind of lure.

We, however, prefer a ground-bait of meat, bread, etc. And here again the dearer ingredients may be totally spoiled without care. Salter, in this respect, cannot be improved upon, if worms are not used as the ground-bait in rivers. He tells us: “For a few days” angling a quarter loaf is necessary, the crust of which you will cut off, the crumb to be cut in slices about two inches thick, and put into a pan or some deep vessel, and covered with hot water; when the bread is quite soaked squeeze it nearly dry, then add the bread and pollard by handfuls, equal quantities of each, and knead them together similar to making bread, until the whole is nearly as stiff as clay. In making this ground-bait it requires some labour and time.”

The qualities of this ground-bait for cleanliness, and its tendency to attract carp, roach, chub, dace, and bream, will, however, amply repay any trouble in the making of it. It is, however, to be observed that it is more particularly calculated for ground-baiting still deeps, or very mild currents, it being neither heavy enough to withstand rapids, nor will it, from its solvent properties, bear a stone well within its masses. The best ground-bait is that which at once attains its allotted situation, remains stationary, and dissolves slowly.

Mashed potatoes, three parts, and barley meal, one part, with stiff, clean, adhesive clay or marl, worked well together, will form a cheap ground-bait. The potato is particularly attractive to bream, carp, and tench, pieces of boiled potato being used on the hook.

Soaked greaves and clay mixed are often used for barbel.

Boiled wheat or malt are used for carp, tench, chub, and bream.

A little chewed bread or a few gentles thrown into ponds, or very quiet canals or rivers, is quite sufficient at times; but nothing can compete with the custom of previous baiting, whether for days before or only the previous evening.
SHADOWS on the wall may also be produced by cutting out designs in a bold sketchy style on cardboard, and in such manner that the general surface is not weakened so much as one part falls out of place or away from another, and then allowing the light of a candle or lamp to pass through the apertures, and so produce an image on a wall or piece of white cardboard. The manner of treating this class of shadow designs is shown in Fig. 1, representing a demon’s head.

Heads, figures, flowers, geometrical designs, and even landscapes, may be produced in this manner. The design should be placed upon a piece of thick sheet zinc or hard board, the parts be cut out with a sharp penknife, and both surfaces of the cardboard painted over with Indian ink.

Multiplied Shadows. Here our arrangements become a little more complicated, for we must first stretch a sheet between the folding doors that separate a front from a back room, next suspend by a wire, at a little distance from the sheet, a figure cut out of blackened cardboard, and lastly, produce by means of several candles, multiple shadows of such figure, for every independent source of light produces its own distinct and separate shadow.

The method of managing this arrangement will be at once understood by inspecting Fig. 2, where it will be observed four shadows of the outline figure of a witch are produced on separate portions of the screen by aid of four candles held by two youths.

First of all the candles are held in a line and close together a few feet behind the figure, then one candle is drawn aside, so that a second figure seems to spring out of the first, then a third, and lastly a fourth (or as many as there are candles employed), and all the candles are kept in motion, now near, now distant from each other, up, down, round about, whirligig fashion, so as to produce a mirth-moving witches’ dance.

The ingenuous may vary this mirth-provoking arrangement in a score of ways, each perhaps more startling to the spectator than the last; for the way in which one figure seems to start from another is, to those in front of the illuminated sheet, puzzling in the extreme. Of course a great deal depends upon the ingenuity of the amateur artist who, armed with scissors or penknife and cardboard, may design birds, monkeys, grotesque imps, balls, or fish, which the manipulators of the candles behind the sheet may send flying, leaping, hopping, and swimming in all directions, setting the spectators wondering about the number of figures employed, and the mechanism used for setting them in motion.

In the next paper I shall describe the mechanical arrangements employed for the production of moving shadows, such as may be easily contrived by the young people of a family during the long evenings of autumn and winter. As a rule, the preparations will be found to be simple and inexpensive. Stages and show places will be contrived out of the ordinary domestic appurtenances of home, and the young people placed in a position to furnish many a pleasant evening’s entertainment to their friends, while having a lasting recreation supplied to them in the hints for making figures and apparatus.

Costly optical toy, have set to work and ingenuously contrived a homely kind of apparatus that has answered the purpose very tolerably, and been of no slight mental service to the contrivers.
CASTING.

By A. H. Wall.

CASTING LEAVES FOR ORNAMENTAL PURPOSES.

In our last and first paper on this subject we described the simplest processes of casting; having mastered which, the reader will be quite prepared to go a stage further, and obtain casts from another class of subjects, namely, the leaves of plants. These casts may often be rendered serviceable for any one of a large variety of decorative uses.

For this purpose obtain some silver sand, and having moistened it sufficiently to make the particles adhere closely, without making it too wet, place it upon a board, and raise it somewhat in the shape of the leaf you have selected, which leaf, for a first attempt, should be of the simplest kind, and not too large. An ivy leaf would do nicely. On this sand place your leaf (Fig. 1) in a position which shall appear accidental, natural, and graceful, and with a small paper or other knife press in the sand under the leaf laterally, until all the projecting hollows and curves are filled, and the surface of the leaf is in every part properly supported.

This being done, next mix some wax with a little Burgundy pitch, and melt them together over a slow fire. When they are sufficiently fluid, take a broad camel-hair pencil, dip it into the mixture, and with it carefully cover the surface of the leaf, taking care to do so lightly and completely, without in any way altering its position. This being done, take the leaf from its bed of sand, and place it in cold water to harden. When it is hard enough, remove it, and pull away the wax from the leaf from...
which it will be found tough enough to be readily removed without injury to its form. This is your mould, and it should be placed on the sand in the place formerly occupied by the natural leaf.

See that every part of the waxy leaf is well supported, and bank it up well, and raise a border round its edge to serve the same purpose that the slips of paper served when placed round the coin (see page 319). The plaster of Paris—the finer kind—is then prepared, and poured in according to the directions given in our first paper. As soon as the plaster has set you may raise it from the sand, when you will find that the wax adheres to it, but being rendered soft by the warmth of the plaster, you will also find that it can be removed with great readiness by a dexterous application of thumb and finger. You have then your mould, from which any number of casts may of course be obtained.

In Fig. 2 a cast is shown of a vino leaf, from looking at which you will understand the process of backing up with the sand.

Having succeeded in the above operation, a group of leaves such as are shown in Figs. 3, 4, 5, and 6, may next be attempted, or leaves arranged to form an ornamental border suitable for a cornice or other decorative purpose, as shown in Fig. 7, being leaves mounted on a wooden moulding, of which a profile section is shown in Fig. 8.

The number of subjects which can be made use of in this kind of casting is a very great one, and there is ample scope for the display of artistic taste and mechanical ingenuity in the uses to which the casts from moulds so obtained may be applied. Thus, in Fig. 9 we have casts of leaves used to decorate the support for a glass dish arranged for the reception of flowers. Fig. 10 is another suggestion in this direction; and in Fig. 11 we have a couple of suggestions for mounting casts on a frame of plain flat wood, to form picture frames.

To obtain moulds for casting from insects or other small animals, the usual plan is to suspend the objects by threads of fine silk or hair in a small pasteboard or brown-paper box, the bottom and sides of which must be oiled, and gently pour in the fine plaster of Paris upon it, taking care that it shall not be too thick. When the plaster has nearly set, remove it from the box, and divide it. It is usual to place a piece of stick in contact with the insect before casting, to ensure an opening in the mould.

If the difficulty of breaking the mould should be found too great, the insect may be moulded in two parts. When you break the plaster from the object within it to obtain a mould, the plan is to mark it all over with signs, by which the pieces may be recognised and put together again. Casts of insects and leaves may be combined in the formation of brackets, flower-stands, and many other pretty household objects, a few of which we have sketched. For a bracket, a framework of wood such as is shown at Fig. 12 will be required, and wooden frames will also be required for Fig. 13, while for Fig. 10, a glass cup must be procured.

TOY-MAKING AND TOY-GAMES.

HOOP—STILTS—WONDERFUL TRUMPET—PYRAMIDICAL PAPER HAT—TOY MICROSCOPE—MAGNIFYING PINDELO—PAPER BELLows.

TURNPIKE GATES is a third hoop-game. It is played thus: Get together five or six boys, and secure one hoop—you need only one. Mark then a large circle on the ground, forty yards or so in diameter, and erect the turnpikes round it. These are not difficult to set up, as they consist simply of two bricks or stones laid on the ground, and separated from each other by about four inches. You see the circular highway and the turnpikes in Fig. 1. I have only put five turnpikes into the figure, for I am supposing six boys to play at the game; but you might have more or fewer—the number is of no consequence. Now cast lots, to find out who is to take the hoop first. The successful player becomes hoop-driver, the others become turnpike-keepers. They must take their places so as to be on the right of the hoop-driver when he passes them; this will necessitate their standing on the outside of the circle if he drives in one direction, on the inside if he decides to drive in the other. The hoop-driver starts when all are in their proper positions, and tries to drive his hoop through the turnpikes, proceeding round and round the circle till he touches one of them with his hoop or fails to go through it. The keeper of the turnpike at which the mishap takes place—and sooner or later there is sure to be a mishap—becomes hoop-driver, and the first hoop-driver takes his place. If the hoop-driver touches the hoop at any time with his hand, or lets it fall, he is bound to deliver it up to the nearest turnpike-keeper. Some in playing this game have the turnpikes arranged not in a circle, but in a straight line; this method, however, gives rise to unnecessary trouble, for after the hoop has been driven through all the turnpikes, it becomes necessary for the hoop-driver to turn and drive the hoop back again, and for all the turnpike-keepers to shift their positions, so as to be again on the hoop-driver's right.

The game of Posting is not unlike that of Turnpike Gates. A large circle is marked out, as in that game, and round it a certain number of posting-stations, as they are called, are placed. A player stands at each posting-station; whoever has the hoop at the beginning of the game drives it to the nearest posting-station—let us call it Station No. 1—the keeper of station No. 1 trundles it to station No. 2; the keeper of station No. 2 trundles it to station No. 3 and so on. Whoever takes the hoop to a station remains to take charge of that station till the next round of the game, when he moves on to look after a new station. If any one touches the hoop with his hand, or allows it to fall, he is made to stand out of the game for a certain number of rounds, the number left to the discretion of the players.

The game need not be played only with one hoop; indeed, if the number of hoops be increased, there is a good deal more fun to be had.

Tournaments are a favorite amusement. They can be taken part in by any number of players. Suppose eight to play: each one has a hoop, and it may be remarked that wooden hoops are much better for tournaments than iron ones. They divide into two parties, and stand facing each other, the
distance between the players in each line being about six feet. The combatants then engage with fury, rolling their hoops against each other at full speed. The hoops which fall, lose. Pour out of the eight being defeated, the surviving four set to; then the two which are left engage, and the one who comes safely out of the last engagement is declared the victor.

A few minor sports with hoops remain to be mentioned. In some parts of the country, where there are smooth slopes to be had, boys take their hoops up to the top of the hills, and send them bounding down to the foot. The hoops should be large and strong; and it is a fine sight to see them racing and jumping over the grass. That hoop, it need hardly be said, is victorious which runs fastest and farthest. When trundling the hoop on level ground it is a common feat to drive a small one through a larger one without checking the speed of either. Some boys, if they have a large hoop, will pass through it themselves bodily, when it is going almost at full speed. This requires much agility; it is rather a safer feat, however, than that of leaping when mounted on horseback through a hoop, as we sometimes see done at a circus.

Stilts form our next subject. They are made in the following way:—Get two poles; I cannot name their length, for that will depend on your height, and the distance you wish to be removed from the ground. Nail to the inner side of each of them a strip of leather, in the way shown in Fig. 2; this strip of leather forms a hoop in which the feet may rest. You have now made the simplest form of stilts. When mounted upon them, the poles are kept in position by the hands. Another form, and a better, is when the poles have wooden restes for the feet nailed or screwed to them, as in Fig. 3. A third variety is when the foot-steps are made of wood, as in Fig. 3, but with the poles reaching no higher than is necessary to secure them to the leg by means of a strap a little below the knee, instead of having them long enough to be grasped by the hands. When walking upon stilts of this third description, one ought to use a long pole to preserve one's balance. A very little practice will make the use of them easy, but they should not be tried till one has attained some readiness in walking with the long-handled stilts.

Your natural ingenuity—I suppose you to be very ingenious—will suggest to you many a different method of mounting the stilts. Perhaps the best plan is to set one's back against a wall, and get the right foot on one step, and the left foot, by means of a little spring, on the other. Of course when the stilts are not long-handled ones, but have to be fastened to the leg, the mounting will be more difficult, but by the aid of the wall and the long pole before mentioned, even the beginner need not find it very troublesome work. When he tries to walk he must raise each stick alternately with the hands, lifting the foot at the same time, as in Fig. 4. Should he feel himself losing his balance, the best plan is to leap to the ground; it is much better to do that than to fall. After a few trials, the skill specks of locomotion will be found very easy and pleasant.

The practised still-walker can accomplish many feats calculated to excite the astonishment of those whose feet are never off their native heath. He can run races, go up-stairs and down-stairs, climb ladders laid at a considerable slope, walk, polka, pirouette on one still holding the other above his head and replace it without coming to the ground, and do a host of other things more, in fact, than we have space to mention.

Long ago street-dancing on stilts by girls used to be common, but I have not seen it for many years, and suppose that as a popular spectacle it has died out. The poor children who were intended for performers usually began their course of training very early. One little girl, mentioned in Mr. Henry Mayhew's "London Labour and London Poor," commenced practising on stilts when two years and a half old, and danced in public when she was three and a half. The stilts used in street performances were usually high, often reaching to the first-floor windows of some of the houses. They were fastened on a little below the knee; they were the same, indeed, as the third variety. The young dancers could both walk and polka, and used to play the tambourine whilst they danced.

One would think that the higher the stilts the more difficult it would be to walk upon them, but the reverse is the case; an increase in the height of the feet from the ground rather diminishes than adds to the difficulty of walking.

In some parts of the world stilts prove serviceable in active life. In the desert of the Lomond, for example, which runs along the sea-coast between the mouths of the Adour and the Gironde, they are frequently employed by shepherds. The country is a dead level, and by moving about on stilts they are able to see their flocks a long way off. Besides, it greatly adds to their personal comfort, for their feet are by this mode of walking kept in summer from the burning sand and in winter out of the not less objectionable mud. When taking their walks abroad, they carry a long staff, which acts as a sort of third leg, and is of use when they wish to rest, or are in danger of falling. They go along with great ease and rapidity, and think nothing of running, and dancing, and leaping, when on their stilts.

Stilts enjoyed for centuries very considerable celebrity in the city of Namur we are told by the writer of a "Tour through the Valley of the Meuse." Likely enough the frequent inundations of the Meuse and Sambre originally gave rise to their employment. They were taken up afterwards for amusement, and as early as the eleventh century we find mention made of games on stilts. These gradually assumed a party character, and resulted in much ill-feeling and many broken heads.

It is said that stilts are used in some parts of Scotland to cross rivers.

There is a certain air of dignity about such toys as hoops and stilts, but we ought not on that account to lose sight of those which are smaller: so I shall, by way of concluding this article, give an account of four of these little toys.

The first is the Wonderful Trumpet. There is no music in it, but it gives rise to both music and discord—to the music of laughter in some, and to foolish anger in others. It is, in fact, the instrument of a practical joke. Get a tube of tin, or wood, or cardboard—it does not matter which—a piece of cork, and the hollow part of a quill. Cut a slice about half an inch in thickness off the cork, and place it about half way down the tube, as at a, Fig. 5. You must now cut a second slice off the piece of cork, and make notches round its edge, and a hole in the centre through which to pass the quill. When this is done fix the cork at c, contriving so that the quill will extend about two-thirds of the way down the upper compartment of the tube. Instead of closing up the compartment e with a piece of cork at d, you may use wood or tin or cardboard, but, whatever the material, do not forget to make in it a number of small notches or holes. Now the trumpet is complete. Look at it in Fig. 6.

I must next tell how to use it. Place flour in the compartment e, hand the trumpet to the friend you have selected for the experiment, and tell him that by blowing he will produce an effect as marvellous as it will be unexpected. "Blow hard; the harder the better!" He will blow, the air having no means of escape save through the holes in whatever stops the tube at c, will come rushing out, bearing the flour along with it; his face will be all covered with flour, and then—then, if he is in a great wrath, how can I help it? I think it most natural that he should be so.
The **Pyramidal Paper Hat** is to be manufactured without difficulty if you can make the paper boat described in a former article. You begin the hat just as if you were going to make a boat; turn back to p. 125, Vol. I., and you will see what you ought to do. You proceed as there described, and when your paper is in the form represented by the dotted line in Fig. 8 in that page, all you have to do is to turn in the corners and stop short. Your paper hat is finished. The size of the piece of paper of which the hat is to be made depends of course on the size of the head it is to cover. The hat may be finished off by affixing to the top a plume formed of strips of coloured paper, as in Fig. 7.

A **Toy Microscope** of a very simple nature may be made out of a thin plate of lead or brass. Bore a hole in it with a fine awl or a large needle. Let a drop of clear water fall into the hole so as to fill it up completely. Now place any minute object you wish to examine below the thin plate; look through the globule of water, and you will see it magnified a hundred and fifty times.

The **Magnifying Pinhole** is another form of the toy microscope. Take a blackened card, and make a hole in it with a fine needle. Look at any small object through the hole—holding the object about an inch from the eye—and it will appear magnified about ten times. If the card be immediately withdrawn it will, however, seem invisible, for the eye cannot see unaided at the distance of an inch.

Can you make **Paper Bellows**? If not, you will have a chance now of learning. Take a square piece of paper; fold it double by making two of the corners meet; then open it out; fold it double again, by making the other two corners meet, and open it out a second time. The paper will now have marks of folding impressed upon it in the shape of a St. Andrew's cross. Turn the paper over, and, holding two of the folds between the finger and thumb of each hand, press it inwards, so as to take the form shown in Fig. 3. In the Figure the paper is left a little open, that you may see exactly what is meant; it should however, in reality, be pressed quite flat. Take the corners, a and b, and make them meet at e. Turn the paper over and make the corners c and d also meet at the point e. Turn the first side uppermost again, the paper being now in the form of Fig. 9. Fold a to b, and open out the paper again; then fold a to c, and open out, next fold d to b and open out, and d to c, and open out; folds will be left as shown by the dotted lines. Now pinch the parts indicated by the letters a x z, and d x z, between the finger and thumb, pinch first the one and then the other, and the paper will fall naturally into the form given by the folds, and will appear like Fig. 10. The dotted lines outside of this Figure stand for the paper belonging to the other side: a b c forms the handle of one side of the pair of bellows. Turn the paper over and do with the other side just as you have now done: first fold the paper, and then pinch it into shape. The pair of bellows is now complete, unless you like to add, as we used to do sometimes at school, a small piece of gummed paper at d to keep the handles together. But that is immaterial. The wind will be found, when the bellows are blown, to come out of the opening at a, Fig. 11, and you will be surprised what a strong breeze one can raise by means of such a simple paper article.
ROUN DB GAMES.

By JAMES MASON.

BOUTS-RIMES—CHARACTERS AND PREDICTIONS—THE WOODMAN—THE FEATHER.

"USH!" said Alice to our talkative Emily, "let us hear what David has got to say. He is about to speak."

"I was going to remark," said that gentleman, "that we should signalise the commencement of our seventh evening by a game at Bouts-Rimes."

"Why not say ‘End Rhymes?’" objected Notes-and-Queries; "it has surely been long enough played in this country to deserve an English name."

David turned to some of the company, who did not appear to understand the nature of the proposed amusement; "It is a sort of royal road to poetry," he said. "You must all take paper and pencil, and write down a string of rhymes which I shall give you; then each of you must make a short poem, nonsensical or the reverse, just as you please, the lines of which must end with the rhymes I have read aloud."

"That is certainly poetry made easy," said Maggie, laughing, "it is the rhymes that always trouble me, but here we are going to have them done to our hand."

"The rhymes won’t bother us this time," Notes-and-Queries observed, "but the sense will."

There was a supply of paper lying on the table, so every one took a piece, and David, lifting a book—I think it was a volume of Milton’s poems—read out the following rhymes, "Race, grace; born, adorn; find, mind; cold, old; charm, harm; see, be."

"Must we use these rhymes exactly in that order?" the Laughing Hyena asked.

"Yes," answered David, "only, if you like, you can introduce them alternately—race, born, grace, adorn, and so on."

It was settled that a quarter of an hour was to be allowed for writing, and without delay all of us went into a state of poetic fury.

"Fifteen minutes—stop!" cried David, bringing his hand down with a heavy blow on the table.

Two or three had not finished their verses, but there was no help for it, all had to be given then and there to David.

"I shall hang them over to you, Maggie, to read aloud," said he; "you read with more taste, and will do more justice to them than any of us."

"Nonsense!" said she; and I—the Reporter—think David’s statement quite an exaggeration. Maggie reads very beautifully, but if you only heard our black-haired beauty! she is our best reader. However, that by the way.

"Ladies and gentlemen," Maggie began, "lend me your ears; here is the first piece. It is headed ‘Before and After.’"

"’O’er the fields the hunters race,
Careless they of care or grace;
Foxes, to the manner born,
Leisurely themselves adorn,
For on hunting days they And
They are never out of mind."

That is before the hunt, this is after:

"’There they lie both stiff and cold,
Who on moonlight nights of old
Used their flattering tongues to charm
Hens and chickens to their harm,
Now—now—nothing—let me see;
Now they’re dead as dead can be."

It was thought that this was rather a successful attempt, and that a very little more ingenuity on the part of the writer would have got over the difficulty in the last two lines, for the writer had evidently met with one there.

Whilst its merits were being discussed, Maggie was glancing over the second. ‘It is,’ she said, ‘in a sentimental vein; and whoever wrote it has not put the rhymes two and two, but alternately, as you, David, said one might do. It has no name, but I’ll call it ‘The Fairy Maid.’"

"’She comes of an unevently race,
And under fairy skies was born;
’Twas there she gained that wild-like grace
No other maid did ever show.

’Now it may chance that she may find
This region sad, and strange, and cold,
And with regret may call to mind
The comforts of her home of old.

’So by my love I’ll strive to charm
All things on earth that she can see,
And shield her well from pain and harm,
That this like Fairy-land may be."

The writer of these verses has got over the difficulties of the rhymes very well,” Notes-and-Queries observed. "He certainly is not inspired, but he might start in business as a manufacturer of poetry."

"There are too many at the trade," said John Fergusson.

Of the rest of the verses read by Maggie, nothing is to be remarked, except that though the rhymes were the same the subjects were very different—as different as in the two specimens given above.

When the reading was over, we talked for a short time about the game, and David laid it down as a rule that the best method of composing poetry to fit the end-rhymes was, first of all, to look them over, and see whether they could in any way be made to harmonise together, and suggest an idea to the mind in common. ‘That idea,’ he said, ‘must be made the leading idea of your verses.’"

"Do you know," said Notes-and-Queries, "that End-rhymes were invented by a poor French poet called Dulpot? He used to occupy himself in finding rhymes for others to fill up with sense. Once he lost a packet of these rhymes, and—at least so they said—was heard lamenting that he had lost a hundred sonnets."

"I believe," remarked the Laughing Hyena, "if we could only get behind the scenes, and see some of our great poets at work, their methods of composition would rather astonish us."

"Now," said David, "let us take for our second game Characters and Predictions."

"I did not know you had the cards for it," said Arabella. "Oh yes, I prepared them several evenings ago, in anticipation of our meeting to-night." He rose, and walked to a little table at the far end of the room from that in which the members of the Round-Game Club were sitting. ‘Here,’ he said, ‘are three packs of cards, all the packs being of a different size. I
might have made them of a different colour instead of a different size, but that is of no moment. The cards of this pack—

(lifting one) “have quotations written upon them descriptive of a lady’s character; the cards of this one” (lifting another) “bear quotations descriptive of a gentleman’s character, and here” (lifting the third pack) “are the predictions—quotations applicable to the future fortunes of a lady and gentleman. The quotations, I may tell you, are short, and the authors’ names are all written below.”

The game now went on.

Arabella, by general consent, was appointed to write the names of all the ladies and gentlemen present, on differently-shaped cards; the former on square cards, the latter on three-cornered ones. She did so; then she shuffled the cards, and laid them, with their faces down, in two packs on the table.

“Who is to draw the names?” asked Arabella.

“You,” said everybody.

She drew a card from each pack; the names were those of the Laughing Hyams and Emily.

“Give me your hand,” said the gentleman to the young lady, “and let us go to consult the oracle.”

Hand in hand they walked to the little side table, beside which David had seated himself in a great arm-chair, and was trying to look as imposing and mysterious as possible.

David handed the ladies’ cards to the Laughing Hyams—he drew one. He handed the gentleman’s cards to Emily—she drew the same. The two cards were then handed to David.

“Here,” he said, “are your characters: yours, turning to Emily:

“To those who know thee not, no words can paint,
And those who know thee, know all words are faint.”

—Hannah More.

“And for yours,” looking at the Laughing Hyams:

“Of manners gentle, of affection mild;
In wit a man, simplicity a child.”— Pope.

“Now I, from this third pack, draw the prediction of your fortune,” and, in a deep hollow voice, he added:

“The owl screamed at thy birth—an evil sign—
The night crow cried, foretelling luckless time.”

“Bad fortune that,” said Emily; “but we must take what we can get, I suppose,” and she and her partner returned to their seats.

The next two whose names were drawn happened to be Notes-and-Queries and Kate.

They proceeded just as the first two had done, and Notes-and-Queries drew for Kate the character of a flirt:

“Bright as the sun her eyes the gazers strike,
And, like the sun, they shine on all alike.”—Pope.

And he himself got a better one, he said, than he deserved:

“His words are bonds, his oaths are oracles,
His love sincere.”—Shakespeare.

Their predicted fortune was quite enviable:

“An elegant sufficiency, content,
Retirement, rural quiet, friendship, books,
 Ease and alternate labour, useful life,
Progressive virtue, and approving heaven.”—Thomson.

Thirdly came Maggie and Tom. She was not flattered by the oracle at all:

“She speaks, behaves, and acts just as she ought,
But never, never reached one generous thought.”—Pope.

Tom’s learning received high praise:

“He Greek and Latin speaks with greater ease
Than hogs eat acorns, and tame pigeons pour.”—Gray.

And their fortune was:

“While you in this isle are biding,
You shall feast without providing.
Every dainty you can think of,
Every wine which you would drink of,
Shall be yours.”—Dryden.

Then came the turn of the Princess and the Reporter. What was her character? This:

“Her eyes she disciplined precisely right,
Both when to wink, and when to turn the white.”—Butler.

And his? As follows:

“In his brain—
Which is as dry as the remainder biscuit
After a voyage—he hath strange places crammed
With observation.”—Shakespeare.

Their mutual fortune, alas! was, in the words of Shakespeare:

“Your wooing doth not end like an old play;
Jack hath not Jill.”

Last of all, the names of John Ferguson and Alice were drawn.

“I hope I’ll secure a good character for you,” he whispered.
She blushed. When it was read by David it proved as flattering as could be:

“You are not for obscenity designed,
But, like the sun, should cheer all human kind.”—Dryden.

And Alice drew this character for John:

“A man who, take him all in all,
We shall not look upon his like again.”—Shakespeare.

You, kind reader, must have noticed as I have, from one or two things Alice has said on previous evenings, that she is a little superstitious. I saw, therefore, that she was all eagerness to hear what card of prediction would be drawn by David. He read it aloud:

“Shortly your fortune shall be lifted higher;
True industry doth kindle honour’s fire.”—Shakespeare.

Alice looked very pleased, and so did our John.

“Stay,” exclaimed Notes-and-Queries; “you have been corrupting the text. Shakespeare wrote ‘his fortune,’ not your fortune.”

“It does not matter a pin’s point,” answered David; “in a game such a slight liberty with an author may be excused.”

The amusement of Characters and Predictions was now at an end; but before we began playing at anything else, the Laughing Hyams observed that he had seen the game played with a pleasant addition.

“And what was that?” David asked.

“Well, the leader of the game—in this case, of course, it would have been you—had a bag with a number of small pieces of card in it, all of the same size and shape. One third of those pieces was marked with the letters ‘G.F.,’ for gentleman’s forfeit, another third with ‘L.F.,’ for lady’s forfeit, and the remaining third with a star (*). After the reading of the characters and the prediction, the leader, in each case, handed the bag to the gentleman. He drew a card. If he had ‘G.F.’ on it he had to pay a forfeit unless he could name the author of the lines describing his character; if it had ‘L.F.’ the lady had to pay one unless she could name the author of the verses describing her; and if the card bore a star, the gentleman had the privilege of saluting the lady unless she could name the author of the lines which formed the prediction.”

“I think that a remarkably good addition,” said Notes-and-Queries; “we shall have it next time we play. These cards,”
he added, turning to David, "must have cost you some trouble to prepare."

"Yes, they did, for good quotations are not to be got by the hundred. However, the cards are worth having. They can be used on other occasions."

"I have seen people amusing themselves with them, by drawing the characters and fortunes of absent friends," remarked Maggie.

"Arabella," said David, "let us play next at The Woodman. You will be the Woodman."

"And my work is—what?"

"You must write down on a piece of paper the name of any sort of wood you like. You then go round the company, pretending you have a load of that particular kind to sell. Each person you speak to guesses the name of a sort of wood. If it does not chance to be the right one—that on the piece of paper, which you must hold in your hand, but allow no one to see—you must go to somebody else, and say the same thing, and so on till the right name is guessed."

"Then I suppose whoever guesses rightly becomes Woodman, and I retire into private life on a fortune," said Arabella.

"Exactly so; and, in addition, the one who guesses rightly must pay a forfeit, and whoever repeats a wood that has been named before must do the same."

Arabella wrote a name on a card; then, advancing to Notes-and-Queries, she curtseyed, with the prettiest grace in the world, and said, "Please do you want a bundle of wood?"

"Yes."

"I have one to sell."

"What sort?"

"Cedar."

"No," and Arabella went to Maggie, dropped a curtsey, and began as before, "Please do you want a bundle of wood?"

Maggie guessed "Poplar," which was not the name of the wood in the market. So it went on round the whole company. The other woods named were lime, maple, elm, walnut, chestnut, blackthorn, alder, willow, and the Reporter had to pay a forfeit for naming walnut a second time.

"Must I go round the company again?" asked Arabella.

"Yes, to be sure, until your wood is named."

So she began a second time at Notes-and-Queries.

"Larch, yew, mahogany, ash"—these woods were named—then John Ferguson named the oak.

"You can have the bundle of wood," said Arabella. "I am glad to get rid of it;" and she showed that "Oak" was what was written on her piece of paper. "Why did none of you," she went on, "name it before; it is such a common wood."

"That is the very reason why we did not name it," said David.

After a few rounds of The Woodman, Alice said we had been working our heads quite enough for one evening, and that a game of action would be a fine thing to conclude our meeting.

We agreed that the game of action was to be The Feather. A little light feather was soon got, and we formed a circle, looking inwards, and all sitting very close together.

David threw up the feather, and blew on it to keep it floating in the air. It was coming down near Emily, when she blew on it, and sent it up again. Then it began to descend on the Princess; she blew on it, and so the game proceeded till it alighted on Tom’s jacket, in consequence of which he had to pay a forfeit. It was sent up again, and we laughed and blew, and blew and laughed, and paid forfeits till we were quite exhausted.

When the feather had fallen for about the twentieth time, a dead silence occurred in the room, as sometimes happens even when the fun of a party is at its noisiest. It did not last two seconds, but Notes-and-Queries noticed it.

"When there came a pause like that," he observed, "people used to say there was an angel passing through the room."

"May be," said Alice; "I don’t think they desert us in our amusements."

This gave rise to conversation; we ceased playing for the evening. In a fit of generosity we returned all forfeits, and so ended our seventh meeting.

BIRD-COLLECTING AND SKINNING.

Making a Collection—First Commencing—Investigations—The Bird to be Chosen—Preparing to Skin.

We have already advocated the collecting of birds’ eggs, both as an amusement and as affording excellent training in habits of observation, patience, and perseverance, without, however, holding out any very great expectations of such collections being, at least in their earlier stages, of any immediate value to science.

But we have here to treat of a far more serious and important subject, that of collecting and preserving the authors of those nests and eggs which have from our earliest days charmed us with their beauty, and probably awakened within us the first rude instincts of an interest in natural history. We do not exaggerate when we say that from the moment a collection, even of the commonest local birds, is commenced, it is impossible to say when some fact positively unknown to naturalists may not be recorded; and the beginner need never for a single day feel that everything is already known about our native species, and that nothing is left for him to do. Far from this being the case, we will take what almost any one, if asked which was our most common bird, would be sure to name the house-sparrow, and we can safely assert that the question of the plumages and seasonal changes of this familiar species are so little known to many of our ornithologists who have travelled and collected in foreign countries, that bard blunders have been committed in their subsequent writings; and at this moment a collection of skins of the despised sparrow, with localities, dates, and sexes, carefully noted on the labels, would be a series such as few could show, and might rid ornithology of a great reproach.

We have selected the bird which, from its pert obtrusiveness, is perhaps better known than any other, but ex uno disce omnes, and again we say to the beginner, egg-collecting is principally valuable to yourself; but from the moment you begin to collect and skin birds yourself (not buy them ready-skinned, mind that), from that time you enter upon a higher walk in natural history, and no one has a right to sneer at if as low science.

The investigation of the contents of the crops of birds will teach our collector facts regarding their food which may be of importance as well as interest; a number of vulgar superstitious beliefs will be dispelled by observation of the habits of some of
our opuscular and nocturnal birds; whilst if any of our readers should enter Parliament, his experience will, at least, enable him to avoid, and, let us hope, to check in others, such exhibitions of ignorance as disgraced the discussions on the Sea Birds' Preservation Bill, and completely neutralised the benefits to be derived from the Wild Birds' Protection Bill, passed last session; an Act which, from the ill-advised friends, as tending to keep down the sickly and weakly birds which would otherwise rear an impoverished race. He will be able to show that the balance of Nature, resulting in the survival of the fittest, is not to be disturbed with impunity, for that sooner or later Nature will be her own avenger, as exemplified by the grouse disease, and by mortality in other game, principally due to over-preserving.

advocacy of some of its so-called friends, is simply calculated to bring all legislation on the subject into the utmost contempt. He will be able to teach our rapier senators, who divided on the question of whether or no the "hedge-sparrow" should be left unprotected like the house-sparrow, that the former has not the slightest affinity in food or habits with the latter—that its trivial name, its worst enemy, is merely bestowed by ignorant rustics, owing to its dull colour and fancied resemblance to the proscribed species; he may even be able to convince some of the less bigoted of our game-preserve that in the long run the falcons and hawks, which they have been in the habit of looking upon as "winged vermin," are really true

But if our reader never attains to the high position which we have ventured to suppose for him, "the applause of listening senates to command," he may, at least, be able to teach that no less prejudiced servant of our legislators, the game-keeper, that owls, by their preying on rats, mice, and "ground vermin," are in reality his best friends; that the "Night-hawk," or "ern-owl," despite its trivial name, is neither a hawk nor an owl, and preys exclusively upon insects; that cuckoos do not change into hawks in autumn, and for that reason are not worthy of death, whenever the chance of inflicting that penalty may occur; and, in short, he may combat numberless sources of error, which we will not mention here, for fear of exhausting his patience.
And when, as in these days of general locomotion, it is highly probable, our reader visits foreign countries, his knowledge of the art of bird-preserving will enable him to bring home many choice specimens of species, which will not only remain of lasting value to him, but will redound to the service of science; and we shall then be spared the pain, so often inflicted upon us, when having some rare bird described to us, of being told, “there was no one there to skin it, or else I could have brought you plenty.”

But if our friend had learned the very easy process of skinning, he would have been independent of any professional taxidermist, and would have been able to bring home specimens which could not have failed to be of interest.

It is to enable him to do this that we proceed to give some instructions which will enable the reader, even when travelling, to preserve specimens of the birds he may meet with, reserving till the close of our articles, as of less immediate importance, the details connected with mounting and arranging (“setting-up,” as it is generally called) of such as he may not wish to keep hid in cabinets.

It is not our present intention to lay down rules for obtaining your bird, whether by snaring, trapping, or shooting; the last, however, will suggest itself as the plan generally available, and on this we may offer a suggestion to the collector.

There was a time when walking-stick guns laboured under the imputation still attached to air-guns, of being both dangerous and poaching implements; but without saying much in defence of the latter, we submit that such is no longer the case with respect to the former. On the contrary, they are most useful to the bird-collector, for being light and portable, they can be packed up with and laid in the boat ready with the fishing-rod, in case any curious bird should come past, and they can be taken out in numberless excursions, when the ordinary double-barrel would be out of place, and attract the attention of every gaping idler. They are now made to suit the breech-loading requirements of modern times: and a former source of danger is now obviated, by observing the simple rule never to put a cartridge into the breech before taking the plug or ramrod out of the muzzle.

The liability to forget this with the old muzzle-loaders, which could not be loaded in a moment, and therefore had to be carried ready charged, was a fertile cause of accidents. A skeleton-butt to fit on can be carried in the pocket, but a little practice will enable the collector to shoot very well, by simply holding the gun like a walking-stick, at arm’s length, and running his eye along the barrel; and, as nothing spoils true shooting so much as an overcharge, any recoil which may result will give him a timely admonition on the bridge of the nose, and teach him the correct proportion for the future.

Whether out for the express purpose of collecting, or for general sport, no naturalist should be without a small raw-topped box, containing an ounce or two of fine plaster of Paris, to apply to the wound caused by the shot; some use mahogany sawdust as an absorbent, but we prefer the former. The absorbent, whatever it be, should be sprinkled plentifully over the wounds, a little poured into the bill, filling the throat; the nostrils and eyes should also receive a share; and then the bill and nostrils be carefully plugged with cotton-wool, or some similar substitute, to prevent any blood or mucus from staining the feathers. Wool should also be applied to the wound where convenient, for it is desirable to keep the plumage as clean as possible; at the same time we may observe that blood is far more easily removed hereafter than by any oozings from the mouth, nostrils, or eyes; so let especial care be taken with these. The bird should then be carried exposed to the air, if possible, until quite cool, when it may be carefully wrapped in paper, and stowed away till the return home. In cold weather it is, of course, not so necessary to allow the body to cool, but at any other time, especially if the bird cannot be skinned at once, it is most essential; for if the specimen be packed up when still warm, putrefaction sets in with astonishing rapidity, as we have found to our cost. A painful reminiscence comes over us as we write, of a rare bird forwarded to us by a friend, who hastily scribbled, “I shot it not ten minutes ago in my garden, and packed it off at once; it goes by the mail, and you will get it almost as soon as this letter.” So we did, the very next day, and nothing but
strong doses of carbolic acid, and plenty of practice enabled us to save it.

We will now proceed to some instructions respecting the skinning of specimens; but first, for the convenience of the beginner, we give on page 24 a small diagram of the essential anatomy of a bird, in order that the process may be the better understood.

The sketch is only intended to show the framework of a bird, so far as is necessary to indicate where the incisions and separations should be made; for the hard names and anatomical descriptions which too often scare the neophyte, we refer those desirous of such information to plates of skeletons in any work on the symmetry of birds.

Our sketch represents a specimen laid upon the table, ready for skinning. The cotton, which has hitherto plugged the bill and nostrils, should now be removed, and fresh cotton substituted; a thread is then passed through the nostrils at 1, and tied under the lower mandible, or "jaw," as we should say, of a mammal, at 2, leaving an end fully equal to the length of the neck.

As it is advantageous to rumple the feathers as little as possible, frequent moving of the bird itself may be prevented by placing it upon a small sheet of paper, which can be turned round at pleasure with the bird upon it.

This and other suggestions may appear trifles, but the observance of these apparently trivial details has a great deal to do with the turn-out of the specimen hereafter; and the beginner will probably find the result of his first efforts, especially if made upon a loosely-plumed bird like a warbler, look quite sufficiently ugly, without any needless disturbance of the plumage.

Let him, however, not be disheartened, but finish it to the final sewing-up, and he will be greatly surprised to find how much better it looks a couple of days hence, when the feathers have settled down with the drying of the skin.

If the bird be of moderate size—a starling, or chough, if he lucky enough to get the latter—it will facilitate operations to break the shoulder-bones of the wings, with the finger and thumb, about the point indicated by the lines 3, 4, as the wings will then lie open better; this is, however, optional, and must be done gently, lest the sharp points of the fractured bones should lacerate the skin. Next plug the vent 5 with a little cotton-wool, and then, separating with a sharp scalpel, or round-pointed penknife, the feathers along the breast-bone, which is in itself bare, make an incision from 5 to 6, avoiding, if possible, cutting through the inner membrane, which immediately covers the flesh and confines the intestines.

Practice has shown us the advisability of continuing the incision with a pair of scissors, as with them the points can be inserted between the outer skin and the membrane, and the chance of damaging the latter, and soiling the feathers is much diminished. You then gently loosen the skin with the handle of the scalpel.

CRICKET AND CRICKeters.

BY C. W. ALCOCK.

LAST WORDS ON BATTING—A GOOD RUNNER—RUN THE FIRST RUN SHARP—STOLEN RUNS—THEIR EFFECT ON THE FIELD.

If you have not by this time laid the foundation for future eminence as a batsman, you will admit, at least, that the fault does not rest with me. If you have failed to gain sufficient theoretical knowledge to enable you to improve your practical acquaintance with the art of batting, the blame, you will admit, rests solely on your own incapacity. I have told you what to strive for, and warned you against the eccentricities of certain players, so that I beg you to place the blame of any evil habits that you may chance to have contracted elsewhere than on my tuition. I want you to use living examples, as the most profitable schoolmasters, but, at the same time, you must be cautious in your selection; and while you are bent on advancement, see that you have the most fitting representatives of the different forms of batting. I want you, above all things, to master the early rudiments, and to eschew any self-satisfied notion that you are talented enough to grasp in a moment what cleverer minds than yours have failed to gain in a lifetime. You will have to play correct cricket if you want to prosper, or you will find to your cost that you have made woful havoc with your future at the very outset.

Play cautiously when you go in, and do not be lured to your ruin by the temptation of an over-pitched ball before you have got used to the bowling, or before you have got what is technically termed "your eye in."

You have wondered, I dare say, as have hundreds of your fellows, how it is that Mr. W. G. Grace has so completely outshone the deeds of every batsman either of the past or the present. Shall I tell you the secret of his great success? You can ask, if you like, any or all of the bowlers, whose efforts seem so puny when directed against his levianthan defence, and you will get one uniform answer. It is not that his eyesight has any marvellous power unknown to other mortals, or that he possesses a talismen potent enough to prevent his downfall. It is solely that his batting is more true, that his patience is more decided, and that, as a rule, he never wavers from the one great principle of batting. You will never discover, if you try for years, that his bat is crooked, for no one is keener on keeping the instrument that Old Ward used to designate as a beam instead of a bat, straight and full, and no one would feel more insulted at a charge of playing with a crooked bat. Perhaps the greatest of all curses to a young batsman is the possession of any distinguished powers of hitting. You may smile, if you so please, at the notion that such gifts are detrimental to a young beginner, but you will grow wiser as you grow older, and the truth may dawn upon you when it is too late to profit by it. I have in my mind's eye now more than one genuine cricketer who will own the soft impeachment, and wish vainly that he could have a chance of regaining the time that he has wasted. I can give you many an instance of a batsman, of the highest pretensions on his own village green, but a bitter disappointment to himself and his friends when he has been subject to the ordeal of a county match against bowlers ready and eager to pick out the tiniest flaw in his armour of defence. You may succeed well enough if you are gifted with a quick eye and aptitude for timing the ball, even if your bat be not quite straight when the bowling is loose, and the wickets are likely to remain intact, even if there be no batsman to represent the usual obstacle. I grant you that Hodge is a cricketer of high repute under these circumstances, and that the whole village must not be treated disrespectfully because it over-estimates the 'form' of a batsman, who never
CRICKET AND CRICKETERS.

There are many other features that you will have to study during your apprenticeship before you can earn the repite of being a batsman thoroughly expert in your calling. It is not enough that you should have in you the material for the construction of a lasting game, but that you should possess in addition, the skill necessary to carve and mould yourself until you have reached the height of artistic nicety. I want you to weigh everything conduco to success at its proper value, even though you may have an idea that you can get through your share of the performance generally without the slightest acknowledgment of the minor requirements. Some of you seem to regard the question of running your runs at all as a great nuisance, but you seem to forget that there are few of you who are really fit to play the game as it ought to be played unless you can lay claim to the title of being a good judge of a run.

To some few of us the very mention of a stolen run comes with a sort of pleasant fragrance of the past. If stolen fruit is the sweetest, I know no more pleasant sensation than that of stealing a run, when runs are wanted, and the whole field is on the alert. You have to put your judgment against that of the enemy, your activity against the agility of eleven antagonists, and all honour to you if you are on the right side. You will be surprised to find what you can do in the way of running between the wickets when your powers are put to the test. To a good judge there is nothing more distressing than the listless dawdle that seems to actuate the movements of certain batsmen when they go to the wickets, nothing more painful than to see them stand in their ground stiff as statues, motionless as sentinels, instead of aiming to assist their side by the attainment of runs far from impracticable. You can see many an otherwise faultless player marred by this one defect. I could point out numberless examples without putting myself to the slightest inconvenience; so try and remedy, if you are too late to avoid, this fault, glaring as it is, believe me, in the eyes of every old practitioner at cricket. Do not be misled because you see batsmen of any pretension saunter and stroll between the wickets, as if the whole game were a business to be performed with as little trouble as possible, instead of an exercise to encourage the use of every limb, and the development of all the muscles. I want you to regard the loss of every possible run as an offence that should receive condign punishment. If you play cricket, use your whole powers, and do not be afraid of soiling a collar or ruffling a cuff, as I verily and honestly believe is the main dread of that select order of cricketers, who seem more adapted for cricket on the hearth, more fitted to bat on a velvet carpet than on the green sward under the scorching rays of a sun that bounces if it does not disfigure.

A stolen run! Why, the words recall some of the jolliest memories of the past to me! If you have a chance of getting in with a partner who understands you, and will act in concert with you, runs which seemed impracticable will lose all their difficulty, and you will find that the distance between the wickets reduces itself wonderfully the better the comprehension between your partner and yourself. To see Jupp and Thomas Humphrey run in the days when brave old Surrey was at its best, was a treat worth going miles to see. You seemed to enter into the spirit of the game itself when you saw how complete was the understanding that prevailed between the two old comrades. No loud shout of "Come!" or "Run!" to make the whole field on the alert, but a tacit understanding that did better than whole volumes of advice. It was just a shake of the head, or a nod, and the thing was done.

It is not the loquacious or the noisy cricketer that succeeds, you may be sure; for speech is silver, but silence is golden, as much in cricket as in things of greater moment. The first
element, too, in the way of success in this matter of running is to lose no time in "backing up." Supposing that you may, perchance, be ignorant of some of the small technicalities of the game, I must explain that by backing up I mean the secret of following up the ball immediately it is out of the hands of the bowler. On the other hand, you must not be rash, and leave your ground before the ball leaves the bowler, or you will suffer the penalty, and be convicted under the provision of the law number twenty-nine, which enacts that "when the bowler is about to deliver a ball, if the striker at his wicket go outside the popping crease before the actual delivery, the said bowler may put him out." Directly the ball has left the bowler, be ready to make as much of your way as is prudent, towards the ground of your partner. Do not be over-anxious, and avoid as much as possible any movement that may be likely to give the enemy an idea of your intentions, but be vigilant as well as resolute, and you cannot fail. You will see good runners invariably affect a run when the batsman has played the ball just in front of his bat, and the whole field applauds vigorously, as if the fast had been one of great difficulty, instead of one of comparative ease. You will find often that the runs which appear most hazardous are free from all risk, and this is a notable instance — you have backed up well, and are midway between the wickets, so that it is easy for you to reach the batsman's end before the wicket-keeper can turn to assault your stamps. So far then you, at least, are safe, while your partner, provided that he act well in concert with you, has divined your intentions, and is well on his way towards the end that you have left, to the annoyance of the wicket-keeper, who either fumbles the ball, or fails to get in time, or, worst of all miseries, makes a shot at the wicket, with the likelihood of assisting your score materially by the aid of an over-throw. I have seen this same run made hundreds of times without the slightest hitch or mistake, although there is many a batsman whose resolution fails at the critical moment.

Remember, above all things, that in running, the man who hesitates is lost. It is of no value to you to learn afterwards that you might have saved yourself if you had only made up your mind at first, either to stay in your ground or to run at once instead of vacillating between the two courses to your certain ruin. There is no midway passage open to you, as a rule. You must either run or give your partner a decisive word of command, so that he may be able to act on your order at once.

You will have to use your own discretion in many cases, for one fieldman will place you in danger when you may be safe with all the rest of the side. You will have to make up your mind according as the ball is travelling, slowly or with speed, into the hands of the fieldmen. There is nothing more pleasing to good batsmen, or on the other hand, more likely to tantalise and demoralise the whole field, than a run made when the ball is slowly trudging along on its way to mid-on. There is no surer run for you if you back up well, there is not the slightest risk in your own case, while your partner can presume on the same immunity, as the player who picks up the ball cannot possibly turn round to assail his wicket. You must be careful though not to use words that may be misunderstood when you call for a run. If you decide on not running, you will do well to communicate by means of the usual negative, "No!" or if bent on a run, signify as briefly as possible your intention with the word "Run!" You must be on the alert, with your gaze always fixed on the ball, or you will lose many a run that is perfectly feasible.

It is ridiculous sometimes to see the chances that are allowed to escape, even by the best batsmen in the best matches. You will see players, whose education should have been more highly finished, jog along between the wickets with their back turned to the ball, as if to effect one run alone was a feat arduous enough of itself, without having to expose themselves to the trouble of effecting a second.

You can never tell what may occur if you " run the first run sharp." I want you to study running as one of the most essential requisites for a good batsman, so pardon my prolixity. You may secure runs by good running that are utterly impossible from the bat when the bowling is well on the wicket. You have to keep your side, and you can materially benefit the cause by training yourself to be a good judge of runs. You will have to back up always on the assumption that the ball may possibly be muffed by one of the fieldmen, even though they are the most expert representatives of the art. It is not enough that you should rely on the known skill of any special player, and count on the quick return of the ball, for a blade of grass or uneven piece of ground may entirely divert its course, and you will then have the dissatisfaction of reckoning on a run that you have lost.

You really cannot estimate the disastrous effects that may happen to a side even from one of these runs, when the game is at a critical point, and you are straining every nerve to prevent the better of the two batsmen who are in securing the ball. You do not know how severe the agony of a bowler at finding his analysis spoiled again and again by the achievement of these same sharp runs, with the possibility of over-throws to make matters still worse.

I have known the best long-stops utterly unmanned by a good runner, a whole field thoroughly scared and demoralised, and a probable victory turned into a certain defeat solely by a batsman bent on making the best use of his time, and turning to good account every likely chance of a safe run. You will have to be cautious, though, and be careful not to overdo matters, or you will fail ignominiously instead of succeeding as you ought to succeed. You will have to use your discretion in running to certain fieldsmen; and beware how you run to a left-handed man, or your fate will be speedy! Nor is it wise or judicious to over-run your ground, as you will see many do, passing yards behind the wicket instead of planting their bat just within the crease, and turning at once in the hope of another run. You will soon, too, be impressed with the benefit of running with your bat well in front of you, and all along the ground, as by this means you will gain many a yard when it comes to the question of a close run.

Lastly, do not over-run yourself, but take time to recover your breath, and do not let your eye-sight suffer merely to effect a single run. Remember further that, if you hit the ball in front of the wicket, it is your business to judge the run; your partner's if the ball is hit behind the stumps.

So far I have given you all the advice that I have gained from a long experience to assist you in the difficult task of earning fame as a batsman. I have told you what to do, and cautioned you against what should be left undone, and I look forward hopefully for you in the future. Only oblige me by playing the game with spirit and energy. Do not lounge about the field as if you were treading on velvet pile, or smoking in the dressing room. Abomination, say I, to all the namby-pamby cricket that one sees at times. Play the game as if it were something more than a drawing-room amusement, and make cricket a sport for hearty exercise and honest rivalry. Study your side, and not your own average, and I will own that you have mastered thoroughly the principles that I have wanted to inculcate in this treatise on batting.

Now then, let us leave the bat for the present, and turn your eyes to the ball.
DRAUGHTS.

By George Frederick Paragon.

THE THEORY OF EXCHANGES—THE SINGLE CORNER GAME.

Of course, say many of our friends, draughts is a simple game. But try a few bouts with a really good player, and you will soon discover that it is not so simple as it looks. Move for move, piece for piece, may go on till only a few men are left on the board. Then comes the real struggle—the test of ability, the proof of genius! Then we see how, in a few moves, an apparently strong position is assailed, and a draw turned into a win. The players have each, perhaps, worked on a plan or system, and the several exchanges have all tended to its perfecting. The far-seeing, cautious player has resisted all temptations to complicate his game, and keeps his men well together, till at last an opportunity arises for a sudden attack, and he makes it without hesitation. I remember watching a game between two good players, which had proceeded for a considerable time without direct advantage to either, till at last the Black had two kings and a man opposed to White’s king and two men, in the position shown in Fig. 1.

It was White’s move. What was he to do? He might—and had he been a less skilful player he probably would—have moved into the “breeches” between the black king and man. In that case Black would have defended his position by moving from 7 to 11, and the result would have been simply man for

![Fig. 1](image1)

![Fig. 2](image2)

![Fig. 3](image3)

![Fig. 4](image4)

man, and a drawn game. Instead of that, however, White quietly announced “Game in three moves,” and played his king from 23 to 24. Black was forced to take—22 to 31—and his man was crowned. White then moved his man from 8 to 3, and also crowned him; black king took the man on square 27—31 to 24; when the white king on square 3 passed over the three kings to square 23 and won; every move from the position shown in the diagram being forced—a really fine stratagem.

Similar positions occur in many games, but it requires a real player to take advantage of them. Here, for instance, is one which shows the value of a judicious exchange of pieces; but, unlike the former instance, the advantage of strength is with
the white men, whose king is enabled to attack with impunity
(Fig. 3). White has to play, and he wins in three moves. How?
By giving up the man on square 30, and then attacking the
man on square 16; thus:—

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<tr>
<th>WHITE</th>
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<tbody>
<tr>
<td>30 to 26</td>
<td>22 to 31 K</td>
</tr>
<tr>
<td>7 to 11</td>
<td>31 to 24</td>
</tr>
<tr>
<td>11 to 27</td>
<td></td>
</tr>
</tbody>
</table>

when Black, having to play, can only move into 23 or 24, and
be taken in either square.

This Theory of Exchanges should be carefully studied by
every draught-player; for upon it depends the whole weight
of the game. A few instances of exchanges will illustrate this.
Place the men thus:—

<table>
<thead>
<tr>
<th>BLACK</th>
<th>WHITE</th>
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</thead>
<tbody>
<tr>
<td>Men on squares 13 and 17.</td>
<td>Men on squares 26 and 31.</td>
</tr>
</tbody>
</table>

This, which is known as the coup ordinaire, may occur in any
part of the game; and it is valuable, as it fixes the opposite
man in his square and prevents his moving without loss. White
moves from 26 to 22, when Black must take from 17 to 26 and
be re-taken—31 to 22.

The Exchange Indirect, or coup oblique, is rather less
simple:—

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</table>

White moves from 16 to 12; Black takes from 7 to 16; White
re-takes from 20 to 11, and then wins by the series of moves
shown in Position I. Another form of the same principle is seen
in the king-stroke—a stratagem often resorted to by
superior players when contending with tyros:—

<table>
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<tr>
<th>BLACK</th>
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<tbody>
<tr>
<td>Men on squares 12 and 27.</td>
<td>King on square 15; man on square 20.</td>
</tr>
</tbody>
</table>

White moves from 20 to 16; Black must take by going from
12 to 19, when White takes the two pieces 15 to 31.

It is frequently necessary, in order to obtain a good position,
to exchange rapidly. Here is an instance:—

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</table>

Here White, with an inferior force, wins by giving the man on
27, which Black must take, and then, passing on to square 8,
leaving the other with one piece against two. This is a simple
and ordinary mode of exchange, of which the tyro should be
fully aware.

The Reprendre, or "back move," sometimes occurs, and is
very useful:—

<table>
<thead>
<tr>
<th>BLACK</th>
<th>WHITE</th>
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</thead>
<tbody>
<tr>
<td>Men on squares 10, 12, 15.</td>
<td>Men on squares 19, 20, and 23.</td>
</tr>
</tbody>
</table>

White moves from 20 to 16, when Black must take from 15 to
24, and be retaken by 28 to 19, the result in this position being
a drawn game.

A similar position is the following:—

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<th>WHITE</th>
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</table>

White moves from 13 to 9, when Black must take from 6 to 13.
White then moves from 23 to 21, regains the man, and draws
the game; for, do whatever Black may, he cannot prevent his
opponent from crowning the man now on square 14; and with-
out he is careful he may lose the game.

The Reprise is a move which enables the man attacked to
offer another man, so as to ensure an exchange and save the
game. Place the men thus:—

<table>
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<tr>
<th>BLACK</th>
<th>WHITE</th>
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</thead>
<tbody>
<tr>
<td>Men on squares 13, 14, and 15.</td>
<td>Men on squares 21, 22, and 24.</td>
</tr>
</tbody>
</table>

Black moves from 14 to 18, and it would seem that he must
inevitably win a man; but White offers him a choice of moves
by passing from 24 to 19, and, whichever man Black takes,
secures an exchange. But for this power of reprisal White
must have lost a man and the game; but as it is, he secures a
draw.

Another illustration of this power of reprisal will be found
in the following position:—

<table>
<thead>
<tr>
<th>BLACK</th>
<th>WHITE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men on squares 6, 7, 12, and 23.</td>
<td>Men on squares 14, 16, 31, and 32.</td>
</tr>
</tbody>
</table>

It is White's turn to play, and it would at first sight appear
that he must lose a man. But if he play from 14 to 19, what
is the result? If Black move from 12 to 19, taking the man on
16, White takes the man on square 7, makes a king on square
3, and wins. If, on the other hand, Black takes from 7 to 14, or
6 to 15, White moves from 31 to 27, and wins three men and the
game. This last position is a good problem for young players,
as it is capable of two or three solutions, but always in favour
of White, which can neither escape the attack of the king nor
prevent the losing exchange. A still more potent example of
the power of reprisal is to be found in the following position,
which frequently occurs, especially with young players:—

<table>
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<tr>
<th>BLACK</th>
<th>WHITE</th>
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</thead>
<tbody>
<tr>
<td>Kings on squares 7, 8, or 16, and on square 22.</td>
<td>Kings on squares 15 and 18.</td>
</tr>
</tbody>
</table>

Black having to play wins the game perforce, by moving into
square 11; for, whether White take one king or the other, he
gets fixed in a corner or commanded a square, and loses
immediately. This is also a good proof of the advantage of
having the move. An amusing instance of the power of the
move and the value of reprisal will be found in the
position shown in Fig. 3.

WHITE TO MOVE AND WIN.

If White make any mistake, Black will certainly draw.

The solution of the Problem is as follows:—

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<tr>
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<tbody>
<tr>
<td>29 to 22</td>
<td>17 to 26 *</td>
</tr>
<tr>
<td>22 to 25</td>
<td>10 to 17 *</td>
</tr>
<tr>
<td>28 to 33</td>
<td>1 to 10 *</td>
</tr>
<tr>
<td>27 to 24</td>
<td>20 to 27 *</td>
</tr>
<tr>
<td>16 to 11</td>
<td>7 to 16 *</td>
</tr>
<tr>
<td>12 to 8</td>
<td>4 to 11 *</td>
</tr>
<tr>
<td>10 to 12 *</td>
<td>26 to 19 *</td>
</tr>
<tr>
<td>32 to 30 *</td>
<td></td>
</tr>
</tbody>
</table>

taking six pieces, after a few moves, and pinning the Black on
squares 21 and 13; or taking a man, and leaving White with
two to one, when he wins in the usual way. The * in the
solution shows the taking moves.

Another instance of a similar kind will enable young players
to comprehend those wonderful problems with which Sturge,
Martin, and other writers endeavour to puzzle them (Fig. 4).

This is a position in which it would seem that, the forces
being quite equal, a draw would certainly be the result; but if
we examine the solution we shall see that, though a good many
moves are necessary, White, with the move, wins.

SOLUTION.

<table>
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<tr>
<th>WHITE</th>
<th>BLACK</th>
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</thead>
<tbody>
<tr>
<td>1. 13 to 8</td>
<td>1. 2 to 12</td>
</tr>
<tr>
<td>2. 6 to 2 x</td>
<td>2. 23 to 16</td>
</tr>
<tr>
<td>3. 10 to 8</td>
<td>3. 1 to 10</td>
</tr>
<tr>
<td>4. 7 to 15</td>
<td>4. 16 to 7</td>
</tr>
</tbody>
</table>
WHITE.
5. 2 to 11
6. 14 to 10
7. 5 to 9
8. 9 to 14
9. 14 to 18
10. 18 to 22
11. 11 to 4 k
12. 4 to 8
13. 8 to 11
14. 22 to 25
15. 25 to 30, and White wins.

The value of judicious exchanges is also well seen in the game known as the single corner, the opening moves of which were given in a previous chapter. It would be well, however, for the amateur in draughts—and I employ the word “amateur” to distinguish the lover of the game from the mere beginner—to practise the moves of the single corner and old fourteenth over and over again, till he becomes perfectly familiar with them. In the following game there may be many variations—

<table>
<thead>
<tr>
<th>BLACK</th>
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<tbody>
<tr>
<td>1. 11 to 16</td>
<td>1. 24 to 20</td>
</tr>
<tr>
<td>2. 8 to 11</td>
<td>2. 27 to 24</td>
</tr>
<tr>
<td>3. 10 to 15</td>
<td>3. 24 to 19</td>
</tr>
<tr>
<td>4. 15 to 24</td>
<td>4. 28 to 19</td>
</tr>
<tr>
<td>5. 7 to 10</td>
<td>5. 23 to 18</td>
</tr>
<tr>
<td>6. 10 to 15</td>
<td>6. 19 to 10</td>
</tr>
</tbody>
</table>

BLACK.
7. 6 to 15
8. 9 to 13
9. 3 to 7
10. 1 to 6
11. 6 to 9
12. 7 to 14
13. 13 to 22
14. 15 to 22, and Black wins.

VARIATION.
8. 32 to 23
9. 3 to 7
10. 1 to 6
11. 16 to 19, etc.; and Black still wins. And, in fact, from this opening the first player has a real and substantial advantage.

Some writers have multiplied these positions, and given them fanciful names; but, in fact, there was no need to do so, as draughts is already sufficiently complicated and sufficiently abstruse for any game in which amusement, and not mental labour, is the distinguishing feature. It is too much the habit of writers on home games—at the head of them all, undoubtedly, standing chess and draughts—to insist on their abstruse and scientific exactness, and their value as mental exercises; forgetful that the very essence of a game is that it should amuse without fatiguing, and prove a gentle and pleasant resource for the harnessed and jaded mind.

* The losing move.

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**BUTTERFLY AND MOTH COLLECTING.**

**BY THE AUTHOR OF “THE LEPIDOPTERIST’S GUIDE.”**

EARLY SPECIES (continued)—THE BRISTLESTONE—THE ORANGE-TIPPED—WOOD ARGUS—HOLLY BLUE—GREEN HAIR-STREAK.

ANOTHER very early species is the Bristlestone (Gonopteryx rhamni), of which the colour of the male may be described as “flower of sulphur,” of the female “milk of sulphur,” with a single orange-coloured spot near the centre of each wing. It sometimes makes its appearance earlier than any other species. It is a graceful sfer, its falcate wings greatly assisting it in the art and mystery of “doubling” upon its pursuer. It loves the clearings in woods, but not unfrequently betrays itself to the open country. It is useless to give chase, for as our friends the French say, “Je ne saurait pas la chandelle,” but we may wait until he comes within reach, and then have a try at him; or we may mark him down, and, keeping the sun in front of us lest we might throw a shadow, cautiously creep within reach, and either dexterously catch him as he rises, or quickly clap the net over him; the latter to our fancy being the surest, though not the most graceful mode of capture—surest, because most butterflies naturally look downwards towards the earth and its vernal appendages, and when disturbed instinctively fly upwards, beating not the outstretched hand above them.

The eggs are deposited in spring upon the terminal shoots of both species of buckthorn (Rhamnus frangula and R. cathartica), and these plants will afford a clue to the whereabouts of the perfect insect.

This finishes up the hibernated species; and as we have already disposed of the white butterflies, our next visitor will be the Orange-tipped (Anthocharis cardamines), a common species, to be sure, but still a great favourite with collectors, on account of the delicate prettiness of both its upper and under sides. Its welcome appearance in our lanes and fields on bright May mornings is a gladsome sight, well calculated to stir up any latent longing for the chase. It is not a strong flier, and may be easily run down. As its name implies, the fore-wings of the male are tipped with orange, but the female wants this ornamentation, and consequently not unfrequently gets mistaken for another species—a rarity. *P. Daptides*—and thereby causes much trouble to entomological editors, who prefer in matters of doubt to sift the truth from the communications they receive, chiefly in order that their readers may not be led astray, but partly that their contributors may not make asses of themselves.

Friends will kindly accept this intimation.

In shady lanes, or in the rides, clearings, or borders of woods, the first brood of the Speckled Wood or Wood Argus, as you like it (*Hipparchia Semele*), may be observed flitting about, enjoying the full as much as we do the cheerful early spring. It may be described as brown, with yellowish spots towards the margins of the wings, and an eye-like spot near the tips of the fore-wings. It sometimes occurs as early as the middle of April, but is more to be depended on in the beginning of May. It is sufficiently common throughout the country.
Green Hair-streak (Thecla rubi). It loves to disport itself in open places, such as heaths and broken ground, and pays particular attention to the blossoms of the bramble, which generally begin to unfold themselves simultaneously with its appearance.

The Green Hair-streak butterfly is what poor Artemis would have called a "slippery eel"; when you think that you have netted him you are surprised to find that you have not, and vice-versa, for the little artful dodger has a knack of assuming Fortunatus' cap of invisibility, dropping or starting from the flower at which he was regaling himself, and instantaneously darting out of sight, his uniform brown wings and green under-side greatly assisting the illusion. Of course we stand a better chance of meeting with it in May, especially towards the end of the month.

About the middle of May, the handsome Swallow-tailed Butterfly makes its appearance in the fens of Huntingdonshire, down, particularly in boggy places, but by patiently watching our opportunity, we may get a chance of striking at it, or we may capture it settled, especially if after marking it down the sun should oblige us for a few moments by hiding its face. It is, as we have said, a fine insect, and though many attempts have been made to naturalise it in other localities, no satisfactory result has yet been arrived at; nevertheless we, in common with others, have met with it in a wild state on the heights beyond Dover Castle, and our capture of it is an incident in our life which will not readily be forgotten. We saw one day, four, or perhaps five, specimens upon the wing, and one of them we managed to secure at the moment that it rose from the very edge of the cliff, which at that point must have been at least 200 feet perpendicular fall, and we have since often shuddered at the peril we ran of falling over the precipice, for the recollection of a hair-breadth escape is worse than the actual danger.
SKELETON LEAVES.

LOVELINESS needs not the foreign aid of ornament;" and with this end in view, all the designs for the grouping of skeleton leaves and flowers are very plain and simple—simple in character, that is to say, but, in comparison with the apparent simplicity, exceedingly difficult in execution.

The delicate stems have not strength to support even their gossamer burdens without aid, so we must contrive to have that support as pretty and suitable as possible. The following plan is for a tall shade, one which stands eighteen inches high and measures about thirty-three inches round, the stand on which it rests being about thirty-six inches round its outer rim.

The design is for the long stems to appear to be climbing up a structure, the framework of which is made in this way:—

Take a coil of ribbon-wire, and twist it and twine it in and out, until you have made an erection fifteen inches high, dome-like in form, with a small hollow space up the centre, in fact, a counterpart of your shade in shape, only less in every way as regards size. We must seek a little aid in the way of ornament here, for the leaves would not show to their best advantage unless there was some colour in the background. The next thing to be done, then, is to transform the present common-looking trellis-work into coral, and this is much more easily and quickly done than many people would imagine, only you need not tell this to the world in general, else they will think the loss of your handiwork.

Melt a cube of white wax, and while it is in process of melting, shake into the pan a quantity of powdered vermillion, and stir it until the wax is properly dyed. Put on a pair of leather gloves for the protection of your hands, and then take hold of the wire structure in the one and an iron spoon in the other; hold the former over the pan of boiling wax, and with the latter pour the liquid over the wire. You will find that the wax cools extremely fast, so very rapidly, that, in fact, it has not time to run smoothly along, but stands transfixed on the part on which it falls; consequently there are knots and knobs all over, which give to the whole an appearance uncommonly like branches of coral.

Having covered the inner circle of the wooden stand with velvet, set on it the coral work. And now comes the most difficult part of the task. You will find this more so than the design described a while ago; for one reason of its being so, longer stems are needed to carry out the idea of their clinging to the trellis-work; and another is that here there are not so many opportunities afforded for hiding deficiencies.

A very effective plan is to put four spirals of henbane, placing them with a certain space between each at the base, and arranging them so that they gradually creep nearer one another, until they finally meet on the top of the dome. The spaces between are filled up with a variety of other light leaves and flowers, such as leaves of the musk-plant and pear-tree, hollyhock and mallow flowers.

We spoke of painted twigs as being good substitutes for the original stems, and so they are in many instances, and may be used here if you like; but I think there are some better for the purpose, as being not quite so stiff, and more natural in appearance, and as they show themselves so much, this is of consequence.

Take the branch of any large herb, such as cress after it has run to seed, bleach it as you did the leaves, and then fasten on the leaves one by one. This is done by means of isinglass which has been dissolved in gin. Use a camel-hair brush, and always begin to work from the top of the stalk. You will then find it will more closely resemble the real one; and also, as you approach its base, arrange the flowers or leaves more thinly.

When you have got them all ready, place them on the coral structure, and tie the stems to it here and there, under flower or leaf, with red silk.

If you have succeeded in skeletonising any very tiny specimens, such as the leaves of the Garden Box (Ruscus), or Butcher’s Broom (Phomias), or Jerusalem Sage, Dentia, the delicate Astrantia, the seed-vessels of the Corn-poppys, the Marsh Marigold, we red Dead-nettle, the smallest Campanula, and diminutive woolly Archangel—

if your ambition has led you to see what you can produce as specimens of the art, then 'twere a pity that they should not
show themselves, and in either of the two former methods these pigeons would be lost to view amongst those giants—quite eclipsed by their superior size; they must therefore be arranged in a little group by themselves.

The plan is this:—Take a piece of board, eight inches square, and either leave it that shape or make it round or oval—the latter is the prettiest for the purpose in our opinion—on the front of this glue velvet for the background of the bouquet; then proceed to group the specimens in the centre, laying them flat on the board, and arranging them in the same manner that you would if you were intending to paint a group of flowers for a picture, the larger leaves, etc., for the background, the more minute and delicate ones for the foreground. A very wee drop of gum is sufficient to make each specimen adhere to the velvet.

This requires a frame, which looks well made either of ebony or of common wood covered with velvet. This frame must be twice the depth of the ordinary make, or else another plain frame must come between the ornamental one and the board on which your flowers are mounted, for, remember, it is not a flat surface, like a painting or engraving. There must be plenty of space left between the group and the glass for it to show to advantage.

Only one other design have I to bring before your notice, before I make my final bow and take my departure, and that is the one shown in the illustration on page 33; and I think that you will agree with me in proclaiming it to be excessively pretty and ornamental.

Get a plain wooden cross, made like the one portrayed for your guidance, and cover it with black velvet. This part of the work must be done very neatly indeed. In the first place, the velvet must be cut exactly and evenly. A correct measurement should be made previously of the width required, and then the velvet should be stretched tightly and evenly over the wood. No wrinkles should ruffle the flat surface, and this either you will find difficult to avoid, if the material is not cut straight, and if "the right way of the stuff," as the phrase goes—that is, the selvage way—is not taken for the length.

When the cross is ready for further adornment, twist a wreath of ivy leaves around it, and let ferns lie at the base. Now how can this be done? Twigs won't bend, bleached branches will be too brittle for this purpose. We must have recourse to a species of deception and guile.

Get some very coarse crochet cotton, and stiffen it with gum. When dry, this will be pliable enough for your purposes, and will suit your requirements admirably well. Put the would-be stalk half-way up the middle rib, at the back of the leaf, and fasten it with the dissolved isinglass. The making of this wreath requires great nicety, as you will perceive, but the effect of the whole work, when completed, is very ornamental indeed.

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**CHESS.**

**By John Wisken, the English Champion.**

**The Laws—A Good Game.**

It is now time to submit to the learner the formal laws of chess. The code I append is condensed from that given in Mr. Stansons' "Chess Praxis," which is now commonly accepted. In truth, there is no authoritative code in existence. In 1882, the British Chess Association met, with the view of framing an improved set of rules; but the result was not satisfactory. Some of the alterations were the reverse of improvements. I am in hopes of inducing the Association to try again. Until a really sound code is drawn up and accepted by the chess community, we must be satisfied with what we can get.

The Laws of Chess.

1. **Position of the Board.**—If during the progress of a game either party discover that the chess board has been improperly placed, he may insist upon its being adjusted; the game to proceed from the point where the adjustment took place, as if no mistake had been made.

2. **Omission or Misplacement of Men.**—If at any time in the course of a game it be found that the men were improperly placed, or that one or more of them were omitted, the game must be annulled. (N.B.—An annulled game is to be considered in all respects as if it had never been played.)

3. **First Move and Choice of Colour.**—The right to the first move in the first game of a sitting is determined by lot. The choice of colour must be determined in the same way, if either party requires it. Unless another arrangement be made, each player has the first move alternately throughout any one sitting or match, whether the games be won or drawn. But in the case of an annulled game, the player who had the first move in that game shall also have the first move in the next.

4. **Comencing out of Turn.**—If a player make the first move when it is not his turn to do so, the game must be annulled, if the discovery be made before the completion of the fourth move. If the error be not discovered until afterwards, the game must proceed in due course. In a match an extra first move must be allotted to the player thus deprived of his move.

5. **Playing Two Moves.**—If a player in the course of a game make a move when it is not his turn to play, he must retract the last move, and, if his adversary chooses, after he himself has moved, must play the move wrongly moved, if it can be played legally. But the adversary can only enforce this penalty before touching a man in reply. If the error be discovered later, it must be rectified simply by the j'adoube (I adjust), or words to that effect. And a player who touches one of his adversary's men (under the same conditions) must take it. If in either case the move cannot legally be made, the offender must move his king, and in the event of the
king having no legal move, he must play any other man legally movable that his adversary pleases. If a player, however, touches a man in consequence of a false cry of “check!” or being checked and not apprised of it by his adversary, touches a man, he is not obliged to play it, or, having played it, may retract the move without penalty.

7. Definition of a Move.—A move is complete and irrevocable the moment the piece or pawn has quitted the player’s hand; but as long as the hand remains on the man touched, it may be played to any square it commands. This stipulation does not, of course, apply to illegal moves.

8. False Moves.—If a player move a piece or pawn of his own to a square to which it cannot be legally moved, or capture an adverse man by a move which cannot legally be made, he must, at the choice of his adversary, either

Firstly—Move his own or take the adverse man legally.

Secondly—Permit his turn to move; or

Thirdly—Play any other man legally movable which his adversary may select. Castling wrongfully is to be considered a false move.

9. Touching more than one Man.—If a player, when it is his turn to move, touches with his hand more than one of his own men (unless in castling), he must play any one of them legally movable that his opponent selects. If he touch more than one of his adversary’s men, he must capture whichever of them his adversary chooses, provided it can be legally taken. If in such case it happens that none of the men so touched can be moved or captured, then the offender must move his king, or if the king cannot legally be moved, he must play any other piece or pawn legally movable that his opponent may name.

10. Refusing Penalties.—A penalty can only be enforced before the party who has not committed the error has touched a man in reply. If the illegality be discovered at a later period, the moves must be retraced, the error rectified, and the game renewed from that point. But if the source of an illegality cannot be discovered, the game must be annulled. When the king is moved as a penalty, the party paying the penalty cannot castle on that move.

11. Check.—A player must audibly say “check!” when he makes a move which puts the hostile king in check. A player is not compelled to give check because he utters it. But if it is uttered and not given, the move on which it is uttered must be retraced and another made, if the adversary require it. If a player move his king into check; if he remove a piece which covered his king, and thereby place him in check; if, while his king is in check, he touch or move a man which does not cover the check—in each of these cases he subjects himself to the penalties laid down in section 6.

12. A King remaining in Check.—If the king of either player is placed in check, and the check has not been announced or discovered until one or more moves have been made, all moves subsequently made must be retraced, and the player who ought to have announced the check must make some other move. If the check has been duly announced, but still not provided against, the moves must only be retraced as far as that of the king, which must be placed out of check in any manner his player chooses. If the moves cannot be remembered, the game must be annulled.

13. J’adoube.—When a player touches a man for the purpose of adjusting it, and not with the intention of moving it, he must, before touching it, say J’adoube, or words to that effect. But it is of no avail to say J’adoube after the man has been touched. In that case the piece or pawn must be moved.

14. Counting Fifty Moves.—If at any period of a game one player should persist in repeating a particular check or series of checks, or the same line of play, his adversary can demand that the game shall be limited to fifty more moves on each side; and if within that limit neither party win, the game must terminate as a drawn one.

Secondly, when a player has only the king on the board, he may insist upon his adversary winning in fifty moves, or upon the game being drawn.

Thirdly, when one player has only a king and queen, king and rook, king and bishop, or king and knight, against an equal or superior force, he may insist equally upon the fifty move limit.

Fourthly, whenever one player considers that the game ought to be drawn, or that one side can force a win, the umpire or bystanders shall decide whether the fifty move limit ought to be applied; it being understood that the limit is not applicable in cases where several pieces remain on the board at the same time.

None of the foregoing clauses apply to games wherein one party undertakes to mate with a particular man or on a particular square.

15. Upsetting the Board or Men.—If the board or any of the men be upset or displaced, the pieces must be rearranged as they were when the accident took place, and the game proceed in due course. The opinion of the player who did not upset the board shall always prevail over that of the player who did. Willfully upsetting the board is equivalent to resigning the game.

16. Dropped Men.—If at any time it is discovered that a man has been dropped from the board, and moves have been made during its absence, each move shall be retraced and the man restored. If the players cannot agree as to its restoration, the game must be annulled.

17. Umpire.—The umpire shall have authority to decide any question whatever that may arise in the course of a game, but must never interfere, except when appealed to by one of the players, unless a violation of the fundamental principles of the game has taken place. When a question is submitted to the umpire or to bystanders, their decision shall be final.

Place your board and men in proper array for action, and we will play a game or two together. We will not indulge in any of the refinements of chess strategy, but work at first through a plain game, illustrative of the leading principles of chess and the chief errors to be avoided. Imagine that you are playing the white men, and that Black is conducted by some imaginary adversary.

**WHITE**

1. P to K 4

**BLACK**

1. P to K 4

It is most usual for each player to commence with this move. The game may be opened in many other ways, with more or less advantage, as we shall afterwards see; but nine persons out of ten begin thus. The advance of the king’s pawn releases both the queen and the king’s bishop, and allows the forces to be rapidly developed.

2. K Kt to B 3

2. Q Kt to B 3

By bringing out your king’s knight you attack his K P, which he prudently defends with his queen’s knight.

3. B to Q B 4

3. B to Q B 4

This is the most commanding position for the king’s bishop, since it attacks the adversary’s K B P, which, being defended only by the king, is the weakest point of his line. The opening we have selected is one of the oldest known to chess players. It involves no sacrifices or risks, leads to a rapid
development of the pieces, and generally produces solid and interesting games.

**WHITE.**

4. P to Q 3

**BLACK.**

4. K Kt to B 3

You have a wide range of good moves at this stage. You may castle, or bring out your Q Kt, or advance P to Q B 3 with the view of afterwards playing P to Q 4, and establishing your pawns in the centre. Black plays properly in getting out his K Kt as soon as possible.

5. Castles

**BLACK.**

5. P to Q 3

6. P to K R 3

Both combatants play thus to prevent the adverse Q B coming to K Kt 5, and pinning the knight. Occasionally this

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**Fig. 1.**

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You may attempt the Q Kt by K 2 to K Kt 3, whence it may often be posted at K B 5 with destructive effect. Black determines to get rid of your Q B for his Q B, but this proceeding, as we shall see, was not an advisable one.

9. Q Kt to K Kt 3

10. Kt to Q 5

You pursue the object mentioned in the preceding remarks. You now threaten P to Q B 5, to avoid which Black must take his queen away from the file commanded by your rook. For if he retreated his knight to K sq. to defend his beleaguered Q P, you would play Kt to K B 5 and Q to K Kt 4 having a terrible attack. Nor can Black move his queen to K 2, for you would immediately attack with your knight. He therefore carries her to Q Kt sq. But by so doing he removes her Majesty so far from the centre of action that he would have almost done better had he abandoned the Q P to its fate. Black indeed has a bad game, and your position is far superior.

**Fig. 2.**

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Position of the forces at this critical juncture (Fig. 1).

17. K R to K sq.

18. P to Q B 3

You defend your K P with rook in order that you may play Kt to K B 5. Black exchanges pawns, thinking that he may afterwards capture your weak Q R P. By his 18th move Black thinks not only to block up your attack upon his Q P, but also to prevent your knight going to K B 5.

19. Kt to K Kt 4

20. R takes K R

This capture by Black affords an example of the importance of avoiding all loss of time at chess. A pawn is valuable, but Black’s king is in a critical condition, and he takes no steps to
ORNAMENTAL PAPER WORK.

DEFEND him. By thus greedily snatching at the pawn, White is allowed time to render his attack irresistible.

WHITE.
21. Kt takes Kt
21. P takes K

BLACK.

The object of this sacrifice was to free your Q B without loss of time. The power of the Q B in this attack will be seen immediately.

22. Kt to K R 5
22. P to K Kt 3

If has evidently no other move to avoid mate; but if you had not taken off his knight, he could have saved himself by retreating it to K 3.

23. B takes K R P
23. R to Q sq.

WHITE.

Black evidently cannot take your knight on account of the position of your queen. But by attempting to save his rook he throws away his last chance. He should have moved B to Q sq. to avoid the check at K B 6.

24. Kt to K B 6 ch.
25. Q to K K 4

BLACK.

And you will see that Black has no means of avoiding the discovery of mate by the bishop.

Position at the close — Fig. 2.

ORNAMENTAL PAPER WORK.

By Rosa Fennell.

ROSETTES—THE PAPER—CUTTING—TOOLS—HOW TO PROCEED.

BEFORE commencing directions for different articles to be made with paper, I will describe the tools necessary for their easy accomplishment:—A parallel ruler, with a small wheel at each end, which may be purchased at any mathematical instrument maker’s. A flat ruler, with brass-bound edges, to prevent its being injured when cut against, and rendering it always accurate. A carpenter’s square, the sides of which are rectangular; consequently by placing the side against any straight line, and ruling another with the other side, two sides of a square are produced; by reversing its position, and ruling as before, a square may be made with very little trouble; and will be found very useful to make foundations for frames and boxes.

A T square (Fig. 4) for ruling parallel lines will also be found of great use, and should have inches and their divisions marked on it.

To rule parallel lines, the paper should be fastened to a drawing board, taking great care that it is fixed square on it. Drawing pins should be used for this purpose. The lines are then to be ruled by the side of the long part of the instrument, and if it be carefully moved along the drawing board the lines will be parallel; the trouble of using a parallel ruler will thus be avoided.

Common cheap penknives should never be used, as they are extremely apt to slip when used on stiff cardboard, and are dangerous. I should recommend knives of different sizes and degrees of strength; the blades should be immovable, and the most convenient shape is shown in Fig. 8.

The ruler to guide the knife should be pressed evenly and firmly on the paper, and the blade carried as close to the ruler as possible.

A pair of strong compasses, having a movable arm, with penkn, ruling pen, made of steel, a knife to fit in, are also required; the knife is used for cutting out circles, so as to avoid the unwaverness occasioned by cutting thick paper substances with a pair of scissors.

A crimping machine, fluted on one side with a roller of the same width, and with the same size flutes to match the block, will be found very handy. To crimp paper with this, place the paper on the block, then press and turn the roller over it by the handles.

I have also a little instrument, like Fig. c, which I bought at the shoemaker’s, and find it very useful for crimping.

The other necessary things will be a good well-seasoned drawing board, clamped at the edges; punches of different forms and sizes, for making holes; and a pair of small pincers, and scissors of different sizes.

I trust I have not frightened my readers by this list. Of course, many people only use a knife and pair of scissors, and yet equal in their work those who have a full complement of tools; to those I say, do notumber yourself with superfluous articles; but there are many others who require their recreations to be made easy to them, and have not the correct eye or ingenuity to do without these aids.

To such perfection can the cutting out of paper be brought, that we read in a newspaper of 1862, amongst the reviews of articles in the Exhibition, the following: — “We have enjoyed an opportunity of examining a portfolio of works, which are really works of art. They are pictures cut with a pair of scissors in black paper, with a lustrous surface. They are by M. Muratori, an Italian, and some fine specimens of this kind of work are exhibited at the Great Exhibition. It is surprising what excellent effects the taste and ingenuity of the artist has produced with the simple materials at his command. No description could do full justice to the extraordinary refinement and delicacy of these works; not only is the outline preserved, but a roundness of contour is given which is altogether marvellous, whilst all the intricacies of detail, such as the pencillings on the petal of a flower, the imbrications of leaves, the patterns on a butterfly’s wing, the muscular development of an arm or leg, or the most delicate characteristics of a feature, are rendered with scrupulous exactness. Amongst the most beautiful of the works submitted to us for examination was a group representing Brutus holding the dagger which he has snatched from Lucretia. The whole group is managed with great power. Brutus wears a stern determination in his face, worthy of the sworn destroyer of the hated brood of Tarquin. Lucretia lies cold and dead at his feet, while Lucretius the husband, Collatinus, and the other attendants, are grouped around most effectively. Another beautiful work is the portrait of the Empress Eugenie, surrounded with a
THE POPULAR RECREATOR.

marvelous framework of a thousand flowers. Another, and to
our taste the best, is the copy of a Greek festile vase, with faun
and bacchantes, rarely sculptured; the vase itself being filled
with a choice bouquet of rich blooms. The delicacy and finish
of these scissor pictures must be seen to be appreciated, and
we understand that next week many of them will be offered for
sale at the International Bazaar; which they were, and were
universally admired.

Paper rosette work being the fashion and order of the day,
from the double advantage of its being simple and inexpensive,
and, like knitting, being able to be taken up in any spare
moments without, while working it, hindering the worker from
joining in conversation, I shall commence my articles on
paper by giving full directions for it; and if these are
carefully attended to, there need be no difficulty in becoming
expert.

Many people think this a new kind of work, but, on the con-
tary, it is very old, and only revived with the great help of the
paper being ready cut for the worker, instead of her having,
like our grandmothers, to go through the tedious process of
cutting and arranging to mathematical precision the strips to
be used in its manufacture.

The rosettes are made of these strips of paper, and are used
alone, or joined to one another by the strips left after the
rosette is made being interlaced with the others intended to be
worked with it. When singly used, they are sewn or gummed
to the foundation, which should be of wood, cardboard, or any
material suited to the purpose; this foundation should always
be chosen so as to make a good contrast to the rosettes em-
ployed, such as black upon white, or scarlet upon black. As I
said before, the art of making these rosettes is, with a little
patience, easily acquired; but I should recommend that the
foundations should be procured ready traced.

Roses are sometimes made of ribbon, arranged upon a
foundation covered with velvet or silk, and produce a very
pleasing effect.

I will first show my readers how to stain and varnish the
paper, which is sometimes needed to be done, to use up any
soiled paper that has become so in its manipulation, and also
to produce variety in the points. To stain, it is well to cut
your paper in strips the length required, and lay them on a
board or dish; the latter is best, as it does not absorb the
stain; then apply the colour with a large camel’s-hair brush
quickly and evenly, taking care to let the stain be of an equal
depth of colour all over; turn your paper, and do the same on
the other side, and hang the strips up to dry.

To varnish your rosettes, they must be first made and ar-
ranged in the form they are to remain, before applying the
varnish, which must be very carefully allowed to dry in some
place where it will be quite free from dust. I have seen some
very pretty frames, which it would be difficult to tell from
leather work.

I will now describe how to make the rosettes, and should
advise the worker, in the first instance, to make one of
each of the different widths of paper, so that at any time
she may know by the size of the rosette wanted the width
of paper to use.

These pattern rosettes should be carefully kept in a box,
from the other work, and labelled with the length and
width required to make them.

To work a rosette, take four strips of paper, of exactly the
same width and length (about eleven inches), double them
almost in half, so that one end may be about an inch and a
half longer than the other; cut the ends to a fine point, which
will enable them to be threaded through easily. These
strips should then be numbered or lettered on both sides of
each end.

Now take strip A, and holding it in your left hand, with
the ends towards you, and the short end at the top (see Fig. 1), pass
strip B through it from left to right (see Fig. 2); leave a loop
with it on the left hand side of A, through which pass strip C
(see Fig. 3); leave a loop in c the same as B; take the strip D,
pass it over A and through the loop formed by c (see Fig. 4).
Now draw them up carefully, and you will find you have a nice
square centre; and at this stage of the work all the short
ends should be uppermost. Now fold B over c, c over D,
and D over A, pass A under loop of B (see Fig. 5). You will now
again have a square centre; but instead of the short ends being
over the long ones, they should stand out separately. This
part finishes the foundation of the work, and the next proceeding
will be to make the points. They are begun with the short ends
thus: Fold under short strip D, so as to form a triangle (see
Fig. 6); then fold again, so as to form another triangle by the
side, as in Fig. 6; and double the triangles so formed over one
another, so as to form a point, and slip the end under A. The
working of it is seen in strip B. Repeat this for all the short
ends. Should the rosette be intended to be used separately, the
short ends should now be cut off (see Fig. 7); but if used for
baskets, hats, or crosses, they should be left for lacing them
together.

The work must now be reversed, so as to have the long ends
uppermost. Let the little squares on this side to correspond
with the long ends; the right hand square at the top mark A,
as strip A should be at the top, D to the left of A, C under D,
and B under A. You now work the long ends in exactly the
same manner as the short ones. Commence with A, which fold
under to the left, then fold it towards you over the triangular
point and the long end B, and parallel with the squares A and
B. Cross the fold firmly, then fold the edges of the triangle
together, leaving the long end flat over squares A and B.
Raise the long end and slip it under the square A, drawing
it through carefully, so as not to break the paper, or draw the
point through (indeed, all through this work great delicacy
of handling is required, so as not to tangle or crease the paper).

Turn your work round, and work end D next in the same
manner. It should lie parallel in the first place with the two
points to the left of the square, then folded parallel with squares
D and A, and passed through square D. Turn back the end
out of the way when finished. Work strip C, fold as before,
and bring it out above square A. Then
work B in the same manner. This completes the points; and
from the right side of the work you will only see four of them,
as the long ends will lie over the others. Now comes the
part of the work which many find the most difficult—the centres.

Hold the rosette in the left hand, and with the right one
take the long end from under A, bring it sharply round so as to
make it curl, and insert it under B; push it gently, until the
point comes out in the middle of the triangular point D. Now
take the end D, and loop it in the same way under C; B goes
under A; and the end A under D, which is already covered with
a point.

When they are not to be joined, the ends should be
cut off, and a little bit of gum inserted under each, to give
additional strength and firmness to the work. Should a double
rosette be wished for, the short ends left from the first
points made should be twisted round and inserted under the
point next them, when they will form four extra loops (see
Fig. 10).

If a different colour for the centre is desired, after you have
finished all the points, cut off the long ends, take four strips of
the colour chosen, and having pointed them at one end, put a little bit of gum on the other, and slip them under where each length has been cut off, and when dry, complete the centre as before given.

A pretty change may also be made, by folding a piece of paper of a different colour, and fixing it between the loops (see Figs. 11 and 12).

This work is more especially suited for church decorations, as the rosettes can be stitched on to baiZe or other foundations, and can be re-arranged from year to year, only needing a fresh coat of varnish to render them fresh-looking as before; for this purpose cartridge paper should be used, as it is much cheaper, and if care is taken, may be cut very easily.

To do this, take a pair of compasses, open them to the width required, hold them firmly, and keeping one foot outside the cartridge paper, draw them along, and the other foot will make an indentation; or a piece of pencil may be screwed into the arm of the compass, which will draw a line; afterwards cut off the strip with a sharp pair of scissors.

Many cover the foundation of their work with kid or leather; this should be dampened before applying, and then carefully glued on, without creases. Powdered t alc or glass sprinkled over the rosettes while wet with the varnish, gives a very pretty and glittering appearance, but should not be used where the work will have to bear much heat; the rosettes so ornamented are very pretty for cardboxes, baskets, etc. A very pretty frame can be made, without any cardboard foundation, in the following manner — A piece of glass must be procured, exactly the size of the object to be framed, and the two must, with a piece of cardboard to back it, be carefully bound together with brown Holland tape, which should be carefully cemented, so as to exclude the dust; this being done, and the rosettes all joined in the right shape, they should be glued on the glass.

If an Oxford frame is intended, the rosettes that project should have a small strip of stiff cardboard slipped through the loops.

The purposes for which the paper rosettes can be used are too numerous to mention. I saw the other day a very elegant box, made from a foundation of an old cigar-box, lined inside with plaited paper (see Fig. 13), which is merely done by putting one strip over and the other under every row, reversing every other; the inner edge was finished off with the plaiting (Fig. 14), fastened down with tiny drawing pins.

The outer plaiting was done in the following manner: Cut a piece of paper, coloured or white, the dimensions you design the

size of your box to be. Then take a ruler and very light pencil, and mark off a margin or edge on every side. Draw horizontal lines at about the distance here indicated | | | from each other, the long way of the mark, taking care that they are quite even.

You will now require a very sharp penknife and a brass-edged ruler, to cut the pencilled lines through. Take then some strips of a different colour, exactly the same width as the lines cut in the foundation paper, and long enough to cross it the narrow way. Then plait them in and out of the lines cut in the —

First row.—Commence from top left hand corner (see Fig. 15), put the paper under the first cut line, over one, under one, over one, over one, over one, under one, over one, over one; continue from *.

Second row.—Draw the paper under the fourth cut line, over one, under three, over one, over one, over one, over one, over one, over one; continue from *.

Third row.—Commence under the third line, over one, under one, over one, under three, over one, over one, over one, over one; continue from *.

Fourth row.—Commence under second cut line, over one,
Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.

Fig. 8.

Fig. 9.

Fig. 10.

Fig. 11.

Fig. 12.

Fig. 13.

Fig. 14.

Fig. 15.

DESIGNS FOR PAPER ROSETTES.
JOINERY AS A RECREATION.

By Ellis A. Davidson, Author of "Drawing for Carpenters and Joiners," "Drawing for Cabinet-Makers," "Happy Nursery," etc.

TO MAKE A SMALL STEP-LADDER.

"Mary," asked a lady of her servant, "how is it that all the French polish is scratched off the chairs in the hall?"

"Don't know, I'm sure, ma'am; it has been so this long in the school-room, and I put one chair on another, and it slipped off and I fell down, that's all. You know we haven't a step-ladder."

"John," says the good wife, "when will you hang up that while," said Mary; but the real reason was that Mary used the chairs to stand on every night whilst lighting the hall lamp. There was not a small step-ladder in the house.

"Tommy, how did you come by that bruise on your forehead?"

"Please, pa, I only wanted to get something off the top shelf new engraving? it is of no use having had it framed and then letting it stand in a corner against the wall."

"Oh!" says the devoted husband, "I will ask neighbour Jones to lend me his nice little step-ladder, and then I'll do it in 'no time.'"
Now, all these little inconveniences—the polish-denuded hall chairs, Tommy's bruised forehead, and the agitated wife—are all the result of one thing, the want of a small step-ladder.

So let us to the rescue. Let us show how to make the much-needed article. Then we can climb up our way rejoicing, and consider ourselves public benefactors.

In accordance with our usual custom, we give in Fig. 1 a full-length portrait of the step-ladder completed; but before it reaches this climax it has to pass through many intermediate stages. So we must begin at the beginning, and must call in the aid of Fig. 2, which represents one of the sides.

As this is to be only a light and small step-ladder, this side—or rather these sides, for two of them will be required—will be made of "stuff" four inches wide and one inch thick. They must be cut slantingly at the bottom and top, and all the steps and the top must be parallel to the bottom line, A B.

Now as to the height. Well, of course, that depends on the size you intend your ladder to be. We wish for only a small and light one, so our measurements are as follows:—From the ground to the first step twelve inches, then five steps of one inch each, and five spaces of nine inches each; and thus the total length of the sides is to be five feet two inches.

Mark the places for the steps, as shown in Fig. 2, and saw them about three-eighths of an inch deep, removing the wood between the saw-cuts, so as to leave grooves of the depth mentioned.

Now in certain of these grooves, as at C D E (or more in a larger ladder) cut a hole quite through the wood, for a purpose of which we shall speak presently.

In sinking these grooves, having made two cuts with your tenon saw to remove the wood between them, use your chisel, using it with the slanting side of the edge downwards, by which means it is prevented sinking deeply into the wood. The bottom of the groove should be quite smooth and free from all chips and inequalities, which would interfere with the accurate fitting of the steps.

The front of the step-ladder is to be wider at bottom than at top, and the proportions will be best understood if we say that the lower step is to be fourteen inches, and the upper one twelve inches, this length including the tenons which will be embedded in the sides when the whole is made up, and let us set about putting it together as far as we can.

The upper and lower steps, then, and several intermediate ones, if the step-ladder is a large one, are to be cut at the end so as to form a tenon (shown in Fig. 3) and these are to be inserted in the holes cut to receive them in the sides. When the top and bottom steps are ready, put them in their places—that is, put the front together temporarily—and this will enable you to measure the exact lengths for the intermediate steps, and in doing this you must bear in mind that the steps which are to be tenoned into the sides must be measured the full width across, at their proper height, including the thickness of the sides, whilst the intermediate steps must be only the width at their particular height, of the space between the sides with the addition of three-eighths at each end for the depth of the grooves into which they are to fit. The steps should all be about an inch wider than the sides, and this extra width should project in the front, the edges being rounded and the ends chamfered off.

The measurements then being settled, take the frame to pieces again, and place in it all the tenoned steps, then make up again as before, but this time for a permanency.

Place the frame on its side, and, with the chisel, split the tenons a short distance down, and into the clamps thus made drive a couple of wooden wedges, to be cut off close to the surface when driven far enough, a couple of good nails are then to be driven through the sides into the length of the steps. Great care is necessary in driving these nails; so that they may be of service, they must run in the middle of the thickness of each step, and the point must not protrude on the upper or under side.

Should a nail by some misfortune run slantingly, it must be driven back by striking it on its point with the hammer until the head can be gripped by the pincers, and the offender thus drawn out to be succeeded by another, which may travel in a more correct path.

When the tenoned steps have been thus secured, the others are to be slipped into their places, and nailed in the same manner as the tenoned ones.

The top is now to be made and nailed on. It should project an inch on each side, one inch in the front, and two inches at the back.

The back piece marked A in the sketch is made of wood one inch thick and seven inches broad; it is to be the width of the step-ladder at the top, and should be cut accurately to the shape, and planed neatly at the edges.

This piece must be firmly nailed or screwed to the body of the ladder, as to the back, which is the support when in a slanting position, will be subsequently attached.

The back-stay is to be made of wood two and a half inches wide and one inch thick, it consists of two long and two short pieces, which latter must be mortised into the former, the upper cross piece must be at least four inches wide. The back-stay is to be of the same general shape as the step-ladder itself, viz., broader at bottom than at the top.

When the two parts of the step-ladder thus described are ready, they are to be connected by hinges, which should be of the long kind shown in Fig. 4, and should be attached by means of screws to the long pieces of the back-stay of the step-ladder.

The back-stay should be about four inches shorter than the ladder itself.

It will now only remain to attach ropes to prevent the step-ladder spreading too widely open; to do this, holes must be bored in the sides and in the back-stay, as shown in the sketch, and a piece of rope about two feet long must be passed through the holes on each side, a knot being made at each end.

This will, no doubt, have been so often seen, that no further description will be necessary.
PHOTOGRAPHY.

By J. C. Leake.

HOW TO PRINT—MATERIALS.

Having by this time mastered the somewhat difficult process of making a negative picture, and having duly overcome the various vexations failures which must of necessity be encountered in so delicate a process, it will be with great relief that we turn to one which is not only of a more simple and easy character, but which will provide for us a series of pictures in their own proper light and shade.

It must not be supposed however, that the process of printing may be conducted carelessly, or without due regard to the fact that, as in the collodion processes before described, the chemical reactions are exceedingly delicate; and where the best results are desired, every part of the process must be conducted with the utmost care and cleanliness, and with delicate and careful manipulation. Yet, upon the whole, the printing process is a comparatively simple one, and one which may easily be mastered by a little patient attention.

There are many ways of producing a print from a negative impression, some of which are of a very complex character; but these we shall pass over for the present, and confine our remarks to the one most usually employed, which is capable of yielding the most exquisitely beautiful results, if properly managed.

Of course, a photographic print may be made simply by washing over the surface of the paper with—first, a five-grain solution of common salt; and, after drying, again floating it upon a thirty or forty-grain solution of nitrate of silver; but it is generally felt that the prints produced in this manner are wanting in depth of tone and brilliancy. In order to overcome this, it is usual to employ a paper which has received a coating of albumen, or white of egg, which not only improves the surface and renders it capable of receiving the more delicate shades of the negative, but at the same time increases in a remarkable degree the depth of the impression and improves the colour of the print. It may in fact be said that the process of printing upon albumenised paper is the best and most generally useful of all the photographic printing processes.

As we endeavoured at the outset, in describing the collodion process, to briefly explain in outline what would occur in making a negative upon collodion, so we may now furnish in a few words a simple explanation of the printing process, as we have found that it is in all cases better to understand what we are aiming to effect than to go blindly on without really knowing what we are about. Briefly then, the photographic printing process is based upon the fact that chloride of silver becomes rapidly darkened upon exposure to light, at any rate when in combination with some organic matter, such as albumen, or when there is present an excess of nitrate of silver.

Bearing this fact in mind, it will be observed that if we can obtain a layer of this sensitive salt upon or in the paper, when we place our negative upon it, and expose it to the light, it will become darkened in the exact degree in which it is projected or the reverse by the negative impression, and if, when sufficiently impressed, we can remove that part of the sensitive film which is unaltered by light, without destroying the darkened part, we shall have rendered our picture permanent, and the work is accomplished.

It was at this point that the early experimenters failed. Very many photographs were made years and years since. Even the old alchemists knew that chloride of silver became blackened by exposure to light; but the first attempt to employ this fact in the production of pictures was made by Wedgwood and Davy as far back as 1802. These gentlemen failed, however, in properly fixing the impressions produced by light; and it was only upon the discovery of the power of the salt known as the hypo-sulphite of soda to remove the unaltered sensitive salt, that photography could be said to have become an established fact, and could take its position as an art.

To return to our subject, however—although we shall work with widely different materials to Wedgwood and Davy, the principles are the same. We take a sheet of paper coated with albumen, in which is dissolved a chloride, say chloride of sodium, or common salt; when dry, this sheet is floated upon a solution of nitrate of silver, and chloride of silver is formed, which is our sensitive film. The paper is pressed into close contact with the negative, and exposed to the action of light, and when sufficiently printed, is removed and immersed in a solution of hypo-sulphite of soda, which dissolves out the unaltered or undarkened sensitive layer of chloride of silver, leaving a permanent impression formed by the darkened chloride. This is the principle of all silver-printing processes; and, bearing this in mind, we may proceed to the more practical part of our work, that of making pictures. For this purpose we shall require several fresh pieces of apparatus, but fortunately these are of a simple and inexpensive character, and for the most part may either be made by the operator for himself, or purchased at a small cost.

The first thing required will be a printing frame, for bringing the negative and sensitive paper into contact. This frame may either be one having a plate of glass, upon which the negative is to be laid, with a hinged back to allow of the examination of the print as the work proceeds, or one of a more simple character, without a glass. As our first negatives are small, we prefer the latter; and upon enquiring at our dealer's we find that one suitable for the size of our negatives can be procured for about one shilling and sixpence. This consists of a simple frame of deal, having a rabbet to hold the negative, and into which is fitted a hinged back covered with cloth. The back is kept in contact with the negative by means of two brass springs, which are secured at one end by a screw, and fit into hasps at the other. Beside this we shall require several dishes for holding the various solutions; but as we can subsidise the pastry for some of these, we only purchase one flat porcelain tray of sufficient size, and about one and a half inches deep, which we intend to keep solely for the purpose of holding the nitrate of silver solution employed to render the paper sensitive. This will cost about one shilling and sixpence. The materials we require will be: first, one ounce of nitrate of silver, price four shillings; then one tube of chloride of gold, containing fifteen grains, two and sixpence; one ounce of acetate of soda, sixpence; one pound of hypo-sulphite of
soda, sixpence; and three sheets of albumen paper, one and sixpence. This would be sufficient to produce some dozens of pictures; but we must be careful not to waste our gold and silver solutions, as they may be used over and over again.

Upon our arrival at home we proceed to cut our paper into sheets of the required size, using for this purpose a paper knife of bone or wood—as metal would probably spoil it—and place it in a book or portfolio where it may be kept flat, taking the greatest care not to touch the albumenised or glossy side with the fingers, or stains would result in the finished print.

We then dissolve the ounce of nitrate of silver in twelve ounces of distilled water, and place the bottle, labelled, "Sensitising solution for paper," upon our chemical shelf. The tube containing the chloride of gold we break, and placing it in a small bottle, we add to it seven and a half ounces of distilled water. The acetate of soda we dissolve in one quart of common water. Into a clean bottle we pour one pint of the acetate of soda solution, and add to it two ounces of the chloride of gold solution. This mixture we call the toning bath. The last solution required is that of the hyposulphite of soda, and to half a pound of this we add one quart of common water. We label this, "Fixing solution—dangerous," for we must remember that if the slightest trace of this be by any mischance carried either into our paper, or into any of our solutions, the result will be the certain and inevitable failure of our operations.

We now borrow from domestic sources one or two flat dishes, and, having a supply of water at hand, are ready for work; but as our toning bath will not be fit for use for twelve hours, we defer our printing operations until the morning.

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BILLIARDS.

BY A. G. PAYNE. B.A.

RULES OF POOL.

There have been supplied what we believe to be a great want among billiard-players, viz., a set of rules to be observed at pool. Unfortunately, the old set of rules which are usually found framed and hanging on the sides of ordinary public billiard-rooms, and which generally bear the name of some firm of billiard-table makers, differ so materially from the game of pool as usually played in the leading London billiard-rooms, that for all practical purposes they are useless. We will mention a few instances, as possibly some may feel inclined to question our statement. For instance, suppose a player, say the red, plays on the white ball, which is over the pocket, and puts it in, but in doing so makes a foul stroke, i.e., he hits another ball with his cue, he cannot take a life, and yellow plays on. But in no billiard-room that we know of would the marker take out the white ball and re-place it on the original spot over the pocket. Should he do so, and the owner of the white ball naturally object, he might claim that he was only acting in accordance with the rules. A rule (generally No. 16) states: "If the striker should move his or another ball in the act of striking his own ball, the stroke is considered foul; and if by the same stroke he pockets a ball, or forces it off the table, the owner of that ball does not lose a life, and the ball must be placed on the original spot; but if by that stroke he should pocket his own ball, or force it off the table, he loses a life."

Now this rule implies, for one thing, that a life is lost by a ball being knocked off the table, although the set of rules in question simply state that "a life is lost by a ball being pocketed." Now in very few rooms is it the rule that the striker takes a life by knocking another ball off the table; on the contrary, we know of one large London billiard-room where it is the rule that if the striker knocks a ball off the table he himself loses a life. Again, these rules state that if a player makes a hazard by means of a foul stroke, he cannot take a life; but there is no rule defining what a foul stroke is. It is in fact presumed to a great extent that many of the rules of billiards extend to pool, but this should be distinctly stated if it is wished to avoid disputes.

Now the old rules of billiards define foul strokes as follows: "Note 1. It is called a foul stroke if the striker moves a ball in the act of striking; or if he plays with the wrong ball; or if he hits his own ball twice in playing; or if he strikes a ball whilst it is running; or if he touches another ball; or if his feet are off the floor when playing; the penalty, etc."

The modern championship rules have in addition the following rule, which we have incorporated into the pool rules, it being the general custom observed in most London public billiard-rooms: "If when moving the cue backwards and forwards, and prior to a stroke, it touches and moves the ball, the ball must be re-placed to the satisfaction of the adversary, otherwise it is a foul stroke; but if the player strikes and grazes any part of the ball with the cue, it must be considered a stroke, and the opponent follows on. At present we believe it to be the general rule in London to allow a man to move his ball back if he has accidentally touched it whilst taking aim; on the other hand, the general rule in the country is to call it a foul stroke. What we fear will be the least popular addition or alteration is the rule respecting when it is allowable to have a ball up."

The old rule in this respect was, that a ball could never be taken up unless it was nearer to the striker's ball than the object ball. An amended rule of later years was, "When a ball or balls touch the striker's ball, or are in a line between it and the ball he has to play at, so that it will prevent him hitting any part of the object ball, they must be taken up until the stroke be played; and after the balls have ceased running they must be re-placed."

We believe that the original intention of this latter rule was to allow a ball to be taken up whether the nearest or not, which is the reason the words are printed in italics; but as we know for a fact that in spite of this rule being known many questions have been addressed to newspapers to decide disputes on this very question, we have thought it advisable to insert the words, "whether nearer to the striker's ball than the object ball or not," which at any rate removes any ambiguity.
We believe the rule to be a good one for the reasons—first, that it is a simple one; second, that it avoids disputes. Suppose, for instance, under the old rule a ball lies over the middle pocket with another ball close to it, but not the nearest ball, and therefore which cannot be had up, and there is in billiard language a cut on, the striker plays, and some one instantly says, "Ah, you hit the other ball first!" A dispute as to this fact, which no newspaper can possibly decide, then arises.

Now, no doubt many players will say, "Oh, but you can always tell which ball was hit first by the run of the balls." This we grant, but would remind them that this case we speak of—viz., one of disputes—generally arises where the people are not players. No reasonable man would doubt Cook or Roberts' decision, but many would that of an ignorant marker who can barely read the rules at all, and who never made twenty off the balls in his life.

The only absolutely new rule we have introduced is, that the striker loses a life if he touches his ball before it has done rolling. A little consideration will, we believe, induce many to acquiesce in this addition to the rules of pool. It should be borne in mind what is the object of a written code of rules. Some perhaps will hastily answer, to prevent cheating; to him we answer, No. Our opinion on this point has, however, been so admirably stated in "Cavendish on Whist,"* that we will take the liberty of quoting what he says on the subject, altering the word "card" to "billiard."

"Billiard laws are intended to effect two objects:—1st. To preserve the harmony and determine the ordering of the table; such, for example, as . . . etc. 2nd. To prevent any player from obtaining an unfair advantage."

The word 'unfair' must be taken in a restricted sense. It does not mean intentional unfairness. This is not to be dealt with by laws, but by exclusion from the billiard-room.

"In deciding cases of billiard law, the offender should be credited with bona fide. It follows from this that offences should not be judged by the intention of the player, but by the amount of injury which his irregularity may inflict on the opponent. In a perfect code there should be a penalty for all errors or irregularities, by which the player committing them, or his side, might profit; and, on the other hand, there should be no penalty for errors by which he who commits them cannot possibly gain an advantage."

The evident possible advantage to be derived from stopping a ball before it has done rolling is that it may have been stopped from running into a pocket. Any penalty, therefore, less than that of losing a life would be inadequate.

Again, no possible advantage can be gained by knocking the object-ball off the table, the possibility of losing a life, as played in some rooms, seems to us unnecessarily severe.

Again, in having a ball up when it is in a line, or interferes with striking the object-ball. The one clear principle is, that the striker is not to be baulked either by having balls in the way of his arm or cue, or of the object ball; yet, by adhering to the old rule, it would be very easy to place the balls so that the striker has to choose between hitting the wrong ball first, on the one side, or running into the pocket on the other.

We hesitated as to the advisability of making another new rule, viz.—Should any player, when a proper marker is present interfere and call the wrong game, he loses a life. Those who have played pool for many years will recollect having often met in the course of their lives that public nuisance in a billiard-room, viz., the man that will interfere. We will quote a harmless case in point. We once recollect a large pool, as it contained a "spot red." Yellow had to play on blue; the nearest ball, red, having run in. The marker called the game correctly—"Yellow on blue; green, you're playing," but the owner of the blue ball, who had been looking out of window, suddenly turning round, and seeing, as he thought, yellow playing at the wrong ball, in all good faith said (though he was over a pocket), "No, no! yellow on red," the spot red being close to the blue ball. Yellow, unfortunately, before any one else could stop him, played at "spot red," the wrong ball. What then could be done in such a case? Who was to blame? Could any code of rules ever be drawn up to meet such cases? Our own opinion is that the balls ought to have been re-placed, and that yellow would be entitled to take a life off blue if he could. Questions such as these are hard to decide; but as a rule the general principle that the one who causes the confusion should be the one to suffer, is the sound one; and we fully agree with "Cavendish," that, "Questions of interpretation of law should be decided liberally, in accordance with the spirit rather than the letter of the law." Unfortunately, it is difficult to discover what the spirit is that has hitherto guided billiard laws.

There are several ways of playing pool; namely, with as many balls as there are players; or with two balls only, the players playing in turns, and playing with the alternate balls; playing at the nearest ball; playing at the last player; or the player playing at whichever ball he chooses. But the most popular mode is that in which the player plays at the last player. This is likewise the fairest way of playing the game.

The following are the rules for playing the game according to this last method:—

1. When coloured balls are used, the players must play progressively, as the colours are placed on the pool marking-board, the top colour being No. 1.
2. Each player has three lives at starting. No. 1 places his ball on the spot; No. 2 plays at No. 1; No. 3 at No. 2, and so on, each person playing at the last ball; unless it should be in hand, then the player plays at the nearest ball.
3. If the striker should lose a life in any way, the next player plays at the nearest ball to his own; but if his ball be in hand, he plays at the nearest ball to the centre of the baulk line, whether in or out of baulk.
4. Should a doubt arise respecting the distance of balls, it must (if the player's ball be in hand) be measured from the centre spot on the baulk line; but if the striker's ball be not in hand, the measurement must be made from his ball to the others; and in both cases it must be decided by the marker, or by the majority of the company; but should the distance be equal, then the parties must draw lots.
5. The baulk is no protection to pool under any circumstances.
6. The player may lose a life by any one of the following means—by pocketing his own ball; by missing a ball; by forcing his ball off the table; by playing with a wrong ball; by playing his ball out of turn; by striking any ball before hitting the one he ought to have played at; or by stopping or touching his own ball before it has done rolling.

N.B.—A life is lost by a ball being pocketed.
7. Should the striker pocket the ball he plays at, and by the same stroke pocket his own, or force it over the table, he loses the life, and not the person whose ball he pocketed.
8. Should the player strike the wrong ball, he pays the same forfeit to the person whose ball he should have played at, as he would have done if he had pocketed himself.
9. If the striker misses the ball he ought to play at, and strikes another ball, and pockets it, he loses a life, and not the person whose ball he pocketed; in which case the striker's ball

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* London: De la Rue.
must be taken off the table, and both balls should remain in hand until it be their turn to play.

10. If the striker, whilst taking his aim, inquires which is the ball he ought to play at, and should be misinformed by any one of the company, or by the marker, he does not lose a life; the ball must, in this case, be re-placed, and the stroke played again.

11. If information is required by the player, as to which is his ball, or when it is his turn to play, he has a right to an answer from the marker, or from the players.

12. When a ball or balls touch the striker’s ball, or are in line between it and the ball he has to play at, so that it will prevent him hitting any part of the object ball, whether nearer to the striker’s ball than the object ball or not, they may be taken up until the stroke be played; and after the balls have ceased, running they must be re-placed, but a ball cannot be taken up in order to strike a ball off the cushion, except in the case of Rule 27.

13. If a ball or balls are in the way of the striker or the striker’s cue, so that he cannot play at his ball, he can have them taken up.

14. When the striker takes a life, he may continue to play on at the nearest ball as long as he can make a hazard, till the balls are all off the table; he then places his ball on the spot, as at the commencement.

15. The first person who loses his three lives is entitled to purchase, or, as it is called, to star, (that being the mark placed against his lines on the board that he has purchased), by paying into the pool the same sum as at the commencement, for which he receives lives equal in number to the lowest number of lives on the board.

16. If the first person out refuses to star, the second person may do it; but if the second refuses, the third may do it; and so on, until only two persons are left in the pool, in which case the privilege of starring ceases.

17. Only one star is allowed in a pool.

18. If when moving the cue backwards and forwards, and prior to a stroke, it touches and moves the ball, the ball must be re-placed, otherwise it is a foul stroke. Should the striker pocket a ball by a foul stroke, the owner of that ball does not lose a life, but the ball remains in hand until it is his turn to play; but should the striker by a foul stroke pocket his own ball, or force it off the table, he loses a life.

Foul strokes are made thus:—By striking a ball twice with the cue; by lifting both feet from the floor when playing; by touching another ball, either in the act of striking or before the balls have done running; by playing before the balls have done running.

19. If the striker’s ball touches the one he has to play at, he is at liberty either to play at it, or at any other ball on the table, and it is not to be considered a foul stroke; however, the striker is liable to lose a life by going into the pocket or over the table.

20. After making a hazard, if the striker should touch his ball or stop it before it has done running, he cannot claim the life or the hazard from the person whose ball was pocketed, but loses a life himself; it being possible that his own ball might have gone into a pocket if he had not stopped it.

21. If before a star two or more balls are pocketed by the same stroke, including the ball played at, each having one life, the owner of the ball first struck has the option of starring; but should he refuse, and more than one remain, the persons to whom they belong must draw lots for the star.

22. Should the striker force another ball off the table, neither he nor the owner of that ball lose a life, but the ball remains in hand until it is his turn to play, and the next player plays on; but should the striker force his own ball off the table he loses a life, and the next player plays at the nearest ball.

23. Should the striker’s ball stop on the spot of a ball removed, the ball which has been removed must remain in hand until the spot is unoccupied, and then be re-placed.

24. Should the striker’s ball miss the ball played at, no person is allowed to stop the ball till it has ceased running, whether it has struck another ball or not, except the striker, who may stop the ball when he pleases.

25. If the striker should have his next player’s ball removed, and stop on the spot it occupied, the next player must give a miss from the baulk to any part of the table he thinks proper, for which miss he does not lose a life.

26. If the striker has a ball removed, and any other than the next player’s ball should stop on the spot it occupied, the ball removed must remain in hand till the one on its place be played, unless it should happen to be the turn of the one removed to play before the one on its place; in which case that ball must give place to the one originally taken up; after which it may be re-placed. Should two balls be taken up from the same spot, the one last taken up has to be re-placed.

27. If the corner of the cushion should prevent the striker from playing in a direct line, he can have any ball removed for the purpose of playing at a cushion first.

28. The two last players cannot star or purchase, but they may divide, if they are left with an equal number of lives each; the striker, however, is entitled to his strokes before the division.

29. All disputes to be decided by the majority of the players.

30. The charge for the play to be taken out of the pool before it is delivered up to the winner.

COLOURING PORTRAITS.

By the Author of "Harmonious Colouring as Applied to Photographs," "The Art of Miniature Painting," etc.

WATER COLOURS (concluded)—DRAPERIES—JEWELLERY—BACKGROUNDs—LANDSCAPE AND PICTURESQUE EFFECTS—DRAPERIES.

CHARACTERISTICS OF DIFFERENT MATERIALS.—In colouring draperies carefully endeavour to preserve their different characteristics. The glossy silk, which, being thin, breaks up into small narrow folds with sharp breaks, long narrow loops, and well-defined brilliant high and reflected lights, must not lose these characteristics in the colouring; nor must the broader and more massively rounded folds, and the softer and less brilliant high and reflected lights of thicker fabrics, such as satin and velvet or woollen cloth, be misrepresented, as in the absence of proper care they very readily may be.

Colours.—In selecting the colours for draperies you will of course bear in mind the hints you received when we were speaking of harmonies and contrasts of colours (p. 306, Vol. I). Very light delicate draperies should not be associated with dark swarthy complexion, to which dark blues and greens would give freshness and richness. A skin unduly red will appear even
more red if associated with bright green drapery, and one
unduly yellow will of course have its effect rendered more
apparent if the drapery colour is the complementary of yellow.

Blue Drapery is very apt to be displacing in a portrait,
unless, as in the case of Gaugin’s “Blue Boy” (a sketch
of which I gave on p. 185, Vol. I.) it is surrounded with masses
of warm rich colour. French blue and cobalt are the pigments
most generally used for blue drapery. Always warm the
shadows of this drapery by giving them a tinge of vandyke or
some other warm brown, and by stippling into them a little
crimson lake. Reserve your most brilliant touches of blue for
the high lights only.

Scarlet Drapery.—It is sometimes difficult to get scarlet
sufficiently bright over the dark colours of the photographic
drapery. The better plan is to carry over it a strong tint of
cadmium, over which use scarlet vermilion, and hatch and
stipple it up with gamboge mixed with carmine. For the
shadows use crimson lake; for the high lights use first
Chinese white—thinnily—and over it scarlet vermilion.

Black Drapery.—A rich transparent black, suitable for
washing, hatching, and stippling over the dark tones of the
photographic drapery, may be made with lake, sepia, and indigo,
which will be brownish or coldly black, according to the larger
or smaller proportion of the indigo. For high lights add to this
a very little Chinese white, with an additional touch of blue.

Compound Colours.—In mixing colours for drapery the
experience you gained with the colour circles (p. 229, Vol. I.)
will enable you to very readily imitate any piece of drapery
which may be placed before you.

Gold.—For gold lace, epaulettes, watch-chains, etc., use
Roman ochre, with burnt umber for the shadows, and for the
high lights a little pale chrome yellow.

Reflected Lights of Drapery.—The reflected lights which play
so beautifully a part in Nature, softening shadows, and giving
roundness, depth, and transparency, being always more or less
subtle and delicate, are not often registered in photographs,
which, in their relative scales of tones or hues, are seldom
faithful to the less prominent effects of Nature’s light and
shade. Therefore, remember, in painting drapery, that if
reflected lights are not in the photograph, there they certainly
ought to be. With regard to the reflected lights of drapery,
we need only point out that woolen and such fabrics receive
weaker and less defined reflected lights than satin or silk
draperies, the sheen of which enables them to catch the re-
lected rays more strongly. Dark woolen cloths have reflected
lights so weak that they are scarcely visible. By-the-by, as
the colours of reflected lights depend upon the colours of the
surfaces from which they are reflected, and these surfaces are
frequently not seen in the picture, we have here the means of
introducing warm colours on cold draperies, or introducing
other effects.

Velvets.—The rich pile of velvet gives it a peculiar char-
acter, which, once caught, is very easily imitated. It absorbs
the reflected light, and its high lights, falling where the rising
folds in turning over expose the pile to catch the light, are
consequently seen, where in another material you would not
look for them.

White Drapery.—Mix with a touch or two of Chinese white
a little cobalt and raw sienna, and wash this over the whole of
the drapery. Add to this a little ivory black, and strengthen
the shadows, into the darkest parts of which stipple a delicate
tone of burnt sienna. Keep the reflected lights warm with a
little Chinese white and Roman ochre. Finish with touches of
ivory black and burnt umber, stippled over with a little burnt
sienna and lake, to give crispness, richness, and increased
warmth of effect in the darkest touchings and markings. As a
rule, where the lights and half-tints of drapery are cold in
colour, as they are in white and blue drapery, the shadows
and half-shadows should be warm.

Yellow Drapery.—Indian yellow or gamboge are the colours
most used for yellow drapery, with burnt sienna for the
shadows, and vandyke brown for the darkest parts.

BACKGROUND.

As I have already given the main principles to be observed
in the treatment of backgrounds (see pp. 104 and 185, Vol. I.),
and as you have now some knowledge of the effects colours have
in juxtaposition, there is less for me to urge upon your attention
under the head of “backgrounds.” The colours used should
be quiet and broken; the tone should be adapted to the condi-
tions settled by your subject. A very pale face or a white
dress should not appear ghostly and staring by the violent
contrast of a very dark background. If objects are introduced,
they must be few in number, and play strictly subordinate
parts, being neither so interesting in themselves, nor so
strongly defined or brightly coloured as to distract the observer’s
attention from the portrait. A background which is very dark
will kill a face which has delicate shadows and subtle gradua-
tions of light and half tones, making it appear flat and weak,
but it will give wonderful force and brilliancy to a vigorously
rounded-out head with brilliant lights and strong darks. Too
light a background, on the other hand, would make a head
with strongly marked light and shadow look heavy, and also
probably dirty.

It is a good plan to repeat the colours of the portrait in the
background under subordinate conditions as to brilliancy and
quantity.

Landscape backgrounds should be treated in a very
simple style, consist of but few features, and these broadly
massed together without any attempt at giving details. Some
warm tints near the horizon will serve to gently echo the
colours of the flesh; and in other parts a quiet richness and
variety of colour, without strong contrasts or anything loud
and self-assertive, will greatly aid the general effect of the
picture.

In a very cheap and valuable little work published by Messrs.
Cassell, Petter, and Galpin, called “Facts and Hints,” are
given some useful practical tables of colours for securing a large
variety of landscape and other pictorial effects. From these
tables I venture to extract some combinations, which the reader
will find admirably suited to landscape effects on photographs
having suitable backgrounds, that is to say, not too dark.

<table>
<thead>
<tr>
<th>TABLE OF TINTS, &amp;c.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cobalt or French blue (the first</td>
</tr>
<tr>
<td>is more easily managed).</td>
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<table>
<thead>
<tr>
<th>For Twilight Effects.</th>
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</thead>
<tbody>
<tr>
<td>Indigo and cobalt.</td>
</tr>
<tr>
<td>Indigo and Flemish blue.</td>
</tr>
<tr>
<td>Indigo, cobalt, and Indian red.</td>
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</tbody>
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<table>
<thead>
<tr>
<th>For Sunrise and Sunset Effects.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cobalt and rose madder.</td>
</tr>
<tr>
<td>Purple madder and French blue.</td>
</tr>
<tr>
<td>Indian red and yellow ochre.</td>
</tr>
<tr>
<td>Yellow ochre, pure.</td>
</tr>
<tr>
<td>Cadmium yellow.</td>
</tr>
<tr>
<td>Ditto, with rose madder.</td>
</tr>
</tbody>
</table>

* For portraits these will require subduing, unless the colour of the
photographic background itself subdues them sufficiently.
For Stormy and Twilight Effects.

(Warm and Cold.)*

Indigo and Indian red.  Blue, black, and cobalt.
Indigo, lake, and sepia.  French blue, purple, and indigo, and yellow ochre.
Indigo and purple madder.  Lamp black and lake.  Sepia and indigo.
Lamp black and French blue.  Lamp black and lake.  Sepia and indigo.
Lamp black and light red.  Light red and ditto.  Cobalt and purple madder.

For Sunset and Sunrise Clouds.

Cadmium yellow and rose madder.  Light red and ditto.  Cobalt and purple madder.
Indian yellow and rose madder.  Lake and ditto.  Brown madder, indigo, and cobalt.
Mars orange and rose madder.  French blue and indigo.  Purple madder.
Gambooge and rose madder.  French blue and lake.  Sepia and indigo.
Yellow ochre and rose madder.  Lamp black and lake.  Sepia and indigo.

**TABLE OF TINTS FOR DISTANT EFFECTS.**

Mountains or Hills.

Rose madder and French blue.  Light red, cobalt, and rose madder.
Cobalt and rose madder.

**TABLES OF COLOURS FOR WATER.**

Still Water in Clear Fine Weather.

Cobalt and raw sienna.  French blue, raw sienna, and indigo.

Still Water in Cloudy Weather.

Indian red and cobalt.  Raw sienna and French blue, raw sienna, and indigo.

**For Brooks and Streams.**

Raw sienna and brown madder.  If yellowish.
Raw sienna and indigo.  Raw sienna and French blue, raw sienna, and indigo.
Indian yellow, indigo, and burnt sienna.  If greenish.
Indigo and brown pink.  Raw sienna and French blue, raw sienna, and indigo.
Cobalt and burnt sienna.  French blue and indigo.
Raw sienna, cobalt, and brown madder.  If greyish.
Raw sienna, cobalt, and purple madder.
Gambooge and brown and brown madder.
Lake, indigo, and Vandyke brown.  If brown or very dark.
Sepia, lake, and raw sienna.

**For the Sea.**

Raw sienna and cobalt.  Cobalt and gambooge.
Raw sienna and Prussian blue, with a touch of madder pink.  French blue and Prussian blue, gambooge.
Bistre, Prussian blue, gambooge.

**For Lights on the Sea.**


**TABLE OF COLOURS FOR ROCKS.**

Various, for Cold and Warm Effects.

Lamp black and French blue.  French blue and burnt umber.
Lamp or blue black.  Lake and lamp black.
Light red and indigo.  Payne's grey.
Indigo and Indian red.  Raw sienna and brown madder.
Indigo, burnt sienna, and lake.  Prussian blue and raw umber.
Indigo, lake, and Indian yellow.  Light red and yellow ochre.  Payne's grey and yellow ochre.
Emerald green and lamp black.

**TABLES OF COLOURS FOR TREES.**

A variety of Greens for Foliation, from which to select.

Gambooge and indigo.  Raw sienna, cobalt, and indigo.
Gambooge and sepia.  Gamboge, brown pink, and indigo.
Gambooge, burnt sienna, indigo.  Olive green.
Cobalt, gambooge, madder pink.  Sepia and Prussian blue.
Lake, French blue, Roman ochre.  Vandyke brown and indigo.
Black and Indian yellow.  Burnt sienna, indigo, and yellow ochre.
Brown pink, indigo, and lake.  Indigo and yellow ochre.
Bistre and Prussian blue.  Indigo, Indian yellow, and burnt sienna.

Autumnal Tints, or for Glaring and Foliation.

Raw sienna and rose madder.  Raw sienna, cobalt, and indigo.
Burnt sienna.  Gamboge, brown pink, and indigo.
Purple madder.  Olive green.
Brown madder.  Sepia and Prussian blue.

*All colours which partake of red and yellow are regarded as warm.*

**For Skies and Branches.**

Lamp black and rose madder.  Lamp black.
Lamp black.  Payne's grey and light red.  Indian yellow, lake, and yellow ochre.
Brown madder.  Sepia and purple madder.

**TABLES OF COLOURS FOR FOREGROUNDS.**

Grenna for Grass in Light and Shadow.

Raw sienna and indigo.  Burnt sienna and indigo.
Indigo and Indian yellow.  Burnt sienna and indigo, with Indian yellow.
Yellow ochre and indigo.  Lake, yellow ochre, and indigo.  Sepia and gambooge.
Indigo and gambooge.  Burnt sienna.
Vandyke brown.  Burnt sienna.

**For Decayed Leaves in the Foreground.**

Brown madder and burnt sienna.  Gambooge or Vandyke brown.
Brown madder with gambooge.  Italian pink.
Burnt madder.  Burnt sienna.
Burnt umbre and burnt sienna.

**For Banks and Roads.**

Chiefly for the general Wash.

Light red and yellow ochre.  Vandyke brown.
Yellow ochre.  Sepia.
Burnt sienna.  Brown madder, indigo, and yellow ochre.

**For Darker Passages and for Shadows.**

Lamp black and burnt sienna.  Payne's grey.
Lamp black and rose madder.  Payne's grey.
French blue, Indian red, raw sienna.  Payne's grey.

**For Buildings.**

Bricks or Tiles in Shadow.

Brown or purple madder and burnt sienna.
Vandyke brown, French blue, and purple madder.

**For Wood.**

Lamp black and yellow ochre.  Payne's grey and burnt sienna.
Sepia or Vandyke brown.

**For Slate.**

Lamp black.  Payne's grey.
Lake, indigo, and raw sienna.  Payne's grey.

**For Thatch.**

Brown madder and yellow ochre.  Vandyke brown.
Sepia.  Sepia, indigo, and lake.
Sepia and yellow ochre.  Payne's grey.
Sepia and purple madder.

These tables will be found just as suitable for landscape painting on drawing paper, and they are those compositions of colour which are recommended and used by nearly all our best landscape painters and teachers. For background purposes they will be modified by the colour of the ground on which they are applied, and to the extent that ground may dictate they may require modifying, although in most cases they will be found just right. If it is necessary to lower a tint, do it with broad hatchings and open stippling. If you find parts of the photographic background too dark—as near the horizon it is likely to be—wash over such parts a little Chinese white before applying the colour, and add a little of the same white to the tint you hatch or stipple.

If your background is dark, and you think a certain background will be most suitable, make out the light folds with this washes of Chinese white before covering the whole with its wash of local colour. If over such a dark background you require a crimson, give it a preliminary wash of Indian yellow and carmine, over which hatch and stipple as usual, deepening the shadows with Vandyke brown and crimson lake.
THE most perfect mechanical arrangement for the production of shadows in motion was that exhibited a few years ago at the Polytechnic Institution, under the name of the “Shadow Blondin,” in which a life-sized shadow, projected on the screen of the large theatre, imitated all the movements of a tight-rope dancer—standing, bowing, walking, dancing, straddling, laying flat, turning somersaults, standing on its head, holding the balancing-pole in each position in a very life-like fashion. In Fig. 1 we have a representation of this figure as it appeared to the audience, and in Fig. 2 the mechanical details of the construction of the figure that produced the shadow on the screen.

First we may take the outline figure, r, cut out of metal, which, it will be seen, is constructed on the principle of the children’s toy where motion is given to the limbs by pulling strings that act on leverage projections from the upper end of the limbs, all of which are pivoted to the body with knotted handles, h, to which they are connected. The frame s swings like a balance-arm between two uprights that spring from the carriage, c, by the action of which the figure can be raised or depressed, so as to appear upright or stretched out upon the rope, for the feet are supported on the wire, w, that represents the tight-rope in the shadow, by two pins, P P, projecting at right angles to their surface. The carriage c is supported on wheels that run upon a tramway, r, stretching across the back of the stage. By a careful study of the several mechanical elements that compose the whole of this ingenious contrivance of Mr. Walker, it will be seen that every provision is made for making the shadow appear to traverse the shadow tight-rope from end to end—to rise, fall, rest on one leg, hold the balancing-pole down or overhead, and go through all the motions previously named.

The shadow was produced by a small limelight, L, affixed to the swing-frame s, immediately behind the mechanical figure. Here I may call attention to what has been demonstrated at page 236, Vol. I., Fig. 4, as to the necessity of employing a “point of light” if we wish to produce a sharp image of an object—that is, free from a penumbra, for practically a limelight is a point of light.
THE POPULAR RECREATOR.

so is a candle-flame, in relation to the size of the figures we are now referring to. Paraffin candles fitted into saucer-shaped stands, or sconces, make convenient sources of light, with suitable holders, as the light is bright and the wax cannot drop about, and, should it do so, it can readily be peeled off anything it drops on without damaging it.

*Ombres Chinoises* are worked on the same principle as the Shadow Blondin just described, but the arrangements are of a more primitive character. What Londoner has not seen the Punch-and-Judy box of the summer day converted into the Shadow-Play of the winter evening, with its highly-approving street-corner audience?—an entertainment that may readily be translated into the Theatre Royal Back Drawing-room. In the first place we must beg, borrow, or buy a good-sized clothes-horse, of three folding frames. Over the top centre opening we smoothly strain and fix with laths a piece of thin linnen, and cover the other portion of the framework with red baize or old table-covers, so that the exhibitor may be enclosed and hidden from his audience, while a transparent screen is presented to their gaze—as shown at s, Fig. 3. The figures must be very boldly drawn on stiff cardboard, so that each shadow conveys the proper characteristics of the person or thing represented, and in this respect the characters of the street exhibitions far excel the more artistic efforts of the published sheets, for I find that while the German shadow-figures are too pretty, those produced in this country ape at the introduction of such an amount of detail, that "character" is sacrificed, and the cardboard weakened to such an extent that the figures would not stand upright if the parts intended for excision were cut out. Again, all such figures should be delineated in profile, for full-faced "character" can only be suggested, not defined. Such a character as I refer to is represented in Fig. 4, and the resulting shadow, after all has been done that can be done, as to cutting out the possible details of the printed figure, and ignoring the impossible strokes the purchaser is supposed to elaborate, will be seen to be wanting in effectiveness, and that the head is (what the sailors would term) "holding on by its eyelashes" rather than its natural support. In contradistinction to this, I would refer to Figs. 5 and 6, where the figures are boldly, if not even coarsely, profiled, a good-humoured aspect being given to the cobbler by aid of the upturned corners of the mouth and the rounded outline, while a vinegar characteristic is imparted to the old lady by the downward curve of the lips and the angular aspect of face and body. Motion is always a popular element of any exhibition, and this we attain in the case of *Les Ombres Chinoises* by making arms, legs, head, etc., "suit the motion to the word," by pivoting them to the body and providing leverage points, to which strings or wires can be attached and be brought under the control of the exhibitor. It need hardly be said that these shadow-puppets should be cut out cleanly with a sharp penknife; but it is as well to warn my readers against employing woollen cardboard, as it tears under the knife instead of yielding a sharp edge. That of the nature of Bristol-board will be found to be best for our purpose. Having described the principles upon which these puppets should be constructed, I will proceed to give an example of a shadow-play and how it should be managed.

**SKATING.**

*BY A MEMBER OF THE "SKATING CLUB."*

**THE TROUBLES OF BEGINNERS—LADY PUPILS—BLIND GUIDES—A RUSSIAN "COACH."**

"'Tis an ill wind that blows no one any good;" and even grim old Boreas, black as he is painted, has his admirers and welcomees at Christmas time. Although his advent relegates the horse to his stable, and the hound to his kennel; though foxhunter and turfite grumble and storm over the interruption of their sport, there are quite as many of Her Majesty's subjects who hail with delight the first appearance of those wintry flowers traced on their windows by the frost.
SKATING.

Skating is, more than any other outdoor amusement—more even than fox-hunting—a popular pastime. Every one is not sufficiently well off to keep a hunter, but very few are too poor to possess a pair of skates. Cricket is confined to the stronger sex; and neither an old man nor a man who has any serious business can find time to indulge in it. But both old and young, both men and women, both rich and poor, can enjoy a fine afternoon upon the ice.

It is not often indeed now-a-days that we have the chance. The good old frosty Christmases are gone wofully out of fashion. But when they do come, there is no enjoyment in the world greater than that felt by the thousands of people who crowd upon the nearest ice. It is the inhabitants of our great towns who especially rejoice in a good frost; and the immense numbers that throng to the London parks immediately the ice begins to bear, testify in no doubtful manner to the popularity of skating.

Among those "royal roads" to learning which it is said to be so impossible to find, it is much to be wished that some one would furnish us with one by which beginners might learn to skate. As it is, the process of acquiring the art is fraught with such excessive pain and grief, that it requires a great amount of courage in the beginner, especially if he happen to be of riper years, to enter upon his education at all. He has to face, not only the ordinary toils and troubles which, the Greek poet tells us, are inseparably attached to all kinds of learning, but also certain very serious and practical bodily discomforts in the shape of bumps and bruises. With him it is not, as it is with the aspiring Nimrod, a mere risk of a fall now and then; it is the certainty of many and frequent tumbles. And though a fall on the ice does not break either neck or bones, it is apt to make one feel very sore and stiff by the next morning. Moreover, there is a loss of dignity attaching to these tumbles, which is often quite as painful to the sensitive mind as the contusions are to the body.

Skating is an accomplishment that one must either pick up as a boy, when one has not far to fall and not much dignity to lose, or afterwards acquire, when one's vanity is more venerable and one's bones more susceptible of hard knocks. The motion, once learnt, is as natural as walking on dry land.

We will suppose that the old style of skate is adopted, with its wooden framework, leather straps—the front strap passing twice through the solid wood, and fastening with a single buckle above the front part of the foot; and the back one passing only once simply through the heel of the framework, and buckled securely over the instep—and iron heel-screw let into the centre of the heel. We will suppose, also, that our beginner has safely screwed this iron into a hole bored with a proper-sized gimlet in the heel of his boot-sole. He will take care that in boring the hole, or allowing any one else to do so for him, the gimlet does not go right through the sole—a thing which is very apt to occur to the careless. The length of the skate-screw and the height of the boot-heel ought, of course, to be properly proportioned. Moreover, a good broad heel is much to be preferred; as for those apologies for them which have been lately in fashion for ladies, and the surface of which is about the same size as a shilling, they are quite out of the question for skating purposes. The fastening of the straps is not so simple a matter either: for, on the one hand, if they are not drawn very tight, the front part of the skate will shift about and move from its place; and, on the other hand, a too strong compression will check the circulation, cramp the muscles, and often leave the feet quite sore when the skate has been removed. All these difficulties and preliminaries having been got over, the would-be skater is ready to make a start.

Terribly nervous he feels as he first rises off his chair to a perpendicular position, and feels his feet slipping away from him in every direction except that in which he wishes them to go. That, which horrifies him most is the rapidity with which a skate-wearing foot, once started, makes such a start off from its owner. He is quite as at a loss how to check this impetuosity, and, indeed, the matter is by no means easy. His skates are probably new, their edges shine like silver, and slip along over the ice like lightning. If so, and indeed will be the spectacle of our friend, for his first hour is upon the ice! A friend's arm may save him partially, but it is very partially, and the friend runs a great risk of being involved in the calamities of his protégé.

But let the beginner, who wishes to save himself from the extremes of bodily and mental agony, beware of new skates, as he values his skin and bones. Let him get a good old and, if possible, rather rusty pair. Upon these he will be able to a great extent to moderate the ardour of his feet in running away, and attend to the first canons of instruction, which are these: to turn out the toes; to keep the weight of the body always well in front and inside of the feet; to allow one foot to complete its stride before the next is begun; and, above all, to keep the ankles stiff and firm. Without some help in the way of a friendly arm or hand, it seems at first an almost hopeless task to acquire the art. A stick is worse than useless, the hope of saving oneself by its help only aggravates the fall, and your frantic efforts to dig it into the ice, or get a hold with it on the slippery surface, will be totally fruitless. On a friend's arm you may perhaps keep on one foot as long as possible. This will enable you to acquire more strength in the ankle, more confidence, and to become more a judge of pace.

The whole art of skating consists in a knowledge of the rules of gravity, or what is commonly called "balance." When you start you are perpetually "off your balance." As you get on, you gradually gain an intuitive practical idea of the way to "keep your balance." This is the great object. Remember, always, that by throwing the weight of the body forward you escape the risk of those terrible backward falls, which occur through the feet slipping away in front. If you must fall, it is much better to fall forward. Moreover, the body, in skating at all quickly, must always be a good deal inclined to the front. If the feet are well turned out, that will make it impossible for them to go far astray if the body is only prevented from leaning back.

Lastly, courage, confidence in the possibility of succeeding, and a resolution not to be beaten, will do as great wonders in the matter of learning to skate as we know they do in objects of more arduous and serious ambition. But in point of fact it is much more important, in their humble elementary stage as well as in the proud art of figure-skating, to know what to avoid than what to do. In both cases nothing is easier than to pick up a bad style, nothing more difficult than to get rid of it.

Considering that of ordinary skaters—putting out of the question those who cut figures—there are at least four ugly skaters to every pretty one, it is not difficult to see that one's early instructors, as well as one's examples, run a great chance of being very blind guides indeed. The most usual faults in common inside-edge skating, which is all that we have to do with at present, are these—bent knees, high shoulders, waving arms, and shuffling scratchy strokes with the feet. Avoid these failings, hold your head up and your hands down, turn your toes well out, and make long, clear, and firm strokes with each of your feet, and you will soon be master of the inside edge, and ready to proceed to more arduous attempts, whether it be your ambition to win races of speed as a "runner," or to graduate in the elabo-
rate school of figure-skating. There is no occasion to take any pains as to which edge you go upon. No one begins by accident on the outside edge! Lucky for him if only he could do so!

But skating pupils are by no means always of the stronger sex. The ladies, formerly so seldom seen upon the ice, have of late years made an immense advance in courage and perseverance. A good lady skater is no longer an extraordinary sight; and there are many in Canada, some even in England, who can join right well in a simple figure. For their benefit we are bound to do all we can to make the task of learning a little easier. School-boys and undergraduates may fairly be left to find their own way through the usual undignified ordeal; but it is plain that if ladies had always to face this, there would not be many of them on the ice. As it happens, there is almost always a brother or cousin—sometimes one who stands in a still more tender relation—only too glad to undertake the education of the fair beginner. A strong hand, with the assistance of a strong arm, in reserve for cases of extreme emergency, add a wonderful amount of confidence, besides the more material support, to the timid and trembling lady pupil. It is long, perhaps, before that confidence ripens into the bold step of

“going alone;” but, in these cases, who could be un gallant enough to complain of the delay? If the truth were known, there is not much reluctance shown sometimes to prolong it indefinitely. As for those unlucky maidens for whom no such assistance is forthcoming, there is often nothing for it but that they should fall victims to those same blind guides of whom we have already spoken. The favourite instrument to which they are recommended as a “safe help to skating” is a common chair, a veritable instrument of torture, and about the most dangerous assistant that could be put into their hands. The idea is to push the chair along by its back, the back acting as a support when a fall is imminent. The result is that the chair acts perfectly as long as the fair learner stands quite still, which is generally a decided long period; but directly she begins to move forward, either the chair trips up over some inequality in the ice, and the skater is thrown “a header” over its back, or her feet slip from under her, and she falls backwards without the chance of saving herself, pulling the chair down upon her with a crash. The best aid is the contrivance in the cut (Fig. 1), of which a description will appear in our next paper.

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**ELECTROTYPING.**

**By Charles Hine.**

ONE of the simplest and prittest experiments that can be made with a single cell is the formation of the “lead tree,” a familiar object to lovers of scientific pastime. The usual mode of producing this curious specimen of metallic vegetation is as follows:

Fill a four or six-ounce phial of pure water to within an inch of the neck, then dissolve in it a teaspoonful of acetate of lead, shaking it up well to secure perfect inter-mixture; then add a few drops of hydrochloric acid, which will stimulate the action. Have a loosely-fitting cork, and bore a hole through the centre; through this hole pass a piece of zinc wire, long enough to reach within half an inch of the bottom of the phial. Bend the top of the wire over, so that it cannot fall through. Let the whole stand perfectly still for nine or ten hours, and by the end of that time the bottle will be filled with a beautiful mass of foliage (Fig. 1), all the leaves formed of lead, yet light as eiderdown, as will be seen by the shaking of the liquid.

It is as well to cut a notch down one side of the cork, to allow a means of escape for the generated gas.

If zinc wire cannot be readily procured, a narrow strip of sheet zinc will equally answer the purpose.

When the experiment is performed by the aid of voltaic electricity, the piece of zinc wire must be suspended as a cathode, i.e., as the piece of metal or mould to be deposited upon in the depositing trough. A piece of lead must also be suspended in the solution as an anode, answering to the plate of copper which hangs opposite the mould in the illustration appended to our second article, p. 291, Vol. I. The depositing trough must,
course, be filled with the acetate solution just described.

The moment electrical action is set up, the fine particles of lead will be seen to fly from the anode to the cathode, in a regular and beautiful shower, clinging round on all sides, and arranging themselves in the form of flakes, or leaves, in symmetrical order. The tree will not be so perfect a specimen as that produced in the bottle by what we may call the natural process of growth; but to see it visibly generating under our very eyes constitutes the great charm of the experiment.

It is now time to describe how the electric force may be brought to bear upon an object with varying degrees of volume or concentration. For some purposes, quantity is required; for others, intensity. The difference between these two may be aptly illustrated by the examples of a vessel filled with warm water, and a red-hot poker. The water, though not too warm for a bath, may have diffused throughout it more heat than the red-hot poker contains; but in the latter the heat is concentrated, and therefore more intense. Where we have metals to deal with that have a fair affinity for electricity, we shall require merely quantity, in proportion to the magnitude of our operations, and the speed with which we wish them performed. When we have to deal with metals of low affinity, that need a concentrated fire of electricity to make any impression upon them, we shall require intensity.

It is the same thing in principle as the management of a park of artillery, by which the fire of many pieces can be directed against a wide surface, or a single point, according to the object to be gained. This power is obtained in voltaic electricity by connecting a number of cells together, and the whole arrangement is then, very appropriately, called a battery. A single cell arrangement, such as we have dealt with hitherto, is not properly, though it is usually, so called.

With batteries of greater or less extent, the experimenter may, like a general-in-chief, regulate at will the force he brings to bear. Let us suppose that a number (say six) of simple generating cells, such as that described in our second article, have been provided, and that it is desired to ob-

Fig. 1.—THE LEAD TREE.

tain from them quantity, without increasing intensity of electrical current. They must be placed in a row, and all the zinc plates must be coupled together by wires passing from one to the other. The same thing must be done with the copper plates, and then from the two end wires we shall get the quantity of six cells, and the intensity of one (see Fig. 2.)

If it is intensity, without quantity, that is required, we must reverse this, and couple the zinc and copper plates together throughout the series, as shown in Fig. 3, and by this means we get the intensity of six pairs of plates and the quantity of one.

If we want to increase both quantity and intensity together, the matter is more complicated. We must place our cells in two rows (Fig. 4), the zinc plates of the one row, and the copper plates of the other, facing outward, and connect the plates of each row as for intensity. Then connect the copper plate of No. 1 with the copper plate of No. 3 by a wire, and do the like with the zinc plates of Nos. 4 and 6. Link these wires together by a third wire, so as to establish connection between the two rows. Then connect in the same manner the end plates of the two rows facing outwards, and the linking wires b and c will be the positive and negative electrodes to be carried to the depositing trough. From these we obtain the quantity of three cells and the intensity of three. It will thus be obvious that with a sufficient number of cells, we can regulate quantity and intensity at will. Thus, from 100 cells we can either obtain the quantity of 100 and the intensity of 1, or the intensity of 100 and the quantity of 1, or the quantity of 50 and the intensity of 50, or any intermediate degree between the two extremes.

Our friends will soon find out, in the pursuit of scientific recreation, how useful is this power of controlling the force we are dealing with. They will soon discover, in feeling their way (as we hope they will do) to further investigation of the subject than can properly be treated in these papers, a great deal about the mysterious relationship that exists between electricity and the great family of metals and alloys: how in some the impulses of kindship are strong, and how in others it requires a power-
full effort to reach the hidden sources of sympathy. For instance, the useful and beautiful alloy, brass, if attacked in the ordinary way, would be irremovable to electrical assault; but when a converging fire is directed against it from a battery of many cells, it is forced to succumb.

It will add a little interest to our pastime to know, that each successive step of discovery has been fraught with consequences the most important and stupendous to the world of commerce and the industrial arts. A page could be filled with the mere list of commodities that have found their way into the market, adding to the conveniences of man, and finding employment for thousands of busy hands; new sources of wealth, which owe their origin to the labors of scientific investigators in this new and fertile field. Among them may be mentioned the copying of engraved wood-blocks, by which means any number of impressions may be taken, the original woodcut remaining intact, and preserving its sharpness to the last; the copying of set-up types instead of stereotyping—a process largely practised in America, and by means of which the page you now read is printed; the coating of iron and steel goods with various metals to protect them from rust; etc. etc. Many tons of brass-headed nails—i.e., heads coated with brass—are produced annually by this process, superseding the old and expensive method of casting them on. Millions of steel pens are rendered practically safe from corrosion from ink or climate by being coated with brass, and upon that a thin wash of gold, which then appears with a surface of brilliant polish, and does not add to the cost more than fourpence a gross. The parts of fire-arms which suffer most from exposure to the weather, or from the corrosion of the discharge, can be effectively protected by a durable coating of metallic nickel, which looks as well as silver, and will wear ten times as long. Many specimens are shown in the present Vienna Exhibition.

For involved and elaborate battery operations, such as we have yet to introduce our readers to, it will be desirable to set up a more perfect apparatus than the home-made one hitherto described. When interest in the pursuit is once fairly awakened, the expense of a complete set of generating cells and depositing vat, with proper binding screws and suspending rods, will not be considered. The cost is not great. It would be invigorous to recommend any particular dealer in such articles, and it is not necessary. Long before the student has reached the stage where he feels the necessity for perfect tools, he will have found out for himself the best places whence to procure them.

**WINDOW GARDENING.**

By J. C. Leach.

**INSIDE CASE FOR A BOW WINDOW.**

The outside cases described in our last article, although very excellent in many respects, are liable to one defect, which should be mentioned, namely, they are very cold in winter, and, consequently, delicate plants will scarcely survive a very severe season. Where possible, therefore, it is advisable to construct window-cases inside. Of course, a case of large dimensions is frequently inadmissible in a small room; and the outside case possesses the advantage of occupying none of the floor space, but, when there is a low window, an inside case is decidedly the best and most effective. As the temperature inside the case is mostly nearly as warm as that of the room itself, the most delicate plants and ferns can be well preserved throughout the winter, while from the size of the case the larger farns and plants can be grown with the greatest success.

Of course there is much more labour in making a case of this description, but as the work is of a similar character to that before described, the amateur need be in no fear of not being able to construct this more elaborate form of case, if our directions be carefully carried out.

The plan of a case suitable for a window of this description will be easily understood by referring to Fig. 1, the darker shaded portions of which represent the brickwork supporting the sash frame, while the line a a indicates the front of the case next the room. It is mostly better to allow the case to occupy the whole of the recess formed by the window, and to keep the front even with the walls of the room.

The first thing will be to form the bottom of the case, and for this purpose a stout joint or bearer will be required to reach from side to side of the window, as shown at a a. It should be remembered that the weight of earth, etc., will be considerable, and therefore this joint, which will have to carry it all, should be very strong, as well as firmly fixed in position. In most instances the angle formed by the wall at the window opening is protected by a wooden upright, which will serve to make excellent fixing for the joint and other portions of the case. The ends of the bearer should be cut to the required angle, as shown in Fig. 2, and firmly screwed at both ends. The height at which this bearer is to be fixed will, of course, be determined by that of the lower sash, or rather the bottom of the sash-frame, and it should be kept at least six or eight inches below the top edge of the bottom rail of the sash, in order that the earth or pots may be below the line of sight. The next proceeding will be to fix some strong fillets upon the walls in the same line as the front bearer, and these also will have to carry some considerable weight, they will require firm fixing. As, however, these can be well nailed or screwed to the woodwork or walls, they need not be quite so thick as the front bearer, but it is better to have them a little too stout than to impair the strength of the case.

These preparations being made, the cross bearers may be fitted in, as shown at b b b b in Fig. 1. These should not be more than a foot apart; and as it is better not to trust to nails alone, a fillet should be nailed upon the bottom edge of the front and back supports, and the cross bearers nailed over them, as shown in Fig. 3. This will form the groundwork of the case, and upon this may be laid the bottom or floor, which should be of inch boards. As the whole of this work will be hidden, there will be no necessity to plane any of the wood, but, while rough, it must be exceedingly strong. It will now be necessary to determine the height of the case, in order to fix the frame which will have to support the top.

We should again advise that the case should be made coincident with the meeting rail of the sashes, as there will then be but little obstruction of light, and the effect of the case, as seen from the room, will be much more elegant than if two bars be visible.

As this frame will only have to support a light sash, it need not be made of very stout material. The top front rail should be rabbeted on its top and under sides, as shown in Fig. 4, in
order to receive the front and top sashes; and it may be fixed as before directed for the bottom rail, by screwing it to the woodwork at the angle of the window. Of course both these rails must be fixed perfectly level, or the sashes cannot be accurately fitted.

A continuation of this rail must be made round the remaining three sides of the window, but these need only be rabbeted on one edge to receive the sash, as shown in Fig. 5. It will be an easy matter to fix these parts of the case, as they can be screwed to the woodwork of the sash frame in a few minutes, the only precaution necessary being that of fixing them perfectly level. It is better to screw all this portion of the work rather than nail it, both on account of there being less danger of splitting the wood, and because it can more easily be removed when required without injury to the sash frame.

The ends of the case next to the angles of the window will require to be fitted with two uprights to receive the front sashes, as shown in Fig. 6; and as it only will cost a few minutes of labour, if a proper plane can be procured, it is of course advisable to make this little addition when possible. These uprights must be firmly screwed, and fixed perfectly upright, or at exact right angles with the top and bottom rails of the case, as it is to these the sashes will have to be hung, and they will not work properly unless this be attended to.

The framework of the case will now be complete, but before proceeding to make the sashes, it will be better to line the bottom of it with zinc. This is of course absolutely necessary, as, being in a room, any leakage would be ruinous to carpets and furniture. For a case of this description the tray should be at least six inches deep, and if possible the waste-pipe should be passed through the wall to the outside of the house. A piece of ordinary gas-pipe will be sufficient, and a small hole may easily be made in the brickwork below the sill, through which it may pass. Of course, if this cannot be effected, a short pipe with a small tap may be employed, and the waste water received in a pail as required, but the first is the preferable plan.

The case will now be complete, with the exception of the sashes and decoration, but of these, as of the internal fittings, we must defer the description until our next article.

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**LÉGER DEMAIN.**

**BY A PROFESSIONAL.**

**BUSIES IN CONJURING—VARIATIONS IN TRICKS—MAGIC CHAIRS—CONFEDERATES—THE LEMON TRICK—THE RING AND TARGET.**

Different tricks depend upon different principles, and in exhibiting it is always well to vary these principles as much as possible, and especially to avoid showing two tricks following each other that depend upon the same principle.

For instance, it is obvious that any two tricks, dependent, say upon the opening of a certain trap-door, should never follow one another; the very fact of exactly the same part of the table being used on each occasion is very likely in itself to excite suspicion. It is, therefore, desirable to vary the tricks shown, so that if possible one may help to divert the attention from the discovery of another.

In one of our early papers we mentioned a small but useful little trick which can be performed by means of a piece of
elastic fastened inside the sleeve, to the end of which a ring is attached. Now, it is obvious that to a mere looker on, who does not understand how this trick is done, there would be very little difference between it and palming. To them, what takes place in each case is the same—viz., an article placed in the hand, and which mysteriously disappears. Yet no two tricks can depend upon more distinctly different principles.

We would, therefore, recommend the performer—whom we take for granted is an amateur—to let one follow the other.

We will proceed to describe a trick with a handkerchief, dependent principally upon palming, and a trick with a ring, dependent on the elastic and mechanism, which we would recommend to be shown, the one after the other, for the purpose of enabling the conjurer to make the following remark. Having the ring between his finger and thumb, the elastic of course carefully concealed, he says to one of the audience, at the same time presenting to them his magic wand, "You observed that, in the last trick, whenever I squeezed anything in my hand, directly I touched it with my wand, it instantly disappeared. To prove to you the wonderful power of this same wand, will you kindly touch this ring with it?"

The request will of course be complied with, and, to the probable astonishment of the person, by slightly separating the fingers, the ring instantly disappears.

Now, we have known persons who, so to speak, have half guessed a trick, and who have by this means been completely put off the right scent. They, in their own minds, come to the conclusion that the handkerchief and the ring both disappeared by the same means, and the result is that any method which explains the disappearance of one fails to explain the disappearance of the other.

Before proceeding to describe the trick with the handkerchief, we would call attention to an important point in conjuring, and one on which very many tricks depend, and that is on the different methods of changing things. It is often obvious that, in some trick, the performer must have changed the watch or the ring, or the handkerchief, or whatever the article may be, but when he changed it, or how he changed it, will often, if the conjurer be a good one, be impossible to say.

Now, the different methods used in conjuring to change things are almost infinite. One very useful one is a chair specially prepared for the purpose. The drawing represents a behind-the-scenes' view of one of these most useful conjurer's assistants.

It will be seen that the only respect in which the chair differs from the ordinary one is in its having a small shelf at the back of the top cushion or top rail; this shelf is of course unseen by the audience in front; and the chair should be so placed that the edge of the shelf is invisible from either extreme of the front of the stage.

The uses of this shelf are various. The conjurer, in walking about the stage, while talking to the audience, may often rest his hand apparently carelessly on the back of the chair; the movement is a natural and an easy one, but exceedingly useful occasionally—an article can be dropped and another picked up, or anything can be got rid of without suspicion.

We will give one instance in which a chair of this description is of the greatest possible use, and is also a case in point that illustrates our remarks a short time back on the importance of varying the method of performing tricks. In a former article we described how to bring bowls of gold fish out of an empty cloth. We will suppose that during this trick a chair, similar to the one we have described, stood upon the stage, and that the performer has brought out two or more bowls, as we then described. Now, suppose he has placed on the shelf at the back of the chair a similar bowl half filled with water, but arranged with flowers, which can be made to look very beautiful, according to the time of year or the depth of the conjurer's
pocket during a visit to Covent Garden Market. This bowl must of course be so placed that no part of it or of the flowers can be seen. The conjuror now again throws the cloth to the audience, and having first retired for an instant and untied the black bag round his waist, shows them that he has nothing whatever concealed about him, and can of course now with safety advance and ask any gentleman to touch his tail-coat pockets, etc. It is, however, very easy to have a small ring of copper wire concealed beneath the waistcoat—this ring to be the same size round as the top of the bowls of fish.

The conjuror now retreats to the stage, goes through exactly the same movements as before, only taking, under cover of the cloth, the copper ring from his side; this he places in the cloth, and of course by slightly letting the cloth fall it has exactly the same appearance as if another bowl were there.

The conjuror must smile as if the trick was completed, and will, in all probability, hear the remark, "There, is it not wonderful! I am sure it was impossible for him to have that bowl about him, for I felt his coat. The trick, is however, by no means completed, as the conjuror must walk up to the chair, and so manage that the cloth hides his right while he gets the bowl from the back underneath it, and then, slowly lifting the cloth, he exhibits the bouquet of flowers, which he places for a short period on the seat of the chair, throws away the cloth containing the ring behind the scenes, and then hands the bowl round for inspection, first pouring on the floor a small quantity of the water in which the flowers had been placed.

We will at some future period describe how to replace one of the bowls containing fish in the cloth, and apparently cause one of the audience seated on a chair to swallow the same. This method of varying the trick has the advantage of very possibly throwing people off the right scent, as many will naturally say—if the trick were performed by means of tight covers over the bowls, how could the flowers possibly be there? and yet they will say to themselves, they saw the bowl in the cloth (the copper ring) before the conjuror went near the chair.

Here, again, we have the full advantage of the double method. Any explanation of the bowl of fish fails to account for the appearance of the flowers, and, on the other hand, any guess that would account for the flowers would signally fail to explain the bowl of fish; consequently, many are led to imagine that the trick is done by some other means altogether, though what those means are they cannot say.

But to return to the trick with the handkerchief, which, as we said, depends principally on palming. The conjuror first places a lemon on the seat of a chair, similar to the one just described. He then borrows a lady's pocket-handkerchief (without any lace round the border), and having burnt a hole in it, as we have before described, ties it up in a small ball with a piece of red tape; this he gives one of the audience to hold; he then retires and fetches a plate and knife, which he places either on the chair or any small stand near. On requesting the person holding the burnt handkerchief tied up in red tape to open the same, it appears in six or seven small pieces which, when placed together on the ground, form a handkerchief only with a hole burnt in the middle.

The conjuror now gathers these pieces together in a ball, and rolling them about again gives them to one of the audience to
hold, when, on unrolling the same, they appear as if all stitched together in a long strip. The conjuror now calls attention to the lemon, reminding the audience that it was placed on the chair before the handkerchief was borrowed, and, holding it in his hand, asks one or two of them to smell it in order to see if it is a genuine one, he then places it on the plate where all can see it, and taking the strip of linen in his hand, rolls it up into a ball. Touching his hand with his wand he says, "Pass!" He opens his hand, which he shows empty, and touching the lemon with his wand, he takes it up in his hand, and going close up to the person from whom he originally borrowed the handkerchief, he proceeds to cut small slices from the end diagonally. At last the handkerchief appears in the lemon, which is quite hollow; the lady is then requested to take hold of the handkerchief, and pull it out of the lemon, which the conjuror retains in his hand. On examination, the handkerchief is found to be the identical one borrowed. This trick, well done, is very effective, but as Mr. A. Ward observed, of taking the census, "it requires experience."

No trick, that we know of, however, can be performed in more various ways than this; it of course depends almost entirely upon sleight of hand, as it is evident that the handkerchief has to be changed into the small pieces, these again into the strip, and lastly the strip has to be got rid of by palming.

Then, again, it is evident that, unless the conjuror adopts a method similar to M. Houdin in Paris, the account of which we gave in our first article on legere du meun, the lemon itself has to be changed. We would, however, again remind amateur conjurors that these exhibitions are intended solely to amuse, and that almost any means are lawful to attain this end. Should, therefore, perform at a friend's house, much can be done by a little forethought; for instance, it would be very easy to obtain a facsimile of one of the handkerchiefs of one of the audience, from, say the lady of the house, who would most likely keenly enjoy the puzzled looks of a niece or sister; or a still more startling trick can be performed sometimes by obtaining a facsimile of a coloured silk handkerchief. We were once, we fear, guilty of bringing on an attack of gout in an elderly gentleman, whose silk handkerchief, or rather duplicate, had been given us, previous to exhibiting, by his daughter.

However, to obtain the handkerchief before starting will be often found to be impossible, nor would we advise the conjuror to be pursued generally. We will, therefore, describe how to perform this trick without any such device being resorted to.

The first thing is to procure two thick-skinned lemons, as nearly alike as possible, and to cut one round about one-third from the narrow end with a sharp knife, keeping the blade of the knife almost parallel with the major axis of the lemon; pull out the piece, and scoop out the whole of the pulp of the lemon, taking, at the same time, great care not to destroy the shape or to injure the long white rind where it has been cut. It will then be seen that a small lady's handkerchief can be placed with ease inside, and the two pieces can be fitted together in a way in which it would be almost impossible to tell where the join is; and these pieces can be easily kept together by means of a few stitches with a fine needle and cotton, these stitches being afterwards rubbed over with a little syrup formed of a small piece of sugar soaked in lemon juice.

The hollow lemon, thus prepared beforehand, is placed on a plate behind the scenes, with the needle and cotton by its side, and the drop of syrup ready for use.

The conjuror advances, having in his hand an ordinary lemon; on the little shelf at the back of the chair is an old lady's pocket-handkerchief, which has first had a hole burnt in the centre, has then been torn up into six or seven pieces, wrapped up into a small bundle, and tied up with a piece of red tape, say six inches long. In his pocket he has another small piece of tape, the exact length of the other piece, and which may or may not, according to fancy, have a small distinguishing mark on it, such as a blot of ink in one corner, purposely put there in order to make it look more like the other one, which is of course marked in a similar manner. The conjuror has also a small piece of white cambrie concealed between his left-hand finger and thumb.

Having borrowed the handkerchief, he pulls the centre apparently between his finger and thumb, as we have before described, but really pulling the piece of cambrie, which he burns; he then, after getting rid of the burnt piece—which he can do best when, after rolling it into a small ball, he takes the piece of red tape from his pocket—ties it up as nearly as possible like the one behind the top of the chair. First showing his hands, that they contain nothing but the apparently burnt handkerchief (now tied up), and with his coat-sleeves sufficiently pulled up to show that nothing can be slipped up them, the conjuror, with the handkerchief between his finger and thumb in one hand, and his other resting easily on the back of the chair, now asks who among the audience will undertake to hold the handkerchief. The answer of some one present is a favourable moment for getting into his hand unperceived the cut handkerchief from behind the chair.

He then pretends to pass the real handkerchief into his other hand, but really retains it, and gets it into his pocket in taking out his wand, giving the prepared piece to the person to hold. The conjuror now, as we before said, retires to fetch the plate and knife, and leaves the real handkerchief with his assistant behind the scenes, who quickly places it in the hollow lemon, fastening the two pieces together, and smears over the stitches with the syrup to prevent their being noticed.

The conjuror returns, however, with a long strip of cambrie rolled up, and carefully concealed between his linen cuff and inside part of his wrist.

Placing the plate and knife on the ground, he asks the person holding the handkerchief to open it, and see if it is burnt, when, of course, much amusement, and, if the trick has been well done, much astonishment, will be caused by seeing that it is in several pieces. The conjuror, with his wand in his breast coat-pocket, and coat-sleeves well turned up, now spreads these pieces out, showing them to be a handkerchief, and then takes them up and throws them carelessly over his hand, and under their cover draws out the strip, which he must carefully keep separate.
CROQUET.

TACTICS—DERIVATIONS—OPENING A GAME.

In describing the commencement of a game of croquet we are entering upon the domain of what is called Tactics. Tactics may be briefly described as the management of your own ball by itself and in conjunction with others in such a way that the required strokes are made easy for yourself, with the least possible risk of helping your adversary. Our last instructions, it is to be hoped, have led to some proficiency in the art of hitting a ball; but when the long-coveted shot has been made, what is to be done with the ball that has been hit? And by what means can we so arrange the balls as to run several hoops with the ball that has made the shot? Or how shall we leave them in positions favorable to the play of our next ball? It is in knowledge of this that real play consists; croquet presenting a great similarity to billiards in this respect—for a mediocre billiard-player will make brilliant hazards and startling shots on many occasions, but poor scoring will result from them, as he has no care for the future position of the balls; while a really good player, whenever he gets a good hold of the balls, scores rapidly, owing to the way in which he works them into easy positions. So it is that a player who has little knowledge of croquet will go banging about the lawn and make astounding shots; and yet, after all, his balls make little progress, and his opponent soon "gets in" again. How often one hears a disappointed bystander—who has come to see the play of a proficient at croquet or billiards—vent his spleen in words like these: "Why, he never made a stroke that I could not have done myself!" Quite so; but you would never have given yourself the opportunity, as the art of the game consists in contriving to leave yourself nothing but easy shots, and as you do not yet possess that art, you would on most occasions have to execute difficult strokes, which may be easily missed.

In speaking, then, of tactics, our endeavor will be to explain...
the proper manipulation of your own ball, both before and after a hit, leaving the execution of the hit itself to the eye and hand of the player. We must prefix our remarks by explaining a few technical phrases, which may be strange to our readers. For "point," "break," "position," "rush," and "finesse," we must refer our readers to pp. 84, 85, Vol. I.

"Dead and live ball" are terms applied to the adversary's balls in reference to the sequence of their play; the ball that has been played just previous to your turn being called the "dead," as it cannot play again until you have had a turn with both balls, and hence, at present, they may be used by you as an inanimate enemy. The ball that will play immediately after your present turn is called the "live" ball, and must be treated with caution, as being alive to avail itself of any slip of yours. This distinction must be perfectly understood and remembered, in order to obtain any idea of croquet tactics.

A player is said to have "command of the balls" when he has made a hit and got all the balls into favourable positions; and he is said to retain that command as long as he continues his turn or leaves the balls well placed for his next ball. The object of finesse is mainly to prevent a player obtaining this command.

A player is said to "get the rush" on a ball when he so places his own ball as to be able to rush the other to the desired spot. He is said to "give the rush," when either his partner's or that it can rush some ball favourably next turn; or else places some ball in front of his partner, so that it can be favourably "rushed" by the partner.

A player is said to "pass the break" to his partner when, after making a break, he leaves the balls so that his partner can avail himself of them to make another break.

You are said to "play into your enemy's game" when you strike your ball into that part of the ground where it will be placed favourably for the play of your opponent with his next ball. Players who know little of the game are perpetually doing this, as they think that the main object of the game is to shoot at some ball, forgetting that, if they miss, their ball is going into a position advantageous to their adversary's play.

A ball is said to be "wired," either when it is placed so that a wire intervenes between it and the ball to be hit, or when it has been driven close against a wire, so as to make it impossible for it to be struck in any direction except towards the hoop. These are very pleasant situations for your adversary's ball, but very disagreeable for your own. In fact, one enthusiastic player declares, that the man who has the heart to disable his enemy's ball by sticking it close against a wire, could rob a hero of his name. My own heart has often been obdurate enough to do the wicked deed, but I have not yet been arraigned as a foul-streaker or forgery.

A ball is said to be "stacked," or "stacked," when one of the sticks takes the place of a hoop in hampering its play.

A player is said to "lay up" near a hoop or a ball, when he ends his turn by placing his ball there.

To proceed to the various ways of opening a game.

The right of choice is decided by tossing; and if you win the toss, elect to begin, as you will probably by that means be the first to get command of the balls. No doubt this sounds very heterodox, as the last place has always been coveted, as giving an opportunity of shooting into a mass of balls lying round the second or third hoop; but it will be seen that all the balls need not congregate in one spot, so that there is no longer such a splendid target for the last ball. Of course, it may hit its partner or partners anywhere, but the chances are against it; and if it does not, the ball that is played first gets the command of the balls.

The method of opening a game varies materially according to the arrangement of the hoops; and the different openings to be described will be applied only to the four-ball game, as the six-ball or eight-ball game only necessitates a repetition of the same process.

To begin with the original positions given on pp. 10 and 22, Vol. I., the first player, after passing through the first two hoops, should strike his or her ball back to the left-hand corner of the ground. [This is better than placing the ball just in front of the third hoop, as the second ball has just as much chance of hitting the "positioned" ball as the third, and if it should hit it, the first player has assisted his adversary's play.]

Supposing, then, that the first ball has been sent into the corner, the second ball, after passing two hoops, may either make the mistake of placing itself at the third hoop, or go the boundary on the other side of the lawn, i.e., the right side, which is the better play.

The third ball then plays through two hoops, and shoots at the second, if it is placed at the third hoop; but if the second ball has adopted our advice, the third tries to hit its partner in the left-hand corner, and if it succeeds, has two courses open to it—(1) to make the bold attempt of "rolling" into position for the third hoop, and continuing its course with the help of the first ball; or (2) placing itself so as to give the first ball a rush down to the second, the object of which will be seen in a minute. Supposing, however, the third ball to have missed, and the first and third ball to be together on the left-hand corner, and the second ball on the right-hand boundary, what is the fourth to do, after it has passed the first two hoops? It must shoot at the second. Why not at the two together? It is the query. Well, if you feel sure of hitting, it is the best game; but, remember, that in case of your missing, your adversary will have the dead ball close to his own, so as to make full use of it; and you will have given him all that he could desire.

We will suppose, however, that the player handling the fourth ball is a "dead shot," and hits one of the two balls, what is he to do with them? There are again two courses open to him according to the ball that is hit—(1) if he has hit the dead ball, i.e., the third, he should get the rush on the live ball, i.e., the first, and croquet it to the end of the lawn, then take croquet from it to the second, and after requesting the second, "split" it up to the third, and place himself at the third hoop; he will then have placed himself at his partner's hoop, his partner near the dead ball and the live ball at the end of the lawn, which is the best of the play; (2) if he hits the live ball, he should get the rush on the dead ball, so as to send it to the third hoop, through which he can continue his onward course by means of its help; and whenever he sees a difficulty ahead, pass the break to his partner in the following way, viz., roll his own and the dead ball down to his partner, take croquet from his partner to the live ball, send it to the end of the lawn, and place himself at the third hoop. The results of these two sets of manoeuvres will be seen in the diagrams, Figs. 1, 2, and 3.

Suppose, however, the player of the fourth ball to be cautious and refuse the shot, what is the first ball to do in case of the fourth missing the second on the boundary? It must be remembered that there were two possible positions—(a) the third ball might have been the first and given it a rush; and (b) it might have gone close by. In the first case the play is very simple; for when the first ball has to play its second turn, it rushes its partner down to the two enemies, leaves it near the dead ball, and then either sends away the live ball immediately and lays itself up at the third hoop, in which state of the game will be similar to Fig. 1; or it continues its turn
with the live ball till it sees difficulty ahead, when it sends away the dangerous companion and places itself as before. It must, however, be distinctly understood, that none but very easy strokes should be attempted with the help of the live ball, as in case of a breakdown the enemy at once gets command of the balls. Next, in the second place (b), if the third ball has not given the first ball a rush, the first ball has a more difficult stroke with which to begin its next round, as it must now "take croquet" from its partner to the two enemies; and this must be done very carefully, as, if it touches the boundary, the turn comes to an end by the Dead Boundary Rule (vide p. 276); if the stroke is successful, care must be taken to hit the dead ball first, and send it with a stop stroke to the third hoop, stopping itself a yard or two from the live ball, which it roquets and sends to the end of the lawn by a split, then returning to the side of its partner, so that the state of the game will be as in the diagram Fig. 2.

It will be seen, then, that in case of the fourth ball not making a hit, the first ball can lay the balls very favourably for its partner's play. The management of the opening of the game depends a great deal on the shooting power of your rival, and it must be varied according to your experience of his capabilities. To give an instance; if he is a very good shot, send the third ball a yard or two to the side of the first, so as not to present a double shot; and there are many other changes.

The opening has been analysed here as applied to the ordinary setting, because so many players only know this, and they will be able to see how croquet admits of good tactics, even with this simple arrangement of the hoops. It is to be hoped that this will lead them on to study the more subtle combinations that arise in connection with the settings used for public matches; for though there is no denying the use of the simpler settings in amusing parties of players, those who are enthusiastic about the game will find a larger fund of pleasure in either studying by themselves the more difficult settings, or trying conclusions at them with some kindred spirits. We will next proceed to openings with the match settings, and their replies.

**QUOITS AND BOWLS.**

**By C. W. Alcock.**

**QUOITS.**

You may, perhaps, be under the impression that skill in quote is an article by no means difficult to obtain. It is possible that the apparent simplicity of the task of throwing an iron ring to fall on or close to a peg not further distant than twenty or thirty yards may have misled you, and that you have found out your mistake when you have made your first attempt. At least, I warn you that you will have to take some little pains before you can hope to become a quot-player of any eminence. You will soon discover your
own shortcomings, if you choose to take the opportunity of witnessing the performances of the adepts who have studied the game until they have made it their profession, and have achieved a degree of accuracy almost beyond belief.

To be a good player at quoits requires a certain amount of strength, but, still more, a natural aptitude for the species of game, as well as a quick eye and a steady hand.

It may not be a very difficult feat to throw the quoit so that it falls within a respectable distance of the peg, but it will be some time, even with an unusual degree of inborn talent, before you can hope to secure a “ringer” with the same degree of certainty as the champions among the ranks of professional quoit-players.

But first you must learn, of course, the technical expressions used in the practice of the game. The quoits themselves are rings of flattened iron—thick at the inner and thin at the outer edge. At each end of the ground is placed an iron peg, known in the vocabulary of the sport as a “hob,” firmly placed in the turf or soil, so as to prevent upheaval.

You will have to select for yourselves, of course, the distance that shall separate the two hob; taking into consideration the weight of the quoits themselves, as well as the strength of the players engaged. Obviously, you will have to be guided by the age and capabilities of the contestants, and you will have to be careful that you do not put too severe a test on your beginners, or you will destroy their chances at the outset.

In ordinary cases, the quoits are estimated to weigh from four to five pounds per pair; and the average distance between the hob may be reckoned from twenty to twenty-five yards.

We will assume, then, that you have had a little practice, by way of a preliminary trial, and that you have so far succeeded as to be able to throw the quoit with a certain degree of precision. You will now have to prepare for the greater responsibility of a game, and try your strength against an adversary, possibly of higher pretensions than yourself.

You will have the privilege of throwing two quoits from hob to hob, as will your opponent; each of you taking care that he adheres strictly to his own quoits throughout the game. I am here, of course, premising that there are only two of you engaged in the strife, and that you throw the quoits from each end alternately, as where there are four players at work, it is customary for one of each side to stand at the separate ends, so that the contest can be maintained without any change of position among the players.

If you have the first throw, you seek, of course, to plant it in the ground as near as possible to the hob; while your adversary follows, bent on improving on your shot, or, at least, interested in either passing your position or casting your quoit from its place of vantage.

When you have each thrown both your quoits, comes the calculation as to which of you is nearest to the hob; and this is of no little importance when the score depends on your success. On the supposition that your two throws are both nearer to the hob than those of your antagonist, you will have the privilege of scoring two; but, on the other hand, should your second quoit have been passed by one of the opposition, you are only entitled to claim one, a measurement easily proving on which side the advantage lies.

You have, though, a better chance still, if you are at all in luck, and that is if you can achieve the distinction of a ringer, as the feat of throwing the quoit so as to cover the hob completely is technically designated. You will have to have acquired great proficiency before you can hope to reach this pitch of excellence, so do not be deterred if you fail for a time, nor be tempted to risk too much solely from the fact that a ringer adds two to your score.

There is an art in the method of holding the quoit, as in most things, so determine to make your first business the attainment of this secret. You will soon learn that you will have to throw your quoit so as to fall with its flat side to the ground, for should it fall with this side upturned, the quoit is considered dead, and is practically out of play entirely.

You will have to hold the quoit, with the rounded side upwards, firmly in the hand, the thumb over the upper part, the fingers tightly clasped round the ring, and the forefinger planted in a small notch on the rounded side of the instrument.

It seems easy enough, my young friend, does it not? but it is not quite so easy of accomplishment, as you will learn to your cost. You will find at first that the flat side will come up, in spite of you, and you will find to your mortification that some of your best shots are nullified by this defect.

You will have to study as much as possible to throw steadily, without giving a jerk at the time that the quoit leaves your hand.

If you hold it properly, with the forefinger as I have just stated, you will find that you have imparted involuntarily to its course a spinning movement, that causes the quoit to fall into the ground with its edge downwards, with a force that will effectually prevent the slightest chance of its removal. You must above all things see that your quoit does not leave your hand in such a manner as to gyrate in the air, as you will find that in this case it will infallibly “waddle” when it reaches the ground, and roll until it turns into a dead quoit, or contains its revolutions until it misses the hob by many a yard.

You cannot hope to secure even any accuracy as a quoit-player until you have overcome this difficulty, so set yourself vigorously to work to master the obstacle. If you hold your quoit firmly, as I have told you, using your strength steadily from the shoulder, instead of trusting to your wrist or elbow, you will not be long in passing, at least, your preliminary examination in the game.

I have shown you, so far, how you are to play quoits merely as an amusement; but as you improve, I have hopes that you will be ambitious enough to seek to make it as much a science as is at present the practice as do the more eminent quoit-players of the day. As you progress, you will find that your requirements become more numerous, as well as that your desire to study the niceties of the game increases in the same proportion.

I know that some of the experienced practitioners object to the use of iron hob, as calculated to jug and cut the edge of the quoit, and that some counsel the substitution of pegs formed of gutta percha, as least likely to injure the instruments themselves and the hands of the players.

The portion of the ground in the immediate neighbourhood of each hob should be formed into a circle, with a surface of clay, tightly pressed together, so as to allow the quoits to adhere firmly to the ground, instead of rolling over, as is usually the case on hard turf. In the centre of the clay should, of course, be placed the hob; and in order to make this clearly visible to the players, it is usual to affix to it a white feather or a piece of white paper, so that its precise position should not be misconceived. Indeed, where “quoits” are much played, it is usual to tend the ground with such care as the turf used for cricket; and as much trouble is taken to see that the clay is kept damp and in good order as is bestowed in preparing wickets in anticipation of an important contest at Lord’s or the Oval.

So do not hesitate to expend some little time and labour in
pursuit of the game, if only by way of a return. You will find much pleasure and enjoyment in the pastime, I guarantee you, if only you have some genuine interest, and put some life into your play.

Remember that until the last you need not despair, so do not be disheartened if the game goes against you at the first. You may have bad luck, and the tide may seem to be setting steadily against you, but there is always hope in the shape of the off chance of a ringer, and the prospect of that is worthy of a struggle until the very end. It may be that you have only your last quoit to throw, but even then the ringer may help you, if you only play up and keep your temper.

You will have to be patient and steady if you wish to excel in quoits, I assure you, so do not be over-confident and fall. You will gain most knowledge by experience, and you cannot learn the arts of a skilled quoit-player in a day.

**Bowls.**

If you wish a game free from all complication and void of any technicalities to confuse, you need not go further than the nearest bowling-green. You may go further and fare worse, though, if you are bent on the selection of an interesting and enjoyable pastime, so bear with me while I attempt to explain the few difficulties that are likely to beset you in the study of bowls.

If you are any respecter of the venerable, you will take to bowls on the ground of its antiquity, for it was a game of universal popularity, if it has of late descended in the competition with other sports of more active character. You will like it, too, for itself, perhaps, if you are one of the modern school with your ideas still unsullied; for it is pleasant enough in all its surroundings to ingratiate itself with everyone who takes delight in the open air, and can find enjoyment in an exercise moderate in its tone, and not provocative of any great display of muscular powers.

If you can see anything refreshing in grass rich as velvet and soft as carpet you will appreciate the game, for you will find both these matters carefully studied, and the proverb of "as smooth as a bowling-green" something more than a mere figure of speech. Indeed, it is an essential that the green should be thoroughly well arranged, or the game will suffer by the contrast.

It is necessary that the turf should be rich and the grass properly tended, as well as closely shaven by means of a mowing machine, or the ground will not be in the order fit for bowls.

You need not be over-anxious that the green should be strictly level, as a slight inequality conduces rather to the advantage of the game, by producing the necessity for a greater amount of skill in estimating the differences of length.

First let me tell you that the bowls themselves are balls made of lignum vitae, or any other hard and heavy wood, the weight and size differing according to the pleasure or capabilities of the players interested.

It is not so easy, though, to manage the course of these same bowls, for they are usually made of the side of the tree; and from the fact that the heart is heavier than the outside, the ball is sure to receive a certain amount of bias, that will baffle the calculations of any but an experienced player. If you disbelieve in the difficulties of bowling without practice, you had better try your hand, and you will soon be convinced.

You will learn that there is an opening for such an amount of tact and skill as you never would have fancied at the first glance.

The game itself is not unlike quoits in some of its main principles, though the instruments used are of different formation, and the talents required are of a different order.

If it is time to commence the game, you will have to open matters by throwing a small ball—round, and after the shape of a cricket ball, though wooden like the bowls themselves—into a remote portion of the green, to act as a target, serving the same purpose as the peg in quoits.

Then comes the series of alternate throws, for it is necessary that meanwhile the several players have been divided into two sides, after the inevitable fashion of British sports.

It is the object of each party, you will readily see, to get as many of their own bowls round the smaller ball—the "Jack"—as possible, of course at the same time impressed with the landlord's desire of keeping his opponents at the most respectable distance.

You will guess that the game is simplicity itself from this explanation; but wait a little, and you will not be so confident. You will have to gain, in the first place, accuracy in your management of the bowls, and this is not so easy of attainment as it looks.

You will have to see that your bowl is delivered strictly upright, or you will be surprised at the extraordinary performances in which it will indulge. You will see it vary its movements in proportion as you deliver it nearer to or further from the perpendicular, and do not be at all astonished if, after a few marvellous gyrations, you find it suddenly fall prostrate on its side, and collapse into total inactivity for the time being.

It is the player gifted with the greatest command over the bowl who can always count on success; and if you were to try your hand against an experienced antagonist, you would soon be impressed with your absolute insufficiency.

You have, though, let us suppose, had your first shot, and you have planted your bowl in the immediate neighbourhood of the Jack. You have then the felicity of seeing your friends as well as foes in turn disport themselves, the one aiming to make your position unassailable, the other to out you from your place of vantage.

It is an open question until the last to which side success will cling, for one good stroke at the finish may possibly scatter all the bowls, and upset all reasonable calculations. It is this uncertainty, after all, that creates a fillip to every sport, so do not be disturbed if your prospects are utterly ruined when you appear to be "in for a good thing."

You will have plenty of opportunities for the display of your skill, so you will have to prepare yourself for the contemplation of every emergency. You will have to be ready to act under different circumstances, either to steer clear of an adversary, or to shape your course to benefit a friend. You will possibly have to face the alternative of either placing your bowl softly immediately alongside the Jack, or of driving forcibly into the bowl of an adversary, to remove him, and clear the course for your own side.

If you are skilful and expert you will soon master the various devices, and you will discover that the most effective stroke of all is that which enables you to circumnavigate your opponents, and steal away with the Jack well in tow. Do not attempt this incursion, though, until you have ripened into an expert, or you will run the risk of ignominious failure, as well as the hazard of utterly ruining your side.

There is many a critical moment in the game of bowls, and you will need all your care and watchfulness to keep you safe, believe me.

You will have need of all your resolution when the Jack is surrounded by bowls on all sides, and on your stroke depends the whole success or ruin of your side.
THE AMERICANS CALL THIS PLANT "BUSYBODY," AND AS IT
BEONGED TO THEM IN THE FIRST INSTANCE, OF COURSE THEY
POSSESS THE RIGHT TO CALL IT BY WHATEVER NAME THEY
PLEASE. IN THIS CASE THE TITLE IS MOST APPROPRIATE, FOR
THE CONVOLVULUS IS NOT EASILY KEPT WITHIN BOUNDS, MORE
ESPECIALLY IN ITS WILD STATE AS BEARINCE; IT SETS OFF AT ONCE TO
SEE WHAT ITS NEIGHBOURS ARE DOING, AND, MORE THAN THIS, IT
TWINES AROUND AND CLINGS TO AND HALF ASSOCIATES EVERY ONE OF
THEM WITHIN REACH OF ITS LONG ARMS.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.

THE CONVOLVULUS.

But in spite of this inquisitive turn of mind, it is a great
favourite, and its flowers are too beautiful for us to turn them
out of the parterre, scentless, it is true, but rich in colour,
and possessing an elegance of their own.

Sad to say, they wither all too quickly—but ours will survive
longer, although they, too, must necessarily be frail and delicate.

Let us make a specimen without further delay.

Fig. 1 must be cut in white paper of a substantial character;
then rolled round, so that it forms a funnel. The marks show
how far the paper is to be folded over and fastened with gum.

Five petals like Fig. 2 are cut out in pink paper of a pale shade,
and placed outside the spiked funnel, arranged so that the edge
of each petal rests on that of each rib. The proper method of
colouring is to paint the inside of the flower with rich purple,
depth at the edge and fainter as you near the centre, shaded as
you see it in the diagram. Then the five strips are coloured
carmine gradually towards the stock.

Fig. 3 represents the little group of stamens you see, which
you will obtain from the seller of those things.

Now that the flower is ready, put the stamens in their place
not a prominent one; pinch the flower at its base, secure it with
thread, fix the small calyx (of which Fig. 4 is the pattern), and
finally curl the petals outwards.

The triangular figure (Fig. 5) shows the shape of the bud—it is
coloured like the petals, and screwed up like you would a corn-
paper, and in this form put into the calyx. So much for con-
volvulus major.

His brother the minor differs a little, and gives rather less
trouble in every respect. In the first place we do not require
Fig. 1, and in the next, all its petals can be cut at once, there
is no necessity for them to be separate, but the semicircle re-
quires to be joined together on one side. Cut it in white paper,
and tinge the petals a rich deep blue with powder cobalt, half
way to the centre; from the centre, and gradually getting
fainter as you approach the base, you tinge with lemon yellow.

In mounting this flower you screw up the base, giving it a
half twist, for you will find that the natural specimen of the
minor emerges out of its calyx in a manner slightly differing
from that of the major.
FENCING.

By Major Hough.

BROADSWORD PRACTICE—THE CUTS—GUARDS—THRUSTS AND PARRY.

Fig. 1—SLOPE SWORD.

RAW Swords.—Seize the scabbard with the left hand just below the hilt, which should be raised as high as the hip; grasp the hilt, turning it to the rear with the right hand; raise the hand the height of the elbow, partially drawing the blade. Draw the sword from the scab-

Fig. 3—GUARD.

bard with an extended arm, the edge to the rear, and lower the hand until the hilt is just below the chin, the blade perpendicular, the edge to the left, the thumb extended on the side of the handle, elbow close to the body. This is the position of “Recover Swords.”

Fig. 4—INSIDE GUARD.

Fig. 5—OUTSIDE GUARD.

Fig. 2—FRONT PROVE DISTANCE.
By a third motion, lower the wrist below the right hip, the arm extended as much as it can be with ease. The upper part of the sword will then be in the hollow of the right shoulder, with the edge to the front. This is the position of "Carry Swords." The left hand quits the scabbard directly the sword is drawn.

**Slope Swords.**—Move the hand to the front in line with the elbow, which is close to the body, with the sword resting upon the shoulder. (Fig. 1.)

**Prepare for Sword Exercise.**—Turn body and feet to the "First Position," with the left hand resting upon the hip, and thumb to the rear.

**Right Prove Distance.**—"Recover Swords," then extend the arm to the right, and lower the sword in a horizontal direction from the shoulder, with the edge to the rear.

**Slope Swords.**

**Front Prove Distance.**—"Recover" as before, then step out to the "Third Position," and extend the arm, lowering the point of the sword to the centre of the target, with the edge to the right. (Fig. 2.)

**Slope Swords.**

**Assault.**—Raise the arm to the front, with the wrist opposite No. 1, and the back of the sword resting on the shoulder, with the edge inclined to the right.

**Cut One.**—Cut in a diagonal line from No. 1 to No. 4; and as the point clears the circle, turn the knuckles upwards, and continue the sweep of the sword so as to bring the point to the rear of the left shoulder, upon which it rests, with the edge inclined to the left, and the wrist opposite No. 2.

**Cut Two.**—Cut from No. 2 to No. 3, and turn the wrist so that the sword point comes below the right hip, edge downwards and elbow bent inwards, and wrist towards No. 2.

**Cut Three.**—Cut diagonally upwards from No. 3 to No. 2, and continue the motion of the wrist and arm in such a manner that the point of the sword shall be below the left hip, edge downwards, the elbow bent, and raised with the wrist towards No. 1.

**Cut Four.**—Cut upwards from No. 4 to No. 1, and turn the knuckles downwards, with the edge of the sword to the right, and the point to the rear over the right shoulder, the elbow bent, and the wrist towards No. 5.

**Cut Five.**—Cut from No. 5 to No. 6, and turn the knuckles up, with the edge of the sword to the left, and the point to the rear, over the left shoulder, the elbow bent, and the wrist towards No. 6.

**Cut Six.**—Cut from No. 6 to No. 5, and bring the hand in the direction of No. 7, the sword being brought directly over the head, point lowered to the rear, edge uppermost.

**Cut Seven.**—Cut down from No. 7 to the centre of the circle, (no further, mind), and remain with the arm extended, placing the thumb long the back of the handle, and the left shoulder well pressed back.

**First Point.**—Turn the edge of the sword up to the right, and draw the wrist back just above the right eye. By a second motion, deliver the point in the direction of the centre of the target, with the wrist raised inclining to No. 1, pressing back the left shoulder so as to advance the right.

**Second Point.**—Turn the edge upwards to the left, draw the hand back to the centre of the breast, the thumb being on the right of the handle, and give point as before, the wrist raised and inclining towards No. 2; nails up.

**Third Point.**—Draw in the hand to the hip, turning the handle to the right during the motion, so that the edge of the sword is uppermost; and the guard touches the back of the hand. Then deliver the point towards the spot marked at the bottom of the target, and raise the wrist towards the centre.

This represents the attack, and according to the theory of the old trooper should end the lesson. You know the story. A cavalry regiment had been much cut up in some campaign, and recruits were wanted in a hot hurry. A groom having been persuaded to enlist was, therefore, sent off to head-quarters, directly it was discovered that he understood about horses, and could ride, without receiving any further instruction, and it so happened that he joined on the eve of an engagement. Like most horsey men, the recruit was shrewd, and it struck him that he would be at a disadvantage if the regiment had to charge on the morrow. So he made friends with a veteran of his troop, and promised to give him a drink if he would teach him the sword exercise. The old soldier agreed, taught his pupil the cuts most carefully, and then announced the lesson at an end.

"Ah! but I shan't like to learn the guards!" cried the recruit.

"Guards!" politely returned his Mentor; "you kill the other fellow right off, and he won't hit back again. What's the use of guards? Come and let's have that drink."

There was something specious about the soldier's reasoning; but I think that as there is no battle coming off to-morrow, and we have plenty of time, we had better complete our education.

**First Guard.**—Keeping your position in front of the target, place your sword exactly opposite the dotted line marked "First Guard," so that it corresponds with it. The edge must be turned to the left, as the cut to be guarded comes from that direction; for edge must always be opposed to edge. Let the elbow be close to the body, the wrist to the front. The left shoulder in this and the other guards on the inside should be kept back; in the outside guards the "Seventh" and "Parry" rather brought forward.

Nails up; point of sword inclining to the front.

**Second Guard.**—Turn the nails down, bringing the edge of the sword to the outside, and let the sword correspond with "Second Guard" on the target.

**Third Guard.**—Turn the wrist and edge to the left, a little below the shoulder, with the point lowered to the right, the sword corresponding with the "Third Guard."

**Fourth Guard.**—Turn wrist and edge to the right, with point to the left, raising the elbow as high as the shoulder; the sword corresponding with dotted line marked "Fourth Guard."

**Fifth Guard.**—Turn the edge to the left, raising the wrist as high as the shoulder, to the left front of the body, letting the sword correspond with the "Fifth Guard."

**Sixth Guard.**—Bring the sword across the body so as to be exactly opposite the "Sixth Guard," binding the wrist.

**Seventh Guard.**—Raise the wrist above the head, keeping the elbow well back, and let the sword correspond exactly with the dotted line marked "Seventh Guard."

**Parry.**—Lower the wrist till it is close to the right shoulder, the edge outwards, to the right, the hips well pressed back. Then turn the wrist so that the point of the sword sweeps downwards towards the left rear, forming a circle from left to right, and returning to its former position.

To secure the edge leading in the cuts it is well to practice those which take the same line in the reverse way several times together, e.g., Cut 1, and then immediately Cut 4; then combine 2 and 3, 5 and 6.

The cuts, guards, thrusts, and parry, having been thus learned in the first position, the three engaging guards are now to be acquired, and the cuts and guards combined. The cuts and points should be given from the wrist to the full extent of
the arm, and in the third position; the guard and parry formed in the first position, in which also prepare for each point.

**Slopes Swords.**

_Hanging Guard._—Advance the wrist, and raise it to a level with the top of the head, extending the arm, and turning the elbow outwards, and the point of the sword down and inclined to the left, edge upwards, at the same time step out to the second position, bending the body, drawing in the chest and neck, and bringing the left shoulder a little forward, and looking at your adversary or the target under your hilt. This is the guard generally adopted in loose play. (Fig. 3.)

_Inside Guard._—Raise the head and body, lowering the sword hand with the nails up; point of the sword to the front, the edge inwards; elbow in front of and a little above the hip; at the same time make the “Single Attack” with the foot. (Fig. 4.)

_Outside Guard._—Turn the nails down, bringing the edge of the sword outwards, and repeat the “Single Attack” (Fig. 5).

Now go through the cuts and guards in combination.

Cut one and third position.

First guard and first position.

And so through all of them; springing in each instance from third position to first.

When two pupils can do this steadily, they should be placed opposite each other, and cut and guard alternately, viz., both being at the hanging guard, at the word _One_. One of them forms the first guard in the first position, and the other makes the first cut upon it in the third position; springing up to the first position, and forming the second guard to receive the second cut from the other at the word _Two_. And so on.

When the sword is exchanged for a stick, and a mistake in the formation of a guard would, therefore, be of slight consequence, alternate cuts and guards which do not follow in the regular order should be combined. There are several of these practices ordinarily adopted before loose play is commenced. This is one—A and B are opposed.

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**RIDING.**

**BY WAT BRADWOOD.**

_HUNTING—FIRST FENCES—HOW TO RIDE TO HOUNDS—DUTY TO ONE’S NEIGHBOURS, ONESELF, AND HORSE._

On some steady old fencer, who has no idea of refusing or of rushing, let him ride at his first obstacle. His “hunting” seat should not be quite the same as that which he would adopt for a long plain ride, or park parade. The stirrups should be a hole shorter, and the feet well home in them, up to the instep. This will bring him well down in his saddle, and though he will lose the elasticity of ankle and instep which, with the stirrup under the ball of the foot, makes all motions of the horse, especially the trot, play so much easier upon the human frame, he will have at once a firmer seat, and avoid the risk of losing a foot from the stirrup as he alights from a fence.

Let him come steadily at the fence, allowing the old hunter to take his own pace. (It is a mistake to make a habit of shoving a horse fast at a fence, unless there is a chance of his refusing, or width to be cleared on the further side. It teaches him to rush, which some day, in a cramped corner, may bring him to grief, and, moreover, when by any chance it becomes really necessary to negotiate a place at a slow pace, the horse, from want of being driven, fancies his rider irresolute, and probably refuses.) Get a lead given you if you can, and it will give you confidence.

Keep the knees well in, hands down, body upright. Do not lean forward as if to see what is on the other side of the fence. Sit still till you feel the horse raise his forequarters to the jump; then, as he springs with his headquarters to project his whole body over the fence, throw your own body well back, so as not to be canted forward on to the pummel, and perhaps out of the saddle by the concussion of his alighting.

We have known some riders, of both sexes, who from fidget, nervousness, or awkwardness, could never get themselves to swing the body well back by the ordinary motion, but always sat
forward, as if trying to see where the horse was going to place his forefeet, and as a matter of course got cantled forward (if nothing worse), in an ugly and uncomfortable manner. In such cases the natural balance may be acquired by teaching the rider to strike the horse with the right hand on the haunch as he rises to his fence. The whip should not be used if the horse does not require it, but the blow struck with the open hand. This will swing the body back, at the same time the hand, striking against the haunch of the horse, will there stop, and so prevent the body from losing its equilibrium by the hand swinging round behind it unsupported.

Give the horse his head as he rises to his fence, not by dropping a slack rein (else you will jerk him in taking it in upon landing, or not take it up at all, and so lack control), but by letting the arm play quickly and freely out from the shoulder as his neck stretches out. Then, as he lands, play the arm in again, ready to control him, or to support him in case he should blunder on landing.

Do not allow yourself nervously to snatch at the rein as the horse rises, as if to save yourself from slipping back out of the saddle. That will only cramp the horse’s action (for he must stretch out his neck to jump), baulk his spring, and bring both you and him to grief.

An easy hurdle or two will be the scene of your first essay. When you have learned to sit still and not to show daylight over the saddle at such easy obstacles, attempt something bigger, and go sometimes a little faster at your fences, that by seeing how much ground you have cleared on the landing side, you may acquire confidence to ride at fences that involve width as well as height, brooks, etc., and may judge the pace at which you must go at them. The greater your fence and the deeper your drop on landing, the more must you sit back. This precaution, and the tightest grip with your knees that you can muster for the instant, will not only maintain elegance and security in your seat, but will be a safeguard against your being shot unexpectedly over your horse’s ears should he suddenly refuse (still worse should he whip round into the bargain), especially when you are going fast at an obstacle.

If you do fall, remember a golden maxim, stick to your reins, unless your horse kicks you or you are stunned by the fall.

Throw your heart over a fence, and the horse will be pretty sure to follow it. The least indecision in your own mind instills itself instantly into your action, and the horse feels that your mind is not made up. If you are undecided, too probably he will also be in the same mind. The more you ride the more will you feel how instantly and unconsciously the will of the rider communicates itself to the horse.

When you have gained confidence sufficient, both in your horse and yourself, to ride at ordinary fences which you know beforehand are negotiable, you will be ready to present yourself in the hunting field. Once there you will be astonished to find how, when the blood is up with excitement and example, both of you rise, literally, to your work. Hesitation and refusal should be out of the question for ordinary and practicable fences; certainly, if you do not demur, your horse is not likely to do so for you, when he sees his own species leading him the way in which he should go.

Above all, as we have repeatedly said, the hand cannot be too light, especially in negotiating awkward, cramped, or “soft” sort of places. It is astonishing what can be done by a light hand and a heart in the right place.

A good horse so handled will perform successfully what is required of him, while a far more “made” hunter, ridden perhaps by a man with as strong a seat, if not stronger, than his predecessor, will come to grief, or refuse, from want of the above-mentioned qualities in his rider. The great merit of the late Mr. Asheton Smith’s riding to hounds, and the secret of his success, lay in his especial possession of these two qualities.

His seat was not a particularly powerful one. Many a man who could have kept a better seat on a restless horse, as a proof of strength of seat, had never a chance with the late master of the Quorn and Tedworth, when it came to holding each his own line to hounds. And it is not always that the “manners” and stamina of hunters themselves have so much to do with the position of a rider in a run. The manners of a horse lie in his mouth, but it is handling that brings them out or destroys them.

Many a horse fetches a fancy price of three figures, simply for what he has been seen to do when lightly and pluckily handled. The looker-on thinks it all the horse that does it; and does not grudge his cheque-book that he may secure the paragon, and go and do likewise on himself. Yet when in the saddle he finds his new purchase no more marvellous than his own previous mount, on which he showed to such comparative disadvantage; and his spleen rises within him as he notes some off cast of his own stable, on which he never saw more than the first five minutes of a “good thing,” careering away in the right place, when nursed in the right hands, and bearing the right heart in the rider who handles him.

To teach a tyro to ride to hounds by mere book-work would be a sheer impossibility. Lessons in that line should be practical, not simply theoretical. However, a few standard maxims may be recapitulated, and borne in mind. Some of these maxims concern his own welfare, some that of his fellows in the field.

For the sake of his duty towards his neighbours, the last-mentioned claim prior notice.

Let him keep his own line. By that we do not mean necessarily that he is to cut out his own line for himself, or to ride straight; if neither his own powers and nerve, nor the capacities of his mount admit of it, he is welcome to ride to a leader, and to dodge in and out like a hare from field to field, if he will.

But he should scrupulously avoid crossing any other rider at a fence, or attempting to take an obstacle at a time and at a place that is not his own. If the place that falls to his lot in a fence does not suit his nerves or his powers, he must at least wait till the coast is clear before he attempts to deviate from his track and to poach upon that of somebody else who has made a more wise or fortunate selection. Neglect of this will bring himself, as well as others, to grief, and burdens the perpetrator with unpopularity, and most probably a good deal of uncomplimentary language to boot.

If he rides to a leader, let him keep at a safe distance in the rear, and not press upon his heels. The least that he can do in return for gratuitous pilferage is not to risk the limbs of his pilot by following him so closely that he must of necessity land upon him if the leader should fall at a fence.

And, for the sake of the sport of the field in general let him remember, (1) not to head the fox when he is breaking cover, nor (2) to halloa till he is well away, else he will, nine times out of ten, double back at once to cover, and most probably into the mouths of the hounds. (3) Let him keep his eyes and ears open as he waits at cover, not only for his sake, but for the sake of public information, if he should be asked if he has seen the fox break at his corner, or cross the ride in which he has been standing. (4) Let him beware how he overrides the hounds.
Even where a man goes well, and holds his own line, such suicidal and jealously selfish conduct will earn him wholesale censure. Still more so if he is one of those who are never conscious at the heels of the pack except when the latter are casting, or slowly hunting a cold scent, at a pace that enables the whole field to be present, and to make their way through land-gates.

For his own sake the tyro should bear in mind the following rules:

To start well from cover; this he can do without rushing off the instant he sees a couple and a half of hounds on the scent. He must give the pack time to get clear and away, and then look out for himself. If the cover is a big one he will have scope for the exercise of his judgment. He must move about, to some extent, according to the direction in which the hounds are drawing, or running, supposing that they have found, and are rattling their fox about the cover. At the same time he need not go into the reverse extreme, and gallop up and down sticky rides all the morning, till his horse has nothing left in him for an afternoon gallop, when at last the fox is persuaded to break.

In such a case knowledge of the country goes a long way; foxes will take very similar lines, according to the locality of the nearest haven of refuge, and an old stag in the field, who knows every yard of the country, will be valuable for the new-comer to watch. He will be sure to be on the alert at the most likely spot for the fox to break. If, however, the tyro does lose the start, he need not "bucket" in pursuit. He had better hide his time, holding on at a fair hunting pace for the first ten minutes or so, keeping his eyes open for a turn of the line in his favour, or for a check which may enable him once more to get on terms with the pack. It stands to reason that if the run is a mere burst, it will be over as soon as—if not before—he overtakes the leaders, and fast running will be so much waste of his horse's powers for a second fox. If the run is going to be a long one, then the more reason why he should economise his horse if he is emulous to see anything of the finish.

It is poor consolation to have just caught up the vanguard of the field, and then to find that the severity of the pace has so pumped your horse that you can no longer hold the vantage you have struggled so hard to regain. If the run is going to be one of duration, and your horse has enough in him to spare, not only to last the day, but to make up his lost ground, the chance will come sooner or later (even if there is no check, and it is long odds that there will be one), and a straight half mile of sound turf, or a distant vista of the field swinging round to right or left, will give you the chance of putting on steam or cutting a corner, if you feel meantime satisfied, from your horse's manner, that he has enough "go" in him to bear a little liberty being taken with him.

**Butterfly and Moth Collecting.**

*By the Author of "The Lepidopterist's Guide."*

### The Chase of the Fritillaries.

INE weather in "the merriest month of May," brings the Bath White (*Pieris rapae*) which makes, or rather ought to make, its appearance, for until of late years it seems to have shown but little disposition to colonise upon our hospitable shores.

Perhaps the fact (we don't mean the price of a passage over the Channel, but provisions for the sustenance of the creature;) for Johnson gives both meanings, and cabmen frequently apply the same term to individuals, we therefore consider it necessary to explain) we have to offer—wild or wild mignonette (*Ruta ruta* and *Rutea*); and wild kale or cabbage—may not possess the requisite flavour; at any rate, it still remains a great rarity in our collections.

We are sorry to say that the greed and depravity of some connected with the British insect market is such that many so-called English "specimens" of the Bath White are in reality merely "foreigners," which have been palmed off by unscrupulous dealers upon unsuspecting dupes, who innocently exhibit their treasures (?) as true Britishers.

*Daplidice* may be described as of about the size of the Small White; but the fore-wing has a black tip in which there are some distinctive white spots. There is a black spot of considerable size towards the middle of the wing, and another—sometimes indistinct or not strongly marked—near the anal angle of the wing. The under sides of the hind wings are greenish spotted with white, somewhat after the manner of the Orange-tipped, a point of resemblance to which we have already alluded.

The greater number of the specimens which have occurred have been captured on the south or south-east coasts.

There is an anecdote told by a reverend rector, who was also a first-rate collector, but whose cabinet was as yet unadorned with *daplidice*. He tells us how one fine sabbath morning, when on his way to church, the sight of a real live fluttering Bath White tempted him more sorely than ever anything else could have done.

He confesses (though not "High Church" we believe) that he did for a moment waver between duty and *daplidice*, but to his credit he concluded in favour of the former, for, as he justly remarked, "In the face of my congregation I could hardly cry 'Hats off, and to the chase!'"

Of course, had it been any other day in the week, *daplidice* would have graced the reverend gentleman's collection, for P. D. is not a strong flier, and our parson was a comparative hawk upon the insect tribe. It certainly was hard luck—6 to 1 against the occurrence, on that particular day of the week.

A species remarkable for its weak powers of flight, the Wood White (*Lepidoptera sinapis*), inhabits woods in various parts of the country, but, though very local, is far from scarce.

There are two broods of it—one in May, the other in August; and enterprising nomenclators, from Hawarth upwards, have made futile endeavours to "split" them into two species.
It is a comparatively small butterfly—not so large as the Orange-tipped—and is white, with a blackish or dark tip to the fore-wing. Its wings are narrow, and its body slender.

When imprisoned in a box, it quickly digresses itself, and should therefore, when captured, be at once killed.

On our first acquaintance with the species—not far from Eyeing—we thought the thing was a crippled White, but curiosity prompted us to net it; after which our morning’s work was cut out for us.

It feeds on various weeds, such as Vicia, Orobus, Lotus, Lathyrus, and the like, and should be in the caterpillar state in June and September. The caterpillar is green, with a yellow stripe on the side.

In May, also, and again in August and September, our hedgerows and lanes are enlivened by the presence of the Wall (Hipparchia genava), or Wall Fritillary, as it is often called, though it has not the most remote connection to that group of butterflies. It is allied to the Speckled Wood, already mentioned, and may be described as fulvous—i.e., tiger-coloured—with rich brown markings, and a white central spot towards the tip of the fore-wing. It is very abundant everywhere.

The Small Heath (Chortoicetes phaonius) is equally common from the end of May to September. It is a tawny little thing, with a blackish spot near the tip of the fore-wing, and its general appearance is very uninteresting.

Its larger congener, the Large Heath (Chortoicetes tiphon), though inconspicuous for its beauty, is a far more interesting creature, not only on account of its restricted geographical distribution—which is confined to the northern counties and to Scotland—but also from its wonderful variability—a peculiarity which has led many of our best lepidopterists astray.

All sorts of names have been bestowed upon its different varieties, or rather, “races”; and for many years the insect has gone in our cabinets by the name of danaa. Tiphon, however, is the oldest, and consequently the correct name.

It varies from pale buff to dusky brown, and the spots on the fore and hind wings are also very uncertain as to number and intensity. Sometimes we find two on the fore-wing, and four on the hind-wing; at other times none at all.

Tiphon flies in June and July over the northern moors and “moors,” and is also to be met with on the slopes of certain hills in Scotland; so that, although the areas of its occurrence are very few and far between, it is not particular as to altitude.

The first of the three Fritillaries (the genus Argynnis) makes its appearance in the genial month of May.

“The Pearl Borderer” (A. euphrosyne) may be met with in woods, especially those in which the Bugle (Ajuga reptans), Bluebells (Campanula), “Ragged Robin” (Lychnis flos-cuculi), and its food plant, the Violet (Viola canina), grow.

It flies merely along, stopping occasionally to kiss a flower and to sip its nectar, and is not very difficult to capture.

Its near relative, the Small Pearl Bordered (A. selene), has similar habits, but occurs nearly a month later on in the season, before euphrosyne is over; so that the two species may now and then be found gambolling in the same wood.

Both are double-brooded, reappearing in August. They are widely distributed, and by no means scarce.

They are of a bright fulvous colour, spotted with black; and their upper surfaces are so much alike that at first sight one is puzzled to tell “t’other from which;” and it is not before we have examined their under surfaces that we are enabled to arrive at a definite conclusion as to their non-identity; just as Alice, in her wonderful adventures “through the looking-glass,” was unable to distinguish the brothers Tweedle one from the other, until she had had a look at the back of their coat collars, when she at once discovered which was Tweedledum, and which Tweedle-dee.

*Bephrosyne* possesses only one large central silvery spot on the under surface of the hind wing, whereas *Selene* is blessed with more; and, moreover, the under-side of the latter is considerably darker than that of the former.

Here we may as well mention the other Fritillaries. There are the Silver-washed (A. paphia), the Dark Green (A. agasia), the High Brown (A. adipe), and the Queen of Spain (A. latona). The name of the latter—the Latin name of the goddess supposed to preside over births—seems a very inappropriate one for the species, since, so far as Britain is concerned, it is propagated anything but freely, and still remains a rarity with us.

A great similarity in the colour and markings of the upper side runs throughout this family.

The Silver-washed (paphia) is the largest; female examples sometimes measuring three inches across the wings, from tip to tip.

It is well named, for its under-side appears as if it were washed with silver—a peculiarity which at once distinguishes it from the rest of the group.

It frequents woods in the south, and is a strong and rather high flier, and, in common with its allies and other butterflies, has the habit of returning to the same places which it had recently visited; it is therefore well to take up a station in the course of the insect’s flight, and to strike whenever we get a chance, for it is of little use to give chase.

A handsome black variety of it, called *valexia*, seems to be peculiar to the New Forest, where it is in some seasons obtained in considerable numbers. The time to make its acquaintance is July and August.

Then come two other Tweedle-dums and Tweedle-dees, *adipe* and *agalia*, the upper sides of the males of which are not readily distinguishable, though a glance at the undersides soon settles the question. In each we find about twenty spots on the under surface of the hind wings; but in *adipe* there is a cast of reddish colour in the markings, and there are silvery spots towards the tip of the fore-wing, near the margin in *agalia*, which are absent in *adipe*.

The females, on the contrary, are very different, that of *agalia* being much the darker.

Both frequent downs, woods, and heaths; and we have frequently induced *agalia* to come within our reach by means of a pinned female. In fact, almost anything bearing a resemblance in colour and size to them will so far excite their curiosity that they not unfrequently swoop down close to the object. Indeed, on one occasion, it is recorded on first-rate authority that one of the Fritillaries paid delicate attentions to the knob of a gentleman’s umbrella which happened to be of the requisite tint. Both fly during the month of July; *agalia* being the larger insect of the two.

*Adipe* has not unfrequently been mistaken by beginners for the Queen of Spain (A. latona), but no one who has ever seen a *real latona* would ever commit such an error, for in addition to the margins of the wings of the latter being more angular, the silvery spots on the under side, towards the base of the wing, are considerably larger—oh! very much larger—to say nothing of *latona* being the smaller insect.

We have never had the good fortune to meet with the insect in Nature, but have seen it alive freshly pinned by a collector, who captured it in the clover-fields at the rear of Dover Castle. Should any of our readers stumble upon it, we shall be glad of a line from them.
A group closely allied to the foregoing is named Melitaes, it contains but three species, all of about the same size, i.e., a little under two inches from tip to tip of the fore-wings. These also are called Fritillaries, but differ from the true ones in that though the colouring of the upper surface is very similar, the pattern of Melitaes may rather be described as tessellated; and, in addition to this characteristic, there are no silvery markings upon the under-side.

The first of the three composing the company (limited—for we assure our readers that they are all limited in more senses than one) is cinxia, otherwise called the Glanville Fritillary, an exceedingly local species, though usually abundant where it occurs.

When we have named the Isle of Wight, Folkestone, Peterborough, Stowmarket, and Falluland, we think we have enumerated the situations in which there is a possible chance of making the acquaintance of the Glanville. My brother editor, Mr. Stainton, in his excellent manual—of which he really ought to reproduce a fresh edition—has an excellent account of the habits and habits of this coveted fly, from the Alpha to the Omega of its existence. This article was originally written by the late Rev. J. F. Dawson for the pages of the Zoologist, where it may be found at page several thousand some hundred and something.

We extract the following:—"It is not to be expected in cultivated districts, but breeds on steep and broken declivities near the coast, which the seythe or the plough never as yet have invaded, and in such spots it may be met with earlier or later in May, according to the season. Near Sandown, on the side of the cliff, there is one of those broken declivities, occasioned by some former landslips, covered with herbage, which slopes down to the beach. A pathway leads to the base. On the 9th of May, a hot sunny day, each side of this pathway was completely carpeted with a profusion of the yellow flowers of Anthyllis vulneraria (var. maritima) when I visited the spot, and these flowers were the resort of an abundance of these Fritillaries, which fluttered about them or rested on their corollas, expanding and sunning their wings, and presenting a most charming picture of entomological loneliness. The great abundance of the narrow-leaved plantain, which also grows there affords food for their larvas."

Mr. Dawson added a good deal more concerning the history, particularly of the earlier stages, of cinxia, but we think the above will sufficiently enable the reader to spot the insect.

Melitaes No. 2 is athalia, or the Wood Fritillary, also a very local species, occurring only in the South of England. Athalia is a little darker than cinxia, and on the under side of the hind wings we find that both have the ground colour of a creamy straw colour, and both have several rows of markings, but in cinxia these partake of the character of dots; whereas, in the case of the other species they may be more accurately described as lines; there are other characters, but the difference mentioned will alone amply distinguish them.

As we have had no personal experience of the habits of this interesting species, we quote the late Rev. Tress Beale as follows:—

"Chief locality Knock Wood. They are generally congregated in one particular spot—an open heathy place where the underground is of about one year's growth. The metropolis is mostly changed every year; for instance, I could point out four different places which have been occupied during the last four years. Stragglers are of course to be met with in other parts of the wood. They are fond of basking in the sun on thistles. When in the net they generally feign death, close the wings, and contract the legs."

Number 3, the last of the genus artemia, commonly called the Gossy Fritillary (not a pretty name, by-the-bye, for a wood nymph), differs from the preceding two in many respects, but we need not mention more than that the ground colour of the under side of the hind wings is yellowish with orange bands, and that there is only one row of black spots near the hind margin. Though a local species, it is not nearly so local as its congeners.

It delights to frequent moist meadows in June. All three feed on plantain, but artemia will also feed upon Scabious (Scabiosa succisa), Germendier (Teucrium scorodonia) and Fox-glove (Digitalis purpurea).

Our first association with this insect at the Holme Bush in Sussex is connected with an incident which taught us a lesson in collecting beetles which we are not likely ever to forget.

Our companion, a worthy doctor, appeared to us on the occasion, to be demented, for he occupied himself for a considerable time in cutting turf and throwing them into an adjacent pond, with what object it seemed at the moment impossible to guess. We afterwards found out that there was at any rate method in his apparent madness, for every beetle concealed in the sods soon took measures to extricate themselves from suffocation, and appeared in succession upon the surface of the water, where the eagle eye of our friend speedily detected them. Our first attention was called to the fact by a short of, "By Jove, K., I've got a Lebia erus minor!" and so he had, and he bottled several more before the day was over—ex uno disce omnes.

Let us see if we were speaking of "the gossy," let us now introduce our readers to more aristocratic society. The Duke of Burgundy (Nemeobius lucina), at your service, that is, if we can "happen" on his grace, for he is by no means a vulgar species, to be captured everywhere! Oh, no! the Duke of Burgundy is a local species, hardly occurring in the north of England, but yet not so very great a rarity in the south, though we believe it is never taken in abundance.

This species is small in size for a butterfly, measuring from an inch to an inch and a quarter across the wings, and resembles the Fritillaries in so far that the colouring of the upper side is similar, though the colours are conversely disposed, for the brown tints in this case may be correctly described as the ground colour, and the fulvous as the markings. Towards the middle of the wings there are two broken bands of fulvous tawny spots; and a marginal row of similar adornments, each being dotted with black. Underneath, on the hind wing, lucina has two bands of white spots, one at the commencement of the wing the other at the middle.

This anomalous family contains but one genus and species, (Nemeobius) which has no other representative in Europe, the family Nepticide to which it belongs, being an exotic group of insects.

It was the Rev. Harpur Crewe, we think, who first discovered in this country the caterpillar, which feeds upon the primrose (Primula vulgaris).

"Pale primroses,
That die unmarried are they can behold
Bright Phoebas in his strength."
WHEN midsummer is passed, the poppies open their crumpled petals to the sunshine, and, shall we confess it, the odours which the breezes waft far and wide are unpleasantly strong.

which the spider enwreaths the hedges, the light summer shower only brightens them by its spangles, and the soft winds but ruffle them to display their beauty.

Sometimes these flowers are like white gauze; again they

glow in brightest scarlet or deepest crimson; or their petals are tinged with a purplish blush, or edged with a rim of rose colour.
ROUND GAMES.

By James Mason.

Cross Questions and Crooked Answers—Acting Rhymers—The Ten Birds—My Lady's Toilet, or Twill the Trucks.

The pods of the natural poppy are prepared specially for this use, and can be bought at the shop where you obtain your other materials. The seed-vessels one sees ordinarily are foreign ones, and would be too gigantic for our English flower.

All the elements being ready, the first thing is to fix the seed-vessel to the stalk, and then to slip on one after the other petals one, two and three. Now, the petals of this kind of poppy look wild and confused in their natural state, so we must try and make these of paper resemble those in that condition. I should crumple and crush them a little now they are mounted, and make them mingle their points together.

The four outer petals are now put round; these adhere to the others for some little distance—say as far as the purple shade extends—and the remaining portion of the petals, although not actually fastened, still clings to the other crumpled petals, and forms a cup out of which they look out. This poppy has no calyx, so that you will have to be particular to make the petals fit very carefully and neatly round the stalk of the flower.

To any question. You must imagine a question for yourself.

Every one whispered in accordance with David's directions. Our friend, whilst this was being done, stood aloof from the company, so that he could hear nothing of what passed between the players. But when every one was in possession of an answer communicated by his neighbour, David came forward and said—

"I shall now ask a series of questions—any that occur to me; and each of you must reply to the question addressed to him by giving the answer confided to his keeping. John," he went on, turning to John Ferguson, "How are you?"

"As mild as the moon."

"Have you any news, Emily?"

"Outside the window."

"Alice, we are friends, are we not?"

"Hot and cold."

"Are you fond of dancing, Notes-and-Queries?"

"I "if you could hear your hair growing."

"Do you enjoy life, Arabella?"

"Trimmed with point-lace."

"Is the fire burning, Tom?"
"In the deep sea."

In this way the questions and answers went on, and we extracted a good deal of amusement out of this conversational nonsense; the questions and answers being often ludicrously at variance.

"The game," said John to Kate, "remembers very closely those conversational cards of Maggie's, with which you and I played here a good long time ago." (See p. 163, Vol. 1.)

"Yes," said David, "it is much the same; but I think in some respects it is rather an improvement on conversation cards. Amusement manufactured at the moment is usually better relished than that which has been prepared beforehand. The only difficulty about cross-questions is to frame such questions as to allow all sorts of answers being suitable."

"That you seemed to get over well enough. Let us have another round of the game," said Alice.

We had another round, and John Ferguson took David's place in asking the questions.

Then we played at Acting Rhymes.

"We must choose a word," said the Laughing Hyama, "and then, by dumb show, indicate all the words that can possibly rhyme with it. What is the word to be?"

"Let it be shoe," said John Ferguson; "it has a great variety of rhymes."

We were still sitting in a half-circle, and it was agreed that we were to play in the following fashion:--The player at one end of the half-circle was to express a rhyme by action, and the player at the other end was to name it aloud; then the players the second from the two ends were to do the same; then those the third from the two ends were to follow, till at last it would happen that the player who acted the first rhyme would name the last aloud, and he who named the first would act the last. David sat in his chair. He stretched out his hands and appeared to grasp something. Then he began to pull away steadily, his eyes looking right before him.

"I see that you know how to row," said the Reporter, who sat at the other end of the half-circle. "Row" was David's rhyme.

Emily stood up, turned round sideways, held out her left arm straight before her, drew back her right, which she bent so as to have her hand about on a level with her ear, and keeping her eye fixed, appeared to be taking aim at a distant object.

"The archeress now bends her bow," said Tom.

The Princess laid some little pieces of torn paper on the back of her hand, and, with a breath, sent them flying on to the floor.

"Soft the western breezes blow," said Maggie.

Notes-and-Queries, rising, laid hold on an imaginary implement, and, bending his back, began cutting down an imaginary crop, stopping every now and then to wipe the sweat from his brow.

"See him trying hard to row," said Alice.

Arabella pretended to be very industriously mending a rent in a glove.

"This is not a time to sew," exclaimed the Laughing Hyama.

John Ferguson walked over to where Tom, our small boy, was sitting, laid his hand on his head, and indicated by various gestures that he was no size to speak of. Then he raised his hand gradually till it had reached a height of about six feet, when he nodded and returned to his seat.

"Wait a little; Tom will grow," said Kate.

It was Kate's own turn now to act a rhyme. She rose, made a little movement first in one direction and then in another, and looked so plainly what she meant, that John Ferguson at once said, "Where do you intend to go?"

The Laughing Hyama put himself into a fighting attitude.

"May you conquer every foe," said Arabella.

Alice walked at a small pace to the other end of the room.

"You are going very slow," said Notes-and-Queries.

Maggie covered her face with a handkerchief, and made believe that she was sobbing away and quite overwhelmed by grief.

"What a spectacle of woe!" said the Princess.

Tom made himself as like a bird as possible, flapping his arms instead of wings, and immediately inducing Emily to say, "You are something like a crow."

The Reporter lifted up his hands in token of astonishment at the success with which the players had imitated and discovered the various rhymes, and it was allowed that he had said "Oh!" as plainly as attitude and grinaces could speak.

"Had any one failed," said David, "to find a rhyme or act it well, he would have had to pay a forfeit."

"Shall we have another round of Acting Rhymes?" said Alice.

"No—no," said the Princess. "I think we should have The Ten Birds."

"You will be leader, then," said David.

"Very well," answered the Princess. "Begin—A good fat hen."

Every one of the company, in turn, repeated, "A good fat hen."

"Two ducks and a good fat hen," said the Princess, and every one in turn repeated these words.

The following sentences were then given out by the Princess, and repeated by the players, and for every mistake or omission a forfeit had to be paid:

"Three squeaking wild geese, two ducks, and a good fat hen."

"Four plump partridges, three squeaking wild geese, two ducks, and a good fat hen."

"Five pouting pigeons, four plump partridges, three squeaking wild geese, two ducks, and a good fat hen."

"Six long-legged cranes, five pouting pigeons, four plump partridges, three squeaking wild geese, two ducks, and a good fat hen."

"Seven green parrots, six long-legged cranes, five pouting pigeons, four plump partridges, three squeaking wild geese, two ducks, and a good fat hen."

"Eight screeching owls, seven green parrots, six long-legged cranes, five pouting pigeons, four plump partridges, three squeaking wild geese, two ducks, and a good fat hen."

"Nine ugly turkey-buzzards, eight screeching owls, seven green parrots, six long-legged cranes, five pouting pigeons, four plump partridges, three squeaking wild geese, two ducks, and a good fat hen."

"Ten bold eagles, nine ugly turkey-buzzards, eight screeching owls, seven green parrots, six long-legged cranes, five pouting pigeons, four plump partridges, three squeaking wild geese, two ducks, and a good fat hen."

It had been agreed that every one was always to repeat his sentences as rapidly as possible; but, even with that rapidity, we found the Ten Birds a little tedious towards the close.

"Reporter," said Alice, "I think you should say in your notice of our meeting that this game should only be played by a limited number of players. Twelve is too many; half a dozen would be quite enough."

"Ten Birds," observed Notes-and-Queries, "appears to have
been suggested, in form, at least, by the familiar story of 'This is the house that Jack built.' There are a good many games of the same accumulative class. I remember one that we used to play at long ago at school was called 'The Yule days.' It began, 'The king sent his lady on the first Yule day a papingo-aye (that is to say, a peacock): Who learns my carol and carries it away?' The next verse was, 'The king sent his lady on the second Yule day three partridges, a papingo-aye. Who learns my carol and carries it away?' Then, 'The king sent his lady on the third Yule day three plovers, three partridges, etc.'

And so it went on, something new being added for every day, till the game ended with the repetition of this verse:

"The first day of Christmas
My mother sent to me
A partridge in a pear-tree."

"And I," said John, "remember a game much of the same sort, commencing—"

"John Bell shot them all. John Scott made the shot,
But John Bell shot them all...

"Now, who will vote for playing at My Lady's Toilet?"
"All!" said everybody.

"The pleasant game of Twirl the Trnccher!" exclaimed Notes-and-Queries, giving it another name.

David sent Tom to fetch a plate; he said he was sure there was no wooden trencher in the house, so we must make a plate do duty instead.

The plate was brought.

"That is far too good for the purpose: we must break it," said David. "Go and ask for a common one—a willow-pattern one will do."

When the willow-pattern plate made its appearance, Notes-and-Queries asked if we knew the story of the pattern; and as most of us seemed never to have heard that affecting legend he told it. At least he told his version of it. But as the Club appointed me not to report tales, but only games, and as the legend has not the remotest connection with My Lady's Toilet, I omit it altogether, and go on to say that, when the tale was ended, David asked who should spin the trencher at first.

"I," said Emily.
"You are a good girl," said David. "Here is the plate."
We had taken our seats so as to form a wide circle. There were eleven of us sitting, of course; the twelfth of our party was Emily, and she took her place in the centre.

"Stop talking, if you please," said Emily. "I shall give you your names. You, David, are a buckler; you, Maggie, a cap; you, John, a necklace; Alice, you are a pair of gloves; Kate, you are a pair of shoes; you, Notes-and Queries, are a collar; you, Arabella, a card-case; you, my dear Hyrama, a pair of slippers; you, Princess—Princess, will you attend to me for a minute?—you are a bracelet; you, Reporter, a pencil-case; and as for you, Tom, you are a watch. Now, do you all know your names?"

"Perfectly."

"Well, then, the game begins," said Emily, holding the plate in her right hand. "My lady is going to dress for a ball, and wants—" here she bent down and made the lower rim of the plate touch the floor—"her card-case;" and as she named the article she gave the plate a twist and left it spinning on the floor.

Arabella—who was the card-case—jumped up, and ran to catch the plate before it ceased spinning. This she managed to do. Emily, in the meantime, took Arabella's chair, and as she sat down she said, "By-the-bye, I forgot to give myself a name. I shall be a pin."

"My lady," said Arabella, "is going to dress for a ball, and wants her necklace."

Just then she set the plate spinning.

Up sprang John Ferguson, and caught the plate, but not a minute too soon. Arabella took his place.

Then the pair of shoes—that was Kate—was called for; and after that the bracelet was wanted—that was the Princess.

"My lady," said the Princess, "is going to dress for a ball, and wants her brooch."

"You must pay a forfeit," exclaimed Emily, "that is the rule. You have named something not included in the game."

"If I must, I must," said the Princess. Then she went on again: "My lady is going to dress for a ball, and wants her cap."

The plate was set spinning, and fell to the ground without a movement on the part of any one.

"Hello!" said David, "is there no 'cap' in the room?"

"I am the cap," said Maggie, starting. "Oh dear! oh dear! what was I thinking about?"

Maggie paid a forfeit for her inattention, and took her turn at twirling the plate.

Everything now went smoothly, till Alice was in the centre of the circle, when she introduced a variation in the game. "My lady," she said, "wants her whole toilet."

The word "toilet" is understood in Twirl the Trnccher as a signal to change places. Every one jumped up. Alice made a rush at the nearest vacant chair, and all tried to make a move of some sort. Whoever failed to change his place paid a forfeit; and Tom, who was left without a seat, had to take his turn at spinning the plate.

In a little we had another variation. The Laughing Hyrama, who was spinning, said, "My lady is going out this evening at twilight. "Toilet," and "Twilight," being a little like in sound, several sprang to their feet to change places, for which slight indiscretion they had to all pay forfeits.

After playing for some time we found that we get so familiar with our names that we hardly ever failed to answer when called upon. This did not improve the fun, so we agreed to exchange names, and proposed, as a general rule, that every dozen twirls or so every player should have a change of name.

Twirl the Trnccher proved a great success with us.

"I think," said Tom, "it is the best of all games."

"That is a slap-dash assertion," remarked Notes-and-Queries.

"I would not go so far as that; but I think there are few so deserving of popularity."

Thus ended the games of the evening. An hour after, the members of the Round Game Club boldly faced the wind and rain, and, with cheerfulness in their hearts, went their several ways homeward.
DRAUGHTS.

By George Frederick Parson.

OPENINGS—LAIRD AND LADY AND OLD FOURTEENTH.

THE LAIRD AND LADY.

The few first moves of this opening I gave in a previous chapter, but it will be as well now, perhaps, to play a game throughout.

The first ten or twelve moves in each opening should be committed to memory. It is only by such a plan that the adept is able to play a game without seeing the board. His pictures to his mind the position of the men at the commencement, and notes every change of move; always remembering the places of the men, and never allowing his thoughts to wander from the game—a most terrible task, but still by no means impossible, for the earnest amateur. And I have known players who, by a strong effort of memory, could play dozens games simultaneously against a dozen opponents; but it must be remembered that this faculty is a test of memory rather than of excellence of play; and that it is better to win one game against a thorough master, with the board before you, than a score of blindfold games against indifferent adversaries.

This last observation applies equally as well to Chess as to Draughts. It must, however, be admitted that blindfold play has this advantage—it enables a man to fix the moves in his mind, and so familiarises it with the best modes of attack and defence.

In the Laird and Lady, as in the other openings, we assume that the black men occupy the upper half of the board, and make the first move. This being thoroughly understood, we begin—

BLACK. WHITE. BLACK. WHITE.
1. 11 to 15 1. 23 to 19 15. 11 to 16 15. 20 to 11
2. 8 to 11 2. 22 to 17 16. 7 to 16 16. 26 to 23
3. 9 to 13 var. 3. 17 to 14 17. 17 to 26 17. 23 to 19
4. 10 to 17 4. 21 to 14 18. 16 to 23 18. 27 to 11
5. 15 to 18 5. 26 to 23 19. 13 to 17 19. 30 to 23
6. 13 to 17 6. 19 to 15 20. 17 to 22 20. 23 to 19
7. 4 to 8 7. 23 to 19 21. 22 to 26 21. 11 to 8
8. 6 to 9 8. 24 to 20 22. 26 to 31K 22. 8 to 4K
9. 1 to 6 9. 28 to 24 23. 31 to 26 23. 4 to 8
10. 9 to 13 10. 15 to 10 24. 26 to 22 24. 8 to 11
11. 6 to 15 11. 19 to 10 25. 22 to 18 25. 32 to 28
12. 11 to 15 12. 31 to 26 26. 18 to 9 26. 10 to 6
13. 8 to 11 13. 25 to 22 27. 3 to 7;
14. 10 to 25 14. 29 to 22

and the game is drawn.

The following is the position of the men:

BLACK.

WHITE.

White to play and draw.

Black must now accept a draw; for, if he is not very careful, he will lose the game if he continue it beyond this point.

Now let us see what would have been the effect had Black, at his third move, gone from 4 to 8, instead of from 9 to 13.

BLACK. WHITE.
3. 4 to 8 3. 17 to 13 14. 13 to 17 14. 22 to 13
4. 15 to 18 4. 24 to 20 15. 8 to 12 15. 24 to 19
5. 11 to 15 5. 28 to 24 16. 15 to 31K 16. 28 to 22
6. 8 to 11 6. 26 to 23 17. 12 to 19 17. 22 to 8
7. 9 to 14 7. 31 to 26 18. 14 to 17 18. 21 to 14
8. 6 to 9 8. 13 to 6 19. 10 to 17 19. 8 to 3F
9. 2 to 9 9. 26 to 22 20. 7 to 10 20. 25 to 21
10. 1 to 6 10. 32 to 23 21. 17 to 22 21. 20 to 16
11. 3 to 8 11. 30 to 26 22. 10 to 14 22. 16 to 11
12. 9 to 13 12. 19 to 16 23. 31 to 26 23. 11 to 8
13. 12 to 19 13. 23 to 16 24. 26 to 30;

and the game is again a draw; the variation having converted the Laird and Lady into the

OLD FOURTEENTH OPENING.

The position of the men at the finish is as follows:

BLACK.

WHITE.
To demonstrate the immense variety of moves arising out of this opening would need a volume instead of a chapter; but we must needs pursue our game a little farther. Suppose that, instead of moving from 17 to 13, White at his third move had played from 25 to 22, he would have altogether altered the character of both the attack and the defence. See:

<table>
<thead>
<tr>
<th>BLACK</th>
<th>WHITE</th>
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</thead>
<tbody>
<tr>
<td>Moves 1 and 2 on each side as before.</td>
<td>3. 23 to 22</td>
</tr>
<tr>
<td>4. 15 to 18</td>
<td>4. 22 to 15</td>
</tr>
<tr>
<td>5. 11 to 18</td>
<td>5. 17 to 13</td>
</tr>
<tr>
<td>6. 9 to 14</td>
<td>6. 29 to 25</td>
</tr>
<tr>
<td>7. 10 to 15</td>
<td>7. 19 to 10</td>
</tr>
<tr>
<td>8. 6 to 15</td>
<td>8. 26 to 23</td>
</tr>
<tr>
<td>9. 8 to 11</td>
<td>9. 30 to 26</td>
</tr>
<tr>
<td>10. 11 to 16 var.</td>
<td>10. 20 to 29</td>
</tr>
<tr>
<td>11. 1 to 6</td>
<td>11. 20 to 11</td>
</tr>
<tr>
<td>12. 7 to 16</td>
<td>12. 26 to 22</td>
</tr>
<tr>
<td>13. 2 to 7</td>
<td>13. 22 to 17</td>
</tr>
<tr>
<td>14. 7 to 10</td>
<td>14. 23 to 19</td>
</tr>
<tr>
<td>15. 16 to 23</td>
<td>15. 25 to 22</td>
</tr>
<tr>
<td>16. 18 to 25</td>
<td>16. 27 to 2 E</td>
</tr>
</tbody>
</table>

And White wins. The position at the finish is this, from which it will be seen that Black’s game is hopeless:

<table>
<thead>
<tr>
<th>BLACK</th>
<th>WHITE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moves 1 to 10 as in last game.</td>
<td>10. 24 to 29</td>
</tr>
<tr>
<td>11. 7 to 11</td>
<td>11. 28 to 24</td>
</tr>
<tr>
<td>12. 3 to 7</td>
<td>12. 24 to 19</td>
</tr>
<tr>
<td>13. 15 to 24</td>
<td>13. 26 to 22</td>
</tr>
<tr>
<td>14. 11 to 15</td>
<td>14. 29 to 11</td>
</tr>
<tr>
<td>15. 7 to 16</td>
<td>15. 27 to 11</td>
</tr>
<tr>
<td>16. 18 to 27</td>
<td>16. 32 to 23</td>
</tr>
<tr>
<td>17. 2 to 6</td>
<td>17. 11 to 7</td>
</tr>
<tr>
<td>18. 6 to 10</td>
<td></td>
</tr>
</tbody>
</table>

And White wins from the following position:

<table>
<thead>
<tr>
<th>BLACK</th>
<th>WHITE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moves 1 to 10 as in last game.</td>
<td>10. 24 to 29</td>
</tr>
<tr>
<td>11. 7 to 11</td>
<td>11. 28 to 24</td>
</tr>
<tr>
<td>12. 3 to 7</td>
<td>12. 24 to 19</td>
</tr>
<tr>
<td>13. 15 to 24</td>
<td>13. 26 to 22</td>
</tr>
<tr>
<td>14. 11 to 15</td>
<td>14. 29 to 11</td>
</tr>
<tr>
<td>15. 7 to 16</td>
<td>15. 27 to 11</td>
</tr>
<tr>
<td>16. 18 to 27</td>
<td>16. 32 to 23</td>
</tr>
<tr>
<td>17. 2 to 6</td>
<td>17. 11 to 7</td>
</tr>
<tr>
<td>18. 6 to 10</td>
<td></td>
</tr>
</tbody>
</table>

Again we may try a variation:

<table>
<thead>
<tr>
<th>BLACK</th>
<th>WHITE</th>
</tr>
</thead>
<tbody>
<tr>
<td>The moves to the variation on each side the same as before.</td>
<td>12. 2 to 6</td>
</tr>
<tr>
<td>13. 15 to 24</td>
<td>13. 26 to 22</td>
</tr>
<tr>
<td>14. 11 to 15</td>
<td>14. 20 to 11</td>
</tr>
<tr>
<td>15. 24 to 23</td>
<td>15. 11 to 8</td>
</tr>
<tr>
<td>16. 12 to 16</td>
<td>16. 22 to 17</td>
</tr>
<tr>
<td>17. 3 to 12</td>
<td>17. 17 to 1 E</td>
</tr>
</tbody>
</table>

And, once more, White wins, with the following position:

<table>
<thead>
<tr>
<th>BLACK</th>
<th>WHITE</th>
</tr>
</thead>
<tbody>
<tr>
<td>From all this—and we might multiply the variations indefinitely—we see that White’s third move should be 17 to 13, and not 25 to 22. But, if either player make the slightest mistake in his opening, it is fatal, as we may see in this next example:</td>
<td>1. 23 to 19</td>
</tr>
<tr>
<td>2. 8 to 11</td>
<td>2. 22 to 17</td>
</tr>
<tr>
<td>3. 4 to 8</td>
<td>3. 17 to 13</td>
</tr>
<tr>
<td>4. 15 to 18</td>
<td>4. 24 to 20</td>
</tr>
<tr>
<td>5. 11 to 15</td>
<td>5. 28 to 24</td>
</tr>
<tr>
<td>6. 8 to 11</td>
<td>6. 26 to 22 var.</td>
</tr>
<tr>
<td>7. 9 to 14</td>
<td>7. 31 to 26</td>
</tr>
<tr>
<td>8. 5 to 9</td>
<td>8. 26 to 23</td>
</tr>
</tbody>
</table>
and Black wins; as he changes to advantage, as may be plainly seen by a glance at the position:

<table>
<thead>
<tr>
<th>BLACK.</th>
<th>WHITE.</th>
</tr>
</thead>
<tbody>
<tr>
<td>9. 1 to 5</td>
<td>9. 22 to 17</td>
</tr>
<tr>
<td>10. 11 to 16</td>
<td>10. 29 to 11</td>
</tr>
<tr>
<td>11. 7 to 16</td>
<td>11. 25 to 22</td>
</tr>
<tr>
<td>12. 18 to 25</td>
<td>12. 29 to 22</td>
</tr>
<tr>
<td>13. 3 to 7</td>
<td>13. 22 to 18</td>
</tr>
<tr>
<td>14. 15 to 22</td>
<td>14. 19 to 15</td>
</tr>
<tr>
<td>15. 10 to 28</td>
<td>15. 17 to 3 K</td>
</tr>
<tr>
<td>16. 22 to 26</td>
<td>16. 3 to 8</td>
</tr>
<tr>
<td>17. 16 to 20</td>
<td>17. 23 to 18</td>
</tr>
<tr>
<td>18. 26 to 31 K</td>
<td></td>
</tr>
</tbody>
</table>

White’s losing move was his sixth. Had he not so precipitately gone from 26 to 22, he might have had a winning game. This may be easily demonstrated:

<table>
<thead>
<tr>
<th>BLACK.</th>
<th>WHITE.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Moves 1 to 6 as before, with the difference that White moves from 23 to 22, instead of 26 to 22.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6. 23 to 22</td>
</tr>
<tr>
<td>7. 18 to 25</td>
<td>7. 29 to 22</td>
</tr>
</tbody>
</table>

Thus, we see that, despite its apparent simplicity, Draughts is a game full of charming surprises and unexpected changes of fortune; that on the slightest mistake on one side depends its failure, and on the other its success. And, in that respect, indeed, the game resembles life, and becomes a Teacher as well as a Recreator.

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**Canoes and Canoeing.**

By Captain Lampton Young.

**Canoes and Materials, Woods, Etc.**

HE delights of canoeing, and consequent inducements to this mode of travel, have been fully appreciated since the summer of 1866, when Mr. Macgregor, “Rob Roy,” called together some kindred spirits at Putney, and after giving an entertaining account of his journey of 1,000 miles in a canoe, through various countries of Europe, it was decided to establish a “Canoes Club,” with the objects in view of improving canoeing, promoting canoeing, and writing canoeists; by arranging and recording canoe voyages, and by holding meet-
many others in branches at Oxford, Cambridge, Liverpool, in Ireland, etc. As this new safety-valve for the superabundant energy of England's young believers in "muscular Christianity" is so conducive to health and strength, we cannot do better than give an account of the different kinds of canoes, how to build and use them, and a short statement of the vast distances which have been traversed and explored by canoeists in all parts of the world in nearly 200 different voyages.

Canoes are divided into several classes, but it will be enough in this paper to describe the three principal kinds—travelling, racing, and sailing canoes; the first, better known as Rob Roy's, being more or less counterparts of those built for the various voyages and journeys of "Rob Roy." These canoes must be strong, to bear the many knocks and shocks inevitable in landing in railway-trucks, on board ships, on carts or horses' backs, and in the course of journeys; light, to enable the paddler to drag them round obstacles to be encountered in every voyage; hardy to stand an hail or wind in a breeze, a gale, or a rapid current, and of such capacity as to contain an average sized man (canoes, as a rule, should be built for each person, his measure being taken as carefully as for his coat), and the luggage and stores for the journey; and yet be no longer than will go conveniently into an average goods-truck or wagon on the railways, at home or abroad.

The economy of this kind of boat is one of its many recommendations, and such as to enable any one to build or purchase one; the very best, with the fittings of the most luxurious kind, costing complete only £15, and descending in price to a canoe of spruce fir, with only paddle and apron, for £7, all other fittings being extras; and this cheap canoe is a very useful, strong one, such as can be used in most rivers, lakes, and waters in this country. Ladies as well as gentlemen should procure canoes when living anywhere near water, and learn how to add immensely to many other enjoyments of country life, as well as how to manage a small boat under all conditions of weather, current, and light. Ladies may be seen frequently on the Thames during the summer, paddling in parties, or resting under the shade of some tree, and working, reading, or sketching; all this in perfect safety, as, from the centre of gravity in properly constructed canoes being so low, no danger can arise to a lady, even if somewhat nervous, if she keeps quiet and does not roll about.

But here all readers of this paper should fully comprehend the necessity of being able to swim, as this accomplishment is considered of such paramount importance that no canoeist is admitted to membership in the Canoe Club unless he can swim, and the consequence of this excellent rule is that not one member of the club has been drowned since its foundation, now seven years since. Where such an accident has happened to any one when in a canoe, it has invariably turned out that the unfortunate sufferer was not a member of the club, and could not swim. All parents reading these facts should at once make it a point of duty to have their children taught to swim, and then they may not have the bitterness of lamenting the loss of a child who might have still been a comfort to them, if they had not neglected to have this vital point in its education attended to; and all boys should look upon it as being quite as necessary to be a good swimmer, as to excel at football, cricket, or rowing.

Further on will be given plans for a "Rob Roy" canoe, and all the parts and fittings, so that any one in the country may build one himself, or have it built by the local carpenter; also an account of stores usually carried on a voyage, and instructions how to use them. Rigs, rigging, and sails, paddles of various kinds, fittings, how to steer under various conditions, leeboards, centre-boards, rudders, camping out on a journey, and tents suited for use and carriage in a canoe; wheels to carry on board, so as to drive the canoe with stores, luggage, and any other matter over roads, or across country from river to river, or lake to lake, for any distance; ballast of all kinds, pumps and their substitutes, cleats, ropes suited for the various requirements of a canoe, hatches and aprons, canoe compasses and their variations, charts and maps; how to take bearings when cruising along the coast or on a large lake; currents and tides; leeway and its dangers; clothing for a journey; cooking, and the many and various apparatus invented; stores of food necessary; portable fuel, shoes, stretchers, portable canoes, built in sections to pack into one another; the various woods used in canoe building—all these will be discussed upon:

"I wind about, and in and out, With here canoe swift sailing, And here and there a salmon trout, And here and there a grizzly."

"And out again I curve and flow To join the mighty river; Canoes may come, canoes may go, But I go on for ever."

Transom improved upon.

Canoes travelling, though a charming pleasure in itself, has not yet reached perfection, which can only be ultimately attained by the practical experiments of enthusiasts, which all canoeists should be. Every little thing in a canoe should be noticed and logged during a journey, so as to be put in practice whenever an opportunity may offer—the position of a cleat, the length of a rope, the incline or position of the stretcher, the play of the backboard, or any such small matter.

To derive the utmost amount of pleasure from a voyage abroad, the canoeist should be almost an "Admirable Crichton," and amongst others should be imbued with the following good qualities:

- A muscular body, and great presence of mind; the power of swimming either with or without his clothes; a love of the water; aptitude for cruising, birrowaking, fishing, shooting, either rapid or birds, and skimming the latter when wishing to collect; or in a foreign country, amongst a different fauna to that of his native country, the power of making himself understood by foreigners, even when he does not understand their language; and possess a well-built canoe, reliable in all its suits, stores, and fittings, musquito nets and helmets, air and water tight bags of India-rubber, lamps, beds, cork, India-rubber, etc.

Every one should carefully consider what he requires his canoe to do before he commences to design her; every nail to be driven must be well thought over, and should any reason arise for a change of position in any part, it should be made, as it is too late to do so when the canoe is built. The different kinds of wood must be well considered, and only such as are suited to the particular purpose for which the canoe is to be built should be selected. There are many kinds of wood suited for boat-building, but for thorough hard work and knocking about oak is the best, but then where weight is an object some other wood should be used. The relative weights of woods used for canoes are as under, cubes of each kind of wood exactly equal in size being weighed:

<table>
<thead>
<tr>
<th>Wood</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oak</td>
<td>12 lbs</td>
</tr>
<tr>
<td>Yellow-wood</td>
<td>11</td>
</tr>
<tr>
<td>Cedar</td>
<td>7</td>
</tr>
<tr>
<td>Mahogany</td>
<td>10</td>
</tr>
</tbody>
</table>

A canoe built of oak would be five-twelfths heavier than one...
built of cedar, or nearly half the weight, a very material difference in a long day's paddle.

Cedar is a very nice-looking light wood, but very apt to split when exposed to a hot sun, and if by any chance a cedar canoe gets aground on a rock or snag, it is a great chance if her planks are not split by the simple movements of her owner in trying to get her off. Cedar being so very light, and procurable in such great breadth, is generally used for the decks of canoes, being very carefully selected so as to be free from cracks or shakes, and the knots of small size.

Red pine is a hard, heavy wood, full of turpentine, and not often used in light boats; but it is very strong and durable if carefully picked so as to be straight-grained, and without knots or shakes. Ships' boats are sometimes built of this wood.

Yellow pine or spruce is a good wood for the planks of canoes, but is admirable for constructing the spars of canoes, being excessively light; also it is straight, close-grained and free from knots.

One of the many advantages of this wood is that if the mast comes suddenly in contact with a tree, rope, or any other obstacle, it will break short off at the deck without smashing it up, or bursting the beams or carlings, any other wood being certain to carry away everything.

Pine masts were used by the ancient Greeks at the time of the Trojan war; and shortly after, in Homer's "Odyssey," ii. 434, we are told:—Telmachus and Athena start on a cruise in search of Ulysses; the goddess causing a fair wind to spring up, Telmachus gave the orders to lay the oars in and make sail. "Raising up the pine mast (lervos d'Askrous), they stepped it through the centre cross plank" (Shaw). Mahogany is a capacious wood for canoes, being strong, handsome, one-sixth lighter than oak, everlasting, as insects rarely touch it, and from its immense size in both length and breadth, suitable in almost every way for boat-building, an immense number of ships' boats in the royal and mercantile navy being constructed of it. The Spanish chestnut is much used for timbers in canoes and large boats, as it is very tough and strong, working with a fine finish, and standing sudden shocks and strains admirably.

Birch is a very good wood for any light work where great strength is required, in beams, timbers, carlings, combings, or any similar position.

The engravings on this page represent, on a scale of a quarter of an inch to the foot, Fig. 1, a section with masts and sails, length over all, 38, 14 feet; from stern to beam, n, 7 feet 6 inches beam, outside (6 inches abaft amidships), 26 inches; depth from top of deck at c, fore end of the well, to upper surface of keel, 11 inches; keel, depth outside 1 inch with an iron band along its whole length, 3 inch wide; cumber, 1 inch; depth of gunwale, 81/4 inches. The upper streak is of mahogany, and quite vertical at the beam, where its depth is 3 inches. The gunwale streaks and the next on each side are very strong; k, mainsail; l, jib; o, luggage; j, stretcher. In Fig. 2, the well, from c to d, is 32 inches, and from r to r' 20 inches, so placed that r r' is 2 feet, and thus the beam of the boat being aft of the midships, the weight of the luggage o, and the masts and sails stowed forward, brings the boat to nearly an even keel; the additional basket of cooking things at i, brings her a little by the stern. For a boat without luggage the beam should be 1 foot abaft amidships to secure an even keel. Fig. 3 shows the midship section of the canoe. Fig. 4, the stretcher cut down in the centre in a curve, so as to enable the mast, sails, etc., when rolled together, to rest there. Fig. 5, after side of oarline cut away, so as to let the knees and shins clear as they go under the deck. Fig. 6, end of oarline cut off, so as to enable the water to run to the centre, when the canoe is tilted on one side, and be easily removed with a sponge. Fig. 2, a bird's-eye view of the deck. Figs. 3 and 4, on a scale of an inch to the foot, cross sections at the beam and the stretcher.
HAVING practised and re-practised the various simple forms of the electrotyper’s art, such as have been described, until a perfect mastery has been acquired over the materials and conditions of success, the learner may venture to indulge himself with a plunge into its more recondite mysteries and difficulties. We will suppose that he has been content so far to take copies of coins, medals, or casts in baso-reliefs, and has not aspired to the dignity of being a producer of entire figures, busts, or works in detached relief, such as Cellini wrought with such loving fingers in the palmy days of art. But it is now time for him to take a higher flight, and we are quite ready to introduce him, hoping that he has by this time acquired the requisite skill and confidence, into the inner and more interesting arcana of this beautiful pursuit.

It must be clear that the moulds we have been using will only do for models that will leave, to use the casting pattern maker’s technical phrase. Unless all the parts that are in relief slope gradually upwards from the flat, either the mould or the cast will be broken in coming away. In other words, there must be no undercuttings in the design. But copies are produced by electro-deposition, of works so involved and so intricate in their undercuts, that no combinations of moulds could be contrived to leave them with any hope of bringing out a passable copy. How then are such works produced? Ah, dear reader! that was for a long time a most impenetrable puzzle and secret, but now it is common property, and quite at your service.

Invention’s universal mother, Necessity, no doubt prompted the idea, that since the cast was inflexible, the matrix must be yielding and elastic. The problem then was to find a material that should take and retain, all the sharp lines and impressions of the work to be copied, and yet be so good-
must be fenced round in the manner formerly described (vol. i, p. 142). Press the soft matter carefully into all the hollows, draining off the moisture which will squeeze out, until you feel sure that every part of the impression is well filled up, and then let a good body of the material lie on the top to settle down. After a few hours' exposure to the air, it will harden somewhat, but now and again, if necessary, the moisture must be carefully drained from it. It will be easy to tell by the feel when it will be safe to pull it away; the veriest tyro will not be likely to make a mistake, unless his impatience gets the better of his judgment. A sharp scratch will do it, but it is better to remove the fencing, and pull it away from the sides gradually, humouring it a little, as the complexities of the model may seem to require.

The eminent electrician and chemist, Mr. George Gore, F.R.S., recommends the following mode of preparing the elastic composition:—Break the glue in small pieces, and soak it till quite soft. Then drain it, and heat it in a common glue-pot with the treacle, one part treacle to four of glue, to nearly the boiling point, stirring it well to ensure thorough mixture of the two substances. By the way, the glue will give some little trouble in the breaking, if you are not up to the carpenter’s dodge for preventing it. Lay the cakes of glue between the folds of stiff brown paper, and hammer away at the paper; elsewise, the brittle substance will fly about in all directions, and maybe attack the face and eyes of the incautious operator.

If we wish to get a copy of a plaster bust or statuette, we must proceed as follows:—Partly fill the hollow interior of the figure with sand, to make it heavy, and prevent its rising in the liquid; then place it, base downwards, in an earthenware vessel, large enough, when filled with the liquid, to immerse it well all over. A vessel tapering towards the bottom is best, because of the composition leaving it when set—precisely as jelly turns out best from a tapered mould. The vessel should be well oiled inside to facilitate this operation. The composition must be thin enough to flow; Mr. Gore recommends that it be poured in hot, and also that the vessel be moved about a little, and the figure gently tapped during the pouring, to allow any air bubbles to escape. Cover the figure a few inches overhead, and then let all stand in a steady place to set, which will be in from twelve to twenty hours, according to bulk. Then you will find that the mould, with the figure embedded in it, can without much difficulty be shaken out of the vessel, as a cake would turn out a pudding. The figure, if of plaster, must be saturated with oil (see p. 142 for method) to prevent the melted composition adhering to it.

Old George III. was mystified as to how the apple got into the dumpling. Our mystery is, not how the figure got into the mould, but how to get it out again. Nothing more easy, with a little adroit manipulation. We will suppose that a mark has been made on the base of the figure, by which it may be known which is the front and which is the back. Take a sharp knife, and slit up the mould right at the back of the figure, one clean and straight incision, beginning at the base and extending upwards to the top of the mould, above the head. The mould will now open readily, by inserting the fingers on each side of the slit. Open it with care, and without unnecessary violence, extending the cut, if requisite, and let some other hand take the figure out deftly while you hold the walls of the mould asunder wide enough to let it pass. (See illustration.) The mould will now spring back again, and should return, if properly set before you operate upon it, so completely to its original shape, that the seam of the cut shall be perfectly invisible to the eye, and leave no mark upon the figure you deposit.

There is considerable difficulty in coating a mould of this description with the all-essential conducting material, as you will readily conceive. But we are now arrived at that stage of our pursuit when nicety of handling becomes a sine quā non, and we must not be frightened at difficulties. To become an expert and successful depositor we must labour and acquire skill of hand, and be prepared to exercise the patience of a scientific devotee. The most scrupulous attention must be paid to minute points of detail, or otherwise time and trouble will be alike thrown away. In the first paper, p. 140, we gave some rough-and-ready instructions for black-leading the mould, which were all very well for a beginner who might be supposed to be anxious to get on; but he is developing into an artist now, and must be much more elaborate in his preparations. We ask the reader to carefully study the following instructions for preparing moulds; and shall begin with the simplest, a plain single-faced mould of a coin or medal.

Paste a strip of paper round the edge of the mould; take the best powdered black-lead you can get (Mr. Gore recommends Dixey’s, sold in twopenny packets), and apply the same with a camel-hair brush, dry, to the face of the mould, breathing on it now and then, and blowing off the surplus. Proceed till the face is perfectly clean and bright. Then remove the paper, which has kept the black-lead within bounds, and will ensure you a deposit with a clean edge. Never mind the time it has taken—it will be well repaid.

Elastic moulds require a different treatment. If you can get at all the undercoatings, brushing them over with black-lead, or with the very best copper bronze, will do; but the best way is to coat them with a series of solutions—viz., phosphorus, silver, and gold solutions, prepared according to the following recipe, given by Mr. Gore in his valuable work on "Electro-Deposition":—

"Phosphorus Solution.—To make nearly three ounces, mix sixty-four grains of beeswax or tallow; then dissolve eight grains of india-rubber cut up very small, in 100 grains of bisulphate of carbon, and when it is dissolved add to it very carefully (as it is highly inflammable) the melted wax, and shake the mix-
tured thoroughly; then dissolve sixty-four grains of phosphorus in 960 grains (about two and a quarter ounces) of bisulphide of carbon, and add to it eighty grains of spirits of turpentine, and sixty-four grains of asphalt in fine powder; when dissolved, add this solution to the previous one of india-rubber and wax, and thoroughly mix them by shaking.

"Silver Solution."—To make twenty ounces (one pint): dissolve about eighteen or nineteen grains of pure silver in twenty or twenty-five grains of the strongest nitric acid, and then dilute it to the required volume with distilled water.

"Gold Solution."—To make twenty ounces: dissolve about five or six grains of pure gold in about twenty or twenty-five grains of a hot mixture of one measure of nitric acid and two or three measures of hydrochloric acid, and when dissolved, dilute the solution with twenty ounces of distilled water.

The mould may be rinsed with the first solution, or coated with it in any effective and convenient way, and must afterwards be drained carefully, and allowed to stand till perfectly dry. Then coat with the silver solution in the same way, till it acquires a black metallic lustre. Rinse with distilled water, and apply the gold solution in the same manner, which will give it a yellowish complexion. After another rinsing it is ready for use. Of course the student will know how to adapt the proportions given in the foregoing recipe to the quantity of the various solutions he may require to make.

Another absolutely necessary preliminary is to affix guiding wires in different parts of the mould, especially in the deep hollows, to tempt the electrically charged particles in this direction. No even deposit can be hoped for without these. It would be a pity, after all the trouble and expense incurred in producing a copy of a statuette or other work of art, to find daylight shining through it in some conspicuous place, or to feel some prominent fold doubling up under the slightest pressure for want of substance. For a large mould you must have a stout wire for a main conductor, and twist tightly round it a number of short pieces of fine wire, the fine ends of which must be bent into all the hollows, and either stack lightly and cleanly into the mould, or at least touch the parts required. There must be, in fact, a complete system of arteries to promote the circulation of the electric fluid into all parts of the anatomy of your figure. A glance at the accompanying illustration will convey, better than a page of description, how this should be done. It will be well to have these wires all in position before coating the mould with the solution, because you will then have a conducting surface all alike, the wires being coated as well as the mould. Even the simplest mould, such as that shown in our first article, p. 141, will be the better for having a fine guiding wire passed round the rim of the impression, and sunk into it. It is scarcely necessary to say that all the guiding wires must be in perfect contact with the main conducting wire, so as to establish a complete sympathy between all parts of your electric system.

In the next paper we shall offer to the incipient depositor an alternative way, by which to obtain a copy of the statuette or other model—a more roundabout, but perhaps a more certain process.

But this lesson must suffice for the present.

JOINERY AS A RECREATION.

By EELLIS A. DAVIES, Author of "Drawing for Carpenters and Joiners," "Drawing for Cabinet Makers," "Happy Nursery," etc.

PEDESTAL WRITING-TABLE OF THEM.

THERE is scarcely a house where some disused boxes or old chairs, an old piece of paling, odd volumes of books. Oh, if only any of these could speak, what tales of joy and sorrow, what ups and downs of life we should hear of! What scenes they have had enacted around them before they came to lie separated from their companions on this old stall! Yet, such is life!—what is bought by these shops is also sold again by them; and there are always some people wanting what other people wish to be rid of. So, sell your boxes for whatever you can, rather than let them lie wasting, and the money will help towards buying boxes or packing-cases which will answer your purpose, or in purchasing new wood.

We proceed, then, to show how a pedestal writing-table is to be made of boxes, and of course the same instructions will be applicable in making the table out of new wood.

The size most convenient are as follows—Two 20 inches long, 18 inches wide one way and 18 inches the other; and one 18 inches square and 16 inches deep.

These are to be placed as shown in Fig. 1, which represents the ground-plan of the table, and this will be further made clear by reference to the perspective view of the object in its present stage, given in Fig. 2.

The boxes are to be screwed together, as shown at A B C D, the heads of the screws being placed on opposite sides.

A strip of wood three inches wide is now to be nailed around the bottom of the front and sides, to form a sort of basement. This should be one inch thick in the front—that is, where passing the open part of each box—and half an inch on the sides.

The top of this should be level with the inside of the bottom
of the boxes, as they now stand, and there will therefore be a ledge left two inches wide below the wider side.

This should be supported by blocks glued against it and the bottom, a method which may be seen on looking underneath any strongly-made table, chest of drawers, or other article of furniture.

We now require another box, but you are less likely to have one of this kind by you than of the others. You will most probably, therefore, have to make it of new wood. It is to be of such a size as to cover the whole of the other three. It must therefore be 48 inches long and 21 inches wide, so as to project one inch in front, for a purpose to be spoken of presently, and should be 6 inches high, of which height one inch will be occupied by the thickness of the bottom, and one inch by the thickness of the top, which top, by the way, should be made so as to form a projecting edge on the front and two ends. It will then be 90 inches by 22, and will thus take 8 feet 4 inches of 11 inch wide board—that is to say, it is to be made in two widths, which must be carefully jointed in the middle, and when the top has been fixed in its place, this joint should be covered with a piece of calico glued and well rubbed down.

Before, however, the top is finally fixed, we must point out that this upper portion of the piece of furniture is to contain a drawer, and that therefore, if it be made out of a box, one of the long sides must be taken out, so as to leave the opening in which the drawer is to run, and, if made out of new timber, it will only be necessary to make the back and two shorter sides.

The top is now to be screwed on, the heads of the screws being countersunk, so as to be absolutely level with the surface, and a piece of paper or calico is to be glued over each.

The whole of this upper portion is then to be screwed to the lower, the screws required being an inch and three-quarters long, and passing from the lower box upward, for convenience in turning them.

The carcass of the table may now be said to be complete, and the next thing is to make doors to the three cupboards forming the pedestal. We will treat first of the two front ones. These doors are to be made of half-inch stuff, and will, of course, be fifteen inches wide and eighteen inches high; they should have a couple of cross pieces about an inch and a half wide, screwed across them at the back.

The appearance of these doors will be much improved by forming on them "sham panels." This is easily done by nailing on them a frame formed of very narrow moulding, which may be purchased at about a halfpenny (or less) per foot. The four pieces forming each of these frames should be cut so as to meet accurately at the angles, and they should be attached by sprigs, the heads of which should be driven well in with a punch, or larger nail. The hinges should be screwed on the doors first, the places for them being countersunk by a chisel or gouge.

This should be done on the wall of the cupboard also, and the doors should then be temporarily attached, by means of tacks, to see if they will open and shut properly. If all be right, the tacks are to be drawn out, and screws inserted.

The door of the third cupboard is to be rather differently arranged. A strip of wood, say an inch and a half wide, is to be nailed perpendicularly at each side, and against the left-hand one of these the door is to be screwed; the door will thus be 18 inches high and 12 inches wide.

The drawer is now to be made. It consists simply of a flat box 46 inches long and 20 inches wide. It should be made of good half-inch stuff, well dovetailed at the corners, and the front being made of one-inch stuff. For convenience in placing papers, the drawer may be divided into compartments.

The construction part being now finished, the whole is to be smoothed—sand-poured or otherwise polished off. If the table has been made of new wood, we advise that it should simply be sized and varnished; but if made of old wood, it had better be painted and grained in imitation of oak.

The top may be covered all over with a piece of black or dark green American cloth, nailed to the under-surface of the projecting edge, rubbing the hand over it from time to time during nailing, so as to get it to lie nice and flat.

If this is to be done, the edges of the top should be rounded off with a plane and smoothed with sand-paper, by which means the wearing-out of the American cloth will be deterred.

Another plan is to get some oak veneer and glue a narrow border of it round the top, and to glue the American cloth into the space left.

Handles to the drawer are now to be added. The "hang-down" ones are much better than "knobs," which catch your watch-chain whilst writing, and are always in the way.
locks, also, form a very important feature, and we earnestly advise the amateur not to spare a few pence in this respect, but to buy a good patent lock for each cupboard and the drawer. Various locks are put on in various ways. We will explain one method by taking the lock on the drawer as an example.

Having explained to the ironmonger that you want a drawer lock, or a cupboard lock, a right-hand or a left-hand lock, a mortise-lock, etc.—in fact, having obtained precisely the lock required for the particular position (for you cannot expect the shopman to supply you with the right lock unless you tell him how it is to be applied), hold it against the inside of the drawer, and with a pencil mark round the part touched by the box of the lock—i.e., the iron part containing the "works." This part is then to be deeply sunk, enough, in fact, and rather more than will allow the whole of the box to lie in it. By pressing the lock against the wood a mark will be made by the pin which projects, and on which the barrel of the key is afterwards to work. Bore a hole through the front of the drawer with your large-sized gimlet, to allow the pin to come to the front, and this hole is afterwards to be enlarged and nicely rounded with your gouge.

But this is not all. Place the lock in its place again and draw this time round the brass, or outer plate, not only on the back of the front of the drawer, but on the top edge. Remove less enough of the wood with your chisel to allow the whole lock to sink, plate and all, into the wood, so as to be absolutely flush at back and top with the wood. The aperture through which the central pin passes is now to be enlarged, so as to form the keyhole, and the lock should be held in its place by the left hand whilst the key is worked by the right, to see that all is correct. If so, the lock is to be screwed on.

Now turn the key, so that the tongue or tongues of the lock may rise, and rub on them some of the blackened grease from your olivebranch; turn the key again so as to withdraw the tongues, shut the drawer closely and turn the key again as hard as you can.

Of course you will not be able to turn it all the way, but the pressure of the greased tongues against the under side of the top will leave an impression, which will mark the places for you to cut deep recesses into which the tongues are to pass, and when this is done you will be able to lock the drawer.
settle in your mind the places they shall occupy, and after this
decision is concluded, take the picture and brush it over its face
with a coating of cement—a strange piece of advice, but the
next surpasses it, for after that is done you must put the picture
with its face to the wall, and now its white back will be all you
see of it!

But we must not proceed so fast, or we shall prove by and experi-
ce the proverb of “more hurry, worse speed.” When cementing
the picture’s face use the sailer-hair brush, and give a very
thin coating of cement, but be particular to pass your brush into
every cranny, for it is important that every part of the picture
should adhere to the china or wood. If a corner or any portion
is held back it will spoil the effect. If it is a very small
flower or leaf, you will need the camel-hair pencil for this process.
In a few moments the cement will slightly thicken or become
“tacky,” according to the professional phrase. When you
perceive this, put the picture on to the china, as before said,
the cemented side first. This must seem strange instruction to
the novice, but all will come right, though apparently the wrong
way is taken to secure the right.

The next work is to make the picture adhere closely to the
china, and also to see that it is placed correctly, evenly, and with-
out wrinkle. When this is so, take the roller, and press it over
and over the picture, until the design remains firmly fixed.

If the design be a very minute one you will find that the ivory
paper-knife will answer the purpose of pressing better than the
roller. Now for another odd direction. Take the sponge and
make it quite damp, and then press it on to the picture, and
make this quite damp. Alack, and well a day! We have been
at all this trouble to fasten on the picture, and now we are
doing all we can to spoil our work. Put aside your fears, my
scholars, and do as you are bidden.

Let the sponge remain on the design until the back is
thoroughly wet. Now for the dénouement. The white paper
which veils the picture will show an inclination to come off, so
take the pinces and help it. Tear it away very gradually and
carefully, and behold the picture as brilliant in colour on this
side as it was on the other, and there it is sticking as close to
the china as if it had been originally painted on its surface.
Now do you not call this a most ingenious contrivance?

We have not quite finished all there is to be done, for there
are a few specks about the picture, and besides that, it looks
rather dull. First, make it quite clean by wiping it over with
a camel-hair brush dipped in water, and then dry it by pressing
it with some soft linen, which you must previously make damp,
or it will not absorb the moisture in the design.

As you cannot rub the surface, it will not be quite dry yet,
so it must be left until it gets so; then, for the final embellish-
ment, brush the picture over with a coating of varnish; do
not get too much on your brush at once, or it will look rough
and perceptible. And now is not your vase or dish, or what-
ever article you have chosen for your work, very pretty? Does
it not well reward you for the time and money which you have
spent upon it? Why, it is a correct imitation of Sèvres; and
what better ornamental china could you desire? Sèvres, as
we all know, is costly, and out of the reach of most people,
partly because of the beauty of the china itself, and partly be-
because the pictures on the china are painted by hand; but this
vase, which in the first instance cost you only one shilling, and
is a good imitation of painting by the hand, has been made to
resemble it thus closely by the help of your own fair hands.

There are a great many articles made in white china expressly
for this style of decoration. I should advise you to experiment
on small and inexpensive pieces at first, and then you can pro-
cess to greater things—a tea or coffee service for instance.

There is one thing to be observed with respect to this deco-
oration of china, that it requires careful and not too constant
washing, so that it is as well to confine it to articles which are
more particularly ornamental. The tea service should not be
one in daily use, but reserved for particular occasions, and
therefore only requiring an occasional ablation.

When we use wood there is not this consideration to fetter
us, and there are innumerable articles, big and little, made for
us to decorate; boxes of every description and suitable for every
purpose, also screens for the mantelpiece. Then, we can orna-
ment cardboard in the same way, and make a variety of articles,
such as glove and handkerchief cases, which would look doubly
effective when decorated by this art.

We must now see what is to be done when silk is the material
to be used instead of one more substantial. The pro-
cess requires to be slightly altered. In the first place the silk
should be stretched out and pinned down, or it would be liable
to wrinkle when it felt the damp. The previous directions as
to the cutting out of the designs, and cementing and placing, all
hold good with silk as the background as well as with china or
wood, also the pressing and rolling of the picture, but when
you come to damp it place a paper between it and the sponge,
to prevent the silk being touched by the latter. Or you can
adopt another method. When you have cemented the design,
lay the uncoloured side upon some warm water for a few
moments, and then raise the edges, taking care not to touch
the coloured design. Place it on a sponge just long enough for
the water to drain off, and then fix it in its place on the silk;
press it well down, and then lift off the paper, which, being wet,
will readily come away without further damping. You will
perceive that the decoration of silk is a rather more difficult
accomplishment than that of china or wood, but it is worth
your while combating the difficulty, as there are various articles
which you can make ornamental—sofa cushions, and scent bags,
ribbons and sachets, and many other little things which your
own ingenuity may devise.

There are a few hints to be given about the materials. The
cement and varnish should be kept from the air, or they will
quickly spoil by becoming thick. A drop or two of spirits of
wine will help to bring them back to usefulness if they are not
too far gone; but carelessness in leaving a stopper out of the
bottle, or the bottle out of the box, will cause you much trouble.
You have not been told what use to make of the bottle of
detergent. That is for the purpose of cleaning the brushes,
which will get clogged with the cement or varnish; it will also
remove any spot of varnish which may have been dropped on to
the article you were decorating or on to your own dress; and
further, by its help you can remove any design whose position
you may wish to alter.

There is a branch of this art of decalcomanie which is very
simple, and a very favourite occupation with children. No tools
or materials of any kind, except the designs themselves, are
required, and the object is to transfer these designs on to
paper. For this purpose the pictures are sold ready prepared—
that is, they require no further application of cement or varnish,
and they are already cut out. Get a basin of cold water and
put a design into it, there let it soak for several minutes, then
take it out, and you will be able to withdraw the paper from
the picture. This you do with your finger and thumb; first of
all you slightly move the design on the paper so as to leave
a margin on the picture, and then placing that margin on the
letter-paper or whatever you wish the picture to remain on
you gently pull the paper on which the design is, from underneath
it. If it is not quite in its proper position, it can be easily moved
while it is wet. Afterwards press it well on to the paper.
THE AQUARIUM.

By W. A. LLOYD.

THE AQUARIUM.

We have now four masses of water—a fluid capable of sustaining the lives of aquatic animals, or rather, of maintaining their respiratory apparatus in good condition. Yet, if any water-breathing animal were at once introduced, it would not live healthily for a long period, unless some of the water were taken out, and other water put in.

Supposing, therefore, that the water needs to be thus changed—say once a day, it follows that though the creatures may be well enough for the first few hours, the water becomes less and less fit for them to breathe in, and towards the time when the change is necessary, it has arrived at a state when it is very bad indeed; especially in warm weather, because increase of temperature not only causes water to retain in solution less of the air on which the health of animals depends, but it also causes organic decomposition to proceed at a quicker rate than at lower temperatures.

This was, and is, the mode adopted in keeping gold-fish in globes, such globes being in the first place chosen without respect to the right proportions which give the greatest surface of water exposure to air. They are filled with water, and a gold-fish (a highly-coloured variety of the common carp) or gold-fishes are introduced.

For a little time the water is quite clear; then it becomes less so; afterwards it gets quite turbid, and the unfortunate fishes, finding no air in the water, protrude their noses above its surface, and painfully gulp in air from the atmosphere, as they best can.

Yet it is not quite taking-in atmospheric air; it is an action of the mouth which swallows the very top surface of the water, where it is in contact with the air, and which necessarily, therefore, contains most air in solution; and the motion given to the fluid, as it is disturbed by the action of the fish's mouth, causes the water to be divided into small thin masses, in which state it more readily absorbs air, and the thus aerated water is then made to pass backwards over the fish's gills, which take up the air, and the blood within them is oxygenated, and the water passes away at the hinder edges of the gill-covers.

But a fish under these circumstances is a distressing thing to see, for all its limbs (its fins) are employed in keeping its mouth in a constrained position at the water's surface, just the same as though a human being were confined in a room so badly ventilated that one's entire strength was expended in suspending one's self with one's mouth at the only air-hole in the apartment, in the ceiling.

In a former number I dwelt much on the manner in which the speed of oxygenation is increased by the minute division of the object to be oxygenated, and I explained how burning is merely a rapid oxygenation (made still more rapid by the thing which is burnt being presented in large surfaces to the oxygen), and how animal respiration, on the other hand, is a slow oxygenation, or combustion—that is to say, the blood, after doing its duty in the system of a fish, for example, becomes vitiated by respiration, and needs to be purified. This purification, or consuming, or modified burning, or respiration, is effected by exposing the blood to air—i.e., to the oxygen contained in atmospheric air—and as nature never expends more force in doing anything than is absolutely necessary, the blood is not presented to the air in great thick masses which can be permeated only slowly and with difficulty, but it is presented to the air (contained in the water) in bulks which are divided, and subdivided, and again divided, until they occupy a series of minute blood-vessels, or a multitude of very small tubules, through which the blood circulates, it being propelled through them by the mechanism which in a fish serves the office of a heart in the higher animals; and whether these tubes or gills are arranged as loops of tubes suspended from arches, or whether they are disposed in tufts and fringes, or in any other manner, the great broad general principle is that in them the blood has an enormously large surface exposed to air, so that the purification is effected with the smallest effort, and in the shortest time.

The walls of the tubes forming the gills, while they hinder the water from actually mixing with the blood, are yet so thin that the air in the water in contact with them penetrates their excessively attenuated membraneous coats, and it is thus that the blood in these vessels becomes oxygenated.

It is the same with all animals, whether fishes or other; the incessant purification of a vital fluid is carried on by the system of infinite enlargement of surface. It is so even in animals which are so humbly organised that they have no distinct respiratory apparatus—as sponges and zoophytes—but where the entire surface of the creature is employed for the function of respiration, or what is tantamount to it; and it is just the same with the highest animals, breathing air by lungs.

The lungs of a human being, for instance, are composed of a multitude of cells, through which the blood circulates, and air is allowed so to permeate that the greatest of surface exposed enables the purification to be effected in a short time, and with small exertion.

In the supposed case of a gold-fish in a globe, therefore, the blood is, by the creature's internal apparatus, caused to circulate through the membraneous tubes of the gills, and then the fish continually takes in water by its mouth, and passes it out at the gill-covers, and as it flows along it bathes the gills and arteries and purifies the blood within them; and if the water given to the fish does not contain sufficient air for this work, the creature dies.

I have gradually got in the way of thinking of this ingenuity of nature in doing so much so easily by a mechanical extension of the surfaces to be operated upon, that it has become a habit of mine to apply it to all manner of things, whether the application touches oxygenation or not. Thus, if I see a man taking snuff, I reflect that he takes pleasure in doing so because the tobacco is presented to his organs of smell, not in lumps, but in a state of minute division—i.e., as a powder—and that leads to the remembrance that if the surfaces over which the olfactory nerves are distributed are smaller in a man than in some animals, yet in many of them—as the seal—this principle of extension is carried out by certain bones being branched and convoluted in a wonderful manner, so as to increase their surfaces.

So, too, the lightness of a piece of cork instantly suggests to my mind (which is always running on this theme) that its small specific gravity is due to its being extensively and uniformly permeated by large air-cells, and that if these cells are filled with water, the cork sinks in it as a hard wood would do.

I can never crush a lump of sugar in my tea without remembering that I do so in order to increase its surface, and
cause its speedy solution. It is absolutely impossible for me to see linen hung up to dry, or to observe, as I did a short time ago, a heap of wet sand turned over and over daily to dry it, without reflecting that in each case this was merely an extension of surface to aid evaporation.

So it is with many other things: the minute subdivisions of the roots, branches, and leaves of trees; the multitubular boilers of locomotive engines; the many points of the upward-turned forks of lightning-conductors, and so forth—all are so many contrivances for extensions of surfaces for definite purposes.

Let me return, however, to the old-fashioned globe with the unhappy gold or silver fish in it—the fish being many times too large for the quantity of water the glass contains.

We have seen that on first changing (or renewing) the water all seems healthy, and that gradually the water has become turbid and offensive. This offensiveness arises from an accumulation of dead animal matters, resulting from the breathing of the fish (and from its excreta), whereby the water becomes carbonised and poisonous, as the creature exhales carbonic-acid gas. Then this accumulated poison is at once removed by the renewal of the water, and is then again allowed to accumulate and get poisonous, as has been explained.

I once more beg to be allowed to employ, as a favourite illustration, because it at once appeals to the eye, my comparison of the consumption of oxygenation wrought by fire with that which goes on in an aquarium; and this time I shall make my meaning plain by the use of candles.

A common tallow candle consists of a mass of fat—which is a highly carbonaceous inflammable substance—enclosing a cotton wick—which is also an inflammable carbonaceous substance. When this wick is set on fire, the heat of the flame melts the tallow below, and the fluid fat is drawn up into the fibres of the wick by what is called capillary attraction, and is then and there burnt and dissipated; and it gives out a luminous flame, because of the carbon it contains.

After it has gone on burning for some time, however, the light gets dim, because the burnt wick remains in the flame—right in the middle of the part of it which gives out the least heat, because it is not in immediate contact with air; and, the wick containing no more inflammable matter itself, it obscures and obstructs the light-giving qualities of the candle by its presence.

To remove this superfluous half-burnt wick, therefore, a pair of "snuffers" are used. Snuffers are now so seldom seen, however, that many young people hardly know what they are, and therefore it has to be explained that they consist of a kind of pair of scissors, one blade of which has a box fitted to it, and the other blade has upon it the lid to the box. Below the box and its lid are two cutting edges, and these, by their opposition, cut off the burnt wick, which enters the box, and the lid being (by the further movement of the snuffer) pressed on the removed wick, whatever fire it contains is extinguished.

The instant this is done the candle burns brightly, and the brightness is increased by spreading the burning wick over a larger oxygenating surface by means of a sharp point, which terminates the fore part of the snuffer. (Here again crops up the everlasting extension of surface for a definite purpose.)

As the candle burns, its light again becomes dimmer, and the snuffing process has again to be repeated; and so on, till the candle has been consumed.

Now this is precisely what takes place in the globe of goldfish, the water of which has to be renewed. It is no mere fanciful analogy; it is the most perfect and parallel homology that can be adduced; for in both cases we have an accumulation of carbonaceous material standing useless and harmfully in the way, and needing to be removed by the introduction of oxygen. And in both cases the removal is sudden and inter-
mittent, and therefore objectionable in its mode of action. So some one set his wits to work, and invented a candle which required no snuffing; and that was done in this wise: The wick was so arranged that as it burnt it did not stand bolt upright in the flame, and so rob it of a large part of its illuminating power, but it was plaited, or twisted, or bound round with something which was loosened as it burnt, in such manner that it curved aside, and presented a nose to the atmosphere, at the very edge of the flame, where it is hottest because in contact with air, and was thus gradually got rid of and rendered invisible—that is to say, the incandescent mass of burning wick is oxygenated, or dissipated, by contact with the atmosphere the moment it has performed its office, and the flame is allowed, continuously and without interruption, to burn clearly and unobstructedly to the end.

Here, then, we have another set of truthful comparisons with what goes on in an aquarium; and we have seen a globe of gold-fish needing a removal of water at certain intervals, and have observed also that in all respects such removal is chemically identical with the removal of the snuff in a candle.

Then I have shown how it is possible to construct a candle needing no snuffing, and have shown the reason why.

And now I shall explain how it is possible and easy to make an aquarium which requires no change of water.

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**THE LONG-TAILED TIT.**

**EGG-COLLECTING.**

*THE MISSEL-THRUSH—SONG-THRUSH—BLACKBIRD—STARLING—HEDGE SPARROW—LONG-TAILED TIT.*

We now come to a group of far more familiar birds, and with some of them it is hard to say where they do not occur; still, the first of them, the Missel-thrush (Turdus viscivorus), affords scope for a few remarks without danger of repeating what everybody knows.

Some years ago this, the largest of our British thrushes, was by no means so abundant nor so generally distributed as at present, but now every village lad is well acquainted with the "torn-cock," a name derived from the bold way in which the male bird utters his love-note, apparently in very rivalry of
the biting and whistling March wind; or else it passes under the still more appropriate name of the “grey” thrush, a very good characteristic by which to distinguish it on the wing from the song-thrush. It builds in the fork of almost any tree, and makes no attempt to conceal its large and clumly-built nest, pieces of dried grass and other material being frequently left hanging down, as if to invite attention; at the same time it has a habit, where yew-trees are abundant, of placing its nest in the very outermost fork of one of the horizontal branches, immediately over the line which any birds’-nester would be likely to take in his scrutiny of the interior of the foliage, and many a nest escapes detection by thus apparently inviting it.

The eggs, of a reddish ground spotted and blotched with brown, are easily recognisable, although when the ground colour partakes of a greenish hue they are somewhat like those of the ring-ousel, which we shall come to later on.

For persistency in nesting in any spot to which it may take a fancy it is perhaps unrivalled, and we may give an instance which came under our own observation. A pair of missel-thrushes had selected, for reasons best known to themselves, the wide fork of an apple-tree not four feet from the ground, and at the very corner where the path from the flower-garden bent round to the kitchen-garden. A more exposed site it would have been impossible to find, but, in addition to this, the fork was a very convenient one for the gardeners to lay their jackets, strips for binding up plants, tools, etc., and they did not choose to be deprived of it, so that every morning, and every afternoon on their return from dinner, the poor birds’ work was remorselessly torn out of the fork. This went on during the week, till Saturday evening brought that rest from labour to the men which was the birds’ opportunity. Either by accident or design a whetstone was left lying across the fork, thereby necessitating a much larger foundation than usual, but the undaunted missel-thrushes worked with such energy, that when we were called to see the place on Monday morning the whetstone was completely imbedded in a mass of mud and dried grass, and the nest itself had already begun to assume its proper cup shape above the level of the stone. The head gardener was a very hard-hearted man, but even he relented at the sight of so much perseverance, and the missel-thrushes were allowed to complete the edifice and to rear their young in peace. The old nest was duly torn out, and the fork was left clear for the next season, but perhaps the birds found the spot was after all not so agreeable as they had fancied, or else they met with their deaths in the interval; anyhow, neither they nor any other birds ever attempted to nest in the fork of that apple-tree again, down to the time of writing the present.

In many parts of France it is a general belief amongst the peasants and birds’-nesting urchins that no nest of the missel-thrush is ever found without there being one of a chaffinch hard by, often on a branch of the very same tree, and the reason assigned is that the chaffinch seeks the protection of the missel-thrush from hostile birds, especially the magpies, which, as every one knows, are allowed to do pretty much as they like in most parts of that country, the chaffinch on its part giving early warning to the thrush as soon as the common enemy approaches to piller any unprotected eggs.

In England, where the magpie is not allowed such impunity, and is, in consequence, not an abundant species, the necessity for union between the two does not exist in the same degree, but since our attention was drawn to the assertion in France, we have certainly found it to be a fact here, that nearly every nest of the missel-thrush has a chaffinch’s for its neighbour. The converse of course does not hold good, for the chaffinch is decidedly more numerically abundant than the missel-thrush.

As no one of our songsters is better known for its exquisite note than the Song Thrush (Turdus musicus), so, few eggs are more frequently to be recognised amongst the spoils of juvenile birds’-nesters than are those of this species. Indeed, to judge from the number of its bright blue eggs, spotted with black, which are to be seen in the possession of these destructive urchins, the numbers of this bird must be enormous, and from the ease with which the nest may generally be discovered, the very existence of the race must be due in a great measure to the fact of its nesting so frequently in gardens and shrubberies close to habitations where even boys dare not penetrate.

In mild seasons the thrush begins to breed very early, and then usually selects some evergreen tree or shrub for its nest. The top of a staked fence is also a favourite spot. Later on, a moor-grown bank is a very common site, and one which, strange to say, escapes the birds’-nesters more than any other.

It is almost needless to say that the nest of the song-thrush is plastered inside with clay, and never lined with dry grass like that of the blackbird.

It is somewhat singular that the egg of the thrush should be so different from that of its very close relatives, the blackbird, fieldfare, redwing, and ring-ousel, species which even in these days of splitting are left in the same genus, yet so it is, nor do we ever find any varieties approaching the typical eggs of its congeners, although some stress has been laid upon the fact of eggs of the blackbird being occasionally found of a pale blue. This variation, however, we consider as depending merely upon the age or health of the bird, the same thing occurring in gulls, rooks, pheasants, partridges, and many other species utterly unconnected with each other.

The Blackbird (Turdus merula) chooses pretty nearly the same time and place for nesting, but its egg, allowing for variations, is, as most of our readers know, mainly of a greenish ground, streaked and blotched with russet.

Although any one of large experience could give a fair guess at the maternity of a typical egg of this species, yet no one could possibly pronounce positively as to some varieties of the eggs of this species, the ring-ousel, the fieldfare, and the redwing, so much do they resemble one another.

Of the ring-ousel we shall have occasion to speak when we get away to the wilder parts of the country, but as the redwing and the fieldfare are not in the habit of nesting in these islands, although they have frequently been ascertained to do so, we would again warn the young collector against buying from a dealer any egg without some well-known naturalist’s mark upon it, for it is just as likely to be a blackbird’s as what it is represented to be.

Another familiar bird which commences to nest early in the year is the Common Starling (Sturnus vulgaris). This species, though long well known throughout most parts of England, has greatly increased in numbers in Scotland, and vast flocks may now be seen, whether twenty or thirty years ago the bird was almost or entirely unknown.

Formerly its breeding haunts were holes in rocks, crevices in old towers, and holes of trees, and there numbers may still be found nesting, but this species is one of those “social parasites” which has found its advantage in the vicinity of human habitations; and few householders beyond the very centres of large towns have escaped the nuisance caused by the well-known habit this bird has of making its nest in any chimney to which it may take a fancy, and which does not happen to be in daily use.

The first result of lighting a fire on a chilly spring evening in some seldom-used room is a cloud of smoke, followed,
perhaps, by the appari tion of sundry black imps, half singed, and covered with soot, the nearly-fledged nestlings, which, although too young to fly upwards from the fire below, are yet quite sufficiently active to flutter about the room and soil both walls and furniture considerably before they can be captured.

The top of a waterpipe, particularly if protected by overhanging eaves, is another favourite site, especially if the early spring is a dry one, and when Paterfamilias finds that, owing to a sudden downpour of rain, the water is coming in all along the side of the house, it is a poor consolation to know that the starlings must be positively swamped.

Although mainly insectivorous, the starling is by no means averse to an egg or a young bird occasionally, and exhibits altogether some of the tastes of the crow tribe, with which he has several affinities. We think it just as well that his numbers should be kept within due bounds. The nest itself is a loose conglomeration of straw or dry grass and feathers, in which some four or five glossy pale blue eggs are deposited, and for the benefit of those who are in the habit of bringing down eggs in their mouths, we would state that in our experience no bird so often has an addled egg as the starling, and if it break, the taste is not easily got rid of.

Perhaps few nests are better known than that of the modest brown-coloured little bird which is generally called the Hedge Sparrow (Acanthon axillaris), for not only is it one of the very first which the hedge-prowling schoolboy finds, but from the bright blue colour of the eggs, contrasting so well with the tints of the nest itself, the subject has become a favourite one with artists; and, originally immortalised on the canvas of the late W. Hunt, the hedge-sparrow’s nest has been depicted both in oils and water-colours by numberless imitators. Built, as it frequently is, before the hedges have put forth sufficient leaves to hide it from the glance of the merest tyro, the wonder is that any but those in private grounds and gardens escape capture; but later on, when the quicksets are thick in foliage, the second broods enjoy comparative immunity, and the nests placed on the commons, in bushes, and against ivy-clad fences or palings, are those which then run the greatest chance of detection.

It is a sociable and familiar little bird, feeding almost entirely on insects and worms; and we trust that our readers will spare it, and induce others to spare it from molestation as much as possible.

It might seem pedantic to interfere with the established name, and to call it the Hedge Accentor, yet the choice lies between that and the offensive and utterly inappropriate suffix of “sparrow,” which nearly cost our little friend the life of the Wild Birds Preservation Bill; and at all events we cannot too strongly insist that this species has not the slightest relationship to the house-sparrow, or any of its tribe. Its food and habits are utterly distinct, the only point of similarity being a slight resemblance in colour.

The family of the Accentors is a well-defined and not a numerous one, there being only some seven or eight species known, all belonging to the Old World; and in Europe there is but one representative of the group, viz., the Alpine Accentor, specimens of which are occasionally obtained in England, and which is common and resident in Switzerland and other mountainous countries. Most, if not all except our own bird, are found of mountainous districts, and lay plain bluish eggs, the affinities of the family being perhaps closest to the Chats (Svoicoidea).

With the beginning of April the number of our nesting birds is much increased, and it is hard to decide the question of priority. That hardy little bird, the Long-tailed Titmouse (Acrocephalus rosea), may now be observed carrying moss and lichen for its nest, and in a few days the collector will probably be gratified by the sight of the completed edifice, which is without doubt the most exquisite specimen of bird-architecture to be found in the British Islands.

Every country lad knows the nest of the “bottle-tit,” or “feather-poke,” two of the commonest local names to which the shape and texture of the nest have given rise. In some parts of Hampshire it is called a “caffin,” a doubtless an old Saxon word full of meaning, but respecting which we confess ignorance. It must have a meaning, because Caffyn is a common surname in the counties of Hampshire and adjacent parts of Surrey and Sussex; indeed, the name will recall the famous cricketer to many of our readers, but it never occurred to us, in the days when we knew him, that his name had any particular signification, for we had not then visited the New Forest district, and when there, we found it quite difficult enough to understand the local names and the dialect used by the natives, without further perplexing ourselves and them with linguistic subtleties and derivations.

The nest, more or less in the shape of a ball, with one small hole for entrance and exit, is warmly lined with feathers, and generally contains as the complement, about eight tiny eggs of a white colour spotted with small rust marks, or sometimes pure white.

We have heard and read of a far larger number of eggs being found, and some have supposed that these were the productions of two pairs of birds, but all we can say is that we never knew of more than eight eggs, and have only heard of one reliable case of ten eggs. Neither have we yet succeeded in finding a nest in situ with two holes, one for ingress and one for exit, or for the tail of the sitting bird to stick out of, as some have boldly stated. True, we have had nests brought to us with two holes, but it was always apparent that the second one had been made in taking the nest from one of the twigs upon which it was woven. A silver fir is a favourite situation, but almost any tree may be selected, and it is not uncommon to find the nest placed against the lichen-covered bole of some tree, so closely assimilated as barely to be distinguishable at a yard’s distance.

Notice how the lichens which adorn the outside are stuck on with gossamer, and the web of spiders’ eggs, and although the nest will not bear comparison for ingenuity with those of some exotic birds, yet its beauty will always render it a great attraction in this country. The bird itself, from its elegant appearance and sprightly habits, is one of our most charming residents, its usefulness in destroying insects is unquestionable; its numbers are somewhat on the decrease, therefore be merciful, and neither take nor permit others to take the nest from mere idle curiosity, just to show at home and throw away.

We would draw attention to the fact that our common species is not the same as that found in Northern and Central Europe, the latter, when adult, having a pure white head, whereas our bird has merely the centre of the crown white, with a broad streak of black on each side, besides other points which it is superfluous to enumerate here.

The white-headed species has been obtained in this country, and has very likely been overlooked or confounded with our species, therefore let the collector bestow some time and pains in watching the parent birds of any nest he may find, so as to ascertain positively to which species they belong, there being no ostensible reason why both should not be found breeding in this country, as they do in some parts of the Continent.
ERE, before proceeding to sensitise—which will be the first part of the actual printing process—the nitrate of silver solution must be carefully filtered into a clean glass or bottle; as, however clear it may seem, there will be some dust or seum upon its surface when poured into a dish, which will attach itself to the paper and spoil the prints. When thus filtered, the solution may be poured to the depth of about half an inch into the flat dish, which must previously have been perfectly cleansed. The albumenised paper having been cut to the required size, is now to be floated upon the silver solution, in order to render it sensitive. This operation must, of course, be performed in a darkened room, as, although the paper is not nearly so sensitive to the action of light as a collodionised plate, it is yet sufficiently so to rapidly darken under its action, which, if long continued, would spoil the white parts of the picture. It is best to cut the paper, so as to sensitise enough for several pictures at once; and if the dish be large enough, to take what is called a quarter sheet—that is, one of eleven inches by nine—a piece of these dimensions will be sufficient to make eight quarter plates (the size of the negatives before described), or an equal number of cartes de visite.

The floating of the paper requires some little care in order to sensitise it equally, and avoid spots and air-bubbles. It must be laid down upon the solution with one even motion, as any break in the movement would cause a line of imperfect action, which would show like a sharp crack in the finished print. The best method is to turn the paper back into a rather sharp curve, having the glossy or albumenised side downwards. Now, taking the sheet by the corner, we place one end gently upon the solution (glossy side downwards, of course), and taking the opposite end with both hands, push, as it were, the paper down upon the surface of the solution.

We have said "push the paper down upon the surface of the solution," and this is most important; for if any part of the paper be immersed, or if by an accident the silver solution reaches the back of the paper, the result will be a light spot in the finished print. One of the reasons for the employment of albumen is, that it keeps the sensitive film upon the surface of the paper, thereby rendering the print more brilliant, while, if the silver be allowed to touch the back, this effect is weakened, or altogether lost, and the print becomes flat and poor in effect.

It frequently happens that when a highly-albumenised paper is used, or when the paper is very dry, it will, when laid upon the silver solution, curl up at the corners, through the rapid expansion of the under surface. This must, of course, be remedied as quickly as possible, or the paper will be spoiled. It is one of the odd episodes in the history of photography, that this little difficulty was sufficient to really bother many good photographers, who devised several plans for overcoming it, more or less complicated and successful, until, in the fulness of time, some happy genius suggested breathing upon the back of the paper as it lay in the dish, when it at once expanded at the back and lay flat upon the solution, and of course no more was heard of that trouble.

After having rested upon the solution for about a minute, the paper should be lifted gently, for nearly half its length, by one of the corners, using for the purpose a pair of horn forceps or two long alips of glass, in order to ascertain if there are any air bubbles, and if so to exclude them. The operation should be repeated from the opposite corner, so as to include the whole sheet in the examination, after which the paper should rest for about four minutes—making five minutes in all for the sensitising process. The paper should not be allowed to remain longer, as beyond this it absorbs the silver; and, while wasting the solution, it is rapidly spoiling.

The sheet should now be carefully lifted, not jerked, but rather drawn off the fluid, and suspended by one corner until quite dry. Of course every drop of silver solution is valuable, so a measure or other vessel—an old saucer will do—should be placed to catch the drops which will drain off the paper, the last of which may be absorbed with a fragment of blotting-paper.

It will be best to sensitise as many sheets as will be needed before commencing to print; and as we find that two sheets will suffice for our first day's experiments, we having prepared these, replace our sensitising solution in its bottle, and having wiped out the dish, set about the drying of our paper.

While the sheets are drying, the negatives may be carefully examined, in order to ascertain if they require any retouching. It is but seldom that a negative is without blemish, and the most perfect specimens frequently have in them a few small transparent holes, which, if printed, would show as black spots on the finished picture. These "pin holes," as they are technically termed, may be easily stopped out with a fine camel-hair brush and a little water colour, and if this is properly done, the defects will not be observable in the print.

By this time our paper is dry, and we may proceed to the actual printing of our proofs. We begin by cutting our paper to the required size by first folding one sheet—the glossy side inwards, of course—into four, and cutting through the fold with a bone or ivory paper-knife, taking especial care not to touch the sensitive side with the fingers. It may be as well to observe here, that the less the paper is handled the better, and that a good and careful printer will never touch his prints, either at back or front, except by the extreme corners.

The negative is now to be laid with the varnished side upwards in the printing frame, in which, it will be observed, there is a rabbit made to receive it. A soft brush should now be passed lightly over it, in order to remove any adherent dust or grit, and the paper should also receive the same treatment; when this is done, the glossy side of the paper should be placed upon the negative, and the back of the pressure frame being brought into position, the whole should be secured together by means of the springs at the back; these springs should be gently and evenly brought to bear upon the back of the frame, as a sudden jerk might break the negative. The frame will now be ready for exposure to light, and it will depend upon the negative whether it should be printed in direct sunlight or in the shade. Our negatives are not very intense, and therefore, although it will take much longer, we determine to adopt
the latter course. We, therefore, place our pressure frame in
the shade, and watch the effect.
In the course of a few minutes we observe a decided change
in the colour of our paper, which we can see through the trans-
parent or shaded parts of the negative picture. From a brilliant
white, we find it change to slate, from slate to pale, and then
to dark brown. When it reaches this stage, we examine the
print by opening the back of the pressure frame, and turning
back the paper from the negative; of course, only opening one
half at a time, so as not to cause a change of position either
in the negative or the print. This examination, which is of
course made in a weak light, shows us that, although the out-
lines of the print are well-marked, the detail in the face and
lighter parts is not yet well developed; we therefore again
close the frame, and expose the whole to the light, precisely as
at first. After a few minutes, a second examination shows us
that the print is exactly as we should wish it to be when
finished—that is to say, the whole of the light and shade is
impressed, and the detail can be seen in every part. We must
remember, however, that in the subsequent processes employed
for fixing and toning the print, some colour will be lost, so that
we expose it in the frame once more until it is slightly darker
than we wish it to be when finished.

When this result has been secured, we take our frame into
the dark room, and remove the back and the print, which we
can now examine at our leisure.
We find that at this stage our print is of a fine deep chocolate
brown in the shaded parts, the deepest portions being almost
inclined to bronze, while the highest lights are nearly, but not
perfectly, white. The whole print looks rich and vigorous, but
slightly darker all over than we should wish it to finish. This
is as it should be; and as we have every prospect of being
successful, we proceed to print the remainder of the required
proofs, placing them as they are removed from the pressure
frame in a dark box, or better still, keeping them flat be-
 tween sheets of dry blotting-paper, until we shall be ready
for the next part of the process—that of toning and fixing
them.

ARCHERY.

ARCHERY VERSUS CROQUET—THE BOWSTRING—ILLEGITIMATE USE OF IT—THE ELLAND TRAGEDY.

If it would take a bolder man than I am to undervalue the
discovery of Friar Bacon, which, if it conferred no other
benefit on the human race, relieved it from the misery of
having to wear armour; yet there is melancholy in the reflec-
tion that so elegant and healthy an art, and one in which
Englishmen once in so remarkable a degree excelled, as the use
of the bow, should be neglected. And what is pushing it from
the pride of place which, after having been driven from the battle-
field and the forest, it so long held on the lawn? Why, croquet,
that most unexciting of games, which, when more than four people
play at it, ceases to be a game at all; the rules and implements
of which have to be perpetually altered in order to keep up the
flagging interest. Croquet requires great skill and much prac-
tice, it is true; so does a piece of variation cut’s cradle piano-
forte music, and it seems to me that the difficulties to be over-
come form the only attraction in either case. However that
may be—and I suppose I am in a small minority—I defy the
conceit of croquet to deny that its pastime encourages stoop-
hing habits, while there is no finer exercise for opening the chest
and straightening the back than drawing the long bow. Then
look at the beauty of the position, ladies! does not the Apollo
Belvedere present the most graceful attitude that has ever yet
been imagined in the poet brain of the sculptor? And what is
that attitude? The god has just loosed his arrow. In spite
of any temporary neglect of their art by the fickle fair, then,
arrows may go on practising quietly; there will be a reaction
sooner or later, they may depend upon it, and then they will
pick up prizes.

Our ancestors used to be very proud of the fact that they
could use arrows a yard long; there is hardly an old ballad
which does not mention that fact.

"An arrow of a cloth yard long
Unto the head draw he.
"So that we can hardly doubt but what there were plenty of
English archers, tall, strong, and long-armed enough to draw a
yard of arrow to their heads; but it is impossible to suppose
that the great majority of Britons were able to use shafts of
such a length with efficiency, and, indeed, there is plenty of
evidence to show that the arrow’s length varied continually.
For instance, an old rule lays it down that the string should be
the height of the man, and the arrow half the length of the
string; which brings the average length of arrow very much to
that used for sport at the present time—viz., twenty-seven
inches.

BOWS.

Yew has always been considered in England the proper wood
for a bow; indeed, the words are often synonymous, and the
weapon is termed a bow or a yew indifferently. And doubtless
the tree was very highly esteemed in the days when the bow
was the national arm, though the popular notion that it was
planted in churchyards for utilitarian purposes is not very well
founded. In the first place, the yew is of such very slow growth
that the cultivation of it within such very narrow limits would
have been a ridiculously minute provision for the future; and,
in the next, to cut down a tree growing in consecrated ground
would have been thought sacrilegious. There is a clause in
Magna Charta forbidding it; and when Henry V. issued a
commission to Nicholas Frost, bowyer, authorising him to cut
yew on private lands for the public service, he expressly ex-
cepted estates belonging to any religious order. Spanish yew
was held in higher estimation than English.

Bows were also made of hazel, elm, ash, and walnut. The Swiss,
though they had plenty of yew, gave the preference to laburnum.
The early English bows were all what is termed self-bows,
that is, made of a single piece; and the large supplies required
for military equipment were obtained by a law of Edward
IV., which obliged the Lombard merchants to deliver a
certain quantity of yew with every cask of wine landed at the
London custom house. When in later times this supply fell
short, bowyers had great difficulty in obtaining a sufficiency of
suitable wood, and were obliged to take a hint from Oriental
nations, and manufacture the backed bow, which was done by
giving a thin slit of some tough wood upon the more brittle
yew, thus forming an artificial back to save it.
In modern times many foreign woods have been found ex-
cellent for the manufacture of bows in two pieces, such as the
topsy, lancewood, cocca, ruby, tulip, and others which have not been tried by English bowyers, though found excellent for the purpose by the natives, as the bois de faute, used by the inhabitants of Guiana, the tabulehu and task of the Hindoos, and the jauket, preferred by Bengalese.

Yew, lancewood, and kickory, however, are the ordinary materials.

When taking up archery do not give too high a price for a first bow, since, if you keep up your practice, you will soon want a second and a stronger one. Of course, a practical trial will be necessary to enable the novice to determine what weight of pull best suits him, but the adept can make his selection without leaving the shop—the strength of every bow being tested in this way: it is strung, and balanced at the handle on some fulcrum, and then weights are hung from the exact centre of the string until it is stretched as far as it would be by drawing an arrow to the head, and the number of pounds weight then suspended determines its power, and this is marked upon the weapon, which may be a twenty-five, a seventy, or one hundred pound bow. It is from five to six feet long, thickest in the middle, which is termed the handle, and tapering towards the ends, which are tipped with horn, the upper being the longest. The notches for the string in these tips are called “nocks.” The outer and that side of a bow is termed the back, and the rounded inner side the belly. The handle is covered with velvet, worsted lace, silk, or leather.

When not in use the bow should be kept in a green baize bag, and if you entertain that feeling towards it which a good workman generally has for his tool, you will polish it up occasionally, by rubbing it first with oil, and then with French polish.

The strength of the bow must, of course, be proportioned to that of the archer. A man of ordinary muscular development, however, should not begin with one of less than fifty pounds, nor rest contented until he can draw a seventy-five pound bow with ease. But if he commenced practice with a bow too strong for him, he would not be able to shoot straight. When there is anything of effort or struggle in drawing the arrow, the target will remain untouched.

Ladies’ bows are from twenty-five to forty pounds in strength.

**BOW-STRINGS.**

Bow-strings have been made of all sorts of materials—the sinews of deer and horses, grass, silk, strips of leather, and women’s hair. Hemp and flax are now alone employed, the former being esteemed the best. The string is fixed to the lower and shortest horn by a timber hitch, the eye having been previously slipped over the other end, so as to play freely up and down; but to prevent its slipping down too far when the bow is unsprung, it is well to loop the eye to the upper horn with a piece of ribbon. It is thought well by some to entwine both the eye (or upper loop, which you find ready made) and the lower noose (which you form yourself) with fine kid. Of more importance is it to mark that part of the string which strikes the arm when the arrow is released, and wind silk, slightly cobbler’s-waxed, round it; for if the string becomes frayed it is liable to snap, and the consequent jar will often break the bow. Rather less than half an inch in the exact middle should be wound with silk of a different colour, to mark the nocking point. Whenever the string gets soft, and the strands loose, twist it tight again and rub it with white wax.

The distance between the belly of the braced bow and the string is called the shaftment, and should be about six inches. The old way of measuring is as good as any, which is to rest the clenched hand, with the thumb upon the inside of the handle, and if the thumb-nail touches the string you need not alter it.

Always have a spare string handy, ancient archers always had, and very ugly were some of the uses to which they put it. The flogging of boys was one, but I don’t object to that; an archer stuck me in the mouth with his tip-cart this morning, another pelted my favourite tortoise-shell cat yesterday. But to twist the bowstring round the forehead of a poor peasant who had concealed his little savings, and tighten it till the agonized confession from him, or to bind his thumbs together so tightly that his blood burst from under the nails, were habitual bits of playfulness indulged in by the old foresters of which we cannot approve. Oriental bowstrings were very gay in appearance, being made of parti-coloured silk, but the part they have always played when unjust is well known. The packa is allowed to suck the life-blood of those whom he has been appointed to govern until he is well gorged, and ready to squeeze. Then some instance of malversation is brought forward against him—a matter easy enough where every official lives entirely upon extortion and corruption, and he receives the inevitable summons.

Yielding to Destiny, he sinks upon his knees; the bowstring is passed round his neck; the loops are drawn tighter, tighter. Well, well, they say that death by strangulation is pleasant, after the first; let us hope that the idea is a correct one.

That great care was taken of their strings by the bowmen of old may readily be believed; the archer whose string snapped or was severed in fight was suddenly rendered as helpless as a modern soldier is when his ammunition is spent, and it was as common to slash at it in a charge as at the rein of a horseman; or sometimes, in the case of a man at bay, it was cut by treachery, which was the fate of Wilkin Lockwood, whose story is so characteristic of the times in which he lived, and so illustrative of the use of the bow at that period, that it may be read with interest here.

In the reign of Edward III., 1341, Sir John Elland, being High Sheriff of York, and the king being abroad, seized the opportunity of carrying out a feud he had with three gentlemen, related, and his neighbours. Arm the servants, he proceeded in one night from the house of Sir Robert Beaumont to that of Quarntby, and thence to that of Lockwood, and murdered all three of them. Lady Beaumont, with her two sons, fled for protection to her near relative, Sir Thomas Crearton, where the sons of Lockwood and Quarntby, with a relation named Ley, joined her. Here, at Borton Hall, in Lancashire, the ladies were well instructed in all martial exercises, and, with the idea of future vengeance in their minds, they practised principally with the long bow. When the youngest had attained his fifteenth year, they agreed to return into Yorkshire, and execute their design against the house of Elland. Having enlisted some associates whom they could trust, they set out, and travelled across country to a place called Crumblebottom Wood, through which they learned that Sir John Elland, coming from the Sheriff’s Court at Bridge House, would pass; and here they lay in ambush, surprised their enemy, and after a sharp fight separated him from his party and shot him. Then they fled to Fowre Fells, where they spent the winter planning schemes for the extirpation of the rest of the Elland family, which now consisted only of a son and grandson of the deceased knight. On the night before Palm Sunday they seized a mill which was on the road from the Ellands’ house to the church, intending to attack Sir John and his son as they passed the stepping-stones of the brook on their way to the service. Sir John, having had an inkling of some plot against him, wore a coat of mail under his clothes, but accompanied his wife and family to church as
nal. When he was crossing the water Beaumont came out of the mill with his bow in his hand, and let fly, hitting him on the breast, but the arrow glanced from the concealed armour. "You shoot wide, cousin," cried Lockwood, joining him; and he then drew an arrow with a like result. But the moment after, Lockwood, perceiving the trick, shot an arrow at the knight's unguarded head, and stretched him lifeless in the stream; at the same time an arrow from another of the party slew his only son; and so perished the male line of Elland.

Their object attained, the avengers retreated, but the tenants and retainers of Elland gathered together in hot haste and gave chase, overtaking them in Avelley wood, where an obstinate fight took place, Beaumont, Lockwood, and Quarby shooting down many Ellanders; but at last, their arrows being exhausted, they were forced to fly. Quarby was killed; Beaumont escaped to the Continent, and served under the knighthood of St. John; Lockwood, evading his pursuers, sought refuge at Camel Hall in Yorkshire, the property of Boswell, the undersheriff, and tenanted by a small farmer named Lacy. He stayed here too long, lingering to enjoy the company of Lacy's daughter, with whom he had fallen in love, and one day, walking with her in the park, he met the keeper, who knew him, and reported the fact of his being there to Boswell. Boswell had little difficulty in persuading his tenant to give the young man up, and brought a party to seize him; so that the young man, attempting to leave the house, found himself surrounded. Having his bow and a good stock of arrows with him, however, he did not give the game up, but ran quickly up-stairs, and defied his enemies from an open window, aiming his shafts with such deadly accuracy that his escape seemed once more ensured, when the girl he loved, fearing that her father would lose the reward for his capture, came behind him with a sharp knife and cut the bowstring. Then the sheriff's men rushed in, seized the defenseless Lockwood, and put him to death.

SKATING.

By a Member of the "London Skating Club."

THE RUSSIAN "COACH"—SKATING IN HOLLAND—A FEW WORDS ON SKATES—THE OLD SKATE—THE "ACME"—THE SCREW-AND-BUCKLE SKATE.

The machine mentioned in our last is a simple affair, such as any country smith or carpenter could knock together in an hour or two. The sketch which was given shows its form and make, and the manner of using it. Its two lower rails, which rest upon the ice, are placed far enough apart to allow plenty of room for the feet—forty inches will be about the right distance. They are connected together by bars of iron or wood at the ends, in front, and at the middle, and a light frame supports the wooden hand-bar at the top, which is raised about three feet from the ground. The hands of the skater, resting on this bar, push the whole machine along in front as he goes on, and as the bar is just above the centre of the long running rails below, it cannot either be pulled over backwards or tripped up forwards. If the height of the hand-bar is properly arranged it is almost impossible for a beginner leaning upon it to get a fall. The only danger is that of the feet slipping forward, and to obviate this either the middle bar at the bottom is placed so low that the feet cannot pass underneath it, or, better still, it is so thickly padded that the ankles driven up against it are stopped without being at all hurt or bruised. It would not be difficult to arrange a device for raising or lowering the bar according to the height of the person using the machine. Thus a whole family, a whole school, or, on an occasion, a whole party of skaters might be put through their first steps in succession, and learn to skate without any other help at all.

One of the beauties of this little Russian "coach" is the speed with which it can be driven along. The lower rails, or runners, will be more durable as well as more speedy if they are made of iron, and the framework above is more elegant and light-looking if it is also, as in the diagram, of metal. But the whole thing can, of course, be made of wood if it be found more convenient. The machine would be a great favourite if introduced in England. The starter of a "coach" to be let out by the hour would soon find plenty of patrons and patrooners.

In Holland, where skating in winter is as natural to all the inhabitants as walking in summer—to some of them, in fact, a great deal more so—they are very fond of making up great parties for an expedition over the ice. Forming into a long line, each holding one of his neighbours' hands with each of his, and a lady between every two gentlemen, they set forth at a good steady pace. Every one keeps time, striking out at all the same moment with the same foot. Talking and laughing, joking and singing as they spin along, their spirits rise in the keen frosty air as they warm with the exercise. With the rise of spirits the pace increases, and perhaps a spirit of emulation makes each one improve now and then upon the speed. To cry halt is to be disgraced or fined, to lag behind is nearly as bad. As for the ladies, they must hold on tight and be wheeled along passively: the pace soon becomes too hot for them to do anything else.

That is the way for people to learn to skate; there is no time to fall, or if you do, you are whipped up again in a moment by the two strong hands on either side. No check, no mercy; the ice seems to fly away behind, beneath your feet. As if on wings, you glide smoothly and easily along, the mile-post fly past half unperceived, and as you rattle into the prim Dutch village with a final rush that makes the ice ring out far and away beneath your feet, you are astonished to find that a whole hour is gone already, and still more surprised to hear that in the one hour you have put ten good English miles behind you. That is something like skating! A lady who has joined two or three of these expeditions will not have much quantity left for her private practice. And yet I doubt if the species of skating lesson about to be mentioned has not sometimes at least an equal charm. Suppose the skating-master possessed of his pupil's two hands, and skating backwards as she follows him. He must be a good skater—a first-rate skater—to do his business to perfection. It is not every one who can keep up a good pace backwards, while he gives his full attention and both his hands to the fair burden which they half support. But if he is, good by to the Russian coach—you may discard all such dull devices. The lady keeps a look-out ahead, and steers so as to avoid collisions; the gentleman does the hard work and the instructing partly a light task after a little while. To fall, for the lady, is impossible; to need a tight grasp is very easy. As for the gentleman, let him be the most hardened bachelor that ever put
skates upon his feet, and he will have such a trial to go through as he never had before. They talk of the dangers of a ballroom—why, dancing is a dull, a heavy affair compared with this swift-flying course! Where is the girl who, if she might only choose her own skating-master, would not soon learn her lesson in this style? If such there be, let her take off the skates with all convenient speed. She will never get into the Skating Club!

It remains for us to say a few words as to the selection of a pair of skates. Out of the almost innumerable varieties, each of which is considered by its admirers to be the best, there are two which at once suggest themselves to notice as the simplest and most generally used—that is to say, the old screw-and-buckle skate and the new American lever, or "Acme" skate. They are the extremes, not only historically, as the first and the latest inventions of the kind, but artistically—the one being the simplest device imaginable, capable of being worked out by any ordinary workman, and the other the most beautiful adaptation of modern mechanism, protected by a patent in the hands of a single maker in the United States. Omitting therefore the intermediate varieties, ranging from those of the utmost complexity and ingenuity to a simplicity equaling that of the old wooden backed skate, we will compare the merits and demerits of the two sorts above alluded to. The old ordinary skate is so well known as to need no description or diagram. It has the advantage of great security, of being able to stand any amount of wear and tear, of fitting to any boot without the necessity of alteration or adaptation, and lastly of cheapness, for a first-rate skate of the old sort ought to be had easily for a few shillings. On the other hand, its disadvantages are that it requires a good deal of time and trouble to take on and off, that its use necessitates the carrying of a gillet to bore the holes in the boot-heel that the straps used with it are apt to cramp the feet and ankles, and lastly that it is a bit heavy both in use and in appearance. Let us now compare with these advantages and disadvantages, those possessed by the Acme skate.

A diagram of this skate is given above, but it is difficult, or rather impossible, by a mere drawing, or even in words, to explain its clever though really simple mechanism. It must suffice to say here that it operates by means of a triple-acting lever, to compress its five teeth or claws round the sides of the boot's sole. Three of these teeth grasp the heel, and two of them the sides of the front part. The lever, after the clasp are fixed in their place, is fastened securely and neatly by a spring snap. To detach the skate it is only necessary to push aside the spring, and by a single motion of the lever, the skate falls off from the foot. Thus a few seconds are all that is required to put on and to take off a pair of these skates. It is quite possible for a man, skating at full speed upon one leg, to take off and put on again several times the skate belonging to the other. The advantages of the Acme skate, besides the rapidity with which it can be put on, are—its lightness, its neat and clean appearance, and its completeness, without the need of straps and buckles, and the troublesome and dangerous gillet. Its disadvantages are—the clumsy and useless projection at the ends of the blades both fore and aft, which the maker should be persuaded to dispense with; the uniformity in its shape of blade, which is rather too curved or "hog-bucked" to be approved by the best English skaters; and a certain liability to give, in some part or other, under the strain of very hard wear. This last objection does not hold good in the case of figure-skating, for which purpose the Acme is quite firm and secure enough. But its delicate steel joints and springs, strong as they are, cannot be expected to stand against the sudden and severe strains to which they are subjected when the skate is used for such purposes as hockey or racing on the ice. Moreover, the strain on the boot-lace, which unaided by straps bears the whole of it, is too much for almost any leather to stand against. The objections to almost all the other forms of skates are that they require a boot specially made to fit them. The great skaters do not mind this any more than a great billiard-player minds carrying about his own one; but for the general public such a restriction is quite a nuisance.

Of course, between the first steps and earliest lessons, for which we have already offered hints, and the full-blown dignity of the bold and confident skater there is a period of transition varying in length according to the courage of the learner and his contempt of falls and bruises. But it is astonishing how soon this intermediate stage is passed, and how rapid is the progress when once a start has been made. At each new trial the ankles seem stronger, the balance more steady, the fear less liable to run away on their own account. The strokes, at first weak and wavering, become very soon firm and vigorous. Instead of their first short scratchy efforts, the skaters begin to seem as if they would make good bold long marks upon the ice and it is possible in some degree to govern their direction and regulate their length and speed. That which surprises one most is the slightness of the exertion needed to impel oneself in any direction. The mere act of leaning on the skate sends one flying over so many feet, and the difficulty is not to keep up the impetus, but to bring it to an end.
USE your scalpel or a narrow paper knife, until you have completely loosened the skin from the body down to the junction of the thighs at c (page 24), and then by taking hold of the joint at H, and by pushing gently upwards, you will be able to loosen the skin all round, and to divide at the joint c, the bottom of the neck, as soon as you have separated the wings, and in the case of a narrow-necked bird, which takes time to skin, it is, of course, as well to do this at once. Push, not drag, the skin gently over the head till the ears are reached, and here with the point of the scissors, dig deep below them.

Apply plenty of plaster between the skin and the body as you go on separating them; work round the lower parts of the back, and when you can get your finger under the backbone just below the vent, H, then cut through the backbone just above the very last joint. Take care not to squeeze the abdomen, or the skin will be dirtied, but use plenty of plaster, and, if necessary, put a plug of wool into the body of the bird; then, taking hold of the backbone with the fingers or tweezers, you skin upwards to the junction of the wings. Slip the skin gently over the broken parts, till you get to the joints at K, where you make the division, leaving the fractured bone attached to the main trunk. Leave the wings for the present, and continue pushing off the skin along the neck, till the base of the skull is reached, and then, cutting through the last joint, you free yourself from the encumbrance of the body, which should be laid aside for future examination. If desirable, the body can be cut away at into the orifice of the skull, so as to separate the membrane without tearing the skin, and don't be afraid of going too deep, for although such an excess of zeal is possible, the fault is generally the other way. Continue skinning till the eyes are reached, when care must be taken in cutting through the membrane which joins the eyelid; this done, the bird is skinned to the base of the bill. Now extract the eyeballs; it is best to do this from the outside with a pair of tweezers, but be careful not to break them, as the liquid is hard to get off if once the feathers are soiled by it. Break down with tweezers or scalpel the interior bones of the skull, and clean out the brain, etc., thoroughly; leave the “jaw-bones” attached to the head, however, but withdraw the tongue, and cut away as far as possible any flesh that may exist about the head, especially if the bird be a large one, for in small birds the preservative will dry up any little bits of flesh that cannot easily be removed.
from the bones. Time is precious, for being turned inside-out does not improve the plumage of any bird, as the quicker the head can be restored to its natural position, the smoother will be the feathers.

Meanwhile your preservative has been getting ready, and now comes the time for using it, but in our anxiety to give you some actual skimming to do, we deferred for the moment any instructions as to its manufacture, which is sufficiently simple. Mix a little plain white soap and water in a saucer until it is of the consistency of thin paste or gruel, add enough powdered arsenic to make it tolerably thick, work the whole together, and apply with a coarse brush when required. Experience will soon teach you how much mixture you require for the work on hand; your saucer is washed, your arsenic put carefully away in some locked drawer, and there is no nasty fermenting mess like the so-called “arsenic soap” left for another occasion, to blacken your nails, and perhaps poison your blood if you have a scratched finger when you use it. But of this more anon, for we are leaving our bird in the very position we so much deprecated.

Dipping the brush in the mixture, you now anoint the inside of the skull; two balls of cotton-wool about the size of the eyes are then inserted in their places from the inside, and the cavity of the skull filled with the same to keep them in their places; the outside of the skull is also anointed, and having done the same thoroughly to the inside of the skin which covers it, the latter is gently pushed back again over the skull, the process being assisted by pulling with great care at the thread which ties the bill. Make a false neck of wool of about the same thickness but somewhat longer than the natural one, and insert one end into the throat quite to the base of the bill, and, passing the brush over the inside of the neck, the skin is now restored as far as the wing-joints, which should now be skinned from \textit{N} to \textit{X}; the bones are anointed, a little wool wrapped round them to take the place of the flesh and tendons, the bones are restored to their places, and a thread is tied to the end of each at \textit{X}; these two threads are afterwards drawn together so as to close the wings, and so as to retain them in their proper places on each side of the body. Clear away the flesh from the bones \textit{D} to \textit{H}, which were left in the skin, and after applying the preservative, wrap them round with cotton wool and restore them to their places; clean the flesh from the rump, and anoint the whole inside of the skin most thoroughly. There is no need to lay it on thick, but it is essential that no part should escape a touch of the preservative, as otherwise the feathers are apt to fall out, to say nothing of the danger from attacks of insects.

Now give a glance at the body of your specimen, which we told you to put aside, and proceed to make a false body of cotton wool or tow of about the same size, though not of the same firmness as the original; place it inside, and accommodate it to the false neck and wings, the threads from which you tie together, and prepare to sew up. The best way of doing this is exactly the same as that adopted in making a shooting-boot, only that if you begin at the right-hand side of the vent you carry the thread up to the left hand of the opening at \textit{A}, leaving two inches or so outside the vent, then lace over from \textit{A} till you come down to the left side at \textit{H}, tighten up the stitches till the sides meet, and tie the two ends at \textit{H} together. Smooth down your feathers, and your skin is done; in a few days it will be set dry and firm, and during that time you can to a certain extent correct some of the faults which must necessarily be the result of inexperience. One of the principal difficulties is with the feathers of the wings, especially with those small ones along the shoulders, which sometimes refuse to be smooth; a few pinches between the finger and thumb whilst the skin is drying has a wonderful effect upon these. Then the neck is very liable to be stretched, showing bare places between the feathers, and beginners are apt to increase this difficulty by exaggerating the size of the false neck or the false body where the two join. Again, if not too full, the neck is frequently too long, and in trying to shorten it, the wool is apt to be pulled out of the throat, to prevent which, it should always be within reach of a pair of tweezers inserted at the bill.

To keep the wings in position close to the body, with the tips just crossed, or nearly so, according to their relative length, it is usual to employ bands of paper, or paper cones, whilst the specimen is drying, but this latter interferes with the supervision requisite for the work of a beginner. For ordinary birds there is a good plan of exposing them to dry on a board on which pieces of wood have been fixed at intervals suited to the width of the specimen; the raised pieces being then covered with paper pasted on to them, and allowed to dip down in between, and the skins being placed in these hollows, which are similar to those of a corrugated iron roof. Birds with long bills should have their heads turned to one side, as otherwise they could not be contained in anything less than drawers of a depth or length utterly disproportionate to their general size, and for these the above plan is not quite so good, but a piece of cardboard cut half through, and bent up at the sides so as to form a trough, is a very efficient substitute, as part of one side of the trough can so easily be cut away to allow of the bill of such a bird as a snipe or woodcock, either being a good bird for practice, lying at about right angles on the same plane with the body.

A practice common enough amongst bungling taxidermists, but one which we strongly deprecate, is that of passing threads through the joints of the wings at \textit{X}, or through the stem of the first large feather at \textit{O}, the object being to secure the wings to the side, and produce a better appearance, but all this tying together of specimens is quite unnecessary, even whilst the bird is drying, and it interferes with examination, measurements, and general usefulness of the skin afterwards. Beware of buying a skin which is fastened up with thread in this way, for when you cut them, as you will have to do, you will probably find that concealment of some defect was as much the object as the desire to produce a good appearance.

The main point to have in view is that of making your specimen as like as possible to what the bird was as it lay upon its back before you began to skin it, and this result can only be attained by practice and experience, which will show you numberless little touches and refinements, especially about the head of your specimen, where a little cotton wool, a knitting-needle, and careful manipulation will work wonders. It is a common fault to cover stuff skins, and with large birds this is a source of frequent annoyance to the collector who receives skins from abroad, as they frequently have to be opened and part of their contents extracted, before they will go into the drawers for which they are intended. The false body should always be of \textit{rather smaller} dimensions than the natural one, and, when travelling, the skins should be only just sufficiently filled out so as to preserve their shape in drying.

It is as well, even in this country, to pass the preservative brush lightly over the bill, legs, and claws; the preservative can easily be brushed off when dry, and enough will have penetrated to preserve the parts from the attacks of insects or mice. In some foreign countries this proceeding is absolutely necessary as a precaution against insects, and we fancy that benzine would prove efficacious there, as it certainly is at home. Hibbert corrosive sublimate dissolved in alcohol has been the usual preservative for these parts, and it has also been used for pre-
serving the skins themselves, but it is a most dangerous article to use, and the skins prepared by it are dreaded by all professional taxidermists, both for their liability to crack and for the great risk of blood-poisoning attendant on manipulation. Benzine can be procured at any chemist’s, and it is of use in many ways, as we shall have to mention; due warning as to its inflammability is generally printed on the bottle, but in any case this must be borne in mind, and the hot sun or the chimney corner are equally to be avoided, unless you want an explosion; indeed, this liability would probably preclude its use.

TOY-MAKING AND TOY-GAMES.

AUNT SALTY—BATON, OR PITCH-CLUB—CAT AND MOUSE—CLEFT STICK—CHINESE JUNK.

WHERE one obliged to follow the natural order in treating of toy-games, I would have to tell you about the popular amusement of Baton, or Pitchclub, otherwise known as ‘Throwing Sticks,’ ‘Knock-em-downs,’ or ‘Three Sticks a Penny,’ before saying anything about Aunt Sally. For Aunt Sally is descended from Pitch-club, as you may see, for she has the characteristic features of the Pitch-club family. But the natural order is not necessary. Let us speak about Aunt Sally first.

Aunt Sally is by no means an old game. On its first introduction it was received with enthusiasm, and had quite an enviable run of popularity. But, whether it was that it required too much exertion from the players, or that it was found monotonous, or that its name was thought too common and familiar, or that some new attraction appeared, I do not know; at any rate, out of fashion Aunt Sally dropped. For all that it is a good healthy amusement, and you may find many a worse one for passing a forenoon or an evening, especially at the seaside.

I need hardly tell you that all the apparatus required for the game consists in a wooden head stuck on the top of a rod, a number of clay pipes, and several stout cudgels. You have seen it played, and know that well enough, I suppose.

The wooden heads are to be bought ready made, but you can easily manufacture one for yourself. Get a round block of wood, a little larger than you wish your head to be, and cut and carve away till you have got it something like the part above the dotted line in Fig. 1. The part below the dotted line is a separate piece of wood securely nailed on to the first piece. Now carve Aunt Sally’s features. Tradition, you must be aware, represents her as a negroess. Paint the face black, the lips bright red, and the teeth and eyeballs white. If you have no genius for wood-carving, you may content yourself with painting the features on the plain surface; but there is nothing like trying, and, even at the risk of spoiling the block, I would advise your attempting cutting out Aunt Sally’s nose, and eyes, and mouth. Bore a hole in the lower part of the piece of wood which forms the shoulders of the figure (see Fig. 1); it is for fastening the rod in, and should extend several inches up the neck.

Get now a piece of canvas or stout calico, and make a cap of it. Nail the cap on to the head, so that it will cover all but the face. A frill may be made by looping up a thin strip of some coloured stuff between the nails, which, by the way, should be brass-headed ones. Look at Fig. 2, and you will see how the cap should be arranged. Last of all fasten a tippet of some strong and gaudy material about Aunt Sally’s neck. She is now dressed for out-door exercise.

A hole is now to be bored between the lips of the figure, and in this hole a short clay pipe is to be fixed. Some people also place a pipe in each ear, but I do not think this practice should be encouraged. It gives rise, as has often been remarked, to much careless throwing. Pipes fastened, too, in the nose—a common practice—are absurd.

When Aunt Sally is played at, the head is mounted on a wooden stake or an iron rod, and it is a good plan to set up a sheet or a net a little in the rear, so as to catch the cudgels, and save the trouble of fetching them if thrown with too great force.

The game consists in each player taking a certain number of stout heavy sticks or cudgels—they should be from twenty inches to two feet in length—and trying with them to knock the pipe out of Aunt Sally’s mouth and break it. The position of the player should be half a dozen yards or so from the figure.

The art of throwing successfully is to be learned only by practice. One method is to throw the cudgels underhand, imparting a revolving motion to them as they leave the fingers. Another is to strike the pipe with the end of the stick rather than with its side. But you will experiment for yourself, so I may safely cease talking here about Aunt Sally, and go on to refer to the game from which it took its origin.

This is a game of great popularity at fairs and such like gatherings. Baton, or Pitch-club. It has three other names, already mentioned—names which have about them something suggestive of the popular holiday, the busy market-place, and the race-course. I may mention, however, that I am using these names rather more loosely than some writers. Some would apply different names to different varieties of the game—but that is a matter of no consequence. When Baton is played at, several holes, some distance apart, are dug in a loose sandy soil. In these holes, which should be about six inches in diameter, sticks about five feet high are set up, and on the tops of the sticks snuff-boxes, knives, cocoa-nuts, and such like articles are placed. The business of the player is, by throwing a club, to knock the article off the stick, so that it shall fall outside the hole. This is only to be done by hitting the article itself. Should the stick alone be struck, the article will certainly fall into and not outside the hole, in which case the throw does not count. If the article falls inside it becomes the property of the thrower.

The club head should be straight and rather heavy. How should one throw it? you ask. You will learn by practice, as
in the game of Aunt Sally; the same style of throwing is required for both games.

When a sandy soil cannot be obtained on the site of a fair, the gipsies, in whose hands this amusement in its public aspect principally is, provide light baskets of sand in which the sticks are placed. The first time I ever saw "Knock-'em-downs" played was at a fair many years ago in the seaport town of Largs, where the holes were made in the sand, which there was plentiful enough; the last time was a few days back, in Epping Forest, where the sand baskets were used.

This is a good game for the sea-side. It may be played with only one stick and one hole in the ground, a small stone being placed on the top of the stick (see Fig. 3). The player scores nothing if he misses striking either stone or stick with his cudgel; one, if he succeeds in making the stone fall into the hole; and two if he strikes the stone so as to make it fall outside. Instead of a stone one may place any article, such as an apple or an orange, on the top of the stick, the said article to become the prize of whoever succeeds in making it fall without the hole.

Balls may be used for throwing instead of cudgels, and in some respects are an improvement.

A game similar to Baton was very popular among the ancient Greeks. It was played with short thick sticks, and required considerable strength and quickness of eye.

Our ingenious neighbours the French deserve the credit of inventing the game of Cat and Mouse. Would you play at it? Then go, fetch a friend, for it requires only two players. You are both to be blindfolded, and tied to a tree or post by means of two long strings. If you ask me to superintend the arrangements, I shall fasten the strings to the post, or whatever it may be, by a loose knot, so that you may move about easily and without any danger of the string getting twisted. One of you must be the cat and the other the mouse. Now, the mouse must have two flat pieces of hard wood, with the edges of one of them notched, so as to produce a grating sound when the two are rubbed together. You, I suppose, have the two pieces of wood; rub them together: your friend, the blindfolded cat, hears the sound, and does his best to catch you: you, the blindfolded mouse, try to keep out of his way. When you are caught, you undergo a remarkable metamorphosis, and change from a mouse into a cat. Your friend becomes the mouse. So the game may continue for any length of time. Recollect, you must be really blindfolded; there is no fun unless that is the case.

The Cleft Stick, of which I am going to speak about now, belongs to the same family of toys as the sling. The mechanical law upon which it depends is the same as that which regulates the propelling of stones by the sling through the air. Get a stick of tough wood about thirty inches long and three-quarters of an inch in diameter. It should be tapering towards one end, and you will find that ash is the best wood for the purpose. Make a slit at the small end, exactly in the middle of the wood, and extending down the stick for about four inches. Now beg, borrow, or buy a piece of waxed string, and whip it round the stick, commencing at between two and three inches from the thin split end and working downwards. When this operation is finished, the cleft stick is ready for use. Take a smooth flat pebble, force it into the cleft in the stick, then holding the weapon by the lower and thicker end, give it a kind of jerk or throw. The stone will fly to a considerable distance, and, by practice, one may attain to great accuracy of aim, though it may well be questioned whether, after all, as the saying is, the "game is worth the candle." Great care must be taken in practising, not to work mischief in the way of breaking windows, and putting out people's eyes. Indeed, no diversions of the projectile order should be indulged in, unless one can have the run of a field or meadow or some such large and vacant space.

Here and there you will find boys playing at a variety of Cleft Stick. Instead of their sticks being cleft, they make use of a pliant switch, on the end of which they fasten small lumps of clay. These lumps of clay they jerk off their switches with great force. Sometimes they send them against trees, posts, and walls, where they flatten out and stick with great tenacity. And occasionally they get up battles among themselves, and use these clay balls by way of ammunition. The combatants stand at a considerable distance from each other, and the appearance of their clothes and faces at the end of the struggle is more easily to be imagined than described.

There are some things which it is very difficult to make "as clear as the skies" in writing, and the method of turning out the Paper Chinese Junk is one of these. This used to be a favourite paper toy with us at school, but I never saw an account of it in any book that I can call to mind. Perhaps the apparent impossibility of making it plain to the ordinary reader, has kept writers from touching upon it, but it is so pretty a little boat, and so much superior to the one described on page 135, Vol. I.—though that is very good in its way—that I feel bound to try what I can do to teach you how to make it. You will attend to what I say on the subject, and I shall explain as carefully as I can. It requires, you see, an effort on the part of both of us.

Take a square piece of paper, and, first of all, find the centre; this you may do, you know, by doubling the paper twice from corner to corner and opening out afterwards. Fold the four corners into the centre, as in Fig. 4. Fold A B to C D to the dotted line r r, when the paper will look as in Fig. 5.

I may mention, by the way, that in this figure and in all the rest except the two in the centre, the proper proportions are preserved.

Double the paper longways, the side represented in Fig. 5 being kept outmost: it will look now like Fig. 6.

Fold A B to C D (Fig. 6), and fold the other side of the paper—you will find that the paper has another side—just in the same way; that is to say, fold its A B to its C D. The paper
will now look as in Fig. 7, folded up, you observe, in very small compass.

Open out the paper till it looks again like Fig. 5; the only difference being that it will have three marks of folds upon it. Now, below the point marked x in Fig. 5, you will find the four corners of the square piece of paper; pull out two of these, the will lie parallel with the line c u, and that the line n c will lie parallel with c x. Into this position the paper must be folded flat, when it will be found to be in the form shown in Fig. 10. The dotted lines here, as in other figures, represent folds marked on the paper.

Fold the points a, b, c (Fig. 10), so that they will meet at the two belonging to the right and left of the paper, pull one outwards to the right and the other outwards to the left. Then fold up the paper again, when it will look like Fig. 8.

Double the paper now by the fold a b, Fig. 8, so that the two points c and d may touch each other, back to back. The form is seen in Fig. 9. You are following me, I hope? Yes. Very well, take a good look at Fig. 9, and attend still farther.

In the figure the paper is represented as a little open; that is for the sake of clearness. Take hold of the two sides a b (Fig. 9) between the forefinger and thumb of each hand, and pressing the two sides outwards, contrive that the line a c point d; then fold the paper so that the line e f will be parallel with the line o h. This completes one half of the paper.

Now turn the paper over, so that the other half, exactly similar in appearance to Fig. 9, will be uppermost. Do with it just as you have done with the first half, and, when all the folding is finished, the paper will look like Fig. 11.

Insert your fingers between the folds, you will discover the right place without any difficulty; pull the paper outwards to the right and left, and you will find it take the form of a box (see Fig. 12).
CRICKET AND CRICKETERS.

By C. W. ALOCk.

HOW TO MAKE A BOWLER—EARLY PRACTICE IN BOWLING—A PREREQUISITE TO BOWLING—MORE ENCOURAGEMENT—FAULTS TO AVOID.

If you are under the impression that you have mastered the art of bowling, my young friend, because you have gained a certain amount of mechanical proficiency in the course of your practice, you are very much mistaken. Do not be offended at the supposition, because there are hundreds of men who are satisfied with the correctness of this common theory. I dare say that in your own games, and against players of your own calibre, you bear the reputation of being a perfect expert in your command of the ball, because at least you can be fairly praised for accuracy of aim.

I am prepared to admit that you are a Triton, but then the minnows are very small and puny, and you surely have a feeling of ambition to concentrate your attractions amongst fish of a larger growth.

You must banish for ever the notion that precision is all that is required to become a great bowler, or you will have wasted much time and labour that might have been more profitable for you. You must recognise at once the fact that to secure excellence as a bowler needs gifts that all do not possess, as well as a degree of nerve that practice and experience can alone produce. You will find your level surely enough when you meet for the first time a batsman of higher pretensions than those of your own class, and you may be sorry when you have learned the value of the advice that has come too late.

So let us start fair and fresh with the admission that you cannot hope to succeed as a bowler unless you devote a goodly portion of your time, as well as display a considerable amount of perseverance, in the pursuit of your object.

You need patience and resolution, as you well know, to become a good batsman, but you require, in addition, a keen perception, and a readiness to discover the weak points of your adversaries, or you will never mature into a bowler of the highest rank. It is not enough, believe me, to peg away for an hour or more at the wicket with hardly a ball off the line, for the machine known as the catapult will satisfy you in this respect without the necessity of a more active foe-man. You can pick bowlers by scores with the greatest accuracy who can pound away without flagging, and give you excellent practice, but still totally unsuited for the exigencies of a match, by reason of the same monotonous action, and the entire absence of anything like variety in either pitch or pace.

I want you still, though, first of all, to comprehend that a perfect and complete command of the ball is the easiest of the many lessons that you will have to overcome in your course of study. It is not difficult, I know, to deliver one ball out of six that would bestraddle one or more of the stumps against which you have directed your attack, but I shall want much more than this of you before I can certify that you have passed your primary examination in the school of bowling. It is not always the strongest ball that is the most successful, I know full well, nor is it the best balls that are the most likely to secure the downfall of a well-qualified batsman. Still you must have thoroughly grinded yourself in the rudiments of the art, and gained, at least, a medium of confidence, before you can venture to think of experimenting on your own account.

Do not be misled with the idea that it is the bad bowling that succeeds, for you will have utterly misconstrued the meaning of my remarks. I wanted to impress you with the notion that the head of a bowler will often avail almost as much as, or perhaps more than, his arm, and that study will help materially to improve your position as a bowler.

I should possibly have explained my idea better if I had said that a bad ball was more useful than a good ball, at the proper time, and then you would not have misunderstood me. You would at least have seen that I had no desire to encourage bad bowling, but the power of administering the same bad ball at the right time, is as valuable to a bowler as the power of controlling his movements, or the movements of his movements that could only be gained by experience and careful cultivation. You will find it a less easy task than you suppose to secure a facility in guiding the course of the ball, so be cautious, and do not disparage the advice of those who have plodded cheerfully over the same road. If you make a false step at the outset, you will have some difficulty in retracing your way, and I want you to be circumspect in your movements for that reason.

You must possess patience and perseverance too, or you had better make up your mind to give up the quest as hopeless. If you want an instance to encourage you, it is certain that the veteran Lillywhite, one of the craftsman generals, as well as one of the most complete masters of the art of bowling that cricket has ever produced, used to practice during the winter in a barn, labouring to achieve the greatness he ultimately gained. It is not sufficient that you should take the ball up once and again at length intervals, but that you should make bowling an absolute study. You must be prepared to adhere to fixed principles, moreover, or you will seriously hinder your progress. Do not follow the pernicious example that is often set to young bowlers, and bear in mind that you are not yet so fatigued to lift your arm, or move a muscle. It is essential that you should feed your way steadily, or you will find your self gradually transforming what should be a pleasure into an annoyance, as well as pain. You must
CRICKET AND CRICKETERS.

husband your strength until you have become inured to the exertion, or you will learn to your cost that you have overtaxed your powers beyond hope of recall. If you are bent on and enthusiastic in the cause, you will do more good by bowling for a short time, with occasional spells for rest, than by labouring on until your arm is tired, or your hand so benumbed from stiffness as hardly to feel the hold of the ball.

I know there are cautious souls who assert that no young beginner should ever practise for more than half an hour in a day, and I feel convinced that they are not too exacting in demanding this concession, in the case, at least, of the youngest order of cricketers, just learning to feel their way, and not over the roughest portion of the road to bowling.

If you had seen as much as I have of rising bowlers nipped and dwarfed by undue exertion at an early age, you would understand the stress that I am laying on this special point.

You must guard, too, as carefully against the policy of fast bowling on the part of a young aspirant, for this is a system equally pernicious. I would even go so far as to advise that more good would arise from the practice of underhand bowling at the first than by encouraging the adoption of the round-arm delivery, until some degree of accuracy as well as power has been obtained.

You cannot hope to take the position by storm, on account of the weakness of your forces, so, by all means, make sure of the stages as you advance, and see that every precaution is provided in case of a fall. Your main object should be to secure accuracy of aim, in conjunction with some power of propulsion, but this combination is not easy of attainment unless you set to work with a will.

It is certain that bowling is not so popular nor so much cultivated as it should be among amateurs, and hence the superiority that undoubtedly exists in this line amongst those cricketers who have to play the game as a means of livelihood, and are thus compelled, perforce, to aim at perfection in bowling, when their more favoured fellows who adopt cricket merely as an amusement, eschew it, by choice, as secondary in attraction to batting. I know well the order of cricketer, and I loathe the love of self that induces him to go in for the glory of a big score to his own name without a thought of or a care for the honour of his side. I hate the sight of you, Mister Fancy scorer, and all your tribe, great as you may be in your own estimation, all of you.

Oh, for a short spell of the player who rushes at the ball, anxious either to bowl or to field, instead of loolling, but in hand, under the shade of the practice not until a flag is disengaged on a wicket is vacated!

It makes the blood boil to see some of you in the field, with your hands in your pockets and your mouths open, as much interested in the game as is the worthy at the gate in receipt of custumes, away from any view of the play. If you only play cricket for the glorification of such newspaper notices as "Fancy scorer bowled Pleekerball, 196," or the innovation attempted by a few chroniclers in your own special interest, "thrown out by Fancy scorer," disappear for ever, and make way for better men, who can get a difficult wicket when the batsmen are making a stand, and can save more runs in the field, even if they are not gifted with your remarkable talent with the bat.

I should like to see bowling have an equal share of the glory, the same as it has to undergo a proportionate amount of the labour and suffer the same degree of ignominy in case of defeat.

You must follow my instructions if you aim at earning the distinction of so honourable a title as that of "a fine all-round cricketer," so that you will have to qualify as a bowler before I can present you with your full diploma. You want to lose no time, I am sure, so let us proceed to business at once, and commence the study.

I need hardly remind you that there must be some little spot between the line of the wickets more vulnerable to a batsman than any other. You will have to direct your aim at this the same as you would at the heel of Achilles, though obviously you will have, in an absolute contest, to alter your tactics and vary your bowling as occasion requires, to trade on the exposed weakness of any special batsman.

When you have so far progressed as to be able to maintain a continuous fire on this diabolical ground, you can be sure of immediate promotion. You can easily make the precise place well-defined by depositing a piece of paper on the ground, so as to prevent all chance of misdirection, and you will soon value the utility of having this distinctive mark.

You will, first of all, have to master the power of holding the ball completely under control, before you can aim at higher flights; and this practice of accustoming yourself not to bowl without having some definite object for your target, will help you materially.

Do not over-bowl yourself at the outset, but try your strength with a low delivery, and a pace that will not tire or fatigue you. You will find at first that you will have some difficulty in pitching the ball far enough, though the distance does not seem very great until you have tried. You had better do anything than retain that fault, for short bowling is the worst of all, and even one long hop in an over is a fatal mistake that you must seek to overcome at all hazards.

You will assist your future prospects, too, more than you can imagine, by selecting a neat and easy style of delivery. It may be that you have already formed a habit in this line that you cannot well eradicate, and in this case the advice may come a little too late. It is certain that the more easy and less exhausting the style of action, the better the chance of a bowler retaining his skill for any length of time.

If you have, unfortunately, contracted the habit of bowling spasmodically, without the measured steady swing that should mark the movements of a first-class bowler, you can hardly hope to last, although you may electrify the world perchance for a few brief seasons.

You have been fortunate, then, let us admit, in choosing a style of action that will be of permanent use to you, and you feel that you can bowl without contracting your muscles or cramping the play of your limbs. So far you have done well enough, but you will have to be careful, too, that you do not vary the action even in practice, and that you adhere unflinchingly to the method that you have decided to adopt. It is essential that you should endeavour to make, at least, this part of your study mechanical, and that you should never allow yourself to be tempted into conflicting habits that will certainly mar for ever your chances of distinction as a bowler. Do not be lured into the error of bowling even one ball on any other terms, for you can hardly guess the importance that may attach to the slightest relapse from the usual routine.

Commences slowly, at a pace that will serve to give you confidence, instead of aiming at once at the accomplishment of a lightning speed that will inevitably bring you to grief. You know that Rome was not built in a day, so do not be overambitious, and rely too much on your talent for construction. You must remember too that a little learning is a dangerous thing, and the proverb, I assure you, is most applicable to the case now in point.

I want to instil into your minds the necessity of uniformity
in every way during the course of your early studies, for it is by the want of this that you can most readily trace a bad bowler.

Do not indulge in any fanciful contortion in the way of delivery, but keep your body as upright as possible, and endeavour as much as possible to present your full face to the batsman when you are about to set the ball on its travel. You will have to keep the opposite wicket entirely in your line of sight, or you will fail, as does the billiard player who diverts his gaze from the object ball. Forget, to a certain extent, that you have the ball in your hand, and think only of the stumps that you have to attack, and you are sure to fall into a settled gait as well as an action that will in all likelihood become habitual.

You must train, as in batting, your hand and eye to act in concert if you are keen and enthusiastic in your pursuit of bowling.

It will do you infinite good to note the pace and style of celebrated performers with the ball, and you will see for yourself the almost mechanical perfection that practice and strict adherence to fixed principles can produce. You may derive a useful lesson from noticing the absolute ease of their movements in contrast with the laborious and stilted style of others, and you will recognise the value of the advice that I want to impress upon you, of maintaining one undeviating action at all times and under all circumstances.

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CASTING.

By A. H. WALL.

CASTING BRACKETS, VASES, WREATHS, BUSTS, DECORATIVE TILES, ETC.

The experience you have acquired in practising the lessons of our two former articles ought by now to have given you a degree of skill which will justify your proceeding to some task of a more difficult nature. Let us, therefore, try our hand at—

Casting a Bracket.—Like the lady of cookery renown, who gave the advice "first catch your hare" before proceeding to describe how it should be cooked, we say, first get your bracket. In future Numbers of THE POPULAR RECREATOR some papers on modelling in clay will appear, and these will enable you to mould your bracket before you cast it; for the present, however, we must be content to obtain that article either from the wood-carver, the metal-worker, or the modeller in clay.

For a first experiment, let the bracket selected be simple
rather than complicated in its decorative forms, and not too large. We gave the kind of thing required in Fig. 1, page 320, Vol. I. Mix sufficient of the fine plaster in the way described on page 319, and add a little black ink, just sufficient to slightly but perceptibly alter its colour. The plaster being mixed and ready, damp the surface of the bracket with water, and pour gradually into it the plaster of Paris, to the thickness of about a quarter of an inch, moving it, and blowing into it now and then with a pair of bellows to expel air-bubbles. Carefully ascertain that the plaster fills up perfectly all the hollows and sunk lines of the bracket, and to ensure this result, make use of the bellows, the wind of which, if the plaster has been properly mixed, will be quite sufficient to force it into the hollows.

When the plaster is sufficiently hard, which it will be in a few minutes, mix with water thinly a little clay, and rub this wire so bent as to enable you to hang the article up by them. This must of course be done while the plaster is still soft.

In about an hour, with a blunt chisel and a mallet, chop away the mould from your cast, the outer shell of coarse plaster first. This may be done roughly, but when you come to the clay outside the fine plaster greater care must be observed, or you may damage your cast. Begin, therefore, to remove the pieces in smaller sizes and more slowly. You will know when you reach the cast because the fine plaster of the mould having been coloured with ink, that of the cast will be more purely white.

Should any length of time elapse between the process of damping the mould and casting, there will be a great difficulty in separating it from the model, but if the plaster be sufficiently liquid it will adhere very slightly, if at all, to the solid plaster.

For this reason do not pour the plaster into your mould, if the latter has not been quite recently wetted.

There is another way of making a bracket, to which we alluded in our last paper. It is that in which the massive part of the bracket is made in wood, or wood and plaster, or clay modelled in the way shown in the rounded portion of Fig. 1. On this the leaves cast in moulds obtained from Nature are arranged with an eye to decorative effect (see Fig. 3). In addition to leaves, berries, and fruit, twigs and branches, and casts of small animals, may be used either separately or grouped together, as in Fig. 2, which is a design for an aquarium stand.

The common bramble (see Fig. 4) may be made very effective, and is often used for such purposes with admirable effect. In our last paper we forgot to point out that in grouping wreaths of leaves, as shown in Fig. 9, on page 17, the better plan is that of casting each leaf separately. We may here mention, too, that where there is a difficulty in obtaining a cast of any object at once, two or more moulds will have to be employed.

Casting a Vase.—Our first business is to procure the model,
the shape of which should be elegant, and the decorations artistic and tasteful. For this purpose a "core" must be prepared, such as is shown in Fig. 5. This may either be of wood, clay, or plaster, the handles being formed in the first place with iron wire bent into the required form, and afterwards covered with clay. To make the plaster core, take a lump of modelling clay and make in it a cylindrical hole of the required depth and diameter; into this pour the plaster. When you have cast the ornaments you intend for the decoration of your vase, saturate the plaster core thoroughly with water, and brush a little soap on the bare parts. Thin strips of clay must then be cut and placed round, to adhere with perfect closeness and divide the surface into two equal parts. The strips of clay should be well supported, or they will give way under the weight of the plaster. From the vase thus prepared you obtain a mould in two halves. When the one half is formed, remove the strips of clay, wash a little clay water over the exposed edges, and then mould the other half. As soon as these are hard a stroke of your chisel given at the joint will suffice for their separation and removal from the core. The pieces of clay, or the casts forming the decorative parts of the vase, will be in the moulds. These must be picked and washed away. Place along the hollows of the handles some pieces of copper wire, to strengthen them.

Now bind lightly together the two halves of the vase, and either fill it in with plaster alone or with plaster into which you have inserted a glass or other suitable vessel for holding water and flowers, for without this, the plaster being porous, your vase could not be thus used. A vase thus cast will be seen if you refer back to Fig. 2 on page 320, Vol. I.

If the ornaments are not modelled in clay, but cast in plaster, the process given in our last article for obtaining leaves, etc., from Nature must be adopted, the superfluous material shown in Fig. 1 being carefully pared away while the plaster is still soft, in order that you may apply them really to the surfaces to be decorated. Of course, the same plan must be adopted in applying such decorations to brackets, mouldings, etc. In Figs. 4, 5, and 6, rough sketches are given of leaves cast and arranged for the decoration of the different members of a vase or any similar object. In Fig. 7 a suggestion is given for arranging casts of acorns in a way that may often be made available for decorative purposes.

CHESS.

BY JOHN WISKE, THE ENGLISH CHAMPION.

EXAMPLE GAMES.

The beginner has had one illustrative game placed before him, in order that he may gain a general idea of the manner in which operations at chess are conducted—how the opening is managed, how a good position is attained, how time is gained, and how the player who gains an attack upon the adverse king generally wins—but not always, mind. It may be well to impress these facts upon your mind by another example of the same kind, and, accordingly, I select a game from actual play, in which the attack is managed very much in the style adopted in our imaginary game. This partie was contested many years ago between Messrs. Stanley and Rousseau.

WHITE, MR. STANLEY.
1. P to K 4
2. B to Q B 4

BLACK, MR. ROUSSEAU.
1. P to K 4.

Here White plays his bishop out first, whereas in our imaginary game the king's knight was first moved. But the position becomes almost exactly the same in a few moves, as you will readily perceive, on comparing the two.

3. Q Kt to B 3
4. K Kt to B 3
5. P to K Kt 3
6. P to Q 3
7. K B to Q Kt 3

In positions like these, White often plays Q to K 2 or K Kt to B 3. There is a wide choice of moves in this suave piano opening, as it is called.

4. P to K 3
5. P to K Kt 3
6. Q B to K 3
7. Q B to K 3
8. Q Kt to K 2
9. Q Kt to K Kt 3
10. Q Kt takes Kt
11. P to Q B 3
12. Castles.
13. B to Q Kt 3
14. P to Q 4

Black conducts his opening altogether wrongly. Here he ought to have prevented the white Q B from coming to K Kt 3 by the precaution of P to K R 3.

15. B to K Kt 5
16. P to Q 3

Here again Black might have advanced P to K R 3, driven back the bishop, and saved himself from the impending attack.

17. Kt to K R 3
By this move White secures, by capturing the K Kt, the doubling of the black pawns on the K B file, thus opening the position of the black king.
15. P takes P

Black little suspects the dangers that await him.

16. Q to K B 3

A very fine move indeed, 'the effect of which is well worth studying. White abandons the bishop, and proceeds with an attack which has now become irresistible. Had he not taken the bishop, Black might have had time to extricate himself from his besieged position.

17. B takes Kt

The last piece is recovered at once, and the game won besides. Black cannot retaliate with P takes B; if he did, White would simply move Q to K Kt 4 ch, and Q to K Kt 7 (mate).

18. Kt takes K Kt P

Attacking the queen.

19. Q B to K 7

Offering, if White take this bishop, to take the other in return. But the resource availis nothing. White simply takes off the queen, and comes out of the fray with a rook ahead.

Position of the forces after White's sixteenth move (Fig. 1).

19. Kt takes Q

20. Kt takes R

Being a rook in arrear, it was, of course, useless for Black to continue the strife. He accordingly abandons the game.

I have put before the advanced player several situations from the old writers. I will now submit him a remarkable one which occurred in August this year, during the meeting of the Counties Chess Association at Clifton. The players were myself (white) and Mr. Gossip (black). The game was opened as a Philidor's defence, and, after the twenty-eight move of White, the position stood as in Fig. 2.

The game had long been in favvor of White, but Black thought that at this point he might retrieve himself by advancine his Q R P.

28. P to Q R 5

This is the deadly move which Black fancied his adversary could not make after P to Q R 5.

29. P takes P

If White now plays his contemplated coup of R to K R 3, threatening to force mate, Black could check at Q R 8, and win the game. But besides R to K R 3, White had another line of action in view when he moved R to K 3—a line of action which renders P takes P entirely useless.


The course Black did not foresee.

31. Q takes B

Had be taken with the king, White plays Q to R 7 ch, and wins the queen. In case of Kt takes B, the answer of course is R takes R ch.

32. R to Kt 3 ch.

33. K to B

34. Q to R 6 ch.

35. Q to K 7

36. Q to Kt 7 ch.

37. Q to K Q sq.

38. Q takes P ch.

and there is no resource. In the actual game Black resigned before this point was attained.

By the way, a very amusing story was told by the Rev. G. A. Macdonell at the luncheon which followed this meeting of the Counties Association. The rev. gentleman was expatiating on the value of good temper at chess. Two players were contending together in that temple of chess, the Divan in the Strand; one had the better game, but the other, by a happy thought, retrieved himself, and the struggle ended in his favour. Enraged at this unexpected result, the loser exclaimed, "I cannot play with all you fellows talking round!" The number of "fellows" who happened to be round amounted to one, and he said, "I never spoke a single word!" "No," was the reply, "but you breathed so hard!"

It is now time to enter upon the intricate and elaborate subject of the openings; but it may previously be well to say something as to the simpler forms of endings. Nothing is so common as the inability of the young player, when the forces have been cleared off the board, and he is left with a sufficient preponderance to force the decisive mate. Nothing is more vexatious than to be unable to win when the remaining strength at your command is amply sufficient for winning.

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BOATS AND BOAT-SAILING.

By J. C. Wilcocke.

VARIETIES OF THE SPIRITAIL RIG.

The six following woodcuts illustrate various applications of the spirtsail, and they are drawn on a scale of an eighth of an inch to a foot. Fig. 1 is a boat of the same size as that which follows it, although here shown on a smaller scale. She is seen in our illustration without the jib, a method of rigging that is much followed in the boats of watermen, particularly at Plymouth. It is useful, especially for running short distances, and particularly applicable when going alongside shipping, when a bowsprit or outrigger for the jib would be found very much in the way. Fig. 2 is a boat of the same size, but rigged with a spirtsail and jib only. As she has no mizen, the mainsail is made of larger dimensions than in the preceding boat. Fig. 3 has three masts, and is seventeen feet six inches long by six feet ten inches wide. She is a deeper formed boat than either of the preceding, and is intended to be used much more for sailing than rowing. Her type is that of the Guernsey fishing boats, which are remarkable for their quickness in coming about, as well as for their power of beating to windward. The sternpost does not raise as much as is the custom in the Guernsey fishing boats, which is unnecessary; in fact, a sternpost more approaching the perpendicular has considerable effect in steadying a boat when running before the wind. Fig. 4 is the same boat with the mizen of the preceding omitted, and with additional canvas in the mainsail, which is extended by a boom. The boom is raised when desired, by a rope attached to its end, and passing through a sheave-hole in the mast, or a block in the same position; this is termed a topping-lift. This boat may be called a spirtsail schooner. In light weather, a triangular gaff topsail might be set on a pole over the mainsail. Fig. 5 is the same boat rigged with a spirtsail, jib, and topsail, and we may call her a spirtsail sloop. These two last-named, insomuch as they carry booms extending beyond the stern, should be fitted with side decks, or, as they are sometimes termed, waterways.

Fig. 6 is a much larger boat, measuring twenty-two feet from the fore side of the stem to the after side of the sternpost, and with the counter, twenty-four feet in all. Her beam should be seven feet six inches or eight feet. She may be termed a spirtsail yawl or dandy. These triangular, or, as they
SPRAY WORK.

By Eliza Cheadle.

FERN PRINTING—VARIETY—PROPER PAPER—MATERIALS—TOOLS—MATT MAKING.

It is said, but I cannot vouch for the correctness of the authority, that our Queen is particularly fond of this pleasant employment. Be that as it may, it is one which will become a general favourite, even though it should not be honoured by Her Majesty’s special patronage.

The implements for the work are of the simplest and humblest kind, as you will see when we come to talk about them, and yet the results which they help to bring about are such as would form an ornament for any room in the house—dressing-room, boudoir, or drawing-room.

Spray work often goes under the name of “fern printing,” but as we need by no means limit ourselves to impressions of ferns, we have adopted a more comprehensive title. Rose leaves, and heaths and shamrock, and other leaves, can be made of use, but fern fronds hold the highest place, on account of their natural grace and beauty. There is a lightness and elegance about their impressions which the leaf of the rose and its companions lack in a great measure. On the other hand, notwithstanding that there are a great many kinds of ferns, there must be a general resemblance between one frond and another, more particularly in the small varieties, which would be used for our present purpose, therefore the spray of rose-leaves often prevents a monotony in the designs. We shall, for the sake of being the better understood, speak only of ferns, for it will make no difference to the scholar whether leaf or frond is introduced when once the general management of the work is understood.

Before we can do anything else, the ferns must be collected. The greater variety you can find the better, only remember that each one in the manger should be a perfect specimen of its kind, for, as it will leave behind it the exact print of its impression on the material, you would not wish that to be a faulty one.

The ferns should not be gathered when wet, or you will fail to succeed in properly drying and preparing them for their future use.

Some people prefer blotting-paper in which to dry and press botanical specimens, others are of opinion that the paper grocers use for wrapping up moist sugar will do equally well, while others again, think that nothing answers the purpose like “botanical paper.”

What is really required is that the nature of the paper be bulbous or spongy, for the purpose of absorbing the moisture which exudes from the fronds when they are pressed. Blotting paper has for long years been the prime favourite for this purpose, and we still advocate its use.

Your work of pressing the leaves will be done better if you provide yourself with two boards, which should be large enough to allow a broad margin round the fronds. The lid of an old box, cut in two, will serve for what you want. On one board lay a number of sheets of blotting paper, say fourteen or fifteen, and on the top of these place the fronds. Remember that much of the beauty of your work depends on the nicety with which you lay out these fronds. They are now pliable, but when dried and pressed they cannot be bent or straightened; so be careful how you arrange each spray, see that every part lies flat and in its natural position. Put three or four sheets on the ferns, then, if you wish to dry more at the same time, lay others down, and again several sheets of paper on the top of these.

Finally, you must place the other board on the whole. The use of these boards is that they equalise the pressure. Possibly you would not find one book big enough to cover the whole, and if you put several of different sizes, the probability is that you would find the frond bent or injured, because one part of it had been pressed down lower than the other. Having the boards, you need not be so particular about the books above, or whatever you use as weights, although it is better to make the pressure as even as possible.

For this reason a few bricks are excellent weights.

When the ferns have remained pressing for twenty-four hours, take them out and place them on a sheet of fresh blotting-paper with another on the top, and let them remain another day under their weights, when they will be dried ready for the work.

Now on what material do you propose to try your ‘prestige hand?’ Ferns can be printed on smooth jean, on cardboard, and on wood. The last is the easiest substance on which to work; but then think what a pity it would be to spoil the article, for those made for this purpose are very expensive to buy, and your first attempt cannot possibly be quite a success.

Cardboard is inexpensive, but then it is the most difficult on which to work, so jean had better be the first material on which you try.

 Mats for the dressing-table are, most decidedly, the best things for learners to exercise their taste and skill upon, as little imperfections do not show so readily. A set of these mats consists of seven in number, of which two are round, two square, two oblong, and one, much larger than the rest, is oval or square in shape.

I remarked that the tools with which this work is done were of a simple character, and you will agree when I tell you that they consist of a tooth-brush and a dressing-comb! Brushes are sold for this work, but the finest tooth-brush answers the purpose just as well. Besides these things, you want Indian ink—marking ink will do as a substitute, as it shades fairly well, but the former is to be preferred.

If you wish the mats to be a brownish instead of a bluish shade, use gum instead of Indian ink.

The ink must be carefully and thoroughly rubbed in a cancer until it is thick, and until there is plenty of it, for a good deal will be wanted; the great point, however, lies in its consistency, and much of the effect of the work will depend on whether the ink used has been made properly thick or not.

Spread a newspaper over the table-cover, to preserve it from
accidental spirits and splashes; and if you yourself were to wear a bib, you would be freed from anxiety as to the same disfigurations on your own dress.

Lay the mats on the newspaper, and then arrange the ferns on them.

The fronds, mind, will not bear much handling, but I dare say that you will have to alter their position a few times before you can quite decide on what it shall be. Here is the opportunity for displaying your taste. When you are satisfied with the arrangement, pin the ferns down. Each frond must lie flat and close to the material, and plenty of those tiny pins known as "insect pins," must be used to keep it there; these small pins are rather awkward to manage, and yet larger ones would tear the ferns, but if your fingers are clumsy, you can use fine needles instead.

The two mats which are alike in size and shape should be alike in design. You can vary the designs of the others by altering the positions of the ferns; the general plan is to place them so that the sprays appear to be carelessly thrown down, one may be partly resting on another; and a further variation can be effected by the manner in which they are shaded. When that is attempted, those which are to appear white must be laid on first, then those in half-light above.

Now that everything is ready, dip your brush into the ink and rub it gently up and down the large teeth of the comb, the ink will then splutter and sprit in all directions. The centre of the mat should be the darkest, the shade gradually softened off to the edge, which should be white, or nearly so. As you proceed you take off one fern and then another, in order that some may be darker and some lighter; those which you intend to be perfectly white are left on the whole time that the splashing continues.

BILLIARDS.

BY A. G. PATER, B.A.

LEAVING HAZARDS—GIVING A MISS—EXAMPLES.

An oft-recurring and consequently very useful losing hazard is when the white ball is near one of the middle pockets and the red ball on the spot. The diagram explains a few of these strokes, that occur in almost every game.

Position 1 is when the white ball is in a line between the middle pocket and the red ball, which in every case is supposed to be on the spot, the white ball is also supposed to be an inch or two from the cushion. In this position there is an easy losing hazard into the right hand top pocket, and the red ball must be struck what is called a half ball, i.e., the striker must point his cue at the extreme edge of the object ball.

The red ball will of course strike the top cushion and rebound, if struck properly, down the centre of the table. In Position No. 3, i.e., when the striker’s ball is in a line with the middle pocket, the stroke can be played sufficiently slow to bring the red down to the spot A, thereby leaving a losing hazard next time into either of the middle pockets.

Position 2 is when the striker’s ball is a little lower down the table.

In this stroke the red ball must always be struck a little fuller and a little harder, as it is consequently not a true half-ball stroke; the red ball must be struck again so as to bring it down the centre of the table. This stroke must be played with sufficient strength to bring the red ball into hauk and out again.

It must be borne in mind that the strength with which a stroke is played necessarily varies considerably with the table. Now, in the position No. 2, should the table be a very slow one, it would be possible to play the losing hazard into the top corner pocket without bringing the red into hauk. Still, on most tables that are properly brushed and ironed, the stroke should be earnest, played sufficiently hard to bring the ball into hauk and out again.

Experience alone will enable a player to thoroughly judge of the strength of a table, but, as a rule, the strokes we are now describing are more often missed by being played too slow than too hard. Care must be taken, in playing all these losing hazards, to hit the ball high, and especially to avoid putting on side.

Position 3 is when the ball is still lower down the table,

some six or seven inches below the middle pocket, as in position No. 2, there is a losing hazard to be made off the red ball on the top pocket, and the stroke only differs from the preceding one in that it must be played considerably harder.

This particular stroke is so important, that it will be necessary to discuss it very fully. We must, however, first explain why it is so very important. It is almost invariably the third stroke played in every game.

Now suppose two men—say A and B—commence to play a game of billiards, and agree to play the strict game, which is what we would always recommend, as more disputes arise from the lax method of playing than from any other cause—for instance, giving a miss with the side of the cue instead of the point, playing with both feet off the ground in order to avoid the trouble of taking the rest—the only result of this style of play is that when the person who practises this method meets an antagonist who insists on the strict game, he finds that when he wishes to make a miss, he cannot, from want of practice, place his ball within a foot of the spot he intends, and that when he uses the rest he always fails to make the stroke for which he played. The result is, that he loses his temper, plays worse than ever, blames his opponent for being so particular, calls the table a bad one, the balls untrue, observers, too often, "I never can play with this rest!" and finally loses the game as well as his temper, after having found fault with everything except his own stupidity and idleness.

Men, in practising, should play billiards, not play at it.

No maxim, perhaps, is more valuable to beginners than this—Never in practising play a stroke that would not be allowed in a match.

A and B therefore commence by stringing for choice of balls and the lead, i.e., each together plays a ball up the table, and whoever brings his ball back after hitting the top cushion nearest to the bottom cushion, has his choice. Say A wins, and begins the game with the plain ball. Now A can, if he likes, play at the red ball on the spot, and try and score, or he can try and leave his ball somewhere where his opponent cannot score next time, the latter is almost invariably the best play, as the score off the red is extremely difficult even to a first-rate player.
When, therefore, any one commences the game by playing boldly at the red ball, it either proves him to be a novice who knows nothing about the game at all, or some very good player, who feels so confident of winning that he does not mind giving his opponent an advantage at starting.

The best place to give a miss at starting is anywhere within the baulk circle. This stroke, which is by no means so easy as some persons imagine, is made by playing at the side cushion, about an inch out of baulk, with sufficient side on to make it rebound into baulk, and with sufficient strength to cause it to stop where we have said, viz., within the baulk circle. Now, the requisite amount of side is soon learnt; not so, however, the proper amount of strength, even players of some years' standing frequently play this stroke too hard, sometimes, indeed, so hard that they absolutely run across into one of the bottom pockets.

This latter stroke is, of course, terribly ridiculous, and always provokes a laugh, and too often considerably unnerves the player. By-the-bye, we intend before long giving a whole article on nerve, which is everything in billiards. As a rule, therefore, in giving a miss in baulk, err on the side of playing it too slow rather than too hard, and never play it without first chalking the cue. Suppose, then, A has commenced the game, and has succeeded in bringing his ball somewhere within the baulk circle or the n, as it is sometimes called. It is B's turn to play, and he has the choice of either screwing in off the spot into one of the top pockets, or making a cannon by playing at the red ball first and hitting the top cushion and one of the top side-cushions. Now both of these are very difficult strokes, and it would, in our opinion, be odds against either Cook or Roberts scoring in the position named. B's best play, therefore, is to give a miss, and he of course chooses the spot to place his ball in which it is least likely his opponent can score, and yet that he himself can score from next time if his ball be allowed to remain there. Now, the spot marked No. 3 in the diagram is the spot which all first-rate players choose for the purpose. A is placed in this dilemma. The only stroke possible is a difficult cannon either off the red ball on to the white or off the white on to the red, which if he plays it probably miss, and leave the balls in some position where B can score. Or if he gives another miss for safety (which is constantly done), he leaves B by no means a difficult losing hazard off the red into the top corner pocket.

This is the hazard that we were describing as Position No. 3 in the diagram, and which is probably more often the first score in every game than any other stroke on the table.

To be able, therefore, to make this hazard for a "dead certainty," to use the common billiard-room expression, is very important, and we would recommend all players, good as well as bad, to practise it every now and then. The stroke requires above all things a certain "freedom of cue." No be-ginner can make it at all, simply because he cannot strike his ball with sufficient force. The ball must be struck exactly in the middle, and the greatest care should be taken to keep the cue as horizontal as possible. The effect of raising the right hand too much would be either to screw the ball, and consequently what is called "over-do" the stroke, by causing the white ball to hit the side cushion, or to make the white ball jump off the table.

The stroke is what may be called a forcing stroke, as it requires a certain amount of strength to accomplish it, and it is more often missed because it is played too slow than because it is played too hard.

The greatest difficulty about this stroke to good players is position, as very often the result is, the hazard is made, but the red ball is left in baulk. Now when this is the case, more harm than good has been done, certainly the player has scored three, but both balls are left in baulk, and for all he knows his opponent may next time get a break, i.e., have a hazard or a cannon left sufficiently easy to enable him to leave the balls in an easy position for his following stroke. It is of course evident that should this player only want three to make the game he can play the stroke independent of position altogether. Nothing but practice and experience will teach the player the proper strength with which to play, as of course every table is different; and there is as much difference between a badly-looked after table in a sea-side town and a first-rate room in London as between an old brown Bess musket and a new first-class breechloading rifle.

We mention sea-side towns, as the effect of the sea-air on a billiard-table is very considerable, and unless one exposed to it is not only brushed but fried with a good hot iron every day, it is very apt to get damp, slow, sticky, and untrue. Sea-side billiard-room proprietors would do well to remember this. In fact, the management of a billiard-table is a very important part of the duties of a billiard-marker. To thoroughly understand the brushing, ironing, etc., means many pounds a year saved. We have no space to enter into the subject fully, but would recommend every billiard-room proprietor to purchase Bennett's book on billiards, edited by Cavendish, published by De La Rue & Co. We have no hesitation in saying that this book will repay its cost the first six months. It is by far the best work yet published on billiards; and the subject of the management of the table is treated in so practical a manner that any one of sufficient common sense to be a marker at all must understand it.

In Position 4, when the ball is half way or more down the table, it is still more difficult to make the losing hazard into the top pocket, and as the position of the white ball approaches nearer to baulk it is often difficult to decide when the forcing hazard ends and one requiring screw commences, the stroke necessarily varying with the state of the table, and also the state of the balls.
WHEN, in the winter of 1862-3, I began aquarium work in the Zoological Gardens, Hamburg, there came to me a well-known German dealer in natural-history objects, who had been long settled in London, who warned me against what he believed to be the mean and mercenary character of the Hamburg people, who, he said, would, after getting out of me whatever knowledge I possessed, turn meadrift, and put in my place a German at a less salary. So he told me always to keep in my pocket a little bottle containing some water, or even nothing, and when I saw one of the directors of the Zoological Society approaching, I was, with much solemnity and care, to pour, or to pretend to pour, a few drops out of the my situation, as I never otherwise could do, being an Englishman. How much he was mistaken in forming this estimate of his own countrymen, subsequent events and the very handsome conduct of the Hamburger towards me proved; but I did long very much (how much I cannot tell) for some means—no matter what, so long as I did not keep them secret, if found—for maintaining the fresh-water department of the Hamburg aquarium in nice condition. I never could so
keep the fresh-water fishes, however, and what is more, I never discovered the reason why till quite recently, after my return to England. I have to explain that the arrangements I made in Hamburg were as follow:

The fresh-water tanks were four, two of them each containing about three hundred gallons, and two more each containing about thirty gallons. Through these four tanks ran, day and night, a current of water from the city water-works, supplied from the river Elbe, but before it entered the tanks it passed through a filter composed of sand, shingle, and charcoal, which filled a slate cistern measuring ten feet long and three feet wide and deep. It was supposed that, as the same fish which were to be kept in the aquarium lived also in the Elbe, they would do as well in the tanks, especially when they thrived excellently in many small aquaria containing Elbe water in private houses. But in the Zoological Gardens' aquarium, with all the pains taken, and all the expense incurred, they never flourished; and if the marine department of the place had fared as badly, the aquarium would have had to be closed. We substituted for our first filter another and a more elaborate one, composed of blocks of compressed carbon, arranged in iron cylinders enameled inside; we added all manner of nostrums to the water; we allowed an old woman of the male sex to rub our fish with salt (a supposed remedy); and, in short, we adopted as many specifics as one is recommended to try to cure the toothache. It was all in vain, however, our fishes would become covered with a hideous white fungus, they would never feed, and they perished miserably.

I cannot tell how vexed I was, and how I strove to find out the cause. I visited all persons I could whom I ascertained kept an aquarium, and after openly expressing envy at their healthy fishes and brilliantly clear water, I could not get at the reason "why," nor did the proprietors know the cause of their success, the puzzle of which to me was that the water was only Elbe water, exactly the same as the water I used.

There was at that time in Hamburg an aquarium dealer (he supplemented his trade in tanks and fishes with the profession of noodle-dog shaver), who regarded me as an English interloper on his aquarium rights, and who was anything but sorry for my ill-luck, especially as he was fortunate with his fresh-water tanks. (N.B.—It was as wretchedly unsuccessful with marine aquaria as I was fortunate with them.) So he gave it out that he possessed a secret by which he kept his Elbe and pond fish so well. He stated that he got his secret from Russia—a long way beyond St. Petersburg, a long way beyond Moscow, a long way beyond Nižni-Novgorod—and that nothing would induce him to part with it. It is wonderful how much alike are all quack doctors, from Dr. Dulcamara downwards. But, of course, this dealer had not the mildest notion why he succeeded; not he. So I went on cudgelling my brains about it more than ever. I consulted every book I could find on cryptogamic botany, to ascertain the laws which promote or retard fungoid growth, but I could only find descriptions of species and of their organs in various stages, accompanied by microscopic drawings, all learned enough in their way, which, however, was not in my way, which was to discover how to prevent the coming of the fungus, or, rather, to induce such a state of health that no such parasitic growth would appear, for I guessed then, as I now know, as far as I can know, that the fungus was the effect and not the cause of the ill-health, which in every case, without one exception, speedily led to death in a hideous form.

Only one thing seemed certain, namely, that in aquaria where the disease did not occur the water was never changed, and only added to to supply loss from evaporation. That I knew; but it never occurred to me to ascertain the reason why; and so, believing that the result was to be sought for in the kind of water I used rather than in the condition of the water, and having no clear notion about it at all, I took the opportunity in Hamburg, when the too-weak hydraulic engine (which supplied the motive power to circulate our sea-water) was to be supplemented by a steam-engine, to connect a fresh-water pump to the sufficiency-pipe for the machinery, and to add a fresh-water reservoir to the establishment, and thus, in fact, to circulate the fresh-water, unchanged, exactly as the sea-water was circulated unchanged. At the same time I wrongly rejected the Elbe water entirely, and all the filtering apparatus I have mentioned, and had a supply in casks from a neighbouring spring of well water, which, though quite clear when first introduced, quickly became milky in colour, probably from some chemical changes due to the presence of substances dissolved in "hard" water. The milkiness cleared away, and just as I was beginning to make observations as to what the final result would be on the animals, I was called to England, in the summer of 1870, to arrange and manage the Crystal Palace aquarium.

From the opening of the Palace, in 1854, till the fire of 1860, there were always several fresh-water aquaria in operation, with much varying results. Some of these were small affairs, consisting of glass tanks, such as are used in private houses, but there was one quadrilateral arrangement at the northern end, in which the tanks were tolerably large, and into which was admitted a stream of water from the pipes of the Lambeth Water-works, the purest source of supply, excepting spring-water, in the neighbourhood. Sometimes those tanks and their contents would be in a pretty fair state, but at other times the water would come in in a turbid condition, and the fish would be attacked by their old enemy the fungus, and then they died, and had to be replaced by others. In the Palace there was even a fish-hatching apparatus, and the young salmon and trout which were born shared the vicissitudes of their elder brethren. So, when these aquaria perished in the fire at the northern end of the building, they were never restored.

But when, in 1869-70, the present aquarium was resumed upon and commenced, there was a natural wish to have fresh-water tanks in it as well as sea-water tanks, and, accordingly, I was directed to prepare six of the tanks of the larger series—Nos. 13 to 18 inclusive—for the reception of creatures of ponds and rivers. But this order I successfully opposed, for two reasons:—1st, because no arrangements had been made in the building or machinery for circulating the fresh-water unchanged, and the constant expense of such a large and continuous stream as would have been needed from the water-works would have been enormous; and, 2nd, and chiefly, because of my very insufficient knowledge of the causes and the prevention of the mortality to which I have alluded. The command was accordingly formally rescinded, and the whole of the arrangements, as they now appear in August, 1873,—save tank 18s., since added,—were devoted to marine purposes. But, as it was found impracticable to open the building exclusively as a marine aquarium at Easter, 1871,—the period first contemplated,—six of the tanks, Nos. 7 to 13 inclusive, were temporarily converted into fresh-water aquaria (the rest being marine), and were so shown for three days. The fresh-water was tolerably clear, even when looked through in large masses, and was even fit for drinking purposes; but during so short a period as four days,—Friday to Monday inclusive,—the mortality among the fish amounted to over eighty per cent., the specimens comprising jack, carp, tench, barbel, roach, dace, and others, and the stream of water supplied to them was abundant in amount, as well as nearly uninterrupted in its course. This result decided that I was right in my anticipations, but not the less assiduously
did I resolve to endeavour to ascertain the cause of the result.
I therefore judged that the best manner of going about this
task was to secure as far as might be, independence of external
influences, and so I took a tank which was already constructed
for another purpose, and which is shown in the engraving. This
tank measures internally thirty-six inches long, thirty-six inches
broad, and twenty-four inches high, and at the bottom is a
layer of mixed sand and shingle, one inch thick. The water ter-
mates, as shown, three inches from the top, so as to give a
space over which fishes will not readily leap (as they are very
apt to do), and therefore the quantity of water in the tank,
without allowing twenty-five per cent. for the space occupied by
the rock-work, is about eighty-four gallons, with a surface ex-
poure to the air (broken in four places by the projecting rocks)
of about 1,200 square inches, which is a very fair amount for
such an arrangement. The tank was mounted on two brick piers
in the Crystal Palace aquarium work-room, and the rock-work
was so built with stone and Portland cement as to afford space
enough to accommodate a small jack (Elops lucius), and give
him room enough to swim in comfortably, yet with spaces be-
hind, into which he would not readily go, but into which the
small fish forming his food would retire, and come out to be
gradually eaten. This is necessary, for a jack is so ravenous,
that if his food be always readily accessible, he is apt to eat it
all at once, and make himself uncomfortable; and sometimes
even to kill himself with over-eating. (In this respect he is
something like many working-men, who, on taking their
weekly wages, improvidently eat and drink it up nearly all on
Saturday night and Sunday, and leave not much for the rest of
the week. But even rich folks do the same thing in another
way, very often). After the rock-work had stood for some
weeks for the cement to set dry and hard, water was put in to
soak out whatever soluble and injurious matter remained in the
cement—this water being changed about twice during the two
months of the soaking-out, and then it was finally filled with
the Lambeth water, ultimately intended to keep the fishes in.

Before going on further, I have to say that it is a mistake to
suppose that this soaking-out is hastened by putting salt (hay
salt or other) in it, whether the tank is intended to contain
fresh-water or sea-water animals, as the fresher the water is—
i.e., the more free from substances in solution—the more readily
it absorbs other soluble matters. After this final water had
stood for a few days to clear, half a dozen minnows were in-
troduced, and they soon died, after being rapidly covered with
the old enemy the fungus. This showed that it was not the ins-
sufficient quantity of the water that was at fault (for of course
eighty-four gallons for six little fish were several times more than
enough), but that the result was connected with the quality
of the fluid. Nothing more was then done, but the tank was left
to itself to vegetate under the influence of light coming from a
sky light about twenty feet above it. While this was going on
I read a Government report of some cholera or epidemic
disease among human beings in Calcutta having been traced in
a very distinct and direct manner from the presence of de-
caying organic matter, animal and vegetable, in drinking water,
and that it was observed, among other things, that some fishes
in the water from which the people drank were affected as our
Crystal Palace fishes were. Then it struck me suddenly that if
this was the case the poison might be got rid of by never
changing the water, and by subjecting it to the influence of the
laws I have endeavoured to lay down in these papers (Recreator,

* In tank measurement it is usual to name the proportions in the
order above given—i.e., 1st, the length, 2nd, the breadth, and 3rd,
the height, and to avoid the word depth, because it is sometimes used
to express breadth, and therefore is apt to cause confusion.

pages 126, 375, and elsewhere). My own extreme slowness and
criticism in the practical application of principles so well known
to me, also struck me—but this is one of my characteristics.
However, from that moment all became quite clear to me. I
ruled that the fishes had died of cholera, or, some similar dirt
disease, and that if I could keep dirt out, or, what came to
the same thing, if I could neutralise the dirt as quickly as it was
formed, I should keep the fishes alive and well; but that, if,
on the contrary, I should introduce dirt by introducing new
water, all would go wrong. So I let all be, putting some sheets
of transparent glass on the top of the tank, to keep out dust and
rotard evaporation, and allowed the vegetation to have its own
way. In about four or five weeks the surface of the rock-work
began to lose its "raw" appearance, and to become embrowned
by the slowly-coming algae, and the once turbid and poisonous
water looked so brilliantly clear and healthy that I resolved to
introduce the long-coming jack. My readers will know why I
got a jack in preference to any other fish. (See Recreator,
page 60.)

He was put in two years ago, and has continued in the most
robust health nearly ever since, devouring on an average
two minnows daily; and he has increased about four
times his original weight up till now (October 1st, 1873). The
woodcut shows him as at the latter date, in the exact pro-
portion to the size of his tank, and above him swim five minnows,
which he will eat according to his appetite. He eyes these
little fish a foot or eighteen inches off, and, taking deliberate
aim at them when they are in such a position that he will not
hurt his nose by running against the hard rock-work or glass if
the force of his rush carries him beyond his prey, he flies at
them like an arrow, and seldom misses a capture. If possible,
he likes to grip a minnow by the head, so that the latter will
go down his throat head foremost, but if this cannot be managed,
the jack continues to shift the minnow, without letting it go
for an instant, till the right position is attained, and then it
is gone at one gulp.

This is after the minnows have been in for two or three days;
but when a dozen are introduced at one time, once weekly, he
snaps up half of them in five minutes, by rushing into their
midst before they have had time to know the ins and outs of
the rock-work, and in it to get out of his way.

In August, 1872, it was necessary to shift this tank to another
part of the work-room, and in doing so about one-fourth of the
water got spilled, and though this was begun to be replenished
gradually and carefully, at the rate of a quart daily, from the
usual source of supply, yet the jack showed some signs of ill-
health from the introduction of new water. Therefore, a stout
board was placed over the back part of the tank, and on it were
mounted a couple of glass bottles, each of five gallons capacity,
and in these the new water was allowed to become old, and the
decaying organic matter in them to be removed by aeration and
vegetation, as has been explained, before letting it run into the
tank through the taps shown, and, thus prepared, the water
could be added with impunity. These bottles remain as shown,
partly because they are serviceable in re-supplying lost from
evaporation in the tank, and partly because the water in them is
similarly used for another small fresh-water tank in the building.

The attendants, too, have discovered that water from these
bottles is better for drinking than ordinary water which has not
been kept, and so, while one is being drawn from the other is
being purified gradually.

In the tank towards the front is shown a small spiral object.
This is a water-snail (Planorbis cornutus), introduced with the
jack, and this solitary snail has laid on the glass and rock-work
at successive times large quantities of egg masses which have
batches out, and so there are in the tank now hundreds of young snails in various stages of growth; and these, being plant feeders, effectually keep down excess of vegetation in the tank, while the continuous action of light hinders their devouring it entirely.

The access of light, the action of the snails, the development of vegetation, the surface of water exposed to air, the regulation of temperature, and the numbers, kinds, and sizes of the fishes, are in this model tank so well balanced, that it is always scrupulously clean, and yet never wants any manual cleaning.

The spots on the two bottles are growths of vegetation on the inner surface of the glass, and these could be easily removed by the introduction of some of the snails, but none are put in lest they enter the taps, and obstruct them.

The chemical expression of the three aquariums, shown at pages 376, 377, and of the one at page 373, is exactly the same as that the candle needing no snuffing. The candle gives out a mild and steady bright light, with no large flame, but is continuous, and consumes its carbon as it burns, and these aquarium similarly keep bright and clean, and consume their carbon as they exist, but without maintaining any large amount of animal life. Each arrangement of water and of fire is self-containing and self-sustaining with means exactly proportioned to ends.

This history of an individual tank, which any one may inspect for the asking, thus circumstentially told, and precisely drawn to scale, will, it is hoped, be accepted as an eminently practical narrative.

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**GAMES OF THE PLAYGROUND.**

**BASE-BALL—PRELIMINARIES OF THE GAME.**

Do not assume that the game of base-ball is an uninteresting sport, or one of a mild description, because you are wholly ignorant of its specialties or unacquainted with its points. Do not turn your head away, as if the details of this amusement were not worth hearing, for you will soon have reason to acknowledge your mistake. You may respect it, perhaps, a little when I tell you that base-ball is the national game of America, as dear to Americans as is our own brave old sport cricket to every true Briton. Indeed, it may injure your self-love to some infinitesimal extent, to know that base-ball thrives and grows fat where cricket is completely ignored and utterly discarded, with the exception of the occasional outbursts of a few patriotic sons of Old England in the new country. Nor will your snob that base-ball is, after all, merely an improved edition of the English game of rounders do your cause any good; for cricket can be impugned on the same plea that it is itself nothing more than a fanatical species of the old Saxon pastime of cat and dog, hampered by numberless restrictions, and regulated by a formidable coterie of laws. Take base-ball as it stands in its American form, benefited by the freshness of American ideas and the impetuosity of trans-Atlantic youth, and you will surprise me much if you are not impressed with the vigour and ceaseless activity necessary to the sport. I want to make a powerful appeal on behalf of its admission into the ranks of British pastimes, so do not interrupt while I advocate its importation, even though it may be at the sacrifice of owning a debt to the cousins who claim kindred with us from over the sea. You will want to keep your wits well about you, mark me well, or you will never elevate yourself above the inappreciables. It will not be sufficient that you know how to time the ball when it is pitched to you, or that you are swift-footed as Achilles. Your gifts will help you, no doubt, when they are well applied, in conjunction with shrewdness and facility of application, but there are secrets in base-ball that will beset you at every move, and require something more than the head of an automaton to master.

You must commence your apprenticeship, then, with the admission that base-ball is not so easy in practice as it seems in theory. Do not be misled by the fatal error that you are to frame yourself for rounders, as of old, or you will lose valuable time, and possibly be disheartened at the outset. If you desire to become professionally expert, as I assume is the aim of every one of you who is ambitious for fame at any sort of sport, you will have to sit yourself down deliberately for a course of study in the various rules of the game. Technicalities there are that will assuredly deter a faint-hearted apprentice, but nothing that can stay the course of any of you who use proper caution and give your whole attention to the principal requirements of the game.

I want to avoid all charge of misleading you, so understand me thoroughly, that if you mean to continue until you have perfected yourself and become a skilled base-ball player, you will have to expend much labour and pains, display plenty of nerve and resolution, be able to control your temper, as well as possess, in a marked degree, an adaptability for any description of physical exercise, and lastly, an amount of endurance that will prevent your failing or flagging at any critical point of the contest. A high standard of requirements, you may think, but surely the game is not worth the candle unless it possesses some stimulant or demands some sacrifice.

The theory of base-ball is simple enough, as you will see. You have, first of all, to divide your players into two sides, as is the rule of every game worth a fraction under the sun. You will have to regard them in the same light as you would at rounders, the one party as the in or batting, the other as the out or fielding, side. The latter take up their positions as it rounders, the ground having been previously marked out into a square with four bases, one at each corner thereof. There is the pitcher, too, to deliver the ball to the batsman, and the same provision that, if the latter hits the ball so far out of reach of the fieldsmen as to be able to run the round of the bases without being hit, he can claim the privilege of scoring one run. Moreover, he is subject to the same penalties, and when three of his side have been put out, the bat is transferred to the fielding side, the victory falling to the party with the majority of runs after the completion of nine innings to each. So far your task is certainly not difficult theoretically, but you will find the practice infinitely more laborious. So far you have passed the English pastime of rounders in its primitive state, but you have not had the slightest taste of its quality under the general denomination of base-ball, with all the air of American invention and American vigour. I dare say that you have not the faintest idea of the position that you would have to undertake if you were deputed to act as short stop, and I would wager my only hat that you have not the remotest con-
exception of what constitutes a "foul ball," the precise definition of the word "fangoes," or of the American expression used in base-ball and known as being "whitewashed." You have much to learn yet, so that I will endeavour to expedite your studies by the aid of a plan of the field, as furnished by my friend, Henry Chadwick, the author of the book known as "The American Game of Base-Ball," and certainly the greatest authority on the national pastime of America. You will see now that it is not a rough crude exercise that you will have to pursue, but a sport ably arranged and guided by well-regulated principles. I will leave you to digest the various dispositions of the field, with plenty of time to master the entire scheme, as shown by the diagram, while I treat of the first essentials required in the game, and here, obviously, you must consider the materials first of all, though you will not be hampered with an oppressive amount of baggage in this respect. You will have to provide six bases, the same number of bats, and one ball, and with this equipment you will be ready for the fray, with the exception of two posts, surmounted by flags, that you will need to serve as the boundaries of the foul-ball ground. When you have so far advanced as to be able to comprehend the rules of the game, you will discover that the first, second, and third bases must consist of white canvas bags stuffed with sand or sawdust, the fourth, as well as the home base and the position of the pitcher, being marked by a circular iron plate marked white, and each covering a square foot of surface.

You have now prepared yourself with the arms needed for the game, and the next step will be the selection and preparation of the ground for the sport. Here, too, some care will have to be exercised, for it is necessary that the ground should be not only smooth and level, but as carefully tended as the best of our English cricket-fields. It is not absolutely necessary, of course, that those portions of the play in the immediate vicinity of the batsman should be the object of so much care, but in every case the outfielding should be, if possible, as smooth as a bowling-green, for the great burden of the exercise falls on the fielders, and the slightest inequality of ground is obviously calculated to reduce the brilliance of those placed in the outfield. If you can, it will be advisable to have a certain space kept permanently for the pursuit of the game, but if this is impracticable, you will have to make shift with the materials at your disposal. You had better choose the most level spot for the catcher, and then commence operations by depositing the plate for the home base, which guides the whole arrangement of the field, having the first base on the right-hand of the pitcher, the second at his back, and the third on his left hand. At a distance of about forty-nine paces, and in a straight line from the home position, you will have to place the second base, and on the line between these two bases, at a distance of fifteen paces from home, must be planted the plate for the pitcher, another plate being also laid for him four feet further back. It is necessary that the first and third bases should be equidistant from home, and, to secure accuracy, it will be best to measure ninety feet to the right and left for this purpose. You will remember that, with the exception of that at home, the bases have to be surmounted by canvas bags, and therefore it will be a good plan to have the posts in each case secured with a strong iron ring to admit the appendage of the bags, as provided by law.

You will then have no further trouble than to see to the disposition of the foul-ball posts, which are placed on a line with the home; and to distinguish the exact boundary of foul-ball ground it is enacted that "chalk lines must be drawn from the home base to the first and third bases respectively, so as to be plainly visible to the umpire."

You have now advanced so far as to have settled all the preliminaries, and you have chosen sides, so that all that is required to open the game is the monosyllabic key-note of the umpire, the word "Play." First of all, though you must understand the regulations that affect the bat and ball, the only instruments that you will be called upon to handle in your practice of base-ball. You will have to take note that the bat must be round, that it does not exceed forty-two inches in length, and that its thickest part must not be of greater diameter than two and a half inches. You can apply the same rule with regard to the selection of bats at base ball as in cricket, and see that the wood is tough and well-seasoned, willow being the most servicable, with strips of cane implanted in the handles to give repercussive power. Mr. Chadwick estimates the most useful length for a bat at about thirty-eight inches, besides giving ash as the material most usually selected for the composition of bats. He avers, too,
that a full-sized bat, even of the lightest wood, and strong enough for its size, will require a powerful arm to use to any advantage, and your early experience will satisfy you of the truth of the statement, I know right well. The ball itself might well be taken for one of the large white-coloured spheres that are commonly known as tennis balls, and are of no slight substance, as we used to find when a "canik" was allowed in the old games of rounders, that I have reason to remember so well under the shade of John Lyon's noble foundation. Indeed, the ball may fairly be considered to be the first desideratum in the sport, for the primary rule of all is devoted to that subject alone, leading to the inference that other matters are comparatively of secondary importance. You are not unrestricted in the manufacture of the balls, as you can imagine, for it is ruled that the ball must be made only of India-rubber and yarn, with the outer cuticle of nothing but leather. Nor are you at liberty in the matter of weight or measurement, as the ball is not allowed to exceed five and a quarter ounces avoirdupois, nor to measure more than nine and a half inches in circumference, the difference between the ball in this matter and in cricket being, that in the English sport the ball must weigh between five ounces and a half and five ounces and three quarters, and must be between nine inches and nine inches and a quarter in circumference. You will recognise the superiority of the ball when you learn that it has to be furnished only by the challenging club, and that the victors in each contest retain possession of the ball as a trophy.

It would be well, no doubt, if in all amusements the honour of triumph required the same plain stimulant to elate the competition, instead of being showered up by attractive and specious contrivances to enlist an interested support. Possibly you may deem the selection of the ball a matter of no great moment, but you will discover in double quick time, when you come to active measures, that the policy of not confining the dimensions of the ball to any narrow limits was more beneficial than you could have fancied. It may happen that you are better at one department of the game than another, and in this case you will have to choose the ball best fitted to suit your own special powers. You have eight players with you who are more likely to prove of advantage in the field than with the bat, and you have the right to select the ball, assuming, for the sake of the argument, that you are the challenging club. You may even now fail to realise the value of a proper choice of the ball, but you will gradually become alive to the necessity as you grow older as well as better acquainted with the game.

Remember that nine is the usual number of players on each side in any important match, so that with good fieldsmen at your hand, you will have to consider them above all, and choose, in their interest, a ball lighter and more easy to handle than you would were your consideration chiefly directed to further the success of the bat.

Let us presume, on the other hand, that you are likely to be stronger batsmen than your opponents, and in this case you will have to pursue tactics of a different description. You will want now a ball that will fly fast and hard, and you will have to pick the hardest that you can, as well as one that will give you the greatest possible limit in point of weight. If you are worth your salt, and you are a player of anything more than ordinary calibre, you will know how best to utilise any advantage that you may have gained by this right of selection, and I do not wish to place you under the category of "muffins," to use the American Domestic style of describing that inexpressible grade of base-ball players who have not the slightest acquaintance, either theoretically or practically, with the mysteries of the game. For the present, though, I must defer the description of the active practice of base-ball, although the umpire has been waiting for some time to give the signal for the discharge of the first shot. Do not be at all enraged, for I promise you that we will call "play" next time without any delay.

RIDING.

By W. BEALEWOOD.

BEHAVIOURS IN THE HUNTING-FIELD.

"An eye for a country" is an all-valuable endowment for a hunting man, yet it is ludicrous how few possess it. Time will of course do everything, and the man least furnished with the "bump of locality" may, after a certain number of years begin to recognise landmarks, and remember the relative positions of lanes and covers, and recollect what places at a brook are practicable, or what enclosures are impervious. But there are a gifted few who can "take in" a country in as many days and even hours as the former can occupy months and years in mastering the same. One would think that half a field had been hunting in mid air with the "Wild Huntsman" of German legends, and had dropped from the clouds at the finish, to hear the way in which they begin to ask their way home, without for an instant collecting their own wits to help themselves. Many riders are none the wiser whether they have been running rings or holding straight on, and so are solicitors vague as to the points of the compass, if the day is cloudy, or uncertain to within half a dozen miles as to the distance they are from the cover which they started from in the morning. Others seem instinctively to feel their relative position as to points of the compass and distance traversed, even after a tortuous hunting line in a strange country. But such qualities as these cannot be taught, still less on paper. They are second nature where they exist. All that we can advise our friends to do is to keep their eyes and ears open, and to try to make the best use of their wits in noting their bearings as they progress, studying the general features of the country immediately before them, looking out for advantages, and guarding against a cul-de-sac, and most of all, trying to judge pace, which is of double value, not only as a sort of measure of the demands so far made upon the energies of the horse, but as a guide to the distance traversed, and so to the relative positions of a finish from a find.

Though, if a man makes up his mind to be with hounds at all hazards, he cannot afford to dawdle on his way, yet if he is wise he will economise pace so far as he can where ground is heavy, and make it up where the going is favourable; especially if his "eye for the country" (begging the question) do not know that he has such a thing) shows him heavy plough in one place, over which his line must inevitably pass, and similarly a range lighter going on turf in prospect elsewhere, he can afford to hold back on the heavy ground, and to make up his leeway on the turf. Such "coaching" as this will be laughed at, of course, by any man who has the smallest idea
of going to hounds, but what is superfluous to him may not be out of place to a mere beginner whose experience is nil, and whose natural instinct may too probably be to settle along with a sleek rein so long as his beast has any go in him, and to think that after all there is no time like the present instant—sufficient for the moment the necessities thereof.

The old standard rule when crossing a plough parallel, and not at right angles to, the furrow, is to ride down the top of the furrow, or rather of the ridge between the furrows. Being better drained than the gutter, it is presumed to be better going. However, in our opinion this depends to some extent upon circumstances, and the rider must let his eye and geological experience, if any, guide him in his choice. In stiff clay soil, after heavy rain, the gutter of the furrow is often more favourably than the top. The horse’s feet sink deeper, it is true, but the soil in the gutter is more liquefied and less tenacious than at the top of the ridge. One foot depth in “gruel” is less holding than half a foot in thick “jam.”

At water, the tyro must go his best pace, and with his heart already the right side of the obstacle, else his horse is pretty sure to divine the least hesitation of purpose in his rider, and refuse accordingly, in an annoying manner, on the brink. Most brooks have rotten banks and rat-holes in many places, and as a horse does not calculate upon such, but marches his landing (even if he can cover more than the distance in view) to alight just clear of the water, he may come to earth or even subside backwards into the water on landing on such ground. It is best, therefore, to glance round for a second, and choose a dry spot before putting his head at it.

Timber is always best negotiated slowly; there is usually no ditch on the far side to be cleared, so pace is no desideratum, and though long timber can be negotiated fast, so far as safety is concerned, yet to do so is to teach the horse to rush generally at timber, instead of approaching it slowly, timing his distance, and reserving all his powers for vertical rather than horizontal spring.

Avoid unnecessary fences; when hounds are running, horse and man have enough to do without going out of their way to court obstacles. When hounds are joggling from cover to cover it is principally the rough-riders, dealers, and farmers who have young ones to school and sell, who “lack” over fences in sight of the field. Those also who have hired for the day, and want to make sure of their two guineas’ worth, will probably play the same tricks, but the horse is all that gains in reputation, the man is looked upon as a fool for his pains by business-like sportsmen who have come out to see hounds meet, and not simply to air horsemanship, as if to show that they were not such fools as they look. If a gallop, with a certain medium of fencing, is all that is required, better confine oneself to drag, unseated, and red herrings, a pursuit that can be followed for as many shillings as a pack of hounds costs the year.

Even if the tyro is not timid, and is proud of his progress, let him beware lest he earn the dubious praise which old Jem Hille bestowed on Oxford undergraduates, who laughed annoyingly on the heels of his pack on cold scenting Heythrop days—“Lord bless ’em! They fears nothing ’cause they knows nothing.”

Not only for the sake of your own purse, but still more for that of humanity, even if money is no object, be merciful to your horse. Even if you are riding a lively-stable hack, whose hire covers risks and injuries, gratuitous neglect is inexusable and unsportsmanlike. Granting that your own dinner hour is due, house six miles distant, and your inamorata sure to fall a prey for the evening to that odious rival Jones, who has been playing the same cut, still that is no reason why you should grudge ten minutes’ delay for a bucket of gruel and feed for the faithful slave who has toiled under you all day, and who, after eight hours and upwards with you in the saddle, begins to flag from weariness and emptiness of stomach. By the time he reaches home, without sustenance meantime, he may have gone too long to relish his corn, and may be off his feed for the next few days, unless you give way now to his necessities. Granting he is not yours, and the loss is some one else’s, still you have a character for humanity and as a sportsman at stake. Many horses will drink warm beer, or besides gruel, after a hard day, some will even relish “Old Tom” in the same way, others will lose it, but when they will take it, by all means let them have it.

On similar principles do not grudge a slow journey home, or to the nearest blacksmith’s, if you have not cast a shoe. It is sheer brutality to rattle a bare-hoofed horse home, and to injure him, perhaps permanently, to save half an hour’s delay for your own dinner.

At the same time, beware of letting a very tired horse get stiff and chilled on his way home, especially if frosty air sets in after sundown. The sudden chill, especially in crossing an exposed upland, may paralyse the action of the heart, and make him sink from exhaustion, whereas, had he been warmly clothed at the moment with your meekintosh coat across his loins, he could have crawled home safe to his stable. We speak in such a ease of a horse when too tired to raise a trot to keep up his circulation.

But though care should thus be taken not to suffer the circulation of a tired horse to become chilled and stopped, the owner should be careful not to put a distressed horse into a warm stable. The more the air the animal has the better in such a case. If his body is well clothed, the windows and doors are best kept open till his exhaustion passes off.

A horse’s natural pluck will too often induce him to continue his efforts long after Nature has begun to fail. Especially in the case of a horse just bought from a dealer, in “dealer’s condition,” or at the beginning of the season, before horses are thoroughly fit, a horse may be easily ridden to dangerous distress. At the same time, the best that can be said of a man who rides a horse to death is, that if he is not a knave, he is a fool, and ought, if he had any knowledge of horseflesh, or the thoughtless selfishness of excitement of the moment had not blinded him to apparent symptoms, to have at once sacrificed his own jealousy of place in mercy to his horse.

When pace is severe, and a run lasts long, if the horse, besides labouring in his stride, chancing his fences, and hanging heavily on the hand, begins to sob as he struggles, especially in rising at a fence, then, even supposing the horse does not fall, and put an end to further progress, it is sheer and inexcusable cruelty to press him further. A heavy throbbing action, perceptible through the saddle, will often tell a tale; the rider may think it simply the beating of the heart—it is probably more—it is a convulsive throb of the diaphragm striving to relieve the lungs of the pressure of blood with which they are becoming gagged, from their inability to keep pace with the demand put upon them to recragnenate the blood. Such an attack may prove fatal. The least the rider can do on making such a discovery is at once to dismount, become his own vet, to cut the bars of the palate with a knife to ease the system of blood, and if he has a hunting flask, at once give the horse the benefit of its contents.

With these final remarks on the duties of a rider in the field to his neighbour, his horse, and himself, we leave the tyro to do his best to improve by practical experience the very skeleton teaching which is all that our space for the subject can here admit of.
ANGLING.

By Greville Fennell.

THE PERCH—HABITS—FEEDING—BEST WAYS OF FISHING—BAITS—THE PATERNOSTER.

The perch is too familiar to every one to need description. There is, however, one feature in this fish, or rather tribe of fishes, which may justify remark. We allude to the dorsal fin, possessed by most fish, but singularly marked and characteristic in the perch species. This gives the perch that proud defiant appearance, which, aided by the observant expression of its eye, leaves so strong and lasting an impression, from our first youthful glance of its boldly-erected crest, upon our memory. Many have supposed that this formidable fin was more for ornament than use, but as there is little, if anything, in Nature, however beautifully it may be clothed or fantastically it may be shaped, that does not serve some especial purpose, the notion of mere ornamentation here, as well as elsewhere, may be discarded. The truth is, that the dorsal fin of the fish is as the keel to its boat-shaped structure, but, inasmuch as it would be in the way if underneath as in a ship, it is placed on the back, where it serves all the purposes of steadying and balancing the creature’s body, and is raised or depressed when passing through or under any impediment, as do that of the mast and sail of a river barge when threading the arch of a bridge. We doubt whether the fish has the power of thoroughly depressing these spines at will, our notion being, from close observation, that the set of the spines is always upwards, and that foreign aid is necessary to lower them, they rising again as soon as such is removed. When dying or dead, the muscular action gives way, and the spines fall. These spines should be cut off with a strong pair of scissors shortly after capture, for, although there is nothing actually poisonous in the wound they inflict, if the blood of the sufferer be out of order the lacerations become extremely painful, and are long in healing.

Perch may be found in most localities, being as common to the rivers and lakes of Europe as they are to those of England, and in rivers, estuaries, and particularly in such waters as are subject to a rising tide, and are slightly impregnated with brackish particles, although without current, they grow fast and become very fat. Thus, at one time, in the docks at Blackwall, and in Dagenham Reach, they were found to flourish, as well as in the tideways of the Yare in Norfolk, the Trent, the Severn, and the Wye. Sewage has, however, driven them from their old haunts in the Thames, but the admixture of salt water still holds good in those rivers where this curse of civilisation has not grown to too great a head. We read of perch being taken in nine pounds; but the largest we have ever seen was four pounds two ounces, although we are credibly assured that in Malham Tarn, the property of Mr. W. Morrison, M.P., near Settle, in Yorkshire, they are occasionally to be taken at five pounds; but, curious enough, nearly all of these larger perch are either blind with one eye or both.

Perch under a certain size, fortunately for the tyro, herd together by a sort of compact, which confines them to situation, to size, and to habitat, as well as manner. All are alike; the same hole contains them, and the same swim maintains them; and if one should be taken, it is the angler’s fault, with the rudest tackle, and often the coarsest bait, if the whole does not share the same fate. But beware of losing one of them, for if a solitary individual gets off the hook, away he rushes out of the hole, a general stampede follows, and you had better try elsewhere at once.

But although we say that their capture is attended with but little difficulty, this is not always so, for when they have attained a pound weight and over, there are times when the most tempting baits will not entice a single fish, although you may see them all around the line, looking intently at it, as portrayed so ably in Mr. Rolle’s picture of “The Committee of Taste.” Upon these occasions the bait should be moved towards the surface, when very often one or more will follow it, and just as it is, as they imagine, about to escape them, it will be seized, and the struggle between captor and the captured takes place, which should always be conducted upon the part of the angler as quiet a way as possible.

Indeed, Blain, a high authority, considers perch-fishing “a noble sport, standing high among amateurs.” The beauty of the fish, its game qualities, its usual readiness to take a bait, its apparent indifference to your presence if tolerably quiet, and its value when taken, either as a present for others or as a table-bait for ourselves, all render it an object of attention to the angling sportsman. There is a great delight in the roving or search after perch. Now we cautiously approach and peer into one hole, and after a brief interval, seeing no evidence of their presence, we stealthily move on to another, which we crane over from the shelter of an old pollard split from earth to crown by age, and there see four, six, eight and more fine fellows, looking as wise and as thoughtful as senators, waiting for their dinner. With two worms threaded on our hook, or a lively minnow made fast by the upper lip, we advance our rod, and, after splashing the fish or worms about on the surface of the water, we let the line suddenly sink amongst the conclave, then, if they have not already accepted the invitation, we draw it to the right or left away from them, when you may easily tell which of the perch is the captain or leader of the shoal by actions too manifest to misinterpret. Now, this ascertained, your object must be to give any other individual but this fellow an apparent chance of taking the bait. To do this you bring the worm or minnow nearer and nearer to each fish in turn, carefully dodging the bait according to the movements of the captain, who will, to a certain extent, menace all the others from touching it. These tactics, I have generally found, last but a short time, however shy and fastidious the whole herd may be; but as in human nature so in fish-life, the greater bully finding that he is continually thwarted by fortune in the reach of others, and as persistently denied to himself, will make a sudden dash through the throng, seize the prize, which your skill must permit, and receive his reward of greediness, upon which you need not let him meditate, by putting him to death at once. Deprived of their chief, the troop of perch still linger. The same skilful play is gone over again, always taking care to let any other of the perch have the seeming chance of the bait rather than the largest individuals, and thus every fin may be tantalised to their entire destruction. No such tactics, however, are required amongst a shoal of small perch, who act upon the maxim of “findings keepings,” and “first come first served.”

For this most attractive and winning style of perch-fishing we recommend only one hook and one bait. More will make the perch “squint,” and a dulness of attractions mar the effect, which is simply to excite the worst dispositions of the largest fish in turn by coquetting with his appetite, if he has any, or exciting his cupidity in the absence of hunger. This fact is
well known to those who own pampered dogs—we call the cat, and Fido will eat fat. The delight of this mode of angling for perch is yet more enhanced by the knowledge that perch are to be found both in still water and in the swifter current, and it is a great error to suppose that he prefers turbid to pellucid waters. The water cannot be too clear for perch, either for its own good or the sport of the angler; and in this we have that one exception to the rule that when we see the fish we can seldom catch them, on the contrary, in certain streams, to see a perch is almost a certainty that he will be yours in a very short time, if your skill is guided by the above hints.

The perch has a horror of mud, and if he is compelled to live over such a neighbourhood, he shows his dislike to it by great slowness of growth, a want of pluck when hooked, and and make for another opening, when, with the celerity which almost defies the eye to follow its action, the perch has either seized or missed the tiny crustacean.

Here is, then, the angler’s opportunity. He has already provided himself with a kettle of these shrimps, which are readily taken with a gauze-net by brushing the weeds under water, and with a perch hook (it is marvellous what large gaping-mouthed perch may be caught with a small hook properly handled!) one or more of these shrimps are tenderly fastened on the point, and then the fun commences.

The art here is to imitate as closely as possible the movements of the shrimps we have observed in their natural state. To do this we cast our line to some little distance from the scene of action, bringing it as well as we can without observation up to the piles. We then raise the bait to the

a sluggish, dull, heavy movement when watched. Pebbley, gravelly, sandy bottoms are his delight, or even a marly bed, provided it be hard—which are almost as much so as a stone pavement in some of the Norfolk rivers and broads—are essential to the increase of perch both in numbers and size, and from such localities the perch are always the finest for the table.

Perch affect the old piles of wharves and bridges, more particularly those in which there are recesses into which they cannot penetrate, but wherein are cavernous harbours for shrimps and other food so acceptable to them. It is in the vicinity of such places perch are invariably to be found when on the feed; and we have often watched their habits when, lying prone with our vision close to the surface of the water, they, heedless, at least, of our persistent presence, have stalked and hunted their prey from crevice to crevice of the woodwork.

Their operation is this:—One or more perch will take up its quarters opposite an opening in the piles, and there, without the apparent motion of a fin, it will poise itself with eyes intent upon every movement of its lively and active food. Suddenly a shrimp will start out of its Tom Tiddler’s ground level of that of the perch we have selected for our prey, which will be found almost invariably at the same depth as the whole of them, and jerking it from crack to cranny, shall have our reward in taking the entire shoal of fish; for in these places, not being generally a hole, a fish may be lost without the consequences before pointed out.

The best time for perch-angling is from March to the middle of October, and, with the exercise of a little judgment, they can be induced to bite in most weathers. The weather is best when windy; and, indeed, when hoisterous, good bags may be made, but it should be remembered the very opposite rule applies in perch-fishing which is to be observed in angling with paste for roach and other of the carp species. That is, always fish for perch on the side of the river or lake on which the waves break, for there the fish are watching for the food washed up by the action of the wind on the waters. Indeed, we may here add that our heaviest roach are taken under these circumstances by ledgering with a lobworm. Sunny and bright weather is the worst for perch. It must be observed, however, in reference to perch-fishing, as to all other pursuits after fish,
that there is no general and accepted rule, for we have known
a close day with a cloudless sky give to our bag as large numbers
of perch as the most promising. Indeed, once during the noon
of a day of this nature we took in a single hour, while salmon-
fishing from one shallow, no less than nineteen perch, averag-
ing one pound each, with a grizzle fly.

Although perch will take almost any living thing amongst
the order of worms, insects, and small fish, worms are the most
sure and accessible bait for the angler; amongst those they
show a preference for the lob, the red-dung, and the brohdling;
particularly the latter, the yellow acrid exudation from which
appears to have a peculiar charm for this fish, and this fish
almost only. There is no doubt, likewise, that if these worms
are used they prefer two rather than one on the hook. To do
this properly, put the point of the hook in at the head of one
worm and out again a little lower than the middle, pushing the
head up and over the shank of the hook upon the gut; take
then a second and a smaller one, beginning the same way, and
bring its head up to the middle of the shank only; then draw
the first worm down to the head of the latter, so that the tails
may hang one above the other, keeping the point of the hook
well covered. There is no better way than this in worm-fishing,
using a small broad-breasted cork float to keep the bait at
six or twelve inches from the bottom, or at mid-water if you
observe the fish are there.

In the absence of the minnow, the stickleback with its spine
cut off is a good substitute, or the fry of almost any fish will
be found more or less acceptable. If jack are present in the
same waters, fine gimp instead of gut may be used, but it is as
well to fish in such a way for the larger perch as their sus-
picions may be the least aroused. On this head, in describing
the best sort of Paternoster line—that is, a line named after
one of our great fathers of angling—Mr. Francis Francis, in
“A Book of Angling,” has the following admirable remarks:

“The Paternoster is simply a gut line, a yard or four feet
long, with hooks about a foot apart, and weighted at the end
with a bullet or pear-shaped plummet. Some anglers use three
hooks and some two, a necessity which is more often regulated
by the depth of the water to be fished. But the lowest hook,
unless the bottom is unusually foul, should be almost on the
ground, as it is the habit of the minnows to strike up to the
surface in their efforts to escape, just as it is the habit of all
fish in their fear, when pursued by an enemy, to seek the
surface and jump out of the water.” After giving excellent
reasons for this, Mr. Francis goes on to say:

“Some people make a Paternoster by tying their hooks on to
coarse hog bristles, and these again on to a piece of perforated
bone, through which the main line runs, a shot above and
below it keeping the bristled hook in its place. This is done
in order to keep the minnows clear of the main line, the bristles
being stiffer than gut, and to permit the bait to swim freely
and unnaturally round and round like a mill-horse—a very
clever contrivance and very exquisite fooled, but an aboma-
mination of abominations in practice. It is the Paternoster of tackle-
makers,” says Mr. Francis, “made to sell, not to catch fish.”

And, we may add, not the Paternoster of the observant student
of Nature, who would be as likely in the hope of catching his
horse in a meadow to offer it the bridle while he kept con-
cealed the sieve of cat’s behind his back.

“Paternoster properly followed is a very skilful and not
particularly easy branch of our art, and, as far as my experience
goes, not one angler in a thousand knows how to make or fish
a Paternoster properly. You cannot fish too fine for the perch
in season; and the finer you fish, the more and better fish you
catch. To put a great coarse hog’s bristle, with a cumbrous
 paraphernalia of shots and bone, under a perch’s nose, is a
downright insult to his common sense of preservation; and,
if he condescends to take your minnow at all, he will take it
probably without the hook.”

Mr. Francis then goes on to tell us the way in which he
makes his Paternoster; and it being similar to our own, we
quote it in corroboration of the superiority of what we would
recommend:

“The best Paternoster fishers of the Thames make a long
noose for the loop, on which to fasten the lead; and in
this loop, or immediately above it, tie another loop, by the simple
process of doubling the gut and tying it. About nine inches
above this repeat the process, and tie another loop, and at
the same distance above that tie another. This fashion of making
the loops may be thought dangerous to the knot, but in reality
it is not so when the gut is wet; and it has the advantage of
always standing out at right angles, and so keeping the hook
from the line. Into each of these loops slip the end of the hook
gut, which should have a knot tied in the extreme end, to
prevent slipping, and secured by the hitch.

A hook is thus appended to each loop, the gut to each loop
being about seven inches long; the lowest one need not be so
long. Hooks Nos. 6 and 7, stoutish in the shank, and roundish
bend, and are tied upon round gut, the main line being a little
stouter. The lead is best when pear-shaped, and a few should
be kept ready of various weights to suit the stream.

There are those who object to the lowness of the plumed
hook, as liable to take hold of weeds; but experience has shown
that this hook does its full modium of execution, and makes
up by its success for any occasional slight catch. Indeed, the
perch will mostly follow the bottom minnow, and take it in pre-
ference to the others, a preference which may be due to the
self concealing more effectually the arrangement of the line.

We still quote, as the observations of our friend Mr. Francis
so closely agree with our own:—“To use the Paternoster, first
be sure that your baits are alive, and then commence at the
top of the eddy or stream, and fish the eye, or first eddy, care-
fully, for there the best fish lies. Drop the tackle to the bottom,
keeping a tight line, so that the lead touches the bottom, but
with no slack line. Let it rest a minute, and if there is no
bite, lift it, and move it from left to right, or vice versa, read
about you, until the immediate neighbourhood is fished. Then
lifting the tackle out of the water, swing it out a yard or two
further down stream, let it rest a minute, and then draw it
towards you, a foot or so at a time, until the tackle comes
home, when repeat the cast, lengthening the distance each time,
until the place is fished out, or you have to move lower down.

If you get a bite do not strike at the first nibble, but drop
the point of the rod, so as to yield a little line; but when you feel
a quick ‘pluck, pluck, pluck,’ strike firmly, but not too heavily,
and remember that the heavier the fish you expect to catch, the
more time you must give them, as they are slow and cautious;
and if the hook be not well in their mouths, you will lose them
to a certainty, when farewell to sport. I always use a landing
net if the fish is over half a pound; if under, I lift him in at
once, as it saves so much time, from the other hooks often
getting hung up in the net.”

If you are a proficient in Paternostering you will never let a
bunger be in the punt with you, for then good-bye to all sport;
but if you are the bungler, and willing to learn, the Mentor may
do as he pleases.

Small spoon-baits, artificial spinning minnows, etc., are often
used with success for perch; but as they equally apply to
pike-fishing, and our space being scant, we must leave them to
that division of our task.
SKATING.

By A MEMBER OF THE "SKATING CLUB."

AFTER the pains and gries that accompany the early education of the skater, he is amply repaid for his troubles by the ease and rapidity with which he gets along when once he has achieved success. No buttery emerged from the chrysalis flits more gaily through the air. Not the swallow, first launched from the eaves, skims along more merrily over the smooth pond. There is something in the feeling of skating that suggests forcibly the idea of flying. The smooth gliding motion, the almost entire absence of resistance, the swiftness with which one cuts through the clear fresh air, and above all, the ease and lightning rapidity with which one can change the direction of one's course, all combine to inspire the feeling of being upon wings, an imagination in which otherwise, except perhaps in a dream, it is not often that one can indulge.

Almost every one, after a day or two's practice, finds one foot much further advanced than the other in its education. The ankle of one foot is stronger, or its skate fits more comfortably, or, in fine, it seems to have "taken more kindly" to the business. Then is the time to devote one's chief attention to the backward foot. It is all a matter of practice. From this stage, from the first moment that one can get along at all it is experience alone that can be one's guide in learning the inside edge. The grand principle is to keep one foot only on the ice at the same time. The longer the better—the strokes cannot possibly be too long. And as you get to bear more weight upon the skate it will begin to describe the proper curve on the inside edge. There is no fear of beginning with the wrong edge, the only thing to be guarded against is a tendency to use neither, to attempt to slide along upon the flat of the skate. This is bad, and must be avoided by turning the toes well outwards. That is the unfailing remedy: the weight of the body then throws its balance naturally on to the inside edge, and the skate, by a law of mechanics, describes a curved sweep towards and inwards as it goes. The curve described by one stroke properly made should be about that of a quarter circle. When this is finished, the force of the stroke should have been expended, and the other foot should be ready to be put down. The next stroke should be commenced almost at right angles with the end of the last, and thus, in a succession of quarter circles, you progress in a zig-zag course, the eyes being always directed straight to the front, but the feet pointing alternately at the beginning of each stroke to the extreme right and left.

For quite a beginner, three to five yards is a respectable space to cover at each stroke. Racers do three or four times that distance at each stride, even when going at full speed. If both feet are put down at the same time, they must be kept carefully parallel, otherwise, if they separate, each taking its own direction, the consequence is obvious, an absurd and often painful tumble.

The inside edge thus once mastered, it becomes incumbent on the skater to choose as to his further progress in the art. Three courses are open to him. He may either content himself with the inside edge pure and simple, and devote himself to hockey or other games (of which we shall speak in a future chapter); or, secondly, he may qualify as a "runner" or racing skater; or lastly, he may aspire to become a cutter of figures, and graduates as a professor of the highest arts. In each of the last two cases his inside edge skating will be a merely intermediate stage. If racing be his fancy he will assume a pair of "running" skates, and practise those long straight strokes necessary for keeping up the highest speed. If figure skating is his aim, he will at once discard for ever the despised "inside forward," which is to be henceforth utterly tabooed. Thus, it is a very limited number of skaters to whom this kind of skating is really useful in the end, although probably there is not a skater to be found who did not commence by learning it. It may be sufficient therefore to have said thus much about a species of skating which is taught far more by nature than by art, and which is regarded with a righteous abhorrence by the whole army of figure skaters.

As for the other inside edge—the backward—that stands on a perfectly different footing, that is recognised as a thoroughly legitimate style, and admitted into all the first-rate figures. It is almost invariably learnt in the same way, by commencing with the common backward "roll." This is a style of skating more difficult than any to describe. It is performed in forward as well as in backward skating, and consists of a serpentine movement on both feet, to which the impetus is given by a successive alternate pressure on the inside edge of the outside foot. The motion is exactly the same for the forward and the backward roll. The former is so easy, as to be learnt usually in a very few minutes. It is the common inside edge, with the difference that the foot upon which the weight is not rested is kept upon the ice instead of being raised. The chief difficulty of the backward movement consists in its novelty and unnaturalness. There is a sort of shyness and fear in moving backwards, and it is some time before the action becomes natural and the beginner acquires sufficient sang froid to look over his shoulder and keep a look-out where he is going. After the movement is once learnt, great speed may be attained; and a good skater on the backward roll will beat an indifferent skater at his best pace forwards. A little practice at the backward roll gives great confidence, strengthens the legs and ankles, and affords a capital introductory exercise for learning afterwards the outside backwards. After a while the legs can be raised alternately, that one which is on the inside edge alone being kept on the ice, and the motion will then alter into a simple inside edge step, resembling that which we described above in simple skating. In this figure, as well as in the forward roll, the learner should strive manfully to keep his knees unbent, his head up, and shoulders down. In fine, he is on the high road to figure skating, in which attitude is everything, and a bad style fatal to all excellence.

Ladies who have once mastered the ordinary skating may very soon be taught the backward step also, for nothing is needed but a companion and guide, who will skate forward and steer while he holds his partner's hands. A lady, therefore, who is au fait at the forward edge may almost be considered as safe of learning to skate backwards. Unfortunately, the little Russian contrivance, which is so useful for the forward lessons, is not available for the other. Nor is there any other inanimate teacher yet invented. Human aid must perforce be resorted to.
In this place we may as well perhaps—it is not at all too soon—suggest some hints as to the terrible dangers that unfortunately attend upon the amusement of skating. To the greatness of these perils we have, alas! too abundant testimony. Each time that a frost comes on in England we have a wretched list of evidence—a whole catalogue of accidents, too often fatal, which damp and destroy our enjoyment of the sport. At such times we can hardly open a daily paper without coming upon an account of some calamity; and our eyes are horrified almost every morning by the announcement, in large letters, of some "shocking accident," or "melancholy death by drowning," destined to attract the morbid interest of the reader by its horrible details. Until the lakes in the London parks were reduced to a safe depth they formed veritable death-traps for imprudent and reckless skaters, and that in spite of the careful precautions and assiduous attentions of the Humane Society and its servants. In this country there are no possible means of providing against the rashness of foolhardy persons. Against their obstinate folly no warnings have any effect, and they deserve their fate as fully as the Alpine climbers who every summer victimise themselves. But to those whose infatuated love of amusement has not triumphed wholly over their good sense a few hints will prove of the greatest use, and may enable them without danger to enjoy a day's skating that they would otherwise lose.

In the first place, then, unless he has conclusive evidence that the ice is of a perfectly safe thickness, a skater should never venture upon water which is out of his depth unless he can swim well. Swimming is hardly a more useful accomplishment to the boating man than it is to the skater. In both cases, however, the mere ability to swim is often insufficient without other aid. A few minutes' immersion in ice-cold water will chill the limbs and paralyse the strength of the stoutest swimmer, and unless a ladder, or a rope, or some means of escape, be close at hand, he will inevitably sink to rise no more. On all ponds or pieces of water, therefore, where the depth is in any part sufficient to drown a person, one at least of these appliances should be on the spot. It is not much to ask of the owner of the place that he should provide a good coil of rope. The skater can bring one himself if he is not sure of finding it there.

In no case has any person a right to venture on deep water without knowing that there is a rope at hand; the Legislature would be quite as fully justified in insisting upon this as it is in compelling a man to use reins in driving a horse and cart. Next, as to the signs by which safe may be known from unsafe ice. There is a common saying, "Cracks, it bears; bends, it breaks"—and to a certain extent and in certain cases this is true. Almost all ice, certainly all white ice, unless it is of an immense thickness, will crack when it covers at all a large piece of water. Sometimes, even of its own accord, with no one on it, it will burst into one of those great jagged fissures many yards in length, cracking with a sound like the explosion of gunpowder, either through the motion of the water underneath, or, like glass, from the action of the hot sun above. Often still its brittle material will yield to the weight of bodies above it, and relieve the tension upon its broad surface by snapping into a sort of joint in the midst. But such cracks as these are no sign of immediate danger: the edges of the crack remain close or almost close together. They are supported on each side by the bulk of water underneath, for it is the buoyancy of the ice combined with its strength of adhesion, and not the latter alone, which keeps the whole mass from giving way. I have heard during a severe frost and on a large expanse of still water, cracks louder than musket-shots. I have seen the people rush off from the spot as if there was death and destruction in the sound, and I have remarked the calmness of the old experienced skaters, continuing their figures with the greatest sang froid, and, if anything, with renewed confidence. Such loud reports as these are, indeed, a sign of the strength of the ice; for it must be a tremendous strain that causes them, and none but very strong ice could or would cause them to be heard. But there is another kind of cracking, the soft quiet cracking, which may well arouse one's fears. When the fissures are of short length, and extend all over the ice like a network, when they burst with a low hissing or cracking sound, and water oozes up between the sides, then it is that they are suspicious: then is the time to take to flight. It is when the ice is loaded beyond its weight, when the warmth of the sun is too strong, or when an insidious thaw has set in, that this sort of thing occurs; and when it does, let not any one who values a dry skin tempt fortune any longer. The ice may hold out another half-hour; by the retirement of those who take fright it may possibly be relieved so as to last out the whole day. But it will be poor stuff, sloshy and uneven at the best. There will be weak places which you have to avoid, most probably a hole or two where some unfortunate has already gone in; and the feeling that at any moment you may share a similar fate is not conducive to good skating. It is far better, when such signs first appear, either to migrate to less crowded quarters, or to go home and wait for a safer day.

As for the ice that bends, its evil reputation is only in part deserved. It is true that in the case of white ice the bending is a most suspicious sign. It betokens usually a softness or rottenness, which is the result of a weak frost or a gradual thaw. Such ice, though it seems to the spectator on the bank to hold together in a solid continuous surface, will often be found, on closer inspection, to be cracked or broken up in the manner we have already described. The sound of these small cracks is hardly heard, and they spread imperceptibly, until sometimes there is not a square foot of the surface without several seams traced across it in this way. The ice thus weakened gives under the weight of each skater as he passes over it, and seems, as one regards it from the bank, to undulate in great troubled waves in the most alarming fashion. The skaters themselves do not perceive it; their safety each moment that it continues inspires a blind confidence, until at last the crack comes; two or three heavy men meet together, or a fall or collision occurs, and the ice is seen sinking quietly and slowly beneath the strain.

There is, however, another sort of ice, the black ice, which is made by very severe and sudden frosts, which is of quite a different sort. This is the most strong and durable ice that can be found. It is as tough as whipcord, and will bear almost double the strain in proportion to its thickness that the ordinary white ice can stand. An inch of this black ice will bear a man's weight comfortably, if its surface is not too broad; whereas, an inch and a half is the very least that can be trusted as the ordinary rule. It is usually on rivers or on pieces of water where there is a considerable current that this sort of ice is to be found. The smaller frosts have no effect upon this sort of water, and it is only the severe "black frosts," as they are commonly called, that can cover them with solid ice. It is the ice thus formed that is termed by skaters "black ice." It is very elastic, and has the adhesive powers as well as the elasticity of indiarubber. It will bend, therefore, like a whip-bone, without giving way, and will only crack under a strain that shows it is being tried very much beyond its powers. Thus, when it does break, it always does so suddenly, and the danger is the greater, inasmuch as, the skater, once in, may be carried off before he rises again by the current that runs beneath.
ZETEMA.

DESCRIPTION OF THE GAME—VARIETIES OF PLAY—A SOURCE OF AMUSEMENT.

ZETEMA is the title of a new and successful card game, recently introduced to the public in a very attractive form, and which bids fair to achieve as large a success as bezique, or any other modern card game. Although at first sight, and on reading the rules, an opinion might be formed that this game is similar to and founded on bezique, it will be found in practice to be very different, and much superior to that game; indeed, in the variety of chances of counting it approaches cribbage, and in exciting interest to obtain “tricks” it is a formidable opponent to whist itself, while it possesses the advantage of being equally suitable for two, three, four, and even a larger number of players.

The methods of counting or scoring in this game are of two kinds. First, by obtaining in hand, or exposed, or both, certain combinations of cards, the amount scored for each such combination varying with the difficulty of obtaining it; and second, by tricks, which consist of the whole of the cards of the same value, and are scored by the player of the last card of the trick. The score is kept by means of special “markers,” which accompany every set of zetema cards.

The sets of cards for zetema consist of a complete ordinary pack of playing cards, with the addition of a duplicate set of one of the suits, so that the pack contains five suits, of which two are alike. It is quite unimportant which suit is duplicated, consequently a pack may consist of two suits of hearts with one suit each of spades, clubs, and diamonds, or two suits of spades with one each of the others, or the two suits may be clubs or diamonds; it is only necessary to declare, when commencing play, which is the duplicated suit in the cards used. It will thus be seen that each trick consists of five cards—not four, as in whist—as five aces, five kings, etc.; and as some of these tricks are of much higher value than others, considerable excitement is often manifested to secure the more valuable tricks by forcing your opponent to take the others.

The combinations of cards consist of “assemblies,” “flushes,” “sequences,” and “marriages.”

An Assembly is, in point of fact, a trick held in hand, that is, not played; and as this combination is the most unlikely to occur—for with five cards of equal value it is a rare occurrence to secure the whole in one hand—it is rewarded with the highest score, an assembly of kings or queens counting one hundred, and the others varying from ninety to sixty. If three or more persons are playing, it is not advisable to try for an assembly—unless the player has the good fortune to secure three or four cards of the same value very early in the game—as he may lose his chance of any of the other modes of scoring by holding out for cards with chances three or four to one against him.

A Flash is made when all the cards in hand—a six are of the same suit, and as flushes of the duplicated suits do not count, the chances of scoring a flash are thereby lessened; but as the reward for this combination is thirty, it is worth holding out for if a decided majority of cards in hand are of one of the single suits, especially if not many of the same suit have been previously played.

A Sequence, as its name denotes, occurs when all the cards held in hand are in sequential order, that is, follow one another in numerical rotation or value, as ace, two, three, four, five, six; four, five, six, seven, eight, nine; or nine, ten, knave, queen, king, ace, for the ace may be counted either at the beginning or end of a series. The cards of a sequence may be of mixed suits, all ranking the same in this combination; and as there are five complete suits, and the score is thirty, the sequence is one of the most fertile sources of scoring when a small number of players are engaged. After counting a sequence or flash, four of the cards held may be used towards another sequence or flash; and it is well to hold them for this purpose, unless the remaining cards are played, or you know they are in the hands of one of your adversaries. It is no uncommon thing in two-hand zetema to count four or five sequences during the progress of a single game.

A Marriage is scored by playing at the same time a king and queen of the same suit, or if either king or queen have been previously played, by playing the remaining one upon it. A marriage played scores ten, except the second marriage of the duplicate suit, which is called the imperial marriage, and scores twenty; but as by scoring two or three marriages at the same time the score is very largely augmented, it is well to keep back such marriages until more than one can be declared, unless by so doing you interfere with your hand for sequence or flash.

Tricks are scored by the party who plays the last or fifth card of the same value, and this gives five to the player—this is the lowest number scored in this game; but the ace trick and the five trick each score fifteen, and the knave trick scores twenty; so that it is important to secure these latter tricks if possible, and this affords scope for fine and exciting play, especially towards the end of the game, when it becomes sometimes apparent in whose hands the cards lie. The king trick and the queen trick can only be made when an assembly has been declared of one of them, the others are then played in the same way as ordinary cards, and the trick scores fifty; but in the great majority of cases they are used for marriages, and the playing of a king or queen, or the declaration of a marriage, prevents the scoring of an assembly of those cards.

Having defined the various methods of scoring in this interesting game, we will now proceed to describe the method of playing, and in doing so will give such hints as may be necessary to ensure success in learning it.

In two or three-hand zetema each player scores his own game, but when four or any higher even number of persons are playing, the players may cut in the usual way for partners, who must sit opposite each other, and one mark the score made by both, while the other turns and collects the tricks.

The deal is decided in the same way as in nearly every card game, by cutting the cards after shuffling, the lowest being entitled to the deal, and ace, of course, counting low. The cards being cut to the dealer, he deals singly, as at whist, six cards to each player, if not more than four are playing, and then places the rest of the pack face downwards on the table, within reach of all the players. The person sitting on his left hand must then lead for play.

Each person now takes up the six cards dealt to him, and examines his hand, to decide upon his policy in playing. If he has the good fortune to hold three or four kings or queens, or other good cards for scoring an assembly, he decides on holding them for that purpose, if he hold three or four cards of the same suit, and that one of the single suits, he determines to work for a flash; or if he see a chance of combining two or three marriages, especially if he has a chance of both marriages of the duplicate suit, then he retains those cards; but if, as most commonly occurs, he hold a somewhat heterogeneous hand, he will probably endeavour to secure a sequence, and for that purpose will retain in his hand such cards as are nearest each
other in numerical value. If knave and king or queen are held in hand, it will be well to try for a sequence of the higher cards, on account of the value of the knave trick and of the kings and queens for marriages; but if three or four cards of low numbers are in hand, it will be best to discard the higher.

The leader may, before playing, make a declaration, if he have the cards in hand. If it be an assembly or a marriage, he must place the cards on the table, score for the same, turn the cards over on one side, and take the same number of cards from the top of the inverted pack; if it be a flush or a sequence, he scores merely showing the cards, and then plays. If he hold nothing by which he can score, or if he decide not to score at that time, he takes one of the cards which he has decided upon as being least useful to his hand, and lays it face uppermost on the table, and he then takes the top card from the pack to complete his hand. The next player proceeds in the same way, and after deciding which method of scoring will suit his hand, he lays down on the table the card least useful to himself; if it is of the same value as one already exposed on the table, he lays it upon that card; if not, then he commences a fresh trick, and takes the upper card of the remainder of the pack, and so on, each player following round and round.

As each player takes up a card, or after a declaration of marriage or assembly, two or more cards, for he should always have six cards in hand, he notices whether it will help him to the score he wishes to make, and if so he will retain that card and discard some other each time his turn to play comes round; or should a card drawn may modify his play, and he may decide to try some other score, which his varying hand may cause him to think more likely of attainment. When he has obtained cards for scoring he must wait until his turn comes round to play again before doing so. If after playing a card a player neglects to take up a card from the pack, he loses his chance of doing so, and must continue to play a card short, and so cannot afterwards score a flush or sequence in that hand.

If a player holds a marriage in hand he need not at once declare it, and, indeed, it is rarely wise to do so, for if he is sitting at a sequence, and the cards form a part of it, he may score one or more sequences before it becomes necessary to declare the marriage, and should the marriage not be of the duplicate suit, and he should draw another king or queen, he may safely play the first one on the table, for, as he holds the matching card in his own hand, he can score the marriage at any part of the game. It also enables him to have command of a greater number of cards, and may give him the chance of scoring a plurality of marriages, which is always an advantage.

After scoring a sequence it is well to discard either the highest or the lowest, unless the trick corresponding to this card is nearly completed on the table, as the next card drawn may help the series above or below; for instance, if you score the sequence nine to ace, and play the ace, you may draw the eight or the seven, which would help you to another sequence of one or two cards lower. If you have a card of the same value as one in your hand, you would of course play the card already shown, as after discarding two cards out of a sequence you can score another sequence, if you again hold one.

When four cards towards any trick are exposed on the table, the player of the next card, which completes the trick, must, on playing, say "Zetema," turn the trick, and score for it. When three cards of a trick are on the table, it is not worth while for the score of an ordinary trick to baulk your play by retaining the fourth card until another one has been played; but in the ease of the knave trick, where the score is twenty, and also for the ace trick or the five trick, especially towards the end of the game, it may be well to endeavour to make them by retaining a card until some other player has played the fourth card, when the trick must fall to the one you hold.

After playing in this way until all the cards of the pack placed on the table are taken up, the game must be continued for the remaining tricks and marriages, until all the cards are played; and this portion of the game, the playing of the last six rounds, affords scope for very considerable skill, and is by far the most exciting. It is of great advantage to be the drawer of the last card on the table, as all the other parties to the game must play a card before you, and consequently you retain one card more than they do, and can often compel them to play kings or queens which you can marry, and you can retain command of the imperial marriage or the knave trick until the end of the game, if these have not been previously scored. In order to secure this it is well to retain marriage cards in hand towards the end of the game, so that when the cards are nearly exhausted, you may, by a declaration of marriages out of hand, take up the last two or three cards, and thus obtain the best position in the subsequent play. It often happens that during this portion of the play one player has to lead nearly all his cards for his antagonist to take, in consequence probably of both having been trying for the same sequence, and having similar cards in hand, so that the party having to play first must each time play a fourth card, on which the other plays the fifth, and so turns the trick; this is best avoided by giving up the chance of a sequence during the last two or three rounds of the game, before the pack is exhausted, and retaining such cards as will enable you to command the most valuable tricks which remain. Another important point to be attended to in playing the last six cards, is to avoid making marriages out of hand, or declaring more marriages than one as long as possible, because by playing two or three cards at once you leave yourself in a worse position by having fewer cards than your opponents. Of course, declaring a plurality of marriages is so advantageous in scoring, as will be seen on reference to the table of scores, that it must always be taken advantage of; still, if you hold a marriage in hand, one of these cards can be safely played one round, and the marriage declared the next, instead of playing both at once. After playing out the whole of the cards, they must be well shuffled, and the party who led for the last hand deals for the next, and so on, until the game is completed: the score being, when two or three are playing, 300; when four, five, or six are playing, 200; and when a larger number than six are engaged in the game, 150.

As the cards, when taken up, will run in tricks, they require to be very well shuffled after each hand is played. This is, perhaps, best done by three or four players taking portions of the pack and dealing them together to the centre of the table; or if one person shuffles, by dealing them into three piles, and then shuffling the whole together in the usual way.

A very important modification in the method of playing the last six cards is introduced when only two players are engaged. It is quite evident that in this case whoever took up the last card on the table would have a very superior position to his opponent, and to remedy this the rule is introduced, "when only two are playing, then after the pack is exhausted, the winner of a trick leads for the next trick." This entirely alters the position of the players in two-hand zetema, and it is often advisable to compel your opponent to take the ordinary tricks, in order to weaken his hand; and it is also necessary to keep marriage cards and duplicate cards if possible. If there are three cards towards any trick on the table, and you have only one of them, and it is a trick for which the score is only five, by playing your fourth card you leave that trick to your opponent, who, if he take it, must lead for the next trick, thus playing
two cards for your one; and if his second card take another trick, he must still continue to lead, so that if you are able to throw the inferior tricks into his hand he may be compelled to lead the best tricks to you. The advantage of retaining cards for marriages in hand will be at once seen; for if you play any card that does not take a trick you are not compelled to lead after it, but your opponent must; and so by playing first a king or queen, and then next round declaring a marriage with it, unless your opponent hold similarly good cards you exhaust his hand, and then take the whole of the remaining tricks. Duplicate cards help in the same way; if you hold two knives, for instance, and there are three on the table, the trick is yours, and under any circumstances you can play one of them without being obliged to lead at once. This rule for two-hand setema is a particularly advantageous one, making the game for two players as sparkling and agreeable, and as pleasantly exciting, as with three or more players.

Another important variation in the game to be noticed is when the number of players exceeds four, only five cards must be dealt to each player, instead of six, and the order of play and the rule of taking or leading tricks remains the same. The number of cards is thus reduced, and the interest of the game would be considerably lessened. The rules of this game, however, exhibit considerable skill and foresight, and what might be for these conditions have been weak points have been guarded against and provided for, so that the game is equally interesting and agreeable under all circumstances; indeed, we consider it one of the best of the many card games introduced to the notice of the public during the last few years.

We think we have now sufficiently explained this game to enable any one, with the help of the "rules"—a copy of which is supplied with each set of setema cards—to learn the game with ease; and we doubt not that once learned, the pack will not be suffered to fall into disuse. The wonderful variety of the game always presents some new combination to the player, and this alone is sufficient to keep up his interest in it. We now append the table of scores, and the only penalty exacted is that for exposing a card out of turn:

**TABLE OF SCORES.**

<table>
<thead>
<tr>
<th>Action</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>For an assembly of the five kings</td>
<td>100</td>
</tr>
<tr>
<td>For an assembly of the four aces</td>
<td>100</td>
</tr>
<tr>
<td>For a marriage, of which one is the imperial marriage</td>
<td>50</td>
</tr>
<tr>
<td>For a marriage, of which one is the duplicate suit</td>
<td>40</td>
</tr>
<tr>
<td>For a marriage, of which one is the second marriage</td>
<td>30</td>
</tr>
<tr>
<td>For a marriage, of which one is the assembly</td>
<td>20</td>
</tr>
<tr>
<td>For a marriage, of which one is the first marriage</td>
<td>10</td>
</tr>
<tr>
<td>Declaration of marriage</td>
<td>10</td>
</tr>
<tr>
<td>Declaration of marriage, of which two are of the duplicate suit</td>
<td>10</td>
</tr>
<tr>
<td>Declaration of marriage, of which one is the imperial marriage</td>
<td>5</td>
</tr>
<tr>
<td>Declaration of marriage, of which one is the first marriage</td>
<td>2</td>
</tr>
<tr>
<td>Declaration of marriage, of which one is the second marriage</td>
<td>1</td>
</tr>
<tr>
<td>Declaration of a flush, or of all the cards in hand being of one suit</td>
<td>3</td>
</tr>
<tr>
<td>Declaration of a sequence, or when all the cards in hand follow each other in order of value or number</td>
<td>5</td>
</tr>
</tbody>
</table>

**Tricks.**

- King or queen trick (when made) | 50 |
- Knife trick                     | 30 |
- Ace trick                       | 15 |
- Five trick                      | 15 |
- All other tricks                | 5 |

Punish for playing out of turn, or accidentally exposing a card during play:

1st. The card must be left exposed on the table till the player's turn comes round, when it must be played.

2nd. The player cannot draw, under any circumstances, at that time, from the pack to complete his hand, but must continue one card short.

3rd. Declaration of the five marriages at one declaration.

4th. If it is not a winning card it will follow the usual course.

These rules are extracted from the little work published by Messrs. Joseph Hunt and Sons, who introduced the game.

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**LEGERDEMAIN.**

**By a Professional.**

**THE FEATHER TRICK—THE COFFEE TIN.**

We have observed that often the best tricks depend upon the simplest means. As an instance in point, we recollect, in almost the first exhibition we ever gave, many years ago, when quite a boy, a trick which may be called "Bringing a quantity of feathers out of a hat." In the exhibition of tricks of which we speak, there were several that at the time we thought very good, especially the one of bringing the watch out of the loaf of bread, which was described a little time back, as well as the inexhaustible bottle, not yet explained.

The exhibition was an evening party at a private house, and there was one gentleman present, a doctor, a scientific man, and one who in all probability would find out any trick. We recollect, after all was over, being told that he thought he knew how every trick was done except one, and that one puzzled him very much. The undiscovered trick is the one we are now going to describe.

The conjurer advances to the front of the table, or to any part of the room where he can stand quite away from all surrounding objects, and having first spread a large sheet on the ground, takes a hat from which he has previously taken a quantity of articles (this part of the trick we will explain another time, as it is quite distinct from bringing out the feathers), he places the hat under his arm, and pulls out a handful of feathers, which fall on the sheet. The conjurer has his coat tightly buttoned up, and turns round in order that the audience can see that he has no large bag of feathers concealed about him anywhere, he continues to pull out handful after handful, until the hat seems as full as ever. The heap of feathers on the large sheet spread on the ground increases in size as the feathers still continue to fall, until there seems to be enough, not only to fill fifty hats, but several feather beds.

By the time the trick is finished there is a heap on the ground, if the trick has been well done, as high as a dining-
room table, and yet, turning the hat to the audience, it seems as full as ever. This was the trick which, out of the whole collection, remained the sole undiscovered one.

And now, how can this possibly be done? People argue thus:—Of course it is quite impossible that the feathers can all really come out of the hat, where, then, do they come from? One ingenious suggestion was made to us that there was a trap-door in the floor, and that they were pushed up through it, but this is, of course, nonsense in a private house, however possible it might be in a theatre, where there are always plenty of trap-doors on the stage.

We shall probably astonish our readers and pupils by informing them that it is really no trick at all. The feathers do come from the hat, and, what is more, can be put back again into the hat and pressed down. The explanation is so simple, that no one ever guesses the trick, and, consequently, once starting with the theory that it is impossible for the feathers all to come out of the hat, they puzzle themselves with thinking where can they come from, and the more they think about it, the more inexplicable does the trick seem.

We will explain how this exceedingly effective trick should be prepared. The requisites are a quantity of the best feathers, an old but not limp hat, a piece of wood cut the shape of a hat to fit just inside the rim, and a heavy weight. Three or four days before showing the trick, the feathers should be placed in the hat, pressed down as much as possible, the wood placed on the top, and the weight on the top of the wood. It will now be found, that after a few hours, or at any rate the next morning, the weight has so pressed the feathers together that there is room for as many more, and the same will be observed again the following morning.

By this means an enormous quantity of feathers can be got into the hat, but the conjurer must recollect that directly the weight is removed the feathers will begin to swell and bulge, so that the weight must be kept on the top of the wood, pressing them down until the very last moment, and the performer must also begin to scatter them as soon as possible, by picking two or three at a time out of the hat, and spreading them. He must avoid digging his hand down into the hat, as they would in that case come out in such a rush that they would suggest the idea of compressibility.

Of course, the hat from which the other articles, such as a quantity of silver cups, sugar-plums, etc., were brought, is changed into the hat with the prepared feathers; as to the method of changing the hat, we will speak about that another time, as there are different ways in which this can be done, depending principally upon the shape of the room in which the tricks are being shown. But now one or two words of caution. Feathers make a great mess; therefore the trick should never be shown where there is any draught, as they are likely to blow about and cause an awful amount of trouble to clear up. Another thing is, avoid wearing a good dress coat, as it will never look the same again. We speak from experience; and a burnt child dreads the fire.

Before explaining the Indian Basket Trick, we will describe small and by no means clever trick, yet one that never fails to please, owing to the fact that there is something to be got out of it. Conjurers will invariably find that every trick is popular in which there is anything to be given away to the audience. For instance, the hat trick which we mentioned, consists in not only bringing out cups, but toys and sweetmeats, which are distributed amongst those present, and, consequently, is always liked; as far as a good trick is concerned, it is, in our opinion, one of the very worst ever exhibited in public.

Fig. 1 is a round tin canister capable of containing about a quart; Fig. 2 is its cover or lid. On opening the canister, it is found to be full of dry ground coffee, and the conjurer takes a large pinch up in his fingers and shows the audience that it is real. He then calls for a tray with some cups and saucers and milk and sugar on it; on covering the tin and re-opening it, it is found to be full of hot freshly made coffee, and he hands the canister to the people to examine it and help themselves. The trick is very simple, but forms a good excuse for handing round some coffee.

Fig. 2 explains the trick. It is a small round tray, about an inch in depth, and fits into Fig. 1. This tray is filled with coffee, and on putting on the lid tight the tray fits into the lid so that on re-opening it, it remains inside. Of course, this same trick can be shown with tea in a similar manner. It may very often, too, be found useful in a variety of ways, by filling the tray with bran any article can be got rid of, such as dummy handkerchiefs, etc., as they have only to be placed in the canister, covered, and then for the canister to be opened next time in the other place, for them apparently to be changed into bran.

There is a popular belief in this country that there exist in India a class of persons who far eclipse in their performances anything ever seen in this country. In fact, if but half the stories told of them are true, they cease to be conjurors in what we call the toy-shop sense of the word, and become men who either deal in magic—if there be such an art—or are acquainted with some new science which we have never heard of in this country. But we shall discuss this more fully in connection with the Indian Basket trick.
It is a great mistake in archery to have arrows too long. For a five feet ten bow a twenty-seven inch arrow is quite sufficient; a lady’s bow, which is a foot shorter, should not shoot arrows that are any longer than two feet.

A snaked arrow is often lost altogether, or only found warped and spoiled weeks afterwards, though the searcher may know almost the exact spot where it alighted, but when found, it is better to cut the grass on each side with a knife than to use force for its extraction.

In withdrawing an arrow from the target or the ground, seize it close to the head, and turn it round with a boring motion as you pull. Careless handling is apt to injure the feathers and bend or break the shaft. Precaution is particularly necessary when the arrow is snaked—an appropriate term, signifying the course it sometimes takes through grass when the ground is so hard that the point glides instead of penetrating. A snaked arrow is often lost altogether, or only found warped and spoiled weeks afterwards, though the searcher may know almost the exact spot where it alighted, but when found, it is better to cut the grass on each side with a knife than to use force for its extraction.

Arrows are made of lance-wood, lime, ash, deal, and poplar, and of these deal is most in requisition, fletchers preferring that found in old houses to new timber. A piece of heavier wood is generally spliced on to the deal at the point end, and this improves the flight. The points are of iron or brass, riveted on. The notch for the string is mostly of horn. The feathering is very important, as unfledged arrows will not fly true.
The three feathers are of the goose or turkey, and sometimes of the peacock—the one standing up when the arrow is nocked upon the string is termed the cock-feather, and is generally coloured differently from the others, to enable you to fit the arrow readily in the proper manner.

Archers who are fond of roving—as wandering about shooting at any mark which takes the fancy at the moment—is termed, or of trying their skill at rabbits and wood-pigeons, will often lose shafts, and will therefore grudge employing the expensive arrows provided for ordinary target shooting. If they will provide themselves with a stock of small iron heads, they may make very tolerable rough arrows out of straight unbarked hazel wands. The feathers should be attached (the bark having been scraped from the parts where they are to lie) by a mixture of isinglass and glue, dissolved in brandy; it will aid the operation if they are first dipped in hot water to soften them. Arrows should always be marked in some way to prevent disputes at the target.

*The Quiver* is a green tin case for keeping arrows in.

*The Belt* is wound round the waist, and carries the arrows in use, a pot of grease, composed of beeswax and suet, and a tassel to wipe dirt off the arrows.

*The Bracer* is a leather guard for the left arm, buckled on to that part where the string strikes it when loosened; a very necessary protection.

*The Shooting-Glove* is composed of three-finger ends of thin leather, kept in their place by strips branching from a broader part, which is strapped round the right wrist.

A target card is almost invariably carried at archery meetings, the ladies wearing it suspended from the waist, the men from a button-hole. On it the scores of the competitors are marked with pin prick, the columns being coloured in correspondence with the target—a gold hit scoring nine; a red seven; inner white five; black three; and outer white one.

<table>
<thead>
<tr>
<th>Archer’s Name</th>
<th>Gold</th>
<th>Red</th>
<th>Inner White</th>
<th>Black</th>
<th>Outer White</th>
<th>No. of Hits</th>
<th>Value</th>
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Total hits and Value

If an arrow sticks on the margin line of the gold, say, it does not score a gold if there is any trace of the red paint upon it. The same rule applies to the other circles. Targets are of comparatively modern invention; in the palmy days of archery a white mark (the "clout") was fixed in the centre of the butt by a wooden peg, from which the marker measured to the arrow. To split this peg itself was the very perfection of shooting. The modern target is a flat circle of straw covered with painted canvas, the centre a circular patch of gilt, seven inches across, then a circle of red, and another of white, each three inches and a half broad, then a circle of black, one inch and a half, and an outer one of white, one inch broad. The target varies in size according to its distance from the archer. At 100 yards it should be four feet in diameter; at eighty yards three feet; at sixty yards two feet. The target is fixed on a triangle of wood or iron, so contrived that it may be elevated or depressed, as the shots are more or less remote.

**Stringing the Bow.**

Hold the handle in your right hand, with the back of the bow towards you. Place the bottom horn against the hollow of the right foot, turning the latter so as to secure it, the left foot being advanced. Place the palm of your left hand upon the upper end of the bow, taking the eye of the string between the finger and thumb, and slide it up towards the notch as you push with the left hand; at the right till the string is in the notch. Make sure that it is firmly there, and not away, before you let go. Some archers use the left hand to pull at the handle with, and push the top of the bow with the right; it is the same thing.

Unstringing is performed in a similar manner. If the weather is cold, "warm the bow before bracing it."

The above is the correct and graceful method of bracing the bow, but if it is a very powerful one, you may not be able to put it in practice. Then you must use your knee as a fulcrum, placing the bow across it with the lower horn in the ground, and the rounded inner side towards you, and pulling the top down with the left hand, while you nock the string with the right.

Or you may adopt the fashion of a certain tribe of Indians, who lie on their backs, take an end of the bow in each hand, and push the centre out with their feet, while a friend fasts the string. But the position can hardly be a graceful one.

Do not keep your bow strung longer than is necessary. When you have shot your turn, unstring it at once, if several minutes are likely to elapse before you will use it again. A bow kept braced too long together is apt after a time to acquire a bent, or as it is termed, to follow the string; and this detracts from its strength.

**The Five Points of Archery.**

Archam’s famous five points are—standing, nocking, drawing, holding, and loosing.

**Standing.**—Present your left side to the target, the face over the left shoulder, head and neck inclined slightly forward, so if you stand too stiffly erect, you will never acquire the "laying of the body in the bow." The feet are to be firmly planted
upon the ground, with the weight of the body resting equally on both; the heels six inches apart. Ascham arrives at the correct attitude by the exhaustive process of pointing out all the faults which are most common. "Some shooteth his head out, as though he would bite the mark; another stareth with his eyes, as though they shuld fly out; another wynketh with one eye, and looketh with the other . . . ; another hobles his nodd away . . . ; another maketh a wrinche with his back, as though a man pynych him bellynde; another cowereth down, as through he would shoot at crowne; another setteth forward his left leg, and draweth backe with heade and shoulders, as though he poulde at a rope."

Nockings.—"To nock well," says Ascham, "is the easiest point of all, and therein is no art, but only constant attention to nock truly, not setting the shaft either too high or too low, but exactly straight across the bow. Inconstant nocking makes a man lose his strength; and besides, if the shaft hand is high and the bow hand low, or the contrary, both the bow is in danger of breaking, and the shaft, if it is small, will start; if great, it will hobble. You must always nock the cock-feather upwards; and be sure the string does not slip out of the nock, for then all is in danger of breaking." Be careful before nocking to see that the bow is not reversed, but that you have got the top uppermost; otherwise the coloured silk which marks the nocking point will be in the wrong place, and the arrow will not be drawn in the bow's centre. While fixing the arrow, pass the forefinger of the hand holding the bow over it, to keep it steady, and mind not to ruffle the feathers. When the position is secured by placing the first and second fingers of the right hand close on either side of the nock, and holding it and the string by about the middle of the first joints.

Drawing.—"In nocking, the bow may be held obliquely, to prevent the arrow falling from it, but it must be raised to the perpendicular as you shoot. Raise your arms steadily, thrusting your left hand forward with your whole strength, while you draw the arrow to your ear with the right, till the pile (or head) of the arrow reaches the knuckle of the bow-hand. No matter whether it is for a near or a distant shot, the arrow must be drawn to the pile. Many archers draw to the breast, but that is bad form, giving considerably less power over the bow. There is another fault, which Ascham points out. Sometimes an archer, he says, "draweth his shaft well, until within two fingers of the head, and then he stayeth a little, to look alys mark, and that done, pealseth it up to the head, and lowseth; which way, though some excellent shooters do use, yet surely it is a fault, and good men's faults are not to be followed."

After you have once commenced to draw, never look again at your hand or arrow; keep your eye intently fixed upon the gold, to the exclusion of every other object, until the shaft is sped.

Holding.—Bowmen generally draw with three fingers, and the glove is made with three stalls to that intent, but many only use two. Anyhow, the arrow must be between the ends and the first joints of the first and second fingers. "Holding must not be long," says Ascham, after the bow is drawn up, "for it puts a bow in danger of breaking, and also spoils the shot. It must occupy so little time that it may be perceived better in the mind when it is done, than seen with the eye, when doing."

Loosings.—This, says Ascham, "Must be performed much in the same manner as holding. So quick and hard, that it may be without any twitches; so soft and gentle, that the shaft fly not as if it was sent from a bow-case. The mean between both, which is perfect loosings, is not so hard to be followed in shooting, as it is to be described in teaching. For clean shooting, you must be careful of not hitting anything about you; and remember to hold your hand always the same height on your bow, that you may keep the length truly."

Doubtless, this loosing of the arrow is the most difficult motion in shooting, principally in consequence of the necessity of wearing those clumsy finger-stalls; if you had a finger and thumb with pinch enough in them to draw the bow alone, the matter would be easy enough. As it is, there is at first a difficulty; a hitch in letting the string slip at the critical moment, which is as great as an impediment to making a good shot as a stiff trigger is in a rifle, or a hang-fire with a shot gun, and this is only to be got over with practice.

The bow-arm must be held as firm as a rock at the moment of loosing, for, unless the bow is held as in a vice, the flight of the arrow cannot be steady. All this must be done mechanically, however; you must not think of your arm or fingers, you must not be conscious that you have such things, even as the arrow flies away; your whole being should be concentrated in that bright patch in the centre of the distant target; for the fraction of a second you must be ignorant of the existence of anything in the universe but— a bull's-eye.

Holding, drawing, and loosening, though treated separately, for the purpose of explanation, form one continuous action; indeed, the archer should loose while drawing.

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ROUND GAMES.

BY JAMES MASON.

THE LETTER GAME—TRANSPOSITIONS—BUFF—WEIGHT—"SHE CAN DO LITTLE WHO CAN'T DO THIS!"—THE INDIAN—BLIND-MAN'S BUFF.

THE ninth meeting of the Round-Game Club began—

"Why are round games called round games?" asked Alice of Notes-and-Queries.

"Well," answered he, "I have been puzzling myself of late to find out. Some people attach a more limited meaning to the words than we do, but, in our wide sense, I suppose, they are called round because they go round and round the company."
"Or may be," said John Ferguson, "because most of them are common to the round world."

"Or," Kate suggested, "because they are never ending, still-beginning."

"What the reason is does not matter much," said David.

"Come and play at The Letter Game."

"All right," said the Laughing Hyena. "Have you got the letters?"

"Yes, they are in this bag," and David held up a little bag of purple velvet containing twelve or thirteen sets of printed alphabets, each letter being separate from the rest, and pasted on a piece of stiff cardboard. "I shall do out fifteen letters to each of you," he said: "now, I am taking them, you see, quite at random. You must try with your fifteen letters to form words and sentences."

"Must all the letters be used?" Tom asked.

"All."

We set to work, and shifted our letters about till David called upon us to stop, and by that time everybody had either made a sentence or given up the task in despair. Then each one in turn read the sentence he had made.

The letters that had fallen to Emily's share were o, t, e, n, m, a, i, o, m, d, b, n, e, a; and out of these our saucy little character had obtained the sentence "Match me in London."

Notes-and-Queries had e, t, p, t, e, a, b, e, o, r, s, which read "Are their letters?"

Alice's letters were f, o, m, t, s, a, p, o, u, 1, o, d, w, and they made "Pound of soft wool."

John Ferguson got a, l, b, o, l, h, e, a, r, s, d, c, r, r, with which he contrived to make the words "Rarely blockhead."

David's letters were p, t, s, r, u, s, d, e, x, e, p, i; these he made out to be "If purse expenses." "This," he said, "is not a very brilliant sentence, but it is the best I can find out at the moment."

I need not give any other specimens of the phrases that were manufactured; these are enough to illustrate how we played the game.

"Have you contrived to have so many vowels?" said Maggie, addressing herself to David.

"The fact is," answered he, "I put a double supply of vowels into the bag. There is no use making the game too difficult."

"Now," said the Princess, "let us have a few rounds of Transpositions. Suppose we begin with famous men and women."

"Do we use these loose letters in playing?"

"Just as you like. I think it can be done quite as well with a sheet of paper and a pencil."

Some took the letters, and the rest took paper and pencil, and we began.

"There is a celebrated painter," said the Princess, beginning the game, "and the letters of his name compose the sentence John's ready soul. Who was he?"

"Joshua Reynolds," Notes-and-Queries cried out, after a little interval.

"Yes; he was right.

"There is a great dramatist," said Notes-and-Queries, "and his name is to be found in the words 'We all make his praise.'"

"William Shakespeare," exclaimed Alice, when, by placing and replacing her letters she had satisfied herself who it was.

"I hope I am not expected to give a name," said she, "for I don't know one."

"No," said the Princess, "names and sentences are to be given by anybody who knows them."

The following were then given by the Princess, Notes-and-Queries, David, and Alice, who seemed to have a large stock of transpositions:—

- Will it harm, O bag. William Hogarth.
- I search lame foxes. Charles James Fox.
- Throw sword. Wordsworth.
- I once saw trains. Sir Isaac Newton.
- Not lend say fern. Alfred Tennyson.
- O tell, may I sue Lord Grace. Samuel Taylor Coleridge.
- Boar, toss, lava. Salvador Rosa.
- Yes, a long dinner. Algernon Sidney.
- Flit on, cheering angel. Florence Nightingale.
- Johnny, the bear. (Dr.) John Abernethy.

After dealing with famous persons, we amused ourselves with the names of places, such as—

- Men in rank. Innsbruck.
- Hen sat. Athens.
- Lead. Deal.
- No age. Genoa.

Then we tried another variety of the game. We took discussing common nouns instead of proper ones.

"What political cry is it, all the letters of which are contained in the words 'Rare mad frolic?'" asked David.

"Radical Reform," was the discovery of John Ferguson.

"What dear person has all the letters of his name in his sentence 'There we sat?'" Emily asked.


Other words that were given were—

Nine thumps. Punishment.
March on. Monarch.
To love ruin. Revolution.
Mind his map. Midshipman.
Time in a pet. Impatient.
Great help. Telegraph.
Moon starers. Astronomers.
Got as a clue. Catalogues.
Sly ware. Lawyers.

Some of us proved very smart at transpositions, and others very slow. I do not think that games of this kind suit all sorts of players, and am of opinion, too, that—just as was the case last evening with "The Ten Birds"—rather too many were playing at it. It would be a better game for half a dozen, than for twelve.

"Now for the game of Buff," said Emily. "Tom, you must go out of the room."

Tom disappeared from the scene, and, in a short time returned, holding a poker in his hand. He took up his position before the company, who sat in a half-circle at the end of the room most farthest from the door.

"Where do you come from?" Alice asked.

"Alas, from poor Buff, who is full of grief.""

"Did he say anything to you?"

"Yes—"

Buff. said Buff.

And gave me this stuff. (Holding up the poker.)

And made me not laugh.

Till I came back to his house again."

This was said with as grave a countenance as possible, for..."
the great point in the game is to keep from laughing. The company made a host of ridiculous remarks, and asked many absurd questions; but Tom continued to look very solemn, and, turning to Alice, addressed himself particularly to her—

"Buff says Buff to all his men,
And I say Buff to you again.
And he neither laughs nor smiles,
In spite of all your cunning wiles;
But carries his head
With a very grace,
And passes his stick to the very best place."

So saying, he handed the poker to Alice, and burst out laughing immediately afterwards, evidently glad to be at liberty again to give vent to his feelings.

Alice turned to David, and began, with a face as sober as a judge—

"Buff says Buff to all his men,
And I say Buff to you again."

Here she could look grave no longer; and at some absurd remark of the Laughing Hyena's, she began to laugh, and in consequence had to pay a forfeit.

David now took the poker, and, turning to Arabella, repeated the lines with becoming solemnity; but Arabella, in her turn, laughed before she had said half a dozen words.

The fun now got fast and furious, and, laughing being infectious, forfeits became more and more plentiful, till nobody, not even Notes-and-Queries, could look grave for three minutes at a time. Then we stopped playing at Buff, and turned our attention to the game of Fright.

"Who is to be the musician?" asked Kate.

Every one thought it should be Notes-and-Queries; so he, with a rather self-satisfied air—for he knows, as I have told before, that he is a good player—took his seat at the piano.

Emily and Tom said they would arrange the chairs. They placed ten of them in a line. All, however, were not made to face one way. The first faced the right side of the room, the second faced the left, the third faced the right, the fourth the left, and so on alternately back and front.

We players—eleven in all; one more, you observe, than the number of chairs—arranged ourselves in a line round them, keeping them on our right hand.

The music struck up, and we stepped out to it, walking round and round the chairs, and going fast or slow according as Notes-and-Queries played fast or slow. In the middle of a bar, in the middle of a very quick passage, Notes-and-Queries stopped short. Every one now did his best to seat himself on the nearest available chair. At that moment, of course, some were marching past the backs of chairs, and these had the greatest difficulty to find seats. What a scramble there was! One found himself of course without a place—that was John Ferguson. He had to pay a forfeit, and the march began again.

When the music abruptly terminated the second time, it was Emily who was out. The third time the poor unfortunate was the Reporter.

Thus the game of Fright proceeded. Notes-and-Queries did his best to plague us; he was for ever introducing fine closing chords into his music, as if it were certainly coming to an end. When he did so, some one was sure to jump into a seat, thinking to make himself secure, but on the music went again more lively than ever, and the rash player had to pay a forfeit.

"It is the rule," said David to Kate, who demonstrated on the first inflection of the penalty, "no one must sit down till the music really comes to an end."

After a while, Arabella proposed, as a variation of the game, that after every round a chair should be withdrawn, and that the player left without a seat should be "out." First, then, there were ten chairs and eleven players, then nine chairs and ten players, then eight chairs and nine players, and at last there was only one chair, and round it marched Alice and David. They went very stealthily, each trying to keep as much as possible in front of the chair. Notes-and-Queries had struck into the "Soldier's Chorus," in "Faust," and was playing it with great spirit.

Sudden stop! Notes-and-Queries whirled himself round on the piano-stool just in time to see Alice clapping her hands with joy that she had got possession of the chair, and proved herself the cleverest player at Fright.

We did not play any more at this game, all thinking it had come to a very good and natural conclusion.

"Fright," said the Laughing Hyena, "is sometimes played without the music. In that case there is a Captain, who gives the word of command, 'Quick march,' 'Slow,' 'Double,' or whatever it is. When he cries 'Halt,' the chairs are taken possession of."

"That is not half so good a way as our way—with music," said Maggie.

"Certainly not," replied the Laughing Hyena, "but it is as well to know both."

Emily entered the room. She had gone down to the hall to get Notes-and-Queries' walking-stick, which she held in her left hand.

"She can do little who can't do this!" she said, and she thumped the stick several times on the ground. Then she handed it to Arabella.

"She can do little who can't do this!" said Arabella, and thumped the stick in exact imitation, as she supposed, of Emily.

"You must pay a forfeit!" cried Emily.

"Why?"

"Because—you have to pay a forfeit. Hand the stick to your next neighbour, and see if he will do any better."

"He can do little who can't do this!" said Tom, who was Arabella's next neighbour; he thumped the stick.

"A forfeit from you too."

It was paid, and Tom handed the stick to the Princess.

The Princess turned to David, "He can do little who can't do this!" she said, and handed the stick to him. She had to pay no forfeit; I think she must have known what the trick was.

And what that trick was, came out after forfeits had been extorted from most of us.

"You see," explained Emily, "I held the stick and thumped with my left hand; then I passed it into my right, and handed it to the next player, taking very good care that she took it—and indeed that was natural—with her right."

"Oh, I see—I see," said Notes-and-Queries; "we thumped with our right hands. Well, nobody would ever thump naturally with any other."

"Whoever invented the game of 'She can do little who can't do this!' knew that well enough," John remarked; "it is a very good illustration of the force of habit."

"The Indian is to be played now," David said; "let us form a circle. That's it. Now take this piece of ribbon in your hands—Kate, I see you think I might have been more economical, and taken string; but never mind."

The ribbon was a long piece, which was passed round the circle, and each player held it with both hands; one of us held both ends, but we might have tied the ribbon if we had cared.

"Who is to be the Indian?" David asked.

"I, if you like," said John. So saying, he took his place in the centre of the circle.

Now the sport consists in this: The Indian had to touch
the hands of the players before they could be withdrawn from the ribbon. If he succeeded in touching any one’s hand, that player had to pay a forfeit and become blind, whilst the Indian who touched him took his place. It was a simple affair, but very amusing; full of laughter and surprise.

"There is just time for one more game," said David, "what is it to be?"

"Blindman’s Buff"—such was Emily’s wish, and everyone thought that should be it; the chance of having a good romp was as welcome as if we had been a dozen school-children.

"Blindman’s Buff is a very old game," said Notes-and-Queries: "it used to be much practised by the juveniles of this country under the name of ‘Hoodman Blind’.

"Why did they call it that?" asked Kate.

"Because when they played it they used to reverse and blind themselves with the hoods they wore. There are some curious pictures relating to Hoodman Blind in the manuscripts of the Bodleian Library at Oxford. The ancient Greeks also —"

"Bother the ancient Greeks!" exclaimed John, "let us begin." And what the ancient Greeks had to do with Blind-man’s Buff remains, so far as Notes-and-Queries is concerned, untold.

The table was stowed away into a corner of the room, the chairs were all piled up against the wall, a few ornamental articles which would be easily broken were put out of harm’s way, the hearth-rug was removed, and a wire guard was placed before the fire. Everything was ready, and the Laughing Hyena was chosen to be the blind man. Emily blindfolded him, and then led him into the centre of the room, and held up three fingers. "How many fingers do I hold up?"

"Four," said the Laughing Hyena, and the answer was taken as proof positive that he really could not see.

He was let loose, and told to catch whomsoever he could.

You might have heard a pin drop now; the only sound was the occasional rustling of dresses. We went slipping about on tip-toe, and the blind Laughing Hyena groped here and there after us. We crossed his path several times; we touched him on the back, and escaped before he could bring his hands round to seize us, and once or twice Alice gently pulled his hair. At last Alice grew too venturesome; she was going to play some trick or other; she got within reach of the blind man and gave a little stifled laugh; he turned round sharply and caught her fast.

"You must name your captive," said David.

"It is Maggie!"

"No," Alice was let go, and the Laughing Hyena had to try his luck again.

In a little while Tom was caught. His name was rightly guessed, so Tom had to be blind man.

The Laughing Hyena tied the handkerchief over his eyes; led him to the centre of the room, and instead of holding up three fingers, as Emily had done, he said—following what I believe is a traditional practice in some parts of the county — "How many horses has your father got?"

Tom answered "Three."

"What colours are they?"

"Black, white, and grey."

"Turn them round three times and catch whom you may."

Tom turned round three times, and began prowling about. Soon he caught the Princess, and then the Princess became "blind man." She came poor speed, however, at the game, and might have been blind man to this hour, had John Ferguson not taken compassion on her and allowed himself to fail into her hands.

We played in this way till the clock struck — I won’t say what, lest you should think the Round-Game Club kept very disreputable hours.

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POTICHOMANIE.

THE DECORATION OF GLASS—IMITATION SÉVRES, JAPANESE, AND CHINESE WARE.

His is another decorative art, and may be called a relative of Decalcomania. It would be invidious to make comparisons between the two, therefore I shall leave you to judge which you think to be the pleasantest and most fascinating employment, and also which specimens you admire the most. I have told you about Decalcomania first, because it is the easier of accomplishment; there are more processes to be learnt and followed out in Potichomanie, and the subject requires a little study in order that all the concomitants may agree with one another, so that there be no flagrant acts and deeds either of bad taste or of ignorance in your exhibition. On this branch of the subject I shall speak more definitely by-and-by, as just now remarks of this kind would only bewilder you, for we have not said yet what this art of Potichomanie is.

A knowledge of Decalcomania enabled you to decorate china; a knowledge of Potichomanie will enable you to transform a plain glass vessel into Sévres, Japanese, or Dresden china; in fact, amateurs may produce a chef-d’œuvre in any style they elect to imitate, if only they take care to copy throughout the characteristic peculiar to that style.

This pretty and elegant art came to us from that acknowledged city of taste, Paris, and is very soon had a great many votaries amongst our countrywomen. Glass is cheaper to buy in the first instance than china, and then, besides this consideration, which is an obligatory one to many, there is the fact that this art affords much scope for the exercise of taste, and now and then of imagination too; added to this, there is a field for immense variety, for there are numerous styles of china, all differing widely in their several ways, so that the Potichomaniest need not soon weary of this agreeable occupation.

And now I must tell you what you will want in the way of materials. A bottle of prepared gum and another of prepared size; a third of porcelain colour, and a fourth of porcelain varnish. These are absolutely necessary, and if you intend to gild the edge, or any part of your work, you will then require one or two more bottles, viz., one of prepared thinning, and one of gold paint. Besides these, there must be the useful scissors in readiness, and some camel-hair brushes, and lastly, the glass that you are going to decorate, together with the pictures with which it is to be decorated.

I shall not stay now to give you hints as to your choice of these latter materials, but lead you at once through the
different processes, and then offer suggestions as to what are the usual forms in the various productions of the ceramic art.

After you have made up your mind which style of china to copy, take the appropriate designs, and, with a pair of fine-pointed scissors, cut them out accurately. If the picture is a large one, and the glass is globular in shape, it will be better to cut the design into several parts, for it would not be practicable to make it lie flat if the whole was put on at once, and the joins will never be perceived if pieced neatly; or if the design be a circular one, such as a medallion, then cut into the edges all round it, for the same purpose.

If you lay them out on a sheet of paper on the table after they are cut out you will be better able to decide the final arrangement.

When this knotty point is settled, take a damp sponge or a soft wet brush, and pass it over the plain side of the designs, or, if they are very thick, put them into water for a few seconds. Now brush over the coloured side with the prepared gum, and put them in their places inside the glass, the coloured side next it. Press them well with a soft cloth. And here I must pause to tell you that very much of the future beauty of your work depends on the attention which you pay to it at this stage. The imitation cannot rival the reality unless the designs are very carefully presson on to the glass. Little globules of air often intrude between the two, and they must be pressed to depart, and (to say nothing of the untidy appearance of a corner being turned up) another disaster will occur most surely if any such are allowed to remain so, and that is, that when you put on the grounding colour, some of it would be sure to creep in between the picture and the glass, and much it would disfigure the work. Do, therefore, be careful, and see that the whole of the design adheres to the glass.

The third process is to put two coatings of size over the backs of the designs. This is necessary, in order to prevent the ground colour from penetrating into the paper. There are one or two points in this proceeding to which I would draw your attention. The first is, that care must be taken not to touch the glass, the second is that the brush must not be passed over the designs too frequently or at all roughly, otherwise they are liable to be loosened or injured. Then as to the preparing of the size: mix a very little with hot water, and when it is almost cold, use it; when that coat is perfectly dry prepare a stronger dilution, this time using about equal quantities of water and the size, and then give another coating.

The fourth process is that of colouring the glass. You have now to tint the whole with a proper colour to give it the appearance of porcelain, for as yet there is nothing but a plain glass with a few coloured pictures adhering to it.

Just examine it first, for there might be a few specks inside it which would have to remain a permanent eyesores if not removed now; a damp cloth will take them away.

And now, if you are decorating a vase with a narrow neck, or, indeed, any vessel that happens to be very shapely, you had better provide yourself with a bent brush, as you will hardly be able to make a straight one do the work of colouring properly. Every part of the inside of the vase has to be painted, and it is difficult to cover it in an artistic fashion, that is evenly and smoothly, and without streaks and irregularities, if the brush cannot easily reach every part.

The first coat of colour should be a thin one, just enough to cover the glass. When that is dry, a second coating may be applied, and this time the paint may be used more freely, but if too much is put on the brush either time, it will probably run down into the bottom of the vessel and there obstinately adhere, and very troublesome a matter it will be found to dislodge it.

The final process is that of varnishing. This makes the work move durable; the outward effect is not in the least degree altered by the operation, for it is only the whole, the interior which is varnished twice over; this preserves the colouring and makes the article more useful, but notwithstanding this precaution I should never advise water being allowed to stand in it. There are inner vessels fitted for each shape of vase, which are made and sold for this very purpose, and they cost less than repeated applications of varnish would do.

I have mentioned gilding, and this additional decoration is a decided improvement. You can buy the glass ready gilt, and as in these cases the gold has been burnt in, it is all the more durable; but if you choose to ornament them for yourself, the way is this: to mix some of the gold paint with spirits of turpentine and lay it on with a brush. Or you can use gold leaf in preference, but this is more troublesome. In the latter event, you must first wash the glass over with a very weak solution of size and water, and then directly lay on the gold-leaf, making the bordering as long in length as possible, in order to avoid all unnecessary joints. When this is dry, a second coating should cover it, and lastly, after this has dried, brush the gold over with a coating of gilding varnish. To make this bordering neat, and with an even edge, is the chief difficulty; a little cotton wool will wipe off any capes and prominences which may jut out into the seas of glass, provided that you have taken care to observe a straight line with your varnish brush, and therefore have not passed it over them. All gilding must be done previous to any other part of the decoration.

And now as to the articles which look the best when decorated by this art of Potichomanie. Bowls, covered jars, flower-pots and fruit-stands, table-tops and panels for cabinets, together with vases of every size and shape, look excellently well when embellished by this process. But a little study of the whole subject is required beforehand. Whether you wish to imitate the fantastic peculiarities of the Japanese or Chinese porcelain, the antique Etruscan, or the lighter and more elegant Skyres and Dresden china, the process is the same, but the designs and the colour of the ground, and in many instances the shape of the glass, must be suitable, and chosen with a view to the characteristics of each. You know well the grotesque figures, and the birds and butterflies and flowers which adorn the Chinese porcelain; well, light green is a favourite ground colour for that style, and also a yellowish white. Then the Japanese often have a deep brown for their ground colour, and Skyres china is distinguished for its ethereal blue, and Dresden for its delicate yellow. The Etruscan, generally speaking, has red designs on a black ground, or vice versa. I have only jotted down a few of the colours of each style, for it would be impossible to detail all.

As a further variety, you can use photographs instead of coloured prints. Statuary groups are very effective. The ground should be either darker or lighter than the darkest or lightest shade in the photograph, and of the same neutral tint. The edges of photographs, however carefully they may be cut out, are almost sure to be ragged, so that a gold line round the picture is a vast improvement, and a gold rim round the vase is also a great relief to the somewhat grim colouring, but you would find that a brighter ground would not look nearly as well as the grey one does, unless you were to put a plain gold one.

If you want a particularly smart or gay vase, you can have two colours for the ground, that is to say, you can make one part a different colour to the other, or you can introduce a medallion coloured in differently to the rest of the ground.
When you bring in a variety of colours it is necessary to have a line of gold decorations to hide the boundary line. This introduction of more than one colour requires very great taste, besides a great deal more skill on the part of the artist.

I think that I have given you plenty to do for some time to come, so now I will leave you for a while, trusting that you may succeed in your new undertaking when left entirely to yourselves.

**SILKWORMS.**

BY J. A. SPARLING.

THE PROCESS OF REELING.

When a sufficient supply of cocoons being obtained, the next operation to be performed is that of reeling the silk. Our engraving shows a room full of reeling apparatus, as used on the Continent, each of the young women there represented at the different basins being engaged in making two skeins of silk, which are wound on the small circular reels shown on the horizontal shafts; these reels are so constructed as to turn sufficiently large to contain the cocoons required; this basin should be furnished at one corner with a small upright wire projecting about five or six inches from the water, for the purpose of receiving the ends of the cocoons. The temperature of the water should be kept up to about 100 degrees; and on a small scale this will be most conveniently done by having a supply of boiling water ready to add from time to time.

![Fig. 1.](image)

![Fig. 2.](image)

Of course if anything on a large scale is adopted, it would be necessary to keep the water heated either by steam or fire, but for experimental purposes the addition of boiling water from time to time will be found sufficient. We are now supposing only live cocoons to be reeled; if cocoons which have been baked for the purpose of destroying the chrysalis are used, the water should be kept gently simmering, or as hot as the hand can bear it.

The next thing required is a thin piece of steel or iron about five or six inches long, with two small smooth holes towards each end, one side of the holes being bevelled off as though they were to receive two small screws, so that the heads of the screws should be flush with the surface of the metal. This piece of metal should be suspended over the basin with the bevelled side of the holes downwards, at about a foot from the surface of the water, by any suitable support. It is not shown in the engraving, but could be fastened to the framework placed at the back of the basin so that the small holes were clear of the frame, but it would be more convenient if that framework was perhaps nearer the attendant than it there appears.
The next thing is to provide a small brush of rough twigs or thistle leaves, for the purpose of collecting the ends of the cocoons. A handful of the cocoons, first cleared from the loose furry silk which surrounds them, is thrown into the basin, and they are then stirred very briskly, and, the brush being raised, it will be found that many of the cocoons hang or adhere to it; these should be gently drawn from the brush until only a single end from each cocoon adheres to it; the ends should then be fastened to the top of the upright wire, and as soon as a sufficient number of ends have been found, five or six, or even more, should be joined together and twisted round a small wire or twig, which is small enough to pass through one of the small holes in the thin plate of iron or steel before mentioned; and as soon as this has been passed through the hole, the ends of the cocoons which have passed through with it should be twisted together, or a fine crochet hook may be used for the purpose of drawing the end through. As soon as this has been done, another five or six ends should be found, and drawn through the other hole, and twisted; the ends being thus twisted together, the next thing required is a small apparatus for the purpose of twisting the thread made by one set of cocoons round the thread made by the other set, previously to their being drawn on to the receiving reel, which will be better understood by the drawing and description of a reel invented many years ago by Mr. Pulcin, who introduced a proportion between the wheels, so that the silk thread is not wound on the same place on the reel till after the winding of nearly 690 yards, by which time, the silk having time to dry, all tendency of the thread to adhere together on the reel is avoided.

This reel is represented in Fig. 1. At a is shown the manner in which a winch, D, fixed on the arbre, Q A, which passes through a nick in the upright support, N, is made to move the guide-stick, P. What is called a double croisouer, that is, the two threads passing round each other, is made by means of the cross, B, called the swivel-cross, which is made of common lath. At H H are fixed two little ivory or brass wheels, with smooth acute-angled grooves in them to receive the threads which come from the two stop-wires, B B; one end of the swivel-cross, N, is somewhat broad, and rests upon the guide-stick P, directly in the middle between the two guide-wires, C C; here it moves and plays freely on a pin fixed in the guide-stick, the pin passing through the nick N. The other end of the swivel, N, contains the stop-wires B B, and is fixed to the end of the rod, O (which projects from the front bench of the reel), by means of a piece of pack-thread, which, passing through a hole in the swivel and in the piece O, and being fixed to a peg, P, which turns in the under part of the piece, is drawn to a proper degree of tension to allow the swivel to obey all motions of the guide-stick. The double croisouer is formed in the following manner: the two silk threads* are passed through the two stop-wires, B B, and through the two guide-wires, C C, and so are fastened on to the reel. Then either of the two threads is taken in that part of it which lies between the stop-wire and guide-wire, and turned two or three times round the other thread, and then each thread is placed in the groove of the pulley at H H, taking

* The plate with two holes we before described will be found an improvement on the stop-wires, but where there is any difficulty in procuring it the wires can be used.
care to place each in the groove of that pulley which lies at the side of its own stop-wire, the threads will then appear in the situation represented in Fig. 2, twisted round one another at the two points o and p, which Figure shows the condition of the swivel when ready to commence work. It is said that each workman can produce a pound of reeled silk in a day; and if this can be done, there is little reason why the cultivation should not be attended with profit. We shall in a future Number give some suggestions for a smaller and simpler reed for smaller quantities; but it is better that our readers should understand the larger, as they will then have less difficulty in following our suggestions.

PHOTOGRAPHY.

BY J. C. LEAK.

PRINTING.

BEING removed now from the printing frame, the proofs might, as we have before remarked, be fixed in a solution of hyposulphite of soda, and washed, when they would be quite permanent; but as they would then be of a most unpleasant brick-red colour, it is usual to employ the gold-toning solution, which we have before described, in order to change this red tone into one of a more agreeable character.

In order to prepare the proofs for the action of this toning bath it is necessary that all the free nitrate of silver—that is all that is not actually reduced by light, and is forming part of the picture—should be removed. It is necessary, therefore, to well wash the proofs before immersing them in the toning solution, and we therefore provide ourselves with a couple of good deep dishes (the ordinary brown-ware baking dishes answer perfectly), which we fill with clean water. The prints are now immersed one by one in the first dish, giving to each print a good rinse as it is put in, and carefully avoiding touching the surface, by handling it at the corners only. It is now at once seen that there is a large quantity of unreduced silver present, as the water quickly turns milky, from the formation of chloride of silver, by the combination of the chlorides present in the water with the nitrate of silver removed from the print.

After receiving a good wash in the first dish the prints are taken one by one and removed to the second, when it will be seen that although the water therein contained does indeed become discoloured, it does not do so to so great an extent as in the first. This is because a large part of the nitrate has been removed by the first washing. This forms a capital natural test of the complete removal of the free silver from the print. In order to ensure the perfect freedom from silver, which is necessary, it is better to employ two more washes, which may be done by emptying the first dish while the prints are in the second, and refilling it with clean water, as at first. The prints are then removed and rinsed as before, and while remaining in this the second dish should also be emptied and filled with clean water.

It is as well to observe here that the water thus employed contains a large quantity of silver, which should be recovered, or the printing process will be a very expensive one.

It has been calculated that at least seventy-five per cent. of the silver employed in the sensitising process remains unreduced, and may subsequently be recovered; and it is probable that this is really below the fact, if a careful and intelligent system be followed. At any rate it is worth while to save even half one’s silver, so we carefully preserve our washings in a deep pan, into which we pour a little solution of common salt. This will, in the course of twenty-four hours, produce a precipitation of the whole of the silver, in the form of a chloride, from which we may pour off the water and collect the valuable precipitate for further treatment by-and-by.

Our proofs are now ready for the toning process, and we pour into a flat dish the gold and acetate of soda solution, and taking a few of the proofs, say about six, we immerse them one at a time in the fluid, taking the greatest care to ensure a perfect and even action by constantly turning them over and over. The action of this bath is soon manifest; when the prints left the water they were of a red colour; but this is speedily changed, and gives place to a purple, and, if the action is continued for a sufficient period, to a cold slaty blue. Of course this is not to be desired, but as tastes vary as to the best colour, each photographer must tone his proofs to that which he prefers.

Generally, it is found that a warm purple—or chestnut—colour is preferred, and, as the coldness is subsequently somewhat reduced in the fixing bath, the object is to tone a little further than it is wished the print to finish. It should be borne in mind, however, that prints on albumenised paper dry very much darker and colder than they appear while wet, but as this varies with every sample of paper, the proper allowance can only be made when some experience has been acquired. As soon as the print has been sufficiently coloured it must be removed from the toning solution and well rinsed in a dish of clean water, or the toning will still continue and spoil the print.

This course of proceeding must be repeated until all the proofs have been toned, the only precaution necessary being that of working only a few prints at once, and keeping them constantly in motion in order to prevent unequal action, which would of course result in the proofs being over-toned in some parts and red in others. When the whole of the proofs are thus toned the bath may be replaced in the bottle, and everything which is not required, in the shape of solutions, paper, etc., having been put away, that best friend—and, at the same time, worst enemy—of the photographer, the hyposulphite of soda solution, may be brought out and poured into a clean dish (which should be kept for this purpose alone) for fixing the prints.

Into this solution the prints should be immersed one at a time, taking care that there is plenty of solution, and that each print is thoroughly immersed. The whole of the prints may be then immersed, and they must be kept moving to ensure perfect fixation. This process will be complete in about ten or fifteen minutes; and as soon as this time has elapsed the prints must
be removed and thoroughly washed. When a print is first placed in the fixing solution it turns more or less red, but we are not alarmed at this, as we find that when the process is completed, and the whole of the sensitive salts have been removed, the print is as nearly as possible of the desired colour.

It need, perhaps, scarcely be observed that the whole of the processes described up to this point must be conducted in a subdued or a non-actinic light, as, although the paper is not nearly so sensitive to light as a collodion plate, it is yet liable to change colour under its action; and much of the beauty of a photograph is lost if the brilliant pearly whites, which are characteristic of a good albumen print, are replaced by a dull, tawny grey. The only thing now remaining is to remove the fixing solution, and this is not only an important but a difficult process. The reason why properly toned photographs fade is simply this, that the fixing solution has not been removed.

There is no reason why photographs should not be permanent if properly treated; the writer has some in his possession, taken many years since, which are as perfect as ever, and nothing would surprise him more than to see them fade. The only thing is perfect washing. The prints should be placed in running water, and kept in motion for some hours. They should then be sponged, and again washed, and this process should be repeated over and over again for at least twelve hours. With these precautions there need be no fading, but in cold weather it is well to use a little warm—not hot—water for the final washing. The prints should now be pinned up to dry, when they may be mounted with a little freshly-made white starch, as the taste of the photographer may suggest. One last hint upon this part of our subject. It is always found that the best results are obtained when the paper is sensitized, printed, toned, and fixed on the same day.

CANOES AND CANOEING.

By Lamton Young.

TO BUILD A CANOE.

ASH is capital for the cores, also for a rubbing-piece or wales round the upper planks, so as to save the canoe from the wear and tear always consequent on coming alongside boats, banks of rivers, piers, or any other such places.

American elm seems but little known on the rivers and other inland waters, but is well known on the coasts, and is very much used in the fittings of ships' boats, the gratings and gunwales of yachts and vessels that are wished to look smart, and is suitable for: the keels of canoes, from its very straight, long grain, and freedom from warping and splitting. It makes capital bilge keels and wales, and, if steamoned, answers well for timbers of boats when once forced into position and nailed; and it works well, with a good finish.

Box-wood. The blocks used in canoes should invariably be made of box-wood, with sheaves of brass or copper, and any part of the canoe where ropes rub should have the exposed surface protected with this wood. If the sheaves of the blocks were made of wood instead of metal, they would swell and jamb when wet.

Bamboo and canes are sometimes used for masts, yards, and various spars, being at one and the same time wondrous light and strong, and everlasting.

Having chosen the wood of which you intend to build your canoe, the next thing is to decide on the size. The standard which regulates her size is the length of the man's foot, the height from keel to deck being determined by the length of shoe; the length of leg will be the guide to the size of the well, and finally the total weight of crew and luggage, being the chief guide to the amount of displacement to be provided for.

A very good guide to the building of a "Rob Roy" is given by Mr. Macgregor in his "Rob Roy on the Battie." 13 to 14 feet being a very convenient size; the beam varying from 26 to 30 inches; depth from top of deck to upper surface of keel, from 11 inches to 1 foot; keel, outside, 1 inch deep; camber, 1 inch; depth at gunwale, 8 to 9 inches. The greatest beam should be about six inches abaft the true middle of the boat, as there is the place the paddler usually sits; the effect being that the boat is properly trimmed, a little lower at the stern than the bow, as a boat on even keel never looks so smart as when the bow is higher than the after part; and when the paddler gives a stroke with his paddle, the power exerted in propelling tends to depress the boat's head, and thus bring her on an even keel. We now proceed to give drawings to scale that will be a sufficient guide for the building of a perfect canoe; also how to prepare the stocks to fix the keel on, the moulds to give the proper form to the boat, and the mode of determining the exact breadth and form of each plank, timber, and every part required in the construction of the canoe.

The first thing to be done on deciding to build a canoe, is to set up the stocks on which to construct her; and this is done by placing on edge a plank fourteen to sixteen feet long, one foot deep, and two inches thick; if the floor of your workshop is of planks, the best way to secure the long plank to form your stocks is to screw, or nail, at either end very firmly, struts, or knees, both to the floor and the plank, so as to raise the latter from the floor sufficiently high to make the upper edge about eighteen inches above it, as shown in Fig. 1. Next take a long piece of red pine, oak, mahogany, or American elm, two and a half inches deep, two and a half inches wide, and twelve feet long, being careful to see that it has neither knots or shakes, and cut it away on each side till a section in the middle will be as in Fig. 2; this is to form a firm hold for the nails when the garboard strakes are nailed to them, as in Fig. 3, but a slight groove or rabbot must be cut close into the keel, Fig. 4, to let the edge of the plank enter and hold firmly in, and this rabbot must be continued right along the keel, and up the stem and sternpost. The way of fastening the keel to the stem and sternpost is by making a long scarf, as shown in Fig. 5, and nailing them together with strong copper nails, the joint and some inches above and below being covered and strengthened by a piece of oak, ash, or chestnut, in the form of a knee, which is fitted along the inside curve of the stem and keel, so as to knit all firmly together when nailed; the same is done with the sternpost, Fig. 5a. The stem, etc., are usually made of mahogany or oak. These being completed, the keel must be nailed in three places, with strong nails, to the upper edge of the stocks, taking care that the stem is quite perpendicular, and that and the sternpost are kept in their places by pieces of wood nailed to their ends and some place above or at the side, and a long straight piece of plank, a couple of inches wide and an inch thick, is nailed to the top of the
stem and sternpost, holding them exactly in position, and enabling any strut to rest on them, to push a plank out a little, or to get it into its place. Having, in drawing the midship section of your canoe to scale, determined how many planks there were to be on each side, you fix in place an exact mould or template of what the midship section will be when finished, and prick down its sides the width of each plank, and the same on the stem and sternpost; then, when you proceed to prepare the plank for cutting out, the way is to mark in the middle, and also at either end, the breadth, and proceed to saw it out. If your plank is not long enough, it must be scarfed, the nails being carefully roughed on the inside, only the heads of the copper nails being outside; and if this is properly done, the plank will be as strong as if cut from a single piece. The keel having had the T form graduated fore and aft from midships, so that as the form fines or narrows, as the floor springs, the garboard strake, from being nearly flat amidships, gradually rises on its outer edges till the two ends come flat against the stem and sternpost, and their edges being perpendicular—in fact the planks are twisted—these ends are chamfered off so as to fit close and watertight into the small rabbet or groove cut in the stem to receive them, and there firmly nailed with copper nails, about half an inch apart; these planks, in most canoes, are made of what is called six-cut stuff worked, i.e., a spruce deal cut into six planks and then planed down on both sides, the outside being carefully finished with a smoothing-plane.

The garboard strakes having been fixed in their places, the edges on the outside of the plank should be chamfered off with a plane, so as to form the angle at which the next plank will be when nailed along the edge, as in Fig. 6, and soon to the upper strake. Immediately the garboard strake is nailed to the keel, etc., the intended places of the timbers should be marked with chalk on the inside of the plank, and continued up to the gunwale, as each plank is nailed; the way of doing this correctly is to take a chalk-line, and fixing it to a nail in the centre of the top of the stem, then holding a piece of chalk in the fingers and taking the line firmly in the hand, a mark is made on the plank on one side and then on the other, exactly opposite, and by shifting the hand along the line to the next place intended for a timber, they are placed exactly opposite one another. The nails in the edges of the plank should be two inches apart, and after the holes for the small copper nails have been made, the nails are driven through from the outside with a moderately heavy hammer, the inside being kept steady by holding a roughing-iron against it; this iron is a heavy steel-faced tool about six inches long, with a flat end like the head of a hammer, to hold against a plank or timber when driving a nail from the other side, and at the other end there is a small hole sufficiently large to admit the end of a nail, as in Fig. 7, a smaller is also often used. After all the nails have been driven along the plank, it is usual to put on the roughs, and rivet them—the roughs are small square or round pieces of copper, the size of a split-pea, with a small hole punched through them, causing the copper to rise up like the holes in a nutmeg-grater, as in Fig. 8.

The nail having been driven firmly in from the outside, a rough is placed on its point, and the roughing-iron having its small end with the hole in it placed on the rough, is pressed strongly against it, and a smart blow being given with the hammer on the head of the nail, the rough is forced on to the nail and driven close down to the plank; next the projecting end of the nail is seized with a pair of strong pincers just above the rough, and with a rapid twist or two the nail is broken off, leaving a rough jagged end; the roughing iron is now held with its broad flat end on the head of the nail outside, and the hammer is struck smartly on the rough end, riveting the copper nail over the rough, and making the strongest holdfast imaginable (as in Fig. 9), a nail properly roughed never being known to start or yield up the hold it has on the planks.

All the planks having been put in place, fitted, and duly nailed, the next thing is to fit and nail in the timbers. The fitting is a very important part of constructing a canoe, as, unless the timbers fit against the planks most exactly, the effect will be to draw the planks out of shape, and give the outside of the canoe an uneven or corrugated appearance, and cause her to make an uneven progress through the water, giving undue labour or work to the hand and arm on whichever side this fault may lie. The fitting of the timbers is managed by cutting a piece of half-inch oak, ash, or chestnut, to the curve of the canoe's side where it is intended to be put, and then, whilst held firmly against the planks, a pair of compasses or dividers fixed in a certain position with a screw is drawn along one point resting against the plank, and the other marking a line on the timber at an equal distance from the plank, thus showing the exact angles at which the timber must be cut to make it fit to each plank. (Fig. 10.)

The first placed are the cross tiers, or timbers which cross the keel and tie the first two or three planks on each side (Fig. 11). These cross pieces have a piece cut out of them on each side of the keel, so as to let the water flow readily from end to end, in case of any getting on board (Fig. 12). The other timbers usually run from the centre of the garboard strake up to the deck, and are cut at a slope to take and support the deck and deck beams, or, as they are wrongly called, carlines (Fig. 12). The carlines, or deck beams, are cut with the proper curve that the deck is intended to have at the particular part where they come, and great care is required to graduate them properly, so that the deck may have a gradual curve from one to the other (Fig. 14). They are nailed to the gunwale with a copper nail driven right into the length, and then again to the upper timbers, so as to be quite secure (Fig. 15). The inner edge of the upper plank is made stronger by having a strip of wood an inch and a half wide and of the same thickness as the planking nailed just inside it from stem to stern; this stringer, or plate, takes the nails or screws which fix down the deck, and the nails which fasten the timbers pass through it and the planks, and the bows and stern are strengthened by a piece of oak called a fork (Fig. 16), nailed inside the ends so as to keep the gunwale at either end in its place, and prevent any shock from starting the planks or deck; it should always be remembered that those portions of the inside of the canoe which are covered by the deck, fore and aft, must be painted with at least two coats of good paint, as otherwise the damp may cause the boat to rot; also the under side of the deck should be painted to prevent steam and damp from settling there and making the deck decay.

Having finished the shell of the canoe, and put in all the timbers, the step of the mast should be fixed; this is usually a piece of strong wood—oak, elm, ash, or mahogany—cut to fit on the keel and some way up the planks on each side, and is firmly nailed to the keel (Fig. 17), and a trunk made of wood is put from deck to deck, to keep the mast in place and prevent its breaking up the deck should it slip out of the step and fall overboard, as it is sure to do without this trunk. It should in all cases be square, and its edge on deck be surrounded and capped with a brass ferule fixed with four screws to deck and under beams.

The next thing is to put in the carlines for the deck; there are usually four forward and four aft of the well, and they are strengthened with a strip or beam, which runs fore and aft along the centre of them, and is let into the carlines by a notch.
being cut in each, so as to let it down fair with their surface, at the spot where the mast will go; this beam is made much wider, so as to admit of the mast-hole being cut, and yet leaving enough wood to give sufficient strength to bear the strain it will be put to when the mast has sail on it, the carlines fore and aft, which are made of deal generally, having been equalised so that the deck may bear on each part, yet take the wished-for

down to a quarter or three-eighths of an inch thick, and from one and a half to two or more inches deep, and is steamed in hot water or a steam-box, so as to easily turn at the corners; it is then nailed or screwed to the carline at either end of the well and to the fore and aft beams fixed to the tops of the timbers on each side, at the breadth the well is to be; this makes a very strong piece of work, sufficiently so to bear the

curve, the deck of cedar, from a quarter to half an inch thick, planed on both sides, is put on; in some cases it is screwed, in others nailed down, and at times is made in four pieces instead of one, a seam running down the centre of the fore and aft beam, where it is nailed or screwed on each side (Fig. 18); and I think this is a great advantage, as by the centre division there is room given the deck to play, when it expands or contracts with the heat of summer and cold of winter, thus preventing the deck from cracking, as it too frequently does. The deck must be fitted very carefully round the coaming to prevent the entrance of water. The coaming is made of either a common loop of ash, got from the cooper's, or a piece of ash or oak planed

weight of the canoe when lifted by that part alone. The sides, from the gunwale to the coaming, are usually covered with cedar thicker than the rest of the deck, to take the strain of the various cleats, and other fittings attached to them, and at the point of junction with the thinner deck are cut or bored down to meet it, thus avoiding an eyesore.

The deck is screwed or nailed along the edge with screws or nails two to two and a half inches apart, and is fixed in the same way to the carlines, making it a part of the canoe without any play; a piece of American elm or cedar is put along the edge of the deck outside to take any rub from contact with boats, or in coming alongside landing-places; it is half-round.
THE bird of which we have just treated is rather an aberrant form of the titmouse family, so far as its nesting goes; but we will now take the true tits, which invariably select holes of some kind for their nests, the nearest approach to an exception being in the case of the well-known Great Tit (Parus major), the nest of which is in a disused squirrel’s “cave,” or “churl,” as it is called.

As a rule this titmouse places its nest—a warm structure of moss, wool, and rabbit’s fur—in holes of trees, and lays six or seven eggs, white, richly spotted and streaked with red, indeed, some of the more boldly marked ones are so similar to those of the nuthatch, that if mixed together the eggs of the two species could not well be separated with any degree of certainty. The nests of the two birds are, however, entirely different, as we shall soon have occasion to mention.

The above bird is so easily recognised by its size, glossy blue-black head, and yellowish flanks, with a broad black streak running down the centre of the breast, that it is hardly possible to confuse it with any other member of the family, and the same may be said of the little Blue Tit (P. caeruleus), with its white forehead, bright blue cap, and blue tinted wings and tail, all of which may be easily observed from the living specimen, few birds being so familiar as this pert restless little fellow, as he hangs head downwards from some bough which he is carefully investigating for food, within a foot or two of your head. It is much more variable in the choice of a site for its nest than the last species, and is of all others the one which will soonest take up its abode in the artificial nesting places which we recommended, added to which it is perhaps the least easily disturbed.

We have frequently seen a female blue tit remain quietly seated upon her eggs after the false brick was removed, allowing the gardener and even strangers to stroke her gently with the finger, and accepting insects from the hand with great satisfaction, and another, which had made her nest on a stump under an inverted flower-pot, would remain on her nest when the owner removed the pot, just as he might have done with a bell-glass from a cucumber bed; in fact, to carry out the simile, she remained “as cool as a cucumber.”

The nest is made of similar materials to the last, and the eggs, like those of all the true tits, are white, spotted and streaked with red or rust colour.

Both the foregoing species are mainly insectivorous in their diet, and the good which they do to the gardener and farmer by destroying caterpillars, etc., is incalculable, but at the same time we must admit that they are not guiltless of exacting toll for their services, and they sometimes do a fair amount of mischief, although, in all probability, not one hundredth part of what they do in the way of good. For this reason we plead for them, and protest against the warfare which is too often waged against both the birds and their eggs.

By destroying their broods the ignorant agriculturist destroys the young birds, which would otherwise require thousands, nay millions, of the caterpillars which eat up his crops; and he may depend upon it that the balance of Nature cannot be disturbed with impunity.

The remaining two examples of our resident tits are the Coal Tit (P. ater), and the Marsh Tit (P. palustris), neither of which is so numerous as the preceding ones, at least, not in England, for in some parts of Scotland the coal tit is said to be extremely abundant. As a rule, where the coal tit is plentiful, the marsh tit is either absent or rare, although, by the way, the word “marsh” is somewhat apt to mislead those who consider it as nearly the same as “swamp.”

The marsh tit is by no means restricted to wet lands, but merely inhabits, as a general rule, somewhat lower ground than its congener, being partial to coppices, shaws, and willow clumps, in the stumps of which it frequently makes its nest; also occasionally in holes of banks, though it is decidedly less partial to these than the coal tit.

Both species take a good deal of care to prevent the detection of their nests, carrying away in their bills to some distance any chips of wood produced in the course of enlarging the hole which they may have selected.

The marsh tit, again, seems rather more partial to rabbit’s fur in the construction of its nest, which is generally of looser texture than that of the coal tit, the materials of whose nest are frequently felted together.

The eggs of the marsh tit are also more easily recognisable than those of the other tits (which is not saying much), the spots upon them being frequently of a somewhat purplish red, resembling those of the chaff-chaff. Both lay about eight eggs, but the coal tit is, as we have said, extremely partial to holes in banks, old walls, and has not unfrequently been found nestling in a hole on the level ground, which any one would have rather attributed to a mouse than a bird.

To distinguish the two species the reader need only remember that the coal tit has a white patch on the nape of the neck, whereas the marsh tit has none; the latter is also somewhat the larger and more sombre clad bird of the two.

Our next popular favourite, the Robin or Redbreast, is a tolerably early breeder, and owing to the freedom with which at all times it approaches the neighbourhood of our dwellings, a great number of instances of its nesting in peculiar situations have already been recorded; such as an old hedger’s glove, a battered tea-kettle, a broken ewer thrown into the dust-heap, and so on. But the usual positions chosen for its nest are the sides of some sheltered bank or of some ivy-covered paling or fence, generally not far from the ground, unless cats are numerous. The nest itself is a somewhat loose structure of moss and leaves, lined with hair and feathers, and the eggs, generally five or six in number, are of a whitish ground streaked and blotched with reddish brown, nearly white specimens being by no means rare. The first nest is generally made in April, but as two and even three broods are reared in the course of the year, the birdsester may find eggs till July. It is extremely jealous of any interference, and, as a rule, will desert its nest upon very slight provocation.

We have already alluded to the two earliest breeders of the crow tribe, viz., the Raven and the Rook, and we will now dispose of the remaining members of the family which breed in our islands.

We will begin with the Carrion Crow (Corvus corone), a species which has been much thinned of late years by game-preservers, but which yet manages to exist in greater or less numbers in every county in England. Owing to the absence of game-preservers it is, perhaps, more abundant within a radius of ten miles from London than in any other frequented and thickly-populated districts, and if we were debarred from looking for its nest in Middlesex, Herts, and Essex, we should have
to make an excursion into the wild district where Surrey and Hampshire join before hearing its well-known croak. Here its nest, very similar to that of a rock, but lined with wood and fur, is generally placed on some outlying branch, frequently in a fir-tree, and on several occasions we have had to renounce our projected peep into the interior, owing to the impossibility of the bough supporting our weight. In the north and west the crow frequently nests in the rocks; and in the Lake districts we have found the nest in a low bush scarcely removed from the ground.

The eggs, four or five in number, are similar to those of the rock, though, as a rule, a trifle larger.

The only other true crow which breeds in the British Islands is the Hooded, Saddlebacked, or Boyston Crow (C. coronis), which, indeed, is almost confined at the breeding season to Scotland and Ireland, where it is both abundant and terribly destructive to the eggs of game. There it accommodates itself to the locality, and makes its nests indifferently on trees, rocks, or on the bare ground just sheltered by a bush or tussock of heather.

The eggs are similar to those of the other crows, greenish, streaked with brown, or spotted with brown and black on a blue ground, and are generally four or five in number.

It has been known to breed occasionally in the south of England, notably in Essex and Sussex, but these occurrences are few and far between, though in winter the bird is abundant on all parts of our shores and larger streams; indeed, it would be hard if one could not be seen even so near home as Blackwall, when the tide is going down, looking out for something left by the ebb. Its more northern predilections in our country are rather singular, as its nests aboundfully in Egypt and parts of Palestine.

The Magpie (Pica caudata) is another audacious egg-robber, and in consequence every gamekeeper's hand is against him, a sad decrease in one of the ornaments of our landscapes being the result. Before the foliage is thick the great domed mass of briers composing its nest is generally conspicuous enough, but climbing to the nest is often, from the nature of the tree selected, no easy task, and getting the hand in and out of the hole in the side of the "eagle," as it is properly called, is by no means a painless one. The bottom of the nest is thickly plastered with clay, and on this, surmounted by a lining of roots, some five to seven eggs are deposited, the usual ground colour being ashy or pale green, more or less thickly streaked with brown.

In many places the nests are situated in bushes, but the domed form is invariable.

Yet another beautiful bird which is under the ban of the keeper is the Jay (Garrulus glandarius), whose harsh note must be familiar to every one who has passed through any large wood or plantation. Even where the magpie has almost disappeared the jay still holds his own, in spite of guns, traps, and poisoned eggs; and, notwithstanding his exquisite and apparently conspicuous plumage, he is far more often heard than seen.

The nest is cunningly concealed, generally deep down in the fork of a tree, so as to be invisible from below, unless a practiced eye should happen to detect an atom of the materials projecting. And if you think that any noise or apparent anxiety on the part of the parent will assist you to find her nest you are very much mistaken, though she will be very likely to lead you to that of some other bird, say a mistlethrush or a blackbird, but to her own—never. The nest, which is open and not deep, is lined with fine roots and horse-hair, and the eggs, five or six in number, are of a ashen green, some times spotted or streaked in the form of a zone near the blunt end.

The last of this group to which we shall refer, until we get away to the sea-coast, is the Jackdaw (C. monedula). Old ruins, holes of trees, church towers and steeples, and town chimneys are indiscriminately frequented by this bird, and in them it constructs a nest of sticks deeply lined with wool and other warm materials.

The eggs are unmistakable, being of a pale blue spotted with black and brown, pale and nearly spotless varieties being not uncommon.

In some places it piles up large masses of sticks for the foundations of its nest, and it has been stated in print, probably on the authority of some garrulous old verger, that these accumulations largely contributed to the rapid destruction of the west of York Minster.

The pert-looking lively little Wren (Troglodytes parvulus), is an early breeder, and in April its nest may easily be found against the side of an ivy-covered tree or wall, or under the thatched eaves of an outhouse or arbour. It is nearly round, and covered at the top, having a small hole in the side, and is warmly lined; the eggs, to the number of six or eight, being white, spotted more or less with red or purplish red. This species is well known for its habit of building several nests, popularly called "coks' nests," before laying in any one, but although these are frequently abandoned altogether, we have known one, which had been built previous to the first sitting, deserted to after the first brood had flown, and this, apparently, by the original architects.

Those who keep their eyes open on their walks through parks and avenues of trees will have noticed a small bird ascending the trunk, generally in a spiral direction, and looking, in the hasty glimpses obtained of it, more like a mouse than a bird. Having attained some height on the tree, it may suddenly be seen to flit downwards to the bole of another, which it will ascend in the same manner. This is the Tree-creeper (Certhia familiaris), and from the month of April its nest may be looked for in holes of trees where the bark affords a crevice between it and the main trunk, or in the rift of any decayed tree or branch. It is composed of dry grass, moss, wool, and feathers, and in it are deposited six or eight eggs, white spotted, and frequently zoned with deep reddish brown. They are not unlike those of some of the tits, but, as a rule, they are more pointed at the small end.

The smallest of our British birds, the Goldcrest (Regulus cristatus), is, in fact, one of our very earliest breeders, but we have deferred our notice of it until now because the experience of most collectors would point to the discovery of its nest at the end of April and throughout May. In point of fact it breeds several times in the course of the season, and its first nest is seldom observed by any one who is not specially on the look-out for it.

A favourite situation is the under side of a branch of cedar, fir, larch, fir-tree, or yew, the smaller branches being woven into the nest itself, which is sheltered by the foliage. It is not domed over, but is very deep and warmly lined within, presenting altogether one of the most exquisite specimens of bird-architecture that can be found.

The eggs, numbering from six to eight, and occasionally ten, are of a buffish white, generally with a zone of darker colour at the larger end.

From its diminutive size this species appears rarer than it really is at the breeding time, but in severe weather large flocks are sometimes observed on our coasts; and we are also occasionally visited by a near relative, the Fire-crest (R. sibirica).
capillus), a species which not only has a more brilliant crest, but also displays a black streak through the region of the eye, which our own bird has not. The fire-crest has never been known to breed in England, and its range appears to be more southern, and eastern, but we have thought it advisable to point out the distinguishing characteristics.

PAPER-FLOWER MAKING.
BY ELIZA CHURCH.

THE CORN-FLOWER.

"Corn-flower" is rather an indefinite name by which to designate the flower that I am about to describe, for there are several other species which, as summer advances, spring up at the feet of the golden waves of corn. There is the scabious and the corn-cookle, besides the corn bluebottle, which latter is what we have to do with to-day—Centaurea cyanus is its real name, but it has so many aliases that I doubt if any one contrasts so well with the flowers of other colors which form our bouquets. You will soon see that it is not one of the flowers difficult of imitation. There is almost less to be done in the making of this than of any other blossom. One pattern only is given, for the eight florets which are required are all cut out according to the figure in the diagram, Fig. 1.

Mark a line down each point with the pin-tool, or a fine knitting-needle. Provide yourself with eight short pieces of fine wire. Lay one on each floret, so that the end does not extend beyond this higher mark shown in the diagram. Turn over each edge of the floret as far as these marks, and gum one side over the other, which will make the petal half trumpet-shaped. Wind rose-coloured silk round the base to keep the paper to the wire. You may, perhaps, remember how you formed the hyacinths, and that proceeding was very similar to this one. When you have made the eight little florets ready, take the bunch of stamens (Fig. 2) and fix the former all round, with their backs to the centre. Wind more rose silk round the whole, and then affix the natural calyx of the flower if you can obtain one; if not, a few husks of corn arranged round the base of the flower will make a good substitute. Now am I not right in saying that there is very little to be done?
NOW, for our part, we entirely disbelieve all the wonderful tales told of the Indian jugglers, the more so as in the few instances which we have at some pains really investigated, we have found them to be merely ordinary conjuring tricks, certainly skilfully done, but by no means on a par with those of the best European conjurors, simply because the mechanical contrivances, etc., were not in workmanship equal which it is possible to see, or otherwise the trick would be nothing.

The basket is next placed firmly on this stand, quite away from any scenery or from any object near, so that there is no possibility of escape on either side, above, behind, or below. It in this respect resembles the famous cabinet of Mesrur. Maskelyne and Cook.

THE CRITICAL POINT.

The performer advances on to the front of the stage, leading by the hand a little girl, whose countenance can be clearly seen by the whole audience. He then opens the great basket, and explains to the spectators his intention of putting the child inside, and afterwards of running his sword through it. In the meanwhile, however, the child becomes apparently alarmed, and runs away; she is, however, speedily captured and brought back.

If the child is really a good actress—and on the only occasion on which we saw the clever trick performed such was undoubtedly the case—this is the best part of the trick; the audience get interested, particularly the lady portion, some of whom feel almost inclined to interfere, especially, for such is human nature, if the child be a pretty one. At last the conjurer takes a white handkerchief, and bandages her eyes, and, after one more run for life, and one more capture, succeeds in

to our own; and perhaps nothing so tests the mechanical arts as a really first-rate made trick.

These wonderful stories are, in fact, travellers' tales. Some years back the Arab sorcerers were thought to be so good that they surpassed anything ever heard of in this country. So great was their power over the ignorant and illiterate tribes they almost ruled, that the French Government employed that prince of Legerdemain, M. Houdin, to go over and counteract their influence. He describes their performances as clumsy in the extreme.

It is our firm belief that no Indian juggler ever approached either M. Houdin or Herr Willyalba Frikell either in dexterity or skill.

The Indian basket trick consists of a large oblong basket, apparently about five feet long, three feet wide, and three feet deep, with a lid. It is placed on a four-legged stand, underneath

VOL. II.
putting her, in the face of the whole audience, safe into the basket.

He now draws his sword, and thrusts it several times right through the basket. Loud shrieks are heard, when suddenly a buzz of astonishment runs through the audience. Lo! the young lady herself is bowing to them from one of the boxes. The conjuror throws open the basket, and it is empty. There is no doubt about the girl being the same, no two human faces, though all have two eyes, a nose, and a mouth, are absolutely alike. The curtain generally falls amidst shouts of applause.

And now for the explanation. It may seem strange, yet not more strange than true, if the child were not frightened the trick could not be done.

The little girl, when she runs off the stage, and is brought back, is evidently the same girl, as her features prove; she is of course dressed very gaily, with a short low white muslin dress, nicely trimmed, neat white stockings, and her hair decorated with flowers. Now, though it is quite impossible to obtain the children exactly alike, it is by no means impossible to obtain two dresses alike or two flowers alike. While the little girl is on the stage, there stands close behind the scenes her facsimile, only with a white handkerchief tied over her eyes. When the child is therefore blindfolded before the audience they become alike in every respect. The real girl now, as we said, with the bandage over her eyes, makes one more run for life, apparently, but is speedily captured, she disappears but for one instant, but that instant is sufficient. The bandaged facsimile is dragged back and placed quickly in the basket, while the real girl is on her way—having first removed the bandage—to the private box.

Next, what becomes of the girl whom we have been rude enough to call the facsimile. The basket has what is known by conjurors a false bottom. Two basket-work flaps, similar to the bottom of the basket itself, lift up, and the child is concealed beneath, these flaps being prevented from coming right up by two stops, one on either side of the basket.

Next, how about the sword. Now about this we cannot speak with any degree of certainty, there being two ways in which it might be done, either of which is probable. There may be other methods possible, of which we have not thought till. There might, under cover of the flaps, be two or three strong flexible leather sheaths, which might be placed straight by the child, after getting inside, or the sword might be made like the daggers used in theatres, to go back into the handle and up the sleeve of the performer, and to dart out again on the pressure against the point being removed by means of a strong spring-box working on the rough or toothed wheels in the handle, or it might be done by combination of these two methods—viz., part of the sword going into a sheath and part up the handle.

Of course this trick properly requires a stage. What may be called the critical moment, is changing the girls; this must be done naturally and quickly; the second one must be pulled back by her dress, but not too hurriedly, and of course it is very important that both should be alike in figure, as well as dress. This trick, like all the great ones, is very simple when once known, but has in its day puzzled many thousands of persons.

SPRAY WORK.

By Eliza Chablis.

ORDINARY SPRAY WORK—COLOURED FLOWERS—NATURE PRINTING.

To be successful in spray work there are two matters which require particular attention. One of them we have already mentioned, that respecting the thickness of the ink; the other is, that you take care not to get too much in your brush at a time, or you will make blurs and splotches which will mar the beauty.

When the mat is quite dry take off the remaining ferns, and you will then see the full effect; the impression of all the ferns will be faithfully printed on the material. There remains but one thing, and that is to mark the veins of the leaves with a fine camel-hair pencil.

Sofa cushions can be made ornamental in this manner, and extremely well they look if trimmed with crimson cord and tassels. Watch-pockets also are worthy of a trial, and the cover for a toilet-table looks uncommonly pretty if it has a border of ferns printed round it.

This work can be washed, if careful and considerate hands perform the operation; that is to say, if they refrain from rubbing the material, if they eschew soda and are chary of soap, if they do not immerse in boiling water, but choose that which is lukewarm, and finally if they fix upon a windy day, as then the mats, when put out of doors, will dry very quickly. If they cannot go into the air hold them to the fire, for the ink will run if they dry slowly. I don’t promise you that the mats will look quite new when washed, but they will not be the worse for the wetting if care is taken of them.

If you want a little more practice before printing on wood, you might try on cardboard. The process is just the same as for paper, but you will want a board underneath on which to nail your pins.

You can make covers for blotting-cases, glove and handkerchief cases, of cardboard, and ornament them in this way, and very pretty they look. True, they are not so durable as when made in wood, for they are apt to bend and tear if they are much in use; but then they can easily be replaced. A sheet of cardboard and a yard or two of ribbon, which is all you require to form these cases, come within the compass of most people’s purses, whereas, the boxes and other articles in wood, which you are obliged to buy ready-made, are within the reach of few; at any rate, very many of us cannot often indulge our desires to buy them.

The wood on which you print ferns is white and unpolished, and the splashing looks better when in brown than black. The effect is then as if the ferns had been gathered in autumn, with autumnal tints of golden brown upon them. This effect is obtained by mixing sandvycut brown and burnt sienna with the sepia. When the printing is finished, the whole must be varnished. You can buy a small bottle of the varnish which is used for this purpose at the shop where you bought the wooden articles, but in using it do not be too prodigal, put on a very thin coating of varnish, and let it be evenly spread over the whole surface, and pass your brush over it one way.

I will mention a few of the articles which look particularly well when made of wood and ornamented in the way we have been describing, and if I add the prices for which they are to be obtained, my readers will have a better idea on what to
BEZIQUE.

By Geo. Tindall.

THE GAME—VARIATIONS—SCORES—FORFEITS.

BEZIQUE is a game which, though it has been known and played for some time on the Continent and in America, has only been introduced into this country during the last few years; but probably no card game of recent introduction has advanced so rapidly in popular favour, or achieved so great a success. This is, perhaps, owing in a great measure to the totally different method of play and scoring adopted in bezique, which gave the charm of freshness and novelty to the game on its introduction; and partly, no doubt, to the fact that it offers less inducement to playing for money than the older games at cards, and thus to some extent overcomes the scruples of many well-meaning persons, who object to card games altogether, on the ground that they encourage gambling.

Be this as it may, bezique is undoubtedly a very agreeable
and pleasant game; and if it does not possess the exciting interest, nor require the mental skill or calculating forethought of whist or webbage, it has the advantage of being equally suited for any number of players, and of adapting itself to a greater variety of capacity than either of those old and unequalled games.

The playing-cards for bezique are similar to those used for ecarté, euchre, etc., and consist of an ordinary pack of playing-cards, with the two, three, four, five, and six of each suit rejected, so that thirty-two cards form the pack, and two, three, or four packs are used, according to the number of players engaged. The value of the cards varies from the accepted usage, ace counting highest, next the ten, then king, queen, knave, nine, eight, and seven follow in order.

As this game has been introduced from abroad, where it has long been known, there is no copyright for authorship, as in zetema, check, and other games recently published; consequently, all the principal makers of playing-cards have issued the game, and with it sets of rules, which vary very much in some of the most important portions of the play. This tends to great confusion, and is very much to be regretted; and as in most cases of variation there is little doubt which is the best method of playing, we trust that the weaker points will soon be eliminated by common consent from the rules, and a uniform method of play be decided upon.

We will now describe the method of playing two-handed bezique, and afterwards the variations of the game adopted for three, four, or more players. In doing this we will follow those rules which we think most conducive to good play, and point out where the various sets of rules differ, as these points arise.

When two persons are playing, two packs of bezique cards are used; they must be well shuffled together, and used as one. Each set of bezique is usually accompanied with a sufficient number of scoring boards, those in the form of dials, each marking tens and hundreds, being best. But the score may also be kept by means of counters, which must be of different sizes or shapes, representing different values. The game is usually played 1,000 up, but any larger number may be decided upon previous to playing.

The deal is decided by cutting; but, contrary to the usual well-understood rule in card games, the holder of the highest card in the same order of value as that just given wins the deal. The cards being then cut by his opponent, he deals eight cards to each in the following order:—First, three cards each, commencing with his opponent, then two cards each, and then three cards, as at first. He then turns up the next card, lays it upon the table exposed, and places the remainder of the pack face downwards upon the table, in a position convenient to both players. The exposed card is the trump card; and if it be a seven, the dealer at once scores ten for it.

The play then commences, the object of the players being to score first all the aces and tens which are made during the game; and secondly, by obtaining in hand, and then declaring, by placing them on the table, certain combinations of cards, which are called “bezique,” “sequence,” “marriage,” and a collection of four aces, kings, queens, or knaves. The value of these combinations will be found in the table of scores which we give at the end of this article, and by that means the player will be able to judge of their relative value, and so utilise his chances of obtaining those which will most help his score.

Each player now takes up his cards, and places them in order of value, and the non-dealer, looking over his hand, and keeping such cards as will help him to make any of the combinations above-mentioned, plays one of the remainder. It is not incumbent on the other to take the trick, and, indeed, it is not wise to do so, unless he wants to make a declaration, or the card played be a ten or an ace; but the trick may be taken by playing a higher card of the same suit, or by playing a trump of any value. If the trick be not taken by the second player, it belongs to the first, who turns the cards on his own side, and may then, if he has the cards in hand, make a declaration, and score for it. He then takes up the top card of the inverted pack on the table, and places it among the cards in his hand; the other player does the same with the next card; and the winner of the last trick leads for the next.

When any player draws a card that completes a combination for which he can score, he must win a trick before doing so, as combinations can only be scored by the winner of a trick, and before the top card of the rest of the pack is drawn.

One of the chief variations in this portion of the play is, that in some rules the highest card played in a trick, irrespective of suit, wins the trick. This play deprives trumps entirely of their value, and renders the play for tricks quite uninteresting; for each player can at once make his aces and tens by playing them on lower cards of any suit, and can obtain a trick at any time he wants to score; whereas, the most exciting portion of the play occurs when a player has his hand full of cards for scoring and yet has not the lead, for he may be kept out of it by skilful play on the part of his opponent, until he has sacrificed many of his good cards, and towards the end of the round may sometimes be prevented from scoring altogether. Whichever rule for taking tricks may be adopted, the play proceeds in the same manner, each player drawing a card from the pack after every trick, to make his hand up to eight cards, until all the cards on the table are taken up, the winner of the last trick scoring ten for it.

The player of the seven of trumps scores ten for doing so, and has the option of taking up the trump card and laying down the seven in exchange for it, scoring ten at the same time. When the trump card is one of the sequence, it is important to look out for the seven of trumps, and exchange as soon as it is got, for of course there are two sevens of trumps, and your opponent might draw the other at the same time.

“Bezique” is the queen of spades and the knave of diamonds when either of the other suits is trumps; but when spades or diamonds are trumps, then bezique is queen of clubs and knave of hearts. “Double bezique” is the two bezique queens and knaves together. The score for this is 500, the largest number scored in the game, and consequently the bezique cards should be carefully kept unless you see either of them in your opponent’s hand. Bezique, should first be declared and scored, and then double bezique, as soon as the other cards are got. The declaration is made by placing the cards exposed on the table, the second declaration by placing the remaining cards of the combination by the side of the former, so that if any of the cards declared are used in play, the higher combination cannot be scored. In some rules bezique is queen of spades and knave of diamonds, irrespective of trumps.

A “declaration of marriage” is made by exposing on the table together the king and queen of any suit. If it be of the trump suit it is called a royal marriage, and scores twice as many as a common marriage. Kings or queens once married, cannot be used again for marriages, but may enter into other combinations, as sequence, or four kings or queens, or bezique. For instance, if a marriage in spades is scored, a bezique can
BEZIQUE

be scored by playing the knave of diamonds by the side of the queen; but if the player have the other king of spades he cannot marry it to the first queen of that suit, but must get the second to declare the second marriage. If a player declare four kings out of his hand, and afterwards draw the queens, he can marry the kings, and score for such marriages, so long as the kings have not been used in play, and the same if he have declared four queens. In fact, cards once declared cannot be used again for a combination of the same kind, but may enter into any other combination with additional cards. Some rules provide for only one declaration being made at a time, and do not allow marriages with kings or queens after such cards have been used for a declaration of four kings or four queens; but the generally-received method of play now allows as many declarations to be made as the player is able to by cards out of hand and in combination with others already exposed, provided in cards played out of hand one combination forms no part of another declared with it; thus, if a player held a marriage in spades and a marriage in clubs, and the knave of diamonds, he could declare the two marriages together, and if two other kings or queens were already exposed, he could declare the four kings or queens at the same time, but he must win another trick before he could declare the bezique, although he had the remaining card in his hand.

The "sequence" is composed of the ace, ten, king, queen, and knave of trumps. This combination scores 250, and is much more frequently scored than double bezique. It is always worth while keeping sequence cards, unless your opponent shows by his play that he holds two duplicate cards of a sequence. The royal marriage should be declared first, as if you declare the sequence out of hand you cannot afterwards declare the marriage; as we have just explained, it requires additional cards to score for another declaration.

Having exhausted the pack, and scored all the various combinations made in the play, each player will still have eight cards in hand, and these must now be played, with the object of securing as many aces and tens as possible. These tricks are played in the same way as whist—the second player must follow suit or trump, if he can, and must take the trick, if he can. The winner of a trick leads for the next trick. When the whole of the hand is played out, each player looks through his cards for the aces and tens, scoring ten for each. This concludes the round, and the cards must be well shuffled, and the non-dealer in the last round must deal fresh for the next, and so on, until the game is completed.

It often happens that a player has an equal chance to make four aces and four kings or queens, and must sacrifice one or the other. It is usually, however, best to sacrifice the aces, if the opportunity of making them occurs, although the four aces make a larger score than kings or queens; but the latter cards can also be used for marriages, whilst the aces, if declared, often fall to the adversary, when played. Many players underrate the necessity of securing aces and tens, forgetting that every one lost is not only a loss of ten to their own score, but adds ten to that of their opponent, thus making a difference of twenty to the score, or as much as a marriage.

Much diversity of opinion exists as to the best method of scoring the tens and aces, some rules directing that they shall be scored separately as soon as they are made. We think, however, that the best plan is to score them together at the end of each round, and if, on commencing any round, the scores are tolerably even and nearly up, they may then be counted as they are made, or this rule may be adopted: "Non-dealer scores aces and tens first, and in a tie the player scoring most points without aces and tens wins the game. If still a tie, taker of last trick wins."

In playing, avoid, as long as is possible, showing your adversary that you can spoil his sequence or bezique, and carefully look out for any indication that he can prevent your scoring them. This is the most important hint to be given to beginners. As every player endeavours to make these, the highest scores, so long as your opponent thinks he has the chance, he will sacrifice everything to retain those cards in hand, and thus you may entirely spoil his play by retaining duplicate cards of those declarations, even if you lose the scoring of one or two marriages by it yourself.

Use every endeavour to take the last trick; and to do so secure the lead in the last but one, and then lead ace of trumps, if you have it; by so doing you not only score ten, but you can score any combination you may have in hand, and prevent your adversary from doing so.

In playing three-handed bezique three packs are used, in the same way as described for two players. The player to the left of the dealer leads first, and the highest card of the suit led, or the highest trump, takes the trick. In this game triple bezique may be made, and scores 1,500. The game may be made 2,000 up, or any higher number; but many players prefer to reduce the scores of sequence, double, and triple bezique to 200, 300, and 500 respectively, and play the game 1,000 up.

Four-handed bezique is played with four packs of bezique cards, and each person may score for himself, or sides may be taken, and one person score for his partner and himself. In this case a player can make a declaration when either he or his partner has taken a trick, and can enquire whether his partner wishes to declare, before taking a card from the pack. In playing the last eight tricks, the first and second players from the dealer's left play their cards against each other, and score the aces and tens, and then the other two players do the same. Four-handed bezique, however, is not a very interesting game; and with four players it is perhaps best to play two separate games.

Sometimes two players use a larger number of packs of bezique cards shuffled together, as, for instance, three, four, or even more. In this case nine cards should be dealt to each player, and a much larger score should be played for, at least 5,000 we think, for the chances of obtaining the higher scores are very much increased in this kind of play, and triple bezique—not an uncommon combination with four or more packs—scores 1,500. The game is, however, very complicated and uninteresting with more packs than persons engaged in the game.

If the dealer gives himself or his adversary too many cards, the latter has the option of a new deal, or he may draw the surplus cards from the hand of his adversary, and must not himself draw any cards from the pack until his number is reduced to eight.

If a player plays with seven cards in his hand, he suffers no penalty, but may draw two cards the next time. Some rules provide a penalty for this mistake, but it evidently puts the player at such a disadvantage, that it is of itself a sufficient punishment. The same rules provide that if a player plays with nine cards in his hand he shall forfeit 200, which is also an excessive punishment, so that it is best at the outset of the game that some understanding should be come to as to penalties for playing and drawing out of turn, as no two sets of rules are agreed on these points. Some penalty must also be agreed on for revoking during the playing of the last eight tricks. Either the person so playing should forfeit thirty
points, or the adversary should score all the aces and tens in the eight tricks.

### Table of Scores

- **For bezique**—the queen of spades and knave of diamonds; or, if either of these are trumps, the queen of clubs and knave of hearts: 40
- **Double bezique**—all the bezique cards exposed at one time: 500
- **Sequence**—ace, ten, king, queen, and knave of the trump suit: 250
- **Common marriage**—king and queen of any suit except trumps: 20
- **Royal marriage**—king and queen of trumps: 40
- **Four aces of any suits declared together**: 100
- **Four kings ditto ditto**: 80
- **Four queens of any suits declared together**: 60
- **Four knaves ditto ditto**: 60
- **Turning up seven of trumps**: 10
- **Playing seven of trumps (except during last eight tricks)**: 10
- **Exchanging seven of trumps for trump card**; last trick (previous to the eight tricks out of hand): 10
- **Each ace and ten in the tricks**

### Sports and Amusements

Among those who have once mastered the trouble of simple skating, and are quite at ease at the inside edge, there will be many, as we have said, whose ambition carries them no higher; and for whom the honours and glories of figure-cutting have either no attractions or too great difficulties. For these remains an ample field of amusement, which, however much it may be despised by the scientific professors of what is called "the higher art," affords to the more common herd perhaps as much pleasure, and certainly, if they choose, as much hard exercise, as that enjoyed by the detractors in the more exalted sphere. For the whole list of games and races of which this chapter will give some description no greater skill is required than a knowledge of the simple inside edge. Speed, and a facility in turning rapidly or arresting one's course suddenly, are important adjuncts to the art, and they must be acquired by all who would excel. But in acquiring them, practice must be the best mistress. Those will learn the quickest who care the least for falls. On the ice, as in the hunting-field, a "purl" is always a possible contingency, and he who is in constant terror of one will never excel in either way. Pulling up short is sometimes effected by a species of "putting on the drag." This is done, by simply leaning heavily on the heel, whereby the back part of the skate, being driven into the ice, and having to plough its way by cutting deep into the surface, acts as a suitable "skid." It is, of course, only in skates which have the back part of their steel blade flat upon the ice, and not rounded off as it is in front, that this device can be resorted to. Those who are accustomed to use it should be very careful, in using a new or borrowed pair of skates, to see that the steel is not of the rounded pattern. Should they inadvertently try to stop themselves in this way while wearing skates of the latter description, the consequence will be terrible, for they are certain to get the worst fall that can possibly occur; that which happens from the feet slipping away forward, and leaving the back part of the head to come full on the hard ice. With this summary account of some of their attendant difficulties, we proceed to speak of the various charming games and amusements which can be enjoyed by skaters of all sorts, of each sex, and almost of every age.

First and foremost of course comes hockey, the king of games upon the ice. Let no one who has tried to play hockey on dry land, and given it up as a stupid affair, suppose that the dull and muddy sport which disgusted them in a playground has any affinity with the brilliant and fascinating game of which we are now about to speak. As well might one compare the Derby with a foot-race between tortoises, or the speed of a City omnibus with that of an express train. No; hockey, in its only suitable place, on the frozen pond, is a wild, glorious, almost maddening excitement. The ball (of tough seasoned cork it should be) flies at the slightest touch, like mercury, skims like the wind over the clear bright surface, dashes with lightning speed backwards and forwards, hither and thither, in the most unexpected and changeable direction, under the quick blows of the skaters' sticks. No goals are necessary for the game thus played, no sides chosen, no rules as to "off-side" or "out of bounds" imposed. "All against all" is generally the rule, and each man, according to the time he can retain the ball, or drive it before him where he likes, reaps the lion's share of honours and amusement. The sole boundaries are the limits of the pond, and he who, however hard pressed, hits the ball off on to the land is justly accounted a "muff." To play the game well, speed is not the only requisite. It is, as in couring matches, only one of the "points." Of course, there are continual races, either after a ball hit far away or to catch a competitor who is carrying it off with him. But it is not sufficient to be first up with the quarry. He is accounted the best player and gets the largest share of the game, who can manoeuvre and "dribble" the ball along with the greatest cunning and foresight. "Dodging" is everything; and the knowing hands will double like hares, throwing out their followers, just as puss baffles the greyhounds; and getting a fresh start and fresh breathing-time, and a good look round to choose where to go. The best players do not hit hard; it is the gentle neat touches and turns of the wrist that guide the ball the best. As you tear along at full speed after the leader, he can throw you out fifty yards by moving the tip of his stick an inch. If he only aims his stroke properly, he can "place" his hit with perfect accuracy, and reach the spot to which he intends his ball to go almost before you are aware of his intention to send it there. For there is no chance about the game; everything is true and regular. No billiard-table in the world is truer than a good piece of ice; no cricket-ground can compare with it. Everything is skill and activity, the knowledge of pace and time, the power of racing, turning, and pulling up rapidly, and the nerve to strike straight, and to keep a sharp look-out. No wonder that the young skater, having once tasted the joys of hockey, and having once "nursed" the ball for a short hundred yards, becomes fascinated, joins in the eager flight of players, which sends like a whirlwind over the pond, and, throwing all his lessons in figure-skating to the winds, becomes, to the disgust of his monitor, a hardened and incorrigible hockey-player. Yet, however hardened a defaulter in the eyes of the figurists,
let not the beginner spoil their sport, in the excitement that his own provokes. On every pond there should be a sacred corner given up to the scientific. It need not be a large space; but it really ought to be selected and safe from the noisy boisterous whirlwind of the hockey-players. It is quite unfair that hockey should extend itself over the whole pond, to the exclusion of more quiet arts. Yet what figure would not be spoiled in a moment by an intruder of those licentious Goths and Vandalas—as the figure-cutters think them—who wield the hockey-stick? Spare, therefore, O ardent hockey-player, that one secluded spot where reels and quadrilles in their stately grace are being skated! There is plenty of room both for you and the professors; or if there is not, it is high time to seek a wider field for so rough and usurping a sport.

There are dangers, moreover, in this fascinating game. No rose is without its thorn. Some of these may be guarded against; others cannot. The worst of all is of the former class. It exists only when the game is played where there are holes or unsafe places on the ice. In the excitement of the game, some reckless leader is almost sure to lose all remembrance of the danger. On he rushes, heedless of shouts, or of anything but the ball, and lands, or rather unlands himself, and perhaps some of his followers, in the water, and perhaps at the bottom of the lake. Rough ice is a smaller peril, but it is a serious one, and not always to be avoided. In most seasons, and on most pieces of water, there are some nasty jagged or uneven places, and every hockey-player, no matter how smooth the ice on which he begins to play, should be constantly on the look-out for a rough piece. Lastly, in the tremendous strain of racing or turning, or stopping short, a strap or a buckle or a screw may go. At the furious speed with which the game must always be played, this is pretty certain to result in a fall, and a fall when going at this pace means bruised, and sometimes broken, bones, if not a stunning blow on the back of the head. The skates used for hockey ought to be of the very strongest and safest make; no spring that we have ever seen will bear the ordeal. The sticks should be light; but this is a needless caution, for a very short essay will show how impossible it is to play well with an unwieldy heavy one.

Dancing on the ice might be more fashionable than it is. In many towns a band is often to be found in the garden at skating time, and a quadrille makes a very pretty sight, and is capital exercise for ladies and skaters who are not quite up to the orthodox "figures." The space, however, for a quadrille on the ice ought to be very much larger, almost ten times the size of that in an ordinary ball-room. To dance the figures properly—especially the last figure of the Lanciers, which is the prettiest of all—1/4 is far better that all the dancers should do the outside edge; but even without this refinement, the dance is a beautiful sight, and, where there are ladies and music, should always be attempted. An attempt is sometimes made—of course by first-rate skaters only—to get through a valse upon the ice, but the result is not very often successful or elegant.

Such games as rounders, and the other ordinary playground sports, can almost all be played with increased zest upon the ice. Of all of them prisoners' base is the most exciting, and a good rally at it resembles a gigantic coursing match, with a dozen hares and as many greyhounds, wheeling, doubling, racing, and dodging one another in an endless complication of circles.

Leaping on the ice is an accomplishment more rare than difficult. It is worth learning for any one who is tired of the plain straightforward skating, or who wishes to indulge in a steeplechase. To make a leap from the ice, the same motion is required as in making a standing jump on dry land. The skater must, when he is going at a tolerable pace, get his feet parallel, both upright and firmly on the ice. Then bending at the knees, he presses downwards and springs up, keeping his feet exactly level till he alights. On alighting, the feet resume their old position, and the course is then continued. According to the strength of the spring, and the speed at which the jumper was going when he leaped, so is the height and width of the jump made. A very moderate performer will soon be able to clear a chair turned on its face, but we have seen as many as four chairs ranged thus in a row cleared with ease, and a railing as high as a five-barred gate taken beautifully. The great danger is the coming down, for the least alteration in the position of the feet, or in the upright position of the body, will ensure a terrible and often dangerous fall.

When the skater is well practised in jumping over-chairs and sticks, etc., he may actually turn his accomplishment to practical use. It is not a bad thing to be able to clear a ditch which is doubtfully safe or actually unsound. On an emergency, with the wind behind, and everything else favourable, a good jumper will clear eighteen feet of ditch, and make those who try to follow him look very foolish. Among those who can jump, steeplechases can be arranged, or a run across the floos, "taking" all obstacles en route. The writer remembers joining in a famous "cross-country" run in Gloucestershire, when the Severn had flooded its banks for miles. Hedges, and even stiff solid fences appearing above the surface of the ice, were cleared without a look at what lay on the other side; hares scampering over the wild expanses of ice were chased recklessly to the "islands" of green meadow, their safe and only sanctuary. Many were the mad leaps, many the narrow escapes, more the headlong tumbles, but, most numerous of all, the black and blue bruises that remained as memorials of the steeplechase.

FENCING.

By Major Hooker.

LOOSE PLAY—RULES—THE BAYONET—BAYONET EXERCISE—GUARD.

In independent practice with the sticks, it is not necessary to keep so closely to the theory as in fencing; indeed, some of the broadsword directions are more honoured in the breach than in the observance, when you come to their practical application, though, considered as gymnastic exercises for giving suppleness and strength to the wrist and arm they are excellent. Otherwise it is difficult to imagine that the legitimate parry could ever be performed with success, unless you got your adversary to be so kind as not to thrust before you were ready with it; and the three thrusts would be fine things to make at a man who was running away, as you chased him. But if he were facing you, with a sword in his hand, and knew
anything of fencing, he would simply transfus you the moment you drew back your arm.

To throw the weight of the body entirely on the left leg again is a less desirable position than the equal balance upon both legs. The great idea of it is to be able to draw back the leg when cut at, and return at the head. But the stick represents a sharp weapon, and who in his senses would lay the whole of his head and body exposed to a razor edge while he went

the arm in a downward direction, which, is indeed, the thrust in seconde.

It is no uncommon thing for men to play at stick and bar thrusting, but it is a thoroughly bad plan, for those who pursue it are certain to get too close, hit wildly, and counter. It is true they may plead ancient custom on their side; in the old English back-sword and cudgel play there was no thrusting, nor was upper-cutting generally thought fair, though the rules

mowing at his adversary's legs? With the stick, indeed, it might be tempting sometimes to risk the exchange of a cut on the other man's leg, which stings him, for a stroke on your own helmet, which cannot be felt. But it is not difficult to stop that game. Thus, whenever your adversary cuts, or feints strongly, at your leg, cut at his arm—it is the safest possible attack, being at the same time a parry.

It is by cuts 3 and 4 at the arm that the broadsword might have a chance against the rapier. Against a mounted opponent, the swordsman must endeavour to gain his left side; if he can do that he must obviously have the advantage.

The best thrust from the hanging guard is simply to straighten differed in different countries. First blood from the head decided the bent.

The German student's favourite weapon, the schlager, is pointless, being as blunt and square at the end as a razor; but as they only cut at the face, there is little variation in their play, and the victory mostly falls to the arm which can last longest without drooping from weariness.

But with every respect both for antiquity and Tuscian customs, we still think it the greatest mistake to mutilate stick play by extracting the point. It is stupid to see two grown men simply thrashing each other without any exercise of skill, and it is sure to come to that when they lose their
The reason why cutting only is practised, is a fear lest the point should be too punishing, but this is easily obviated by loosening the hold of the stick at the moment of thrusting, when it will slide up through the leather hilt, and the hit will be innocuous.

The rules laid down for independent practice with sticks should be adhered to as strictly as possible, though it is difficult always to combine a light hand with rapidity.

**RULES.**

1. The cut and thrust must not be given too strongly, so as to cause irritation and anger.
2. Each cut or thrust to be acknowledged by the person touched, passing the stick into the left hand, the opponent recovering to an engaging guard.
3. The combat to be renewed out of distance, the parties coming within it cautiously.
4. No two cuts or thrusts to be made upon the same longe.

In case of a mutual hit, the cut given in the third position to be reckoned only.

5. All cuts being made from a defensive position, such must be returned to as soon as the cut or thrust is delivered.
6. No practice to be allowed without masks; and as the stick is the substitute for the sword, the cut can only be considered effective when given with that part which corresponds with the edge, nor should any movement of attack or defence be attempted with the stick which would not be risked in a combat with swords.

**THE BAYONET.**

An infantry soldier, armed with sword, or sword and buckler alone, must necessarily be very much at the mercy of a mounted enemy. He must be ridden down if not cut down. The first weapon employed by the British Foot to keep that terrible cavalry at bay while the archers thinned their ranks, was the pike. The pike-head or spear, shaped like the leaf of an apricot tree, was about four inches long, and broad in the middle, from which it ran to a point. It had two branches or iron plates to fix it to the staff, of about a foot long, and strong enough to
resist the stroke of a broadsword. The staff was made of a slip of ash thirteen feet long, and was shot at the butt, which was pointed, to stick in the ground.

The bayonet took its name from Bayonne, in Spain, where it was first made. It was introduced into France about the year 1671, and was called bayonet a manche. The handle was plain, fitting tight into the muzzle of the musket, and rather enlarging towards the blade, to prevent its entering the piece too far. The English soon adopted it from the French, for we find that in the reign of James II. the first step was taken towards the abolition of pikes in England by the introduction of the practice of sticking the dagger into the muzzle of the musket.

Our ingenious neighbours had the start of us also in the next improvement of the weapon. In one of the campaigns of William III. in Flanders, the 25th were opposed to a French regiment, which advanced against them with fixed bayonets. Whereupon Lieutenant-Colonel Maxwell, who commanded, ordered his men to screw their bayonets into the muskets to receive them; but to his great surprise, when they came close, the French threw in a heavy fire, which staggered the English, who could not understand a fire coming from muskets with the bayonets fixed. However, they soon recovered from their surprise, and charged with success.

At first the bayonet was fixed to the side of the barrel with rings, afterwards it was more firmly attached by a socket, which was kept on to some extent by the sight. But the weapon was still liable to be wrenched off in a mêlée, and it was not till it was locked by a spring, as at present, that it was entirely secured against this accident.

The disaster at Preston was in a great measure owing to the slight manner in which the bayonets of the English troops were attached to their muskets. The Highlanders took the thrust in their targets, and in the consequent struggle the bayonet became unfixed. The effect was so apparent, that at Culloden the soldiers were cautioned before the action not to thrust at the men immediately in front, but obliquely at those next on the right; and at the latter battle the superiority of bayonet over sword and target was once more re-established. And yet a theorist, who has found newspapers ready to air his theories, not long ago boldly cited the battle of Preston as a reason for abolishing the bayonet from the British army, and arming a certain number of men in each company with broadswords. This reasoning would lead him far; for those magnificent mountainers commenced the action by breaking the English cavalry with their impetuous charge, and it is not probable that dismounted swordsmen have often done that.

But, indeed, the penetrating power of the bayonet itself, and the great weight of the firearm behind it, render its thrust the most deadly of any weapon known. It is true that in single combat the sword, skilfully handled, is a fair match for the bayonet, but in the shock of masses, where there is no room to fence and feint, and jump from side to side, the former would have no chance at all. Not only would the swordsmen be baffled in their endeavours to reach their enemies, but, however superior in numerical strength, they must always be overmatched at the point of collision; for, requiring space for the swing of the sword-arm, they cannot charge in the close order, shoulder to shoulder, in which they would have to meet the others.

The great practical advantage of the bayonet, however, is the protection which it affords the infantry soldier when attacked by cavalry; and, from the multitude of anecdotes recorded in illustration of this, we will select the exploit of a private of the 48th, on the night of the 26th of December, 1805, when John Walton and Richard Jackson were posted on the further side of a bridge which the engineers were engaged in destroying during the retreat of Sir John Moore upon Corunna, with orders that if the French cavalry, which had been seen in the neighbourhood, attempted to surprise the post, one should stand firm, the other fire, and run back, to give notice whether the enemy was in force or not. They were attacked; Jackson fired and got in, though wounded by numerous saber cuts. Walton stood his ground, and wounded several of his assailants, without receiving a hurt, though his musket, cap, clothes, and accoutrements were cut all over, his bayonet bent double, and notched like a saw.

Bayonet versus bayonet would be a very murderous style of combat, much like revolvers in a saw-pit; but they have not often crossed. There have been instances, however, as at Vimeira, when at the critical hour of the day, the regiment alluded to above, the 43rd, rallying from a former shock, dashed furiously upon the head of a French column, and literally drove it back.

In these volunteering times articles on the art of fencing would be incomplete without the bayonet exercise, sword versus bayonet being a favourite pastime in most gymnasiums. Indeed, no assault of arms would be complete without a contest of the kind. For this exercise a dummy musket is used, having a bayonet (with a knob instead of a point) which works with a spring, so as to fly back when any object is touched. The sword may be represented either by a light saber, with round point and edge, or a single-stick.

**BAYONET EXERCISE.**

Fall in with your rifle at the shoulder, that is, at the left side, at the full extent of the left arm, resting against the hollow of the shoulder, the fore part of the butt nearly even with the front of the thigh.

**Port Armes.**—Seize the small of the butt with the right hand, and bring the rifle to a slanting position in front of the body, the barrel crossing opposite the point of the left shoulder; and meet it with the left hand below the lower band, thumb and fingers round the rifle.

**Charge Bayonets.**—Turning on the heels, point the right foot to the right, the left, full to the front, and bring the rifle down to a nearly horizontal position at the right side, with the muzzle inclining a little upward; the right wrist to rest against the hollow of the thigh below the hip, the right hand to grasp the small of the butt, the thumb and fingers of the left hand to be round the rifle.

**Guard.**—Fall into the "Second Position," with the knees well apart, the head and body erect, and the chest expanded, the rifle retaining the position of "Charge Bayonets," the point of the bayonet directed towards the height of a man's breast.

**Point.**—Without quitting the hold, or losing the balance of the rifle, advance it to the full extent of the arms; at the same time incline forward, straightening the right leg; the right elbow to be rather under and close to the stock; and resume the position of "Guard."

**Low Guard.**—Turn the sling (or under side of the rifle) uppermost, and raise the butt and right elbow as high as the head, the back of the hand towards the right ear, and the bayonet pointing downwards to the front.

**Point.**—As the rifle is thrust forward and downward, turn the barrel upwards, bringing the sling up again as you resume the position of "Low Guard."

**High Guard.**—Lower the right wrist to the hip; the left hand to be opposite the breast.

**Point.**—As before, but upwards; and come back to "High Guard."

**Head-Parry.**—Raise the rifle, turning the sling upwards till
GUARD.

You next go through the points in an oblique direction, turning at the word “Right” or “Left,” so as to present the bayonet in that direction, keeping the feet steady.

The next exercise will be with the right shoulder and foot foremost.

Guard.—As before.

About.—Straighten the knees and raise the rifle perpendicularly in front of the centre of the body; at the same time turn to the right about upon the heels, the right foot pointing to the new front, the left to its left, and smartly changing the hold of the rifle with the right hand at the balance, and grasping the small of the stock with the left hand, sink down again to the position of “Guard” by bending the knees.

TOY-MAKING AND TOY-GAMES.

GUARD.

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TOY-MAKING AND TOY-GAMES.

SOAP-BUBBLES.—LIGHT—JEW’S HARP—BOTTLE IMPS.

SHALL now speak of that pleasant recreation, the blowing of Soap-bubbles. Who does not remember his first attempts in this line? What a glimpse our first soap-bubble gave us into a wonderland of beauty! It was as if a fairy realm, with all its delicacy and richness of colouring and beauty of form, had suddenly opened to our view. We had not then learned the melancholy lesson that the most lovely bubbles, those that are biggest, those that promise most, burst, as sure as can be, sooner or later.

The apparatus required for making soap-bubbles is of the simplest description. A saucer, with some hot water, a piece of soap, and a tobacco-pipe, is all that is required. The place for blowing them is out in the open air—on the lawn, in the garden, or wherever else is most convenient.

Begin by making the lather with the soap and hot water. Dip the bowl of the pipe into the lather, and catch up a little of it. Then blow through the stem of the pipe, and the bubble will gradually expand. When it is large enough, it may be set free from the pipe by a jerking motion of the hand, and it will then float through the air with great grace and beauty.

With soap and water alone one cannot obtain very large bubbles, but one may get them of much more considerable size by mixing a little sugar with the solution of soap. These sugared bubbles, too, will show the coloured zones in a very perfect manner. Another way to blow large and lasting bubbles is to mix a solution of isinglass with the soap lather.

The thinness of a soap-bubble is remarkable. The film of which it consists does not exceed the two-millionth part of an inch. One cannot realise the fact. We know that the art of gold-plating has been carried to such perfection, that gold-leaf is hammered out till it is only two-millionth of an inch thick, a single ounce of gold being made to cover an area of several hundred feet. But what is that compared with the thinness of a soap-bubble? Indeed, the film of a soap-bubble, previous to its bursting, is the thinnest substance known in Nature.

The most interesting feature of the soap-bubble, as every one knows, is the remarkable and lovely colours which appear upon it. The reason for their appearance has been thus given by Dr. Paris:—“A ray of light,” he says, “is divisible into seven colours. Now, when it passes through certain media, or is reflected from certain surfaces, this division is effected, and the various colours produced. This is remarkably the case where light falls upon a transparent film of great tenacity, which, instead of reflecting white light, sends forth colours of great beauty. These, as they are produced by thinness, are called the ‘colours of thin plates.’ The film of the soap-bubble is among the latter objects.”

Herschel, speaking, in his “Preliminary Discourse,” of the colours which glitter on a soap-bubble, says they are the immediate consequences of a principle the most important, from the variety of phenomena it explains, and the most beautiful, from its simplicity and comprehensiveness, in the whole science of optics.

A curious experiment may be performed with a soap-bubble. Blow one, and set it under a glass shade, so that the motion of the air may not affect it. Now watch it as the water glides down the sides, and the top becomes thinner and thinner. Several colours will appear in succession at the top, and spread themselves from thence down the sides of the bubble, disappearing in the same order in which they appeared. At last a black spot will appear at the top, and it will spread till the bubble bursts.

It may be mentioned, as an illustration of the fact that the simplest toy may often be made to illustrate the greatest truths, and aid in the most philosophic investigations, that the soap-bubble enabled Faraday to carry out a most important series of magnetic experiments.

A simple little apparatus, consisting of a double tube, is to be bought at the toy-shops, by means of which one can blow a bubble within a bubble, and indeed several bubbles at the same time.

The Jew’s Harp properly ranks as a toy. It is true, that a few persons, by dint of ingenuity and perseverance, have obtained such effects from it as almost to warrant one in elevating it to a more dignified place. But to all intents and purposes, a toy it is, and a toy it is likely to remain.

With its appearance we are all familiar, and most of us, no doubt, have tried our hands at producing its delicate music. You see a representation of the Jew’s harp in Fig. 2. It consists, you observe, of a body and a tongue. The narrow part of the body is fitted into the opening formed by the parted lips, the instrument being held in the left hand. The tip of the tongue, a, is then struck by the tip of the finger of the right hand, and the sounds of the harp are regulated by changes in the cavity of the mouth.

The origin of the Jew’s Harp is lost in antiquity. It was once a very popular instrument in Europe, and especially in
the Netherlands and the Tyrol. We also find evidence of its use in Asia, and amongst the Indians of Southern Chili. To speak of our own country, fools used long ago to play upon the Jew's harp to amuse guests at taverns. It is found mentioned, too, in a rare black-letter book called "Newes from Scotland," 1595, where it is told that Guillo Duncan, a servant-girl, celebrated for her performance on the instrument, played before James VI. of Scotland.

One of the great Jew's-harp artists of modern times was Koeh. He was originally a poor German soldier in the service of Frederick the Great. Afterwards he made his fortune by travelling about and giving performances in public and in private. One of the peculiarities of his playing was that he used to require all the lights to be put out. No doubt this was partly on account of the fact that the Jew's harp is not the most graceful of instruments to play upon, and partly because its comparatively weak tone was rendered much more impressive by the darkness. The most talented player, however, was M. Eulenstein. His surprising mastery over the instrument was obtained by ten years of close application and study.

The name "Jew's harp" has long been a bone of contention amongst philologers. Some will have it that it is so called because the Jews were the great vendors of it; others suppose that "Jew's" is a corruption of "Jew's", and a third party, with equal probability, derive the name from the French jeu trompe—toy trumpet. In Scotland it is frequently called a "trump," evidently a corruption of the French trompe.

The Bottle Imps (Fig. 1) is rather a grotesque toy. It consists of a jar of water, in which are placed two or three little enamelled figures, of a grotesque character. The jar is closed carefully by a piece of parchment. Now, by alternately placing the hand upon the cover, and lifting it off, the figures are made to descend and ascend in the water. The explanation of this is easily given. In the centre of the figures there is a cavity, terminating in the lower part in a small hole. The cavity is made to contain a considerable quantity of air, so as to give the requisite buoyancy to the figure. When the hand is placed on the pavement, the water rises, in consequence of the pressure, into the figures. The air being thus compressed into less space, renders the bottle imp less buoyant, so down they fall; on the pressure being removed, of course they rise.

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BIRD-COLLECTING AND STUFFING.

Dissection—Examination—Food Notes—Suitable Birds for Skinning—Beginner's Difficulties.

We now proceed to attach with strong thread a label to our specimen, indicating date, locality, and sex, and, for obtaining an accurate knowledge of the last, recourse should invariably be had to actual dissection. On no account should dependence be placed upon those differences in the plumage, even of adult birds, which are supposed to indicate, and as a general rule do indicate, respectively the male and the female. We allude, of course, to those species in which the normal plumages are distinct, as in the male and female house-sparrow; for in a very large number of species the plumage of both sexes is alike. But even the most black-billed and black-throated old cock-sparrow should never be labelled "male" until examination has proved the accuracy of the statement put forward by plumage.

We do not actually know of a hen-sparrow having assumed the plumage of the adult male bird; but in other species, where the plumage of the sexes is as a rule distinct in the adults, instances are not wanting in which perfectly healthy and fertile females have been found to have assumed the male livery. This "sexual dimorphism" has long been known to occur in many other groups of the animal kingdom, and if collectors would only pay more attention, and could be induced to carefully see their specimens without trusting to plumage, we should doubtless find that this peculiarity was far more common amongst birds than was ever suspected. Thanks to the powers of observation of a few—alas, too few—naturalists, we have already learned that some females, which actually differ in their young plumage from the young males, yet in course of time attain to a state perfectly indistinguishable, only that they take a year or two more to do this, and breed in the immature dress. We are not alluding here to cases of assumption by barren females of the garb of the male, an occurrence especially frequent amongst gallinaceous birds, and one which is well known to all poultry keepers of much experience. Instances of the latter, particularly whilst occurring amongst wild birds, are very interesting, but they are by no means equal in scientific value to the knowledge of each changes taking place amongst healthy and vigorous individuals.

On the other hand males of many of the rank tribes assume, during a portion of the year, the plumage of the female, and without actual dissection the collector is liable to fall into error, although the fact of these changes taking place is perfectly established. It is only by exercising care, and neglecting nothing which can conduct us to absolute certainty, on this and on other points, that our readers can acquire any claim to the title of "naturalist," and rise above the level of the mere collector. Picking up madrepores and pebbles on the seashore, and getting them out and polished, may be a very pretty pastime, but it is not geology; and the mere flaying, however neatly, of so many richly plumed birds, is not ornithology. The Indians and negroes of Brazil, who prepare thousands of humming-birds and other brilliant specimens, can do that as well or better than you can, and so can the individual who writes over his shop-front, "naturalist," and turns out the skin of the toy-terrier, the lamonted bull-pup, and the deceased pet pol-poll-parrot, in a style which gladdens the eyes of the owners, and recalls at every instant the virtues of the dear departed. That there are genuine able naturalists, men with a love and a knowledge of Nature amongst them, we do not deny, and this is especially the case in the smaller towns and country.
villages, where the barber or "hairdresser" has frequently a
taste for natural history, and spends his scanty leisure in ob-
serving, as well as in procuring, specimens merely for sale.
But even with the best of them, registration, date and inves-
tigation of sex is but rarely resorted to, and, at all events, is
not recorded in writing, the result being, that when memory
fails, or when the specimens pass into other hands, those par-
ticulars which would be of some value in a scientific point of
view, are irretrievably lost.

We have been led into this exordium by the feeling that
superficiality and dabbling in ologies, as in everything else, is
the bane of the present day, and by the desire to impress upon
our readers the importance of something more than the mere
skinning of a bird. To return to the actual process of exsicc
the specimens. On removing the lower ribs and raising the in-
testines, the sexual organs will be found. In the breeding season
these are very much enlarged, and can easily be distinguished,
but at other times, and especially with young birds, it is not
quite such plain sailing, and it is advisable to employ a magnifi-
cating glass. In the female the ovary is apparent at a glance
during the breeding season, resembling a bunch of round grapes,
of different sizes, if the bird is laying ; but at other times the
eggs are very minute, and the glass will prove useful. Still,
with adult birds, at any time of the year, it is not difficult to
distinguish the sexes, and with young birds the reader must do the
best he can till he gains experience. We admit that with
birds of the year it is not always easy; but still it is always
possible to discriminate when the organs are not injured by
shot or otherwise.

Having ascertained the sex, the correct way of indicating it
on the label is by the sign ♀ for the male, and ♂ for the female.
This is, of course, merely for the sake of having symbols in-
telligible to naturalists of every nation and language, just as
we employ Latin names and descriptions; but if any of our
readers prefer to write the sex in full, by all means let him do so.
In either case we do most earnestly implore him to abstain
conscientiously from indicating upon his label any sex of which
he is not absolutely certain, and which has not been ascertained
from dissection. Even although he may feel no moral doubt,
owing to distinctiveness of size or plumage, let him content
himself with putting a ♀, or with writing probably ♀ or ♂, as
the case may be, or with a young bird, "♀ d." (sex doubtful).

Amongst our own well-known species, it is true, an error could
hardly have very grave results ; but in the case of a rare and
little-known specimen from those foreign countries which we,
trust, many of our readers will visit, carelessness in sexing may,
and continually does, cause inexcusable annoyance to the
ornithologist.

The contents of the gizzard and crop should always be as-
 examined, and a note made on the back of the label, or in the
note-book, which every naturalist must necessarily carry.
It is also most important that the colours of the "soft parts"—
vix., the bill, legs, feet—should be noted as soon as possible,
for they generally fade, and in some cases a great change
takes place even in a few minutes after death. The colour
of the eyes should likewise be recorded; and it should not be
forgotten that there is very frequently a sexual difference in
the colour of the iris, generally in favour of the male, but
not invariably so, even where the male is the finer bird of the
two in other respects. In the huge South American condor, for
instance, the female has a brilliant crimson iris, whilst that of
the male is dull hazel.

Where there is room on the label, it is always better to record
these particulars upon it, as it then accompanies the skin into
whatever hands it may pass; whereas, the note-book may
easily be lost or mislaid. Some of our Indian ornithologists—
certainly the most enthusiastic, albeit somewhat impetuous
members of the fraternity—even inscribe on the labels the
measurements of the birds when fresh, an excellent plan, no
doubt, but one the usefulness of which is marred by the want of
any positive rule as to the way of taking measurements.
By the time that our reader has had some experience, and has
religiously conformed to our previous precepts, he will be a
sufficiently advanced naturalist to make it useless to give him
any special instructions as to the most approved way of making
these measurements, so we will not vex him with the matter.
If he will only take copious notes as to habits, haunts, and
seasons at which the birds are observed, he will do far better
service than by registering any amount of dimensions.

In our general description of skinning we have supposed a
specimen of about the size of a blackbird or starling—a very
convenient one for the beginner, and one which offers no spe-
cial difficulties; but we will now proceed to point out a few
instances in which a little extra experience is necessary. In
some families, such as those of owls, woodpeckers, ducks, and
others, the neck is narrow and the head is very broad, ren-
dering it difficult, if not impossible, to slip the skin over the
head without stretching, or running a risk of tearing the skin.

It is customary to make an incision in the throat of such
birds, and after turning out the head and cleansing it, to
restore it and sew up the orifice; but our own practice is, as
a rule, to make an incision along the top of the head towards
the nape, and get at the skull in that way. There is little or
no blood on the top of the head, whereas an incision in the
throat is extremely likely to result in soiling the feathers, a
misfortune to be carefully avoided. The aperture must be
carefully sewn up in any case, or the beauty of the specimen
will be impaired.

In large birds there is a good deal of flesh about the bones of
the wings, and instead of skinning them down from k to n (p.
24), it is desirable to make a slit all along, and clean the bones
in that way, giving an extra good dose of preservative to the region
of the joint before sewing it up again. In some cases it may even
be advisable to make a similar incision below the joint, but such
cases are rare. With small birds, particularly those of loose
plumage, do not waste time in cleansing the bones too scrupu-
losely, for the whole of the meat upon them is not so much
as you would necessarily have to leave on those of a large
one; if your preservative is strong and good, and if every
part is thoroughly imbued with it, no bad results need be feared.
Some may think that we are giving rash counsel to the
beginner, but our own experience is, that as much damage is
done to specimens by keeping them too long inside out, with
the feathers displaced and disarranged, as by leaving small
pieces of flesh attached to the bones, and other slovenly acts.
From the time you remove the trunk and get to the head, our
maxim is, "get your bird straight again as soon as possible."

Most members of the pigeon family are very troublesome to
skin, the feathers in general coming off upon the smallest pro-
vocation, and any want of care when manipulating the region
of the tail will result in as absolute bareness as if the bird
were being prepared for the stew-pan. Do not attempt to
remove any fat adhering to that particular part of the skin, or
out the feathers will come, as the skin is very thin there; so
employ very gentle handling, with a good dose of preservative
afterwards. Hoopoes and cuckoos are also birds of delicate
skin, although not so bad as the gorgeous-coloured trogons,
inhabitants of tropical America. On the other hand birds of
the crow tribe are generally tough-skinned, and are capital
practice for a beginner. Hawks are apt to be deceptive, being
Gymnastics.

By Way Bradwood.

General Aspects.

This subject must necessarily be comparatively "dry" in its treatment, purely practical, void of such anecdotes and illustrations as a disquisition upon a pursuit by field or flood could afford to enliven the routine of theory and practice. Yet none the less do gymnastics hold an important position among physical recreations. In themselves they offer but little direct interest to those who pursue them, except in such cases wherein competition occurs to excite or stimulate the performers. But they are to be looked at rather as important means to ends, those ends twofold—the one, health, strength, and physical development, all tending, in their due bounds, to improvement of the mind; the other, general development and improvement of the physique, to fit it for those more practical and interesting pursuits better known as "athletic sports."

To explain more fully the first proposition. It may seem anomalous that culture of body should facilitate that of the mind. At first sight, it might appear that time spent on the former was at the expense of the latter. But there is another side to the question. The "mens sana" depends greatly upon the "corpus sanum;" just as a lazy body cramps the energies of the mind, or as an indolent frame, recumbent in an armchair, predisposes the mind to indolence, in which, were the body energetically seated, it would not participate, so a stunted, cramped, deformed, and so unhealthy body, paves the way too often for a similarly stunted, cramped, and unhealthy development (or rather non-development) of intellectual faculty.

Bodily exercise develops the physical frame, keeps it in good health; and so, as we have shown, bears its fruit with the intellect. Now, of all active out-door recreations, each is dependent upon, and in due time develops, a certain portion of the muscular frame of the body; but we cannot specify a single one that taxes all the muscles of the frame. Running and pedestrian sports generally tax heavily the lower limbs; boxing, the lower limbs and pectoral muscles. Cricket taxes the lower limbs principally, the back and loins to a smaller extent, and engenders activity, but not necessarily in itself great strength, in the muscles of the arms, shoulders, and back; at the same time it brings into play more sets of muscles than any other athletic pursuit. Boxing develops considerable strength in the loins, back, thighs, pectoral muscles, and wrist, but not necessarily any extra activity in the same. None of these pursuits, however, develop the "flexor" muscles of the arm (e.g., the time-honoured se plus ultras of novelists, the "biceps") to any perceptible extent; nor do they simultaneously engender, not only strength, but also activity, in the parts which they call into play. This is reserved for gymnastics, which may be defined as a scientific and practical study for developing, both in strength and activity, all the muscles of the human frame (at least, all of importance). It does not teach a mountebank how to wag his ears, or to bend his top finger-joint, keeping the other joints rigid. Yet each of these anomalous facts can be acquired by practice. And when the disciple has well studied gymnastics, though he will not have directly advanced himself in any given branch of athletics, he will have so far improved his frame all round that he will possess greater facility and greater power in acquiring many other branches of sport; just as the scholar who has mastered the apparently useless dead languages finds his intellect better prepared to acquire and retain other branches of more practical study. This view, however, does not imply that for a man to attain excellence in any given branch of sport he need necessarily study gymnastics as a preliminary. If he is naturally well made, he may at once commence the pursuit to which he aspires, and so cultivate the especial muscles required for it, without wasting time in working up, by gymnastics, those others that will last come into play in the subsequent pursuit. At the same time, if he does go through a preliminary course of gymnastics, he will—especially if a weakly subject to start with—commence his pursuit with a more developed frame than if he had not so taken to preliminary study, though he will undoubtedly start later in the day, as a counterpoise to his extra acquisition of physique. This comment, however, refers only to the practice of gymnastics as an exclusive exercise, for hours a day, allowing scope, meantime, for little else in the way of recreation. If taken only for a few minutes daily, or an hour or two weekly, the student has scope for studying other sports, with a frame proportionately improved by his brief turn at gymnastics. But in such a case he must not hope to compete in the latter on equal terms with men of similar physique to his own who have devoted their exercise to this one branch exclusively.

It is when taken thus as a casual and occasional exercise that gymnastics are of most value. We do not much command competition, and prizes for the pursuit, unless the hours of practice are eternally curtailed to a very small space, so as to place all upon fair terms. Otherwise, the incentive to surpass may tempt students to make a life's study of what, after all, is only a means to attain more important practical ends in the way of recreation. A pianist plays scales and five-finger exercises, to acquire a mastery of the piano; but her final aim is the performance of high-class instrumental pieces. If she spends her life at the scales, she may be se plus ultras at them, but who will care to hear her, and what practical gain will the study have been to her?
JOINERY AS A RECREATION.

With this parallel we may dismiss the theory and general use of gymnastics, and now proceed to practical disquisition upon the several branches of this study.

Gymnastics may practically be divided into three heads—(1) exercises of strength, (2) of activity, and (3) exercises which combine both strength and activity.

The object of this treatise is not to compile a handbook for all the available gymnastic feats that can be practised in a thoroughly-appointed gymnasion; the student who can attend such a school can there learn practically, instead of theoretically from these pages. If he cannot resort to such a place, it would be waste of time to enter into detail of a variety of feats for which in his private house and grounds he cannot well provide the apparatus; moreover, to exhaust practically all the several exercises taught in a gymnasion would fill a good-sized volume, and would be a superfluous product to the world after the publication of Mr. Maclean's scientific work upon physical education.

It is here proposed to treat of such exercises as are within easy reach of a home establishment, and are at the same time of leading importance in producing physical development. It is for those who have not facilities for attending a regular gymnasion, under the tuition of an instructor, that these pages are required.

A pair of parallel bars, a hanging ring, a transverse ladder, and dumb bells, are appliances within the range of even a private house or playground. These are the principal mediums for exercises of strength. A vaulting bar, a pole, and a rope for climbing, are the principal requirements for feats of activity, and these also are within easy reach, and can be fitted up without difficulty in a children's playground.

Walking, running, and plain jumping, are by some classed as gymnastics, but they would more properly come under the head of what are called "Athletic Sports," which latter, especially in these days, form a separate pursuit of themselves. Athletic sports, however, with the exception of the feats of throwing the hammer and cricket-ball, and "putting" the stone or shot, do not require an apparatus for their performance, unless we count hurdle-racing among jumping generally. The only feats of this sort which may be classed as gymnastics, distinct from athletics, is that of leaping with the pole and fixed rope.

The latter is a purely gymnastic exercise, for the rope being a fixture, restricts the practice to a gymnasion. Leaping with the pole is a hybrid—as much of a recreation as a gymnastic exercise—and is by no means restricted to the gymnasion. In old days it was a standard mode for progression across country, especially in the fens, where dykes and not hedges divide the fields; and no local farmer would have deemed his education complete, until he had mastered the use of the pole as a means for going the daily round of his farm. The feat is purely one of activity, not involving any necessary existence of great muscular strength, and may be taken as the first of the series which we shall endeavour to describe.

JOINERY AS A RECREATION.

By Ellis A. Davidson, Author of "Drawing for Carpenters and Joiners," "Drawing for Cabinet-Makers," "Happy Nursery," etc., etc.

OLD BOXES, AND HOW TO MAKE A DRAWING-ROOM CABINET OF THEM.

"Still harping on my daughter," wrote the greatest of English poets; and "Still harping on old boxes" say our readers. Well, yes, we plead guilty to the charge, feeling assured that we are doing a good work in showing how utility may take the place of waste, and how handsome and useful things may be made out of what would otherwise be considered as mere lumber.

We will proceed, then, to show how a cabinet with glass doors may be made for the drawing-room out of an old box, reminding our amateur joiner that the sizes given are merely what "might be," but that any other would do—dependent, of course, on the box to be operated upon.

The size we suppose the box to be of which the cabinet represented on next page is made, is three feet square and ten inches deep; and if such a box is forthcoming, one may be purchased or easily made. The wood should be one inch thick for the sides at least, but for the bottom of the box, which subsequently becomes the back of the cabinet, the "stuff" may be thinned.

On first taking the box in hand, see that it is free from nails; if not free, why then make it so, by drawing them out and plugging the holes very neatly, afterwards punch the heads of the others well in, and plane over the surface so as to get it very clear and smooth.

A plinth or pedestal is now to be made around the bottom; this should be about three inches high, and should be made according to the directions given for a similar portion of the work in the last subject.

When this is done, a shelf or two may be placed in the inside, these should be fixed to ledges screwed against the sides of the cabinet, and the whole of the inside may now be covered with a nice paper—a mental green, lavender, or some such colour should be chosen, in order to afford a good background for china or other ornamental articles which may be placed in it.

And now we come to a very important part of our object, viz., the doors. These will require very careful work, for a pair of good strong frames must first be made.

These frames should be constructed of wood two inches and a half wide and one inch thick, and they should each be exactly
the height of the front of the case and half its width, so that when placed in their proper position they may meet in the middle, and exactly cover the whole front of the cabinet.

The four pieces forming each of these frames may either be "mortised" or "mitred" at the angles. Mortising has already been explained, but to save reference, the cut on page 159 will serve as a reminder. It will be seen that a hole is cut in one of the pieces, and a corresponding tongue or tenon is left at one end of the other, which is then passed into the mortise (b), Fig. 1.

Observe, that in making these frames, the pieces should be cut longer than required, so that they may cross each other at the ends in the manner of the "Oxford" frames; by this method the workman guards against the end burst-cutting out in cutting the mortise; when a couple of neat wooden pins have been passed through (from the back, and not coming quite to the front), or when wedges have been driven into the end of the tenon, so that the angle is perfectly secure, the superfluous ends are to be sawn off.

The other method of joining the pieces at the angles, viz., by mitring, is shown in Fig. 2.

It consists in cutting away a portion of the end of the one piece so as to leave a tenon, and cutting away a corresponding space in the middle of the thickness of the other piece. Great care must be taken that the oblique lines are accurately sawn, so that when the parts are united a perfect right angle may be formed. In addition to glue, a wooden pin must be driven from the back and not quite through the entire thickness. It is also important that the tenon should exactly fit the aperture into which it is to be inserted, for if it should be too thin the joints will be loose, and if too thick there will be a chance of the other portion splitting when the tenon is forced into it.

We will now assume the mere carcass to be thus far finished, but it is necessary to interrupt the construction, and proceed with the staining—treating the subsequent operations as "finishing."

Of course the cabinet could be painted to imitate any kind of wood; but if for a drawing-room, it will look best either in white and gold or black and gold. For white, it should have three coats of good white paint, and then be varnished. If it is to be black, or, as it is now fashionable to call it, "ebonised," the best plan is to give the wood several good washes of common writing ink until the proper depth of color is obtained, or a good black stain may be bought at color shops; when either of these has been applied, the work has to be varnished.

The staining and varnishing having been completed, a frame is to be made of narrow gilt "quarter-round hollow" moulding; this must not be more than half an inch wide, and is to be fixed as shown in Fig. 3, where A is the frame of the door, B the gilt moulding, fixed by half needles driven through the edge, as shown at c. This frame will thus form a "rabbit," against which the glass is to be fixed with putty, as shown at e.

A strip of "three-quarter half-round" gilt beading is then to be fixed to the right-hand door, projecting half way, so that when the doors are closed it may cover the joint. A small bolt may be affixed to the left-hand door to work into a cavity in the under side of the shelf, and then the tongue of the lock will safely work into this door when bolted. The method of fixing locks has been described in a previous paper. The top is to be made of a slab of white marble, about three-quarters of an inch thick, which may be obtained for a very small sum at any marble mason's, ready polished; or the top may be made of wood and covered with white American cloth, but, of course, the marble itself will look by far the better.
The pike may be certainly termed a "game fish" if it is only sought for by the sportsman during those months when it is in its best condition; indeed, we have in the pike as much reckless courage and continued battling with difficulties, during the months of October and November, as we have found in many a salmon. Pike of from six to twelve pounds, at that season of the year, particularly when lightly hooked, will often give the angler considerable difficulty to thwart their many arts to escape; leaping now clean out of water, and now darting off with a lightning dash.

Trolling with the dead gorge has, by some writers, been considered altogether unworthy the attention of an accomplished artist; but it is an art nevertheless, and one which requires great experience to exercise successfully, as we shall endeavour to show. One objection which some have to gorge-fishing is its cruelty, a cruelty more apparent than real in reference to fish which we have known to take not only a second gorge bait to almost the extremity of his hundred yards of line, then seeking the covert of weeds or snags of trees, and giving in only when Nature is exhausted.

This is in the greatest contrast to the conduct of the pike in other seasons, more particularly after they have spawned, and are ravenous for a new supply of flesh and sinew. At such time no true angler ought to kill them—unless in a water in which their absence is desirable—as they then, immediately after they feel the hooks, and a first struggle, will come to hand without further effort, and sometimes actually on their backs. We have no room to go into the natural history of the pike, which may be found in so many works, but must content ourselves with giving the result of our practical and personal experience of the capture of these fish.

There are two general modes by which the pike is taken—trolling and spinning. These styles by some are merged into one, that of trolling. But this nomenclature does neither justice, as the two styles are dissimilar in many respects.

Trolling may, however, include the dead bait with the live bait, the distinction being that there is no float used with the dead bait, and it is generally so with live bait.

Trolling with dead bait may be again divided by the use of the "gorge hook" and that of the "snap hook," the former, as its title implies, being swallowed by the fish, which sometimes is allowed from ten to twenty minutes to do so; and in the other case the angler strikes immediately upon a bite; one or more exposed hooks being used.

Gorge hooks are made with and without wire, but we prefer the latter, and here borrow an admirable contrivance from our friend Mr. Cholmondeley Parnell's "Book of the Pike," which permits us altogether dispensing with the twisted wire.

Fig. 1 in our illustration represents the improved gorge hook unbaited; and Fig. 2 the same when baited, and fastened as follows:—First cut the tail-fin of the bait off close to the flesh, then, with a baiting needle, pass the gimp in at the mouth and out again at the tail of the bait, taking care to
bring it out as nearly in the centre of the tail as possible; then pass the baiting needle laterally through the bait's tail, at about a quarter of an inch from the extremity, drawing the gimp through after it, and finally pass the end of the gimp through the loop thus made at the extremity of the bait, and draw it tight. A sort of half-knot is thus formed, which never slips, and which can be untied in a moment when a fresh bait is required.

Fig. 3 is a smaller size of the same tackle; and the loop A shows the position of the gimp after being passed through the tail of the bait, etc.

In Fig. 1 it will be seen that the Shank of the hook c is left bare for about half an inch above the bend. This is the portion of the hook which lies in the throat of the bait, when adjusted, and the object in cutting away the lead is to prevent that unnatural and unsightly-looking enlargement of the throat and gill which occurs with the ordinary hook, and which renders it necessary to tie the gill-covers down to prevent their catching or tearing in the weeds. It also avoids the necessity of sawing up the lips of the bait to prevent the hooks slipping or shifting, as recommended by some books on trolling.

This mode of baiting a gorge has another decided advantage over the old plan, as by the principal portion of the lead being in the inside it adds to the more natural motion of the fish when raised or left to sink in the water. Mr. Pennell says that its adoption increases the weight of the success of the angler at least twenty per cent., which, although it would be difficult to corroborate, may certainly be the result. The points of the hooks in the gorge should stand outward sufficiently rank to catch some salient part of the pike, or the gorge may be altogether withdrawn by the angler, or the fish throw it up altogether without the desired attachment. Still they should not be so rank as to catch weeds; and in the gudgeon we permit them to follow the inclination of that fish's barbs rather than, as in others, the direction of its eyes.

No link of gimp separate from the trace is required in this arrangement, as the trace, which should consist of about four feet or so of fine stained gimp, can be looped on to any hook in the manner shown in the engraving (Fig. 1, b). Gut is unnecessary in gorge-fishing, when the bait is so frequently amongst weeds and roots, and if used would be liable to be constantly cut and frayed by the long exposure to the teeth of the pike.

We never use swivels in gorge-fishing, and consider them wholly unnecessary. When a fresh bait is required, unhook the gimp at its junction with the running-line, as shown in Fig. 1 (a)—a simple and secure fastening employed in Paternoster lines, and indeed in all other traces and casting lines.

We are now supposed to be by the bank of the stream, armed with our rod, our brass reel (not a Nottingham one), running line, and gorge bait attached. There is no occasion in this style of fishing to use all those niceties which are necessary in the pursuit of other fish, for while you move tolerably quietly along and up the stream, searching for holes and heavy beds of weeds haunted by your prey, you may approach the water almost as closely as is done in perch-fishing from the bank, with this difference, that it is as well to fish the nearer water first before you essay the further distance.

Now draw out a yard or two, and let us see you cast your bait. No, that will not do. You must not hold the butt of the rod at its extremity, but a few inches above the reel, and bring the butt to your side just above your hip, it may touch you if you please; and now, with a gentle swing, the point of the rod raised, cast the bait to the right or the left, as the set of the current may be—always up stream. That was tolerably well done. You see the impetus was quite sufficient to collect up the slack of the line, till then hanging down by your side, and thus give its extra length to the freedom of the bait; but at the same time you noticed that the bait, after reaching the full length of its tether, was suddenly checked, and came back towards you a few inches head-first. This was a defect in your cast, and occasioned by your putting on too much power. The little amount of power requisite to throw certain available distances and the length of slack line you will have to draw out for such purpose you will acquire in time, almost intuitively. But it is a very important consideration, and, when attained, saves much trouble and annoyance. For instance, in this present throw, although you had put on a very little more power than required, that little drew upon the reel, which not giving out line at the same speed as the cast, caused the check we have noticed, and under many circumstances might mar your sport, particularly if you had intended to cast before the mouth of a pike which you could plainly discern, and instead you had either cut him over the back with the descending gimp, or struck him an unnatural blow with the ledged bait.

Now let the bait descend to the bottom. You will perceive through the clear water that it starts and shimmers on its way, and has a gyration motion at times from left to right. This action is due to our scissors, with which we cut off a fin on one side, and a second one—but not the corresponding fin—on the other. Do not, however, carry this trimming process too far, as urged by some pike-fishers, that their removal of all the fins prevents the bait getting caught by weeds. The more you can preserve the natural state of the bait the more certain your success; and for this reason fish the scales of which are easily removed should be handled with great tenderness and care, the shining character of the bars giving a greater chance of its being seen by the pike afer off.

The head of your bait has now touched the bottom of the stream, and what is the consequence? You do not see anything? not that slightest opaque colouring in the water which the current has put in motion, and which your bait disturbed? Now you do. Well, we attach some little importance to that apparently trifling circumstance; for, as the particles fall downward, they arouse the attention and curiosity of any fish that are below, and at once the spot becomes alive with fry, and the larger fish will not then be far off.

Now raise your bait to the surface, drawing and holding in with your left hand a little line; again let your bait sink, and renew this process until you have flashed the water under command, and then cast forth again to another spot and renew the same action, always keeping the bait gently on the move and not quiet for a second.

You have now had several casts without success, and you have doubtless noticed that the bait, when clearing the surface of the water, did so sometimes in a direct downward course, and at others it came with a dash on its side. The latter is another defect, for although there are anglers who maintain that the noise of the descending fish tends the more to secure the notice of the pike, it may do so when they are ravenously on the feed, but our experience has told us that the bait cannot, as a general rule, strike the water too quietly. Indeed, we have purposely followed, in clear streams like the Avon, at a respectful distance, some of the noisy casters, and seeing and knowing that the pike would skedaddie at the noise made by the cast of a pound round thrown as if from a catapult from the rod, have taken by the more silent method those fish which had been aroused and for a time alarmed by the unwonted disturbance.
We have told you always to cast up stream, more particularly if it is beset with weeds or snags. The set of the current will then act upon the bait, and carrying it, slightly guided and raised and depressed by your rod, safety down the runs of the vegetation, thus covering by a very natural process a large area of water. This is opposed to the practice of many pike-fishers of our acquaintance, who are continually getting tied up in their arduous endeavours to stem both current and weeds. They urge that, as fish mostly head up stream, they but imitate Nature; but they forget it is not the rule of small fish to go pooking up or playfully amusing themselves with the tails of their enemies. Again, it is only a practised hand can tell the difference of the contact of a tough weed or snag and that of the veritable bite of a pike, and thus in trolling the doubt may occasion considerable loss of time or lose many a fish.

A “knock” or “run,” as a pike’s bite is termed, is far from being always the same. Indeed, it is capable of being classed, from the sullen touch to the most violent rush, and there are many intermediate distinctions. You suppose you have a run now. Well, give me the rod. See, I draw in the line gently, between my finger and thumb—sensitive parts of our system—until it is nearly taut. I do not feel anything but the tremor of the stream; I tighten it a little more, and there is no reply; I pull slightly, and the bait is free from any impediment and on its passage down stream. It was not a bite.

You think you have again a run. I practise the same art, and this time feel an unmistakable tug. Take the rod, therefore, and pay out sufficient line clear of any impediment of twig or bush, for that was a perceptible “crunch,” which the pike is bestowing on its victim before gorging it. See, the line runs. He is off for his haunt to swallow the bait in quiet, and while he is at his repast we will read you a graphic description of this very scene from the “Angler’s Companion,” by Mr. Thomas Stoddart:—“Suddenly was the bait out of sight when the half-expectations of a fish having seized it took place. No one that ever felt the first attack of a pike at the gorge bait can easily forget it. It is not, as might be supposed from the character of the fish, a bold, eager, voracious grasp; quite the contrary, it is a slow, calculating grip. There is nothing about it dashing, or at all violent; no stirring of the fins, no lashing of the tail, no expressed fury or revenge. The whole is mouth-work; calm, deliberate, bone-crushing—deadly mouth-work. You think at the moment you hear the action—the clanging action—of the fish’s jaws, and such jawbones, so fearful, so terrible! You think you hear the compressing, the sucking of the victim betwixt them. The sensation is pleasurable to the angler as an avenger. Who among our gentle craft ever pitted a pike? I can fancy one lamenting over a salmon or star-stoled trout, or playful minnow; nay, I have heard of those who, on being bereft of a pet gold-fish, actually wept; but a pike! itself un pitying, unsparing, who would pity, who spare? As I have said, I no sooner felt the well-known intimation, than, drawing out line from my reel, and slightly slackening what had already passed the top ring, I stood prepared for further movements on the part of the fish. After a short time he sailed slowly about, conforming his excursions to within a yard or two of the spot where he had originally seized the bait. It was evident, as I knew from experience, that he still held the bait crosswise between his jaws, and had not yet released, and by a moment’s halt indicated that he had taken the hint, and immediately afterwards, all being disposed of at once, pike, out

he rushed, vigorous as any salmon, exhausting in one splendid run nearly the whole contents of my reel, and ending his exertions in the meanwhile with a desperate somersault, which revealed him to my view in all his size, vigour, and ferocity the jaws grizzly expanded, the fins erect, and the whole body in a state of uncontrollable excitement. Being provided with a single-handed rod and windline suited in respect of strength and thickness to light fishing, it was a marvel that either of these stood the test on an occasion so very trying. The worst, however, was over, and although the pike—no fish of its kind under similar circumstances always do—showed signs of remaining strength coupled with great dullness, it nevertheless, in the course of a few minutes submitted to its fate and allowed itself to be drawn ashore at a convenient landing-place, which fortunately was not far off.

But see, your line is running out quietly for the second time. Now you must prepare to “strike.” Gather in all the line which may remain loose in the water. If the fish by its sinuous course (often by being pursued by other and perhaps larger fish) has carried the line round sunken obstacles, use your best judgment in getting rid of these, which, if to be done at all, are always done by gentle means, and then, with a glance at your reel, observe how much line is still out, and by the lifting of your rod see whether you are going to strike straight and true. If you are not satisfied with this, be in no hurry until you are assured that the line is nearly bent enough, which you may learn from the movement of the fish and the precise direction in which the line cuts the water. Strike firmly but gently neither directly away from such inclination or opposed to it but somewhat sideways. The strike should be sharp and short, and, if we may use the term, crisp, but neither violent nor indecisive. Then gather up for the struggle.

Let me now see how you follow our instructions. Well done, to the letter! Keep cool, and the fish is yours. Retain a strain on the line just enough to let him know that he is captive and subject to control—a give-and-take hold—over to your own advantage; he must have line inch by inch. He is a strong and handsome fellow, as I can see, and weighs full nine pounds. Keep him away at all hazards of tackle from that old stump, You can’t hold him? Throw the point of the rod over your shoulder. There, you have turned him! So; now! You have the line around your legs; I’ve cleared that. Now, get in all slack as best you can—for every case of landing a fish will set even a Mentor’s skill at defiance, and, presenting its new features, must be governed by circumstances. No; don’t be too sure, he is not yours yet. Stand a little farther back while we, lying statueque, with gaff in hand, are prepared to secure him. So—he caught sight of you, and is off again; but, see he turns slightly, and that wobble declares that nearly all is over. Yet do not be too sure, as many, too many, a handsome pike has dropped from our hooks without the slightest apparent effort, after a long and hard-fought battle, at the very moment of supposed capture.

There exists a diversity of opinion in reference to whether the pike first pounces a bait and then moves off to his favourite haunt, or goes first to that favourite haunt to pounce it. Although in an attenuated minority, and having watched many hundred pikes take the bait sideways in its jaws and then swim off with it to pounce it anywhere but its presumed home, we admit there are exceptions; but inasmuch as a pike will take twenty, may thirty roach at a meal, we think it more likely, that while out on his search for food, he will not leave his luncheon-ground for home until his appetite is satisfied. The movement after pouncing we are disposed to attribute to a renewed desire for prey, and perhaps a little restlessness at
THE POPULAR RECREATOR.

finding the line hanging from his nose making him fidgotty, as well a thread attached to a piece of meat, half in and half out of the mouth, worry the best of tempers at a dinner-table.

Mr. Fussell says, in “The Book of the Pike,” that the author (Mr. Charles Smart, an attorney at Newark upon Trent) of “Practical Observations,” propounded a theory on the subject of trolling, which, as I do not remember to have met with elsewhere, I shall quote for the benefit of those who may be inclined to verify the fact. “After the pike,” he says, “has had your bait five minutes, take up your rod, and draw your line in gently till you see him (which he will permit though he has not gorged). If you find the bait across the mouth, give him more time, but if he has gorged, govern him with a gentle hand.”

Here, perhaps, our readers will permit us to make a retraction, as this was written in 1861, and we have given this suggestion as original and our own elsewhere, which it could not consequently be. We, however, did not apply the suggestion as Smart has done, for the purpose of ascertaining whether the fish had gorged the bait, but gave it in the Field journal for the benefit of those who might have doubts, while angling in a pike preserve, as to the weight of a fish courting with the bait, and thus save any undersized fish which might otherwise, by gorging the hooks, necessitate annihilation. We are, therefore, glad to corroborate the fact in question, as we have often raised fish thus to the surface in waters thoroughly opaque, and shaken many a small pike from our line which otherwise would have been destroyed.

We have now exhausted all we desire to say on trolling, save that the baits cannot be too fresh, as the pike is comparatively nice in his diet, and will, as Nature dictates, drop all tainted fish from his table for the benefit of less cleanly scavengers of the pool. If, however, you find your bait are not fresh, put on a snap hook, and, following the same rules as here given, strike upon the first suspicion of a run; but in this case you must be prepared for every description of entanglement and bother with which weeds etc. can surround you.

Should you have sufficient gorge hooks, unslip the loop upon the landing of each fish, after striking them upon the head with a mallet carried for the purpose, and extract them at leisure. This is done readily enough when they are dead, as you can feel where the gorge is resident, and with a sharp knife cut down to it and draw it out, not by the mouth but through the orifice.

Should the reel used for trolling be of the Nottingham pattern, the throw and recovery of the line will be according to the directions for the use of that reel. There is not, however, the freedom in trolling with the Nottingham reel, according to our notions, as that which is acquired with the ordinary brass one, although, for spinning, the Nottingham reel possesses its advantages; and, where there is much stubble along the banks of a river, the Nottingham reel is indispensable.

DRAUGHTS.

By George Frederic Pardon.

THE SINGLE CORNER—THE CROSS—THE WHITIERS.

The single corner is very popular with many players, though I certainly consider it inferior to the Old Fourteenth. All the openings should be played occasionally, as it is a bad plan to always begin your game in precisely the same manner. My readers will remember that the opening moves of the single corner game are—Black taking the first move—11 to 15, followed by 22 to 18. In all the published games it is usual to place the black men on the first twelve squares. Let us now play a game throughout.

BLACK.
1. 11 to 15
2. 15 to 22
3. 8 to 11
4. 4 to 8
5. 12 to 16
6. 10 to 15

WHITE.
1. 22 to 18
2. 25 to 18
3. 29 to 25
4. 25 to 22
5. 24 to 20
6. 23 to 18

The usual move now is 27 to 24, in order to endeavour to get two for one, but the move is not sound, as, if Black play the game without mistake, he wins. The better move is 6. 21 to 17 7. 7 to 10 7. 27 to 24;

Black must now move from square 8 to 12, or he will lose a man, thus—White, 24 to 19; Black takes the man, and passes from 15 to 24, when White takes two—28 to 12. The black therefore plays

BLACK.
8. 8 to 12
9. 9 to 14
10. 5 to 14
11. 15 to 24
12. 14 to 17

WHITE.
8. 17 to 13
9. 18 to 9
10. 24 to 19
11. 28 to 19
12. 13 to 27

Black therefore plays

BLACK.
13. 10 to 14
14. 13 to 6
15. 6 to 9
16. 1 to 10
17. 14 to 18

WHITE.
13. 27 to 24
14. 30 to 25
15. 13 to 6
16. 22 to 13
17. 23 to 14

If White move from 9 to 14, Black moves from 18 to 22, and escapes. It will be as well, seeing that in this game neither party can claim the victory, to vary the move of White by its effect. Beginning with the same two moves as before, the game will be seen to assume a perfectly different aspect.
White has now to play, and he moves 27 to 24; let us see what is the result.

The Cross.

And once more White draws the game, with the following position of the men:

\[
\begin{array}{c|c|c}
& \text{Black} & \text{White} \\
1. & 11 to 15 & 1. 23 to 18 \\
2. & 8 to 11 & 2. 26 to 23 \\
3. & 4 to 8 & 3. 23 to 19 \\
4. & 9 to 13 & 4. 27 to 23 \\
5. & 6 to 9 & 5. 30 to 26 \\
6. & 9 to 14 & 6. 18 to 9 \\
7. & 5 to 6 & 7. 22 to 27 \\
8. & 1 to 5 & 8. 16 to 12 \\
9. & 12 to 19 & 9. 16 to 23 \\
10. & 11 to 20 & 10. 22 to 27 \\
\end{array}
\]

and White wins, this being the state of the game.
White has now a man ahead with an assured game.

If, instead of playing 23 to 18 at his second move, White reply by 23 to 19, the opening becomes

THE WHITTLER,

by many considered a strong and safe defence. Let us see:

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</table>

and Black wins, with the following disposition of the men:

White has lost a man, and can only recover it by his opponent making a palpable mistake, which shows us that the game, when thoroughly well played, is a win for the side having first move.

If, instead of moving 8 to 11, at his second move, Black go from 9 to 14, he only succeeds in obtaining a draw:

<table>
<thead>
<tr>
<th>BLACK</th>
<th>WHITE</th>
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</thead>
<tbody>
<tr>
<td>1. 11 to 15</td>
<td>1. 23 to 19</td>
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<tr>
<td>2. 9 to 14</td>
<td>2. 22 to 17</td>
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<tr>
<td>3. 6 to 9</td>
<td>3. 17 to 13</td>
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<tr>
<td>4. 2 to 6</td>
<td>4. 25 to 22</td>
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<tr>
<td>5. 8 to 11</td>
<td>5. 29 to 25</td>
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<tr>
<td>6. 4 to 8</td>
<td>6. 22 to 17</td>
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<tr>
<td>7. 14 to 18</td>
<td>7. 26 to 22</td>
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<td>8. 9 to 14</td>
<td>8. 24 to 20</td>
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<td>9. 15 to 24</td>
<td>9. 23 to 19</td>
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<td>10. 5 to 9</td>
<td>10. 22 to 15</td>
</tr>
<tr>
<td>11. 11 to 18</td>
<td>11. 27 to 23</td>
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<tr>
<td>12. 18 to 27</td>
<td>12. 32 to 23</td>
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<tr>
<td>13. 7 to 11</td>
<td>13. 30 to 26</td>
</tr>
<tr>
<td>14. 11 to 15</td>
<td>14. 19 to 16</td>
</tr>
</tbody>
</table>

and the result is a draw; for, if Black move any other man he must still lose, as will be seen by an examination of the position at this point:

White had the power of moving from 11 to 15, recovering his man, and drawing the game, even supposing that, instead of moving 18...
to 16. Black had gone from 1 to 5, his only apparently safe move.
But suppose Black, at his tenth move, had gone from 11 to 15, in
stead of from 5 to 9, he would have lost; as is proved very simply.

Nine moves on both sides as before.
10. 11 to 15  10. 12 to 28
11. 15 to 24  11. 28 to 11
12. 7 to 11  12. 22 to 15
13. 11 to 18  13. 30 to 26
14. 5 to 9  14. 26 to 23
15. 3 to 7  15. 19 to 16
16. 12 to 26  16. 31 to 15
17. 10 to 19  17. 17 to 3 k
18. 19 to 26  18. 3 to 12
19. 24 to 31 k

White has now a man ahead, and wins perforce, as shown in the
last diagram on page 163.

To thoroughly discuss all the variations of these openings
would require, not a page, but a chapter; not a chapter, but
a volume. Indeed, the lovers of the game—true amateurs—
have spent hours and days and weeks and months in their
elucidation, and have still not determined on any one opening
which is a certain win for the first player. In all the games
given by Sturges, Payne, Martin, and others, the best possible
moves are presumed to be given; but the fact is far different
in actual play, where the least error on either side is likely to
overturn all previous calculations.

In my next I will show you some other favourite openings,
which, after all, are far more important for the student of
draughts than any number of the most elaborate problems.

NOTE.—A correspondent draws our attention to a misprint in the
last game, in page 31, Part VII. In White’s fifth move, substitute
32 to 27 for the move given, and proceed 9 to 13, etc.

BUTTERFLY AND MOTH COLLECTING.

BY THE AUTHOR OF "THE LEPIDOPTERIST’S GUIDE."

THE COPPER BUTTERFLIES—THE BLUES.

Throughout the season, from the end of May to
the end of October, successive broods of the pretty
Small Copper (Polyommatus Phileas), with its black-
spotted, burnished, fiery-copper wings of not much more than
an inch in expanse, enliven our fields, lanes, gardens, and woods; and, indeed, it is everywhere to be met with, settling occasionally on flowers, or depositing its eggs on the sorrel (Rumex acetosa). The collector who does not make up his set of it in his first year, must either have commenced his career in an unusually unfavorable season, or else must be a muff. Not so with its relative the Large Copper (Polyommatus Hippothoe), for any one who could at the present time discover a locality for it, would not only immortalize himself, but would obtain the everlasting gratitude of his fellow-collectors, and would also be surprised at the number of friends who were suddenly anxious to add all sorts of rarities to his collection, quite disinterestedly, of course! No! depend upon it, with the tapping of Xarley and Whittlesea, the Large Copper died out.

Our old friend Mr. Bond, whose personal acquaintance with Hippothoe is probably more extensive than that of any man living, gives a short account of its habits in the “Manual;” he says that “they were very active and shy, and would only fly when the sun shone. They would always settle on a thistle when they could find one in bloom, flying off to attack any insect, no matter what, that might come anywhere near them; not always returning, but generally passing on to another place. It was very little use following them if you missed your first stroke with the net, as they went away like the wind, and seldom let you get a second chance; indeed, it was difficult to follow them, as keeping your eyes on them and the boggy places was rather a difficult job.”

A great many people have fancied that they could find out new quarters for the insect, but nobody to our knowledge has as yet succeeded in doing so. Many years ago a Brighton friend told us that he intended to do the trick some day, but he has been, to say the least, a very long time about it. His grounds for believing the creature still in existence were based upon the yarn of a countryman, who, seeing our friend in hunting costume, observed, “Yer won’t catch no butterflies in these ere parts, like as we see in the marshes where I comes from, about forty mile from here, out yonder.” When asked of what colour they were, he described them as “brighter nor the brightest copper as ever you see;” and when further interrogated as to the markings, his reply was, “that they ain’t got no marks,” and they’re about the size o’ this ‘ere penny piece, oncey if you was to rub this ‘ere coin for a century, it wouldn’t never be a quarter as bright as them ‘ere flies was. No, that it wouldn’t!” and he illustrated his idea by rubbing away as hard as he could at the sleeve of his coat. Whether our friend ever visited the locality in question, we are not in a position to say, but if he ever did visit it, he has kept the result a profound secret. As the countryman’s description of the Large Copper is not a bad one, so far as it applies to the male, we need only add that the female is more marked and spotted with black.

We ourselves once went on a wild-goose chase to Romney, in Hampshire, on the same errand, where we had been told on good authority that the Large Copper had been seen, but though we found plenty of its food plant, the Large Water Dock (Rumex hydrophilus), growing in the dykes, we can assure our readers we had had quite enough of the Large Copper before we got home again. Tales of having seen this coveted butterfly were at one time as common as the penny-a-liner’s paragraphs
concerning the great sea-serpent, but they usually resolved themselves into Tortoise-shells, or, at most, a pair of Small Coppers flying "in company."

May, again, is the commencement of the season for the beautiful Little Blues (*Lycæa*), a very good name for them, though two of them happen to be brown. There must be few who have not met with the Common Blue (*L. aestiva*); certainly no one who has got beyond the bricks and mortar of the metropolis can have failed to have observed it at one time or other. Its male is spotless lila-blue, with spotless white fringes; the wings of the female are of the same colour, but more or less suffused with brown, and there is, moreover, an indistinct row of faint orange marginal spots. The first brood flies from the end of May to the beginning of July, and the second from the end of July to the end of September, so that altogether it has a long spell of existence. It measures from an inch to nearly an inch and a half across the wings, and is abundant everywhere.

The colour of the next, the Silver-studded Blue (*L. eurytheme*), is rather more of a purplish blue, with the hind margins suffused with brown, and the female is generally brown, though occasionally shot with blue. It is a little smaller than *Aletis*; it flies in July and August. Sandy heaths are its favourite places of resort. The blue of the Clifton Blue (*L. adonis*) may be likened to that of a summer Neapolitan sky, a blue which even the large tropical Morphos cannot put into the shade. The female is rather brown. The fringes are, in both sexes, strongly chequered with alternate black and white marks. It is a little smaller than *Aletis*, and flies in May, and again in August. The Chalk-hill Blue (*L. corydon*) is a delicate pale silvery blue insect, with the very faintest suspicion of a greenish tinge. The female is light brown, generally showing sufficiently a few of the pale silvery scales of the male, to distinguish it from the corresponding sex of the foregoing, to which it otherwise bears considerable resemblance; the fringes in this case being also chequered, though not so strongly. Corydon flies from the end of July to the end of August. Both it and its brilliant companion Adonis, are scarcely, if ever, found away from their native chalky or limestone districts, consequently both are local species.

Our next, the Brown Argus (*L. medon*), is a very interesting species, from the fact that it includes three races, each of which have been regarded in turn as distinct species, namely, *Aletis*, occurring only in the south, *Salmacis* only in the midland counties, and *Arasene* only in the north, and in Scotland. All are of a rich brown colour, with a more or less distinct marginal row of faint orange spots, particularly noticeable in the females, which are also brown; but *Aletis* and *Salmacis* have a black spot in the centre of the fore-wing, whereas *Arasene* has a white one; and on the under surface *Salmacis* and *Arasene* have white spots without black centres, whereas the white spots on the underside of *Aletis* are distinctly centred with black. We see, therefore, that *Salmacis* is the connecting link; but we believe the matter is hardly yet thoroughly cleared up. *Aletis* occurs in May, and a second brood of it in August; the others, on account of their habitat being situated further north, are rather later in making their appearance, and are only single brooded.

Now these five foregoing species are characterised by having reddish spots at the hind margins of the under surface of the wings, and the following are separated from them by the absence of this ornamentation.

First, the Little Blue (*L. istrus*) may be regarded as the Tom Thumb of the butterfly tribe. It measures only from three-quarters of an inch to an inch (in large specimens) across the wings. In colour it is dull leaden brown, faintly shot with blue. It is a local species, but not uncommon in its haunts from the end of May to the end of June, and again in August.

The Mazarine Blue (*L. atra*) is still considered by some a rarity, but we believe it has comparatively recently turned up again, though not in any abundance. It was said in a report to have been taken in the Isle of Wight, a most unlikely locality, but Mr. Stainton suggested that it might have gone there in search of its *Gal-ata*, a species which is very common in the island. It is of a deep purplish blue in colour, and the margins of the wings are darker. The female is brown. The Mazarine Blue should be on the wing in July, but we do not know of any recent locality for it.

The Large Blue (*L. arion*) is another exceedingly local species. Its only known locality some years ago was Barnwell Wold,
Northamptonshire, but it has of late years been taken elsewhere (Painswick Hill), and the caterpillar of it was discovered in 1868 by a Mr. Watkins.

In color it is rich blue, with the centre of the wing spotted with black, and the hind margins broad and blackish: it is

display their cornelian tints; but what we wish to impress particularly upon the reader is that they should never be pinched in the net, or consequent disfigurement will be the inevitable result.

Having first shaded our capture with the shadow of our body,

the largest of our Blues. The only other Blue, the Holly Blue (L. argyrosis) has been mentioned in a former paper as occurring in April.

But we fear that if we go on in this strain we shall be giving our readers "the blues," so let us first describe the best way of capturing them in the most perfect condition, and then pass on to something a little more lively.

The Blues are tolerably easy of capture.

It needs no very great amount of exertion on our part to continue to net them as they flit from flower to flower, or chase the females, or alight from time to time to sun themselves, and

to quiet it, a chip box should be placed over it, and then the lid should be dexterously slipped on; by this means we secure our specimens in perfection, for the moment they are in the dark interior of the box, they at once close their wings over their back, and compose themselves for sleep. Another thing that is to be observed is, that we may very often spare ourselves the trouble of running after them in the broiling sun, by waiting until sunset, when they may be found settled on patches of tall herbage, especially grasses, and then they may be boxed by the busy collector in the most leisurely manner possible.
THE POPULAR RECREATOR.

THE AQUARIUM.

By W. A. Lloyd.

IMPORTANCE OF CIRCULATION IN WATER.—WARINGTON’S TROUT.—NO NECESSITY FOR CHANGE.

In my last article I should have said that the word "dirt" is not very definite in its meaning, as being inexpressive of its composition, but is convenient as signifying the presence of harmful matter in places where it should not be. Also, with further reference to the jack or pike, that when he wishes to catch an unsuspecting and quiescent minnow which is only three or four inches from his nose, he varies his tactics, and approaches his prey with a movement not faster than that of the seconds’ hand of a watch; and only when he has lessened the distance to be traversed to about one inch, does he make his final snap. It is stated in many books that jack or pike will not eat tench, that the latter is the former’s physician, and that the jack cures any wounds he has by rubbing himself against the slimy tench. It is an error, however. In an aquarium neither tench nor any other live fish is spared. But it is best not to give him fish having sharp spines, as the perch or the stickleback, as he is apt to injure himself by swallowing them, and even to die of the disease termed by Dr. Badham “Sticklebackitis.”

The four woodcuts at pp. 373, 376, 377, Vol. I., and p. 113, Vol. II., are intended to show, as nearly and as clearly as may be, the amount of animal life that may be continuously maintained in each, with moderate care, and with an intelligent regulation of light and temperature. The latter should range from about 55° to 65° F. in winter, and from about 60° to 70° F. in summer. If pains be taken in the selection of aspect, in the use of fires (diminishing the latter if gas or other source of light employed in the evening give out much heat), in the employment of sun-blinds—internal, external, or both—in the taking advantage of draughts of air, and in the general avoidance of “stuffiness,” then the aquaria represented by those figures can be permanently maintained.

Their contents are as follows:—\(a\), two minnows, one carp, and one stonebasch, none to exceed two and a half inches long; \(b\), twelve sea-anemones and madreporas, the diameter of the base of the largest when closed not to exceed that of a shilling—if a serpula or sabella be introduced, one or more anemones to be omitted; \(c\), six crabs, not larger than from a shilling to a florin, and one star-fish, same size; \(d\), two prawns, two shrimps, one gobie, one benny—Lengths as in \(a\).

Water dimensions:—\(a\) and \(b\), twelve inches diameter, and twelve inches high; \(b\) and \(c\), twelve inches diameter, and four inches high.

In the summer of this year (1873) the highest temperature I observed in the shade out of doors at the Crystal Palace was 92° F., when the water in the tank at page 113 was at 73° F., and all going on right. But if at such a high temperature even a little more life had been then added to that shown, or if a little more were to be added to the suppositional aquaria \(a\), \(b\), \(c\), \(d\), they most likely would have quickly gone wrong. For all that, it is not possible in paper and print to determine proportions of water, plants, and animals with accuracy; aquarium keepers must find out that for themselves by habitual observation, and if that is not very easy always, so much the better.

While I am treating on this to me most seductive topic, I may as well give other instances. A lady in Hamburg kept in her drawing-room, from 1864 to 1867, a twenty-gallon fresh-water aquarium, supplied with a small but constant stream of water from the usual source—the town water-taps from the Elbe—and she told me that she had had very tolerable success. But I never saw the aquarium then, and, from what I could gather, the success was not of that evenly good character which I should have been satisfied with. Be that as it may, in the summer of 1867 she removed to a house in another part of the city, in the suburbs, where the neighbourhood was quite new, and where the iron pipes supplying it were also quite new, and newly-jointed together. The aquarium was again set up in the drawing-room, and a communication made between it and the street pipes; but the water which came into the aquarium was red with the iron rust of the pipes, and otherwise discoloured with deleterious matters, organic and inorganic, or both, and quite unfit for the maintenance of animal life.

As time went on, and the pipes by use became less new and the water better, it was hoped that that which ran through the aquarium would become good enough for the fishes. It did improve, certainly, but it never became quite clear, and never capable of keeping the fishes alive for a few days; and so, after some months of real perseverance, the experiment was discontinued, as it need not to have done had the lady been contented to allow the water to have been purified gradually, by keeping it, and have been satisfied to maintain only as many fishes as she could have done in a streamless aquarium. When I began aquarium-keeping in the Hamburg Zoo, in 1863-4, the neighbourhood of the garden was also new, with new water-pipes, but the water was not fit for aquarium purposes even five years later—in 1869. Was it called “white fish”—dace, roach, bleak, and others—seen to do badly in “hard” water; while others, as trout, flourished in it. But hard water becomes soft by being kept with growing plants in it.

Then, too, when I kept an aquarium-shop in Portland-road, London, I, in 1860, set up a small trout-hatchery arrangement, supplied with a continuous stream from the West Middles Water-Works, the water running away when done with, and not being used again. As it was of good quality, the fish flourished. A few months afterwards a severe frost stopped my supply, yet I managed, with attention, to keep the trout alive; but when a thaw came, the water, which for some days had been imprisoned in the metal pipes, ran into my tank, and immediately killed all my fish.

Now this would not have happened had I possessed a contrivance to circulate the water, but not to change it; for one cannot keep a number of such fish as trout, requiring much oxygen, in a confined space without a current, or without some means of motion which shall aerate the water more than a mere comparatively passive surface contact of water with the atmosphere will do. I believe I was the second person who hatched-out trout in London. The first was Midtdorning, who, about 1854, hatched-out one from an egg in a quart glass jar of water in association with vegetation. When it so far grew as to lose its yolk-bag, and demand other food, Warrington, to give it better chances (so he thought) in this way, turned it out among minnows in a large tank, and he was rendered incommensurable by seeing the minnows instantly devour it.
He was no advocate for currents of any kind in aquaria—at least, so he taught during his earlier experiments—and he even went out of his way to explain that no motion was needed. It seems odd that so scientific a man, and such a philosophical thinker, should have thought thus, and should have confined the self-supporting aquarium theory within too narrow limits. It is probable, however, that he had had some failures, as I and others have had, by using new water, both fresh and marine. We do not know, as Mr. E. W. H. Holdsworth has suggested, that such a motion as is given by a stream of water is advantageous to fishes and other animals as an exercise, so that they may swim against a stream; therefore, it is more safe to believe that motion is merely—in aquaria at least—a convenient means of extending the water surfaces so as to make continuously new contacts with the atmosphere, in order that the latter may be all the more and quickly absorbed. We should always try to follow Nature broadly, and to remember that the air which we cannot see, and therefore are apt to forget, is seldom absolutely still, and that it, as wind, sweeping over so mobile a substance as water, must be to it a source of motion. The most stagnant weed-covered ditch existing, therefore, has some motion given to it in this manner, and absolute stillness is only approached when it is frozen over. More than that, it is not possible to keep any aquarium whatever without its containing within itself the means of maintaining the water in motion. Even the glass-topped glass jar shown at page 57, Vol. I., containing what is called a "old wld," which animal remains fixed to one spot for months and years, has given to it some little motion and some little turning-over of its water surface by the mere opening and closing of the anemone, independently of the other motion which proceeds from the introduction of a pair of forcerps to feed it. As such motion, therefore, cannot be absent, it is lawful to increase it by means I shall afterwards describe, so that in aquaria a larger number of animals can be healthily kept in smaller bulk of water than would be otherwise possible.

I have incidentally mentioned failures from the use of new set-water, and I have known many persons to have lost (from this cause, without knowing it) animals of the sea-side which they would not have lost inland. It is so always when there is an occasional renewal of water from the sea wherever the water is turbid, and the ill result is increased in proportion to the frequency of renewal. It is to this source that may be traced the too-small commensurate biological value of all public seaside aquaria built up till now, when their very large money-cost for erection and maintenance is remembered. That is to say, too much reliance has been by the constructors placed on the facilities which the position of such aquaria give for obtaining new sea-water, and that sea-water is almost always impure, and of much varying density at the shore. Animals may or may not live in such shore water in the sea; but it is a very different thing to living in the same water in the confined limits and measureless and smaller aeration of an aquarium, whence, unlike as in the sea, they cannot escape if they find the water and other circumstances unfit for them.

The advantages of having a marine aquarium at the seaside consist in the ease with which some animals can be obtained without their being carried during a long and exhaustive journey, and in the saving of some of the cost of the first supply of sea-water. But, once obtained, that first supply should be the last, and it should be stored in great dark reserosoirs (see RECREATOR, pp. 128 and 197, Vol. I.), and should be circulated, but not changed; and this is the system adopted in the great seaside aquarium now being erected at Naples, of the construction of which I am the adviser and general arranger.

It is true that if a marine aquarium were to be set up where the sea-water is always clear and equally dense, as, for example, in some of the islands of the South Pacific Ocean, or even in some of our English Channel Islands, then the water could be drawn directly from the sea into the aquarium, and perhaps the animals in the latter would derive benefit from the microscopic food contained in the water in a manner not otherwise possible. But even under these exceptionally favourable circumstances, there would be certainly some disadvantages, which would have to be very gravely considered. In addition, there would be the lack of the great charm of isolation, and of everything being self-contained, as in a microcosm, which was the very essence of the spirit of Ward and of Warington. The beautifully clear sea-water in the Crystal Palace aquarium was in 1870 obtained from Brighton, from where the pumping-engine at the shore supplies Brill's baths, and on delivery at Sydenham it was, in consequence of the locality, neither clear, well-colored, nor of high density, nor in any way fit for the maintenance of animals. These defects were, however, tolerated for the sake of the saving of expense they implied, and the water has become what it now is by keeping it and using it; and in it live not only shore animals, but deep-sea creatures of Britain, Norway, and of the Mediterranean, though while it was becoming fit for them, much was prophesied against it on this score by persons who had not formed the habit of thinking philosophically and broadly. Nine-tenths of the whole population of every civilised country do not so think, however. When new sea-water is turbid from the presence of carbonate of lime or chalk in suspension, it can be quickly made clear by being converted into bicarbonate of lime in solution, by introducing an excess of carbon. A convenient mode of doing so is by having present some hardy form of animal life, as oysters. The operation is assisted by the presence of animal food. The process, however, is a clumsy one, as it is an introduction of one evil (an excess of animal life) to cure another, and the whole thing should be needless.

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CRICKET AND CRICKETERS.

By C. W. ALCORN.

EXPERIMENTS IN BOWLING—HOW TO HOLD THE BALL—EXCESS OF BOWLING—SOUTHERTON ON BOWLING—THE REQUISITES FOR A GOOD BOWLER—PATIENCE AND COURAGE.

You have by this time made your selection, and have profited so far by the instructions as to have fallen into a style of action that has become habitual by reason of persistent practice. So far you have done well, and mastered at least the most difficult of the early rudiments of the art. You have grounded yourself already in the more mechanical branches of the game, so that now you will be able to devote your attention to the scientific application of your powers, and reach even to experiments.

You will have to learn how best to hold the ball, for so much
depends on its course after leaving your hand that every possible advantage in the manner of holding has carefully to be studied. It is obvious that most of the rotatory tendency which proves so effectual in the case of some bowlers, is owing to the method in which the ball is held when it leaves the hand, so that no chance should be allowed to escape in this direction. There are some who deem it to their advantage to hold the ball in the palm of the hand, but the plan is injudicious, and will in no way, I am sure, assist the object in view.

If you come into close quarters with a bowler cunning in device as is Southerton, you will find that he has quite a tight grasp of the ball, allowing the tips of the fingers to touch the seam, with a view to impart the greatest amount of "spin," on the assumption that the fingers have the chief power in ruling the delivery. You will, if you watch, see him sometimes, too, carefully pressing along each side of the seam with the nails of his fingers, with a view to raising the seams, and so imparting to the ball a certain extraneous influence, that may assist its course when the part so manipulated comes into contact with the ground.

You will require something more than a mere facility for accuracy of bowling when you have to meet first-class players, so that you had better make all the necessary preparations as you advance, instead of having to retrace your steps to recover your losses. "What sort of a bowler is So-and-so?" you may hear often enough, and the inevitable reply, "Oh! straight enough; but there's nothing in it." What you want is the talent for imparting to the ball a spin that will cause it to twist, jump, and take the greatest advantage of any inequalities of ground. It may be that at times there are fields so level, turf so well cultivated, and surface so perfect, that the best bowler cannot induce the slightest break into a ball, but it is very rarely that you will be unable to discover something that will help you in giving impact to the ball. Certain peculiarities of action no doubt tend to enable bowlers to procure the desired spin, but generally it may be said to emanate from a certain mechanical combination of arm and wrist. You cannot hope, though, to fathom the mysteries of this rotatory motion from any written treatise, so that I must ask you to judge for yourself as much as possible, by practical experiments, profitably, if within your reach, by the tuition of a well-qualified master. You can do much to help this spin if you study the matter thoroughly, for it is marvellous sometimes to witness the eccentric vagaries incidental to the course of the ball when it reaches the ground propelled from the hand of a bowler who has reached perfection in this matter. You will see that the aim is to encourage, as it were, the action of the spin by a certain throw or jerk after delivery, as if under the impression that the tendency to rotation may be reduced if the process be not continued until the ball has finally left the hand. It is only, too, by care that you will be able to retain this twisting delivery, for overwork has the inevitable effect of deadening the feeling at the fingers' ends, and when this sensitiveness has gone, a bowler may be said to have reached the first step on his downward course.

The difference between a bowler whose vigour is fresh, whose powers are keen and resolute, and one whose muscles are contracted, whose shoulders droop from constant work, is so great, that the former, inferior in skill no doubt, will be vastly more useful in the long run; so that I warn you, above all things, not to persist in shooting at a wicket after you have once felt a sense of fatigue creeping upon you.

I have mentioned Southerton just lately as an instance of a crafty bowler; and here are a few of his ideas on the subject of bowling, so apt that they will well bear reproduction, the more so that no more experienced or observant bowler is to be found at the present time. "It often surprises me," he says, "that there are not more bowlers of merit, as I am quite sure that a large majority of cricketers, both gentlemen and players, could bowl well enough to be of use in a match if they would only try. Of course, to become a skilful bowler requires much study, and I can safely say from experience that it is an art that must be cultivated for many a long day. Any cricketer possessed of a hand and eye quick enough for fielding, as well as a sufficiency of intelligence to but well, cannot fail to bowl if he will only give the art of bowling some time and patience. As far as I know, the art of bowling lies in managing the body in such a manner as to walk or run a few paces to the crease, and then, having the body and arm well balanced, to let the ball leave the hand at the proper moment. The actual movement is purely mechanical, dependent on precision, and the secret of success is, first, a true love of the sport; and secondly, by great patience and practice.

"The spin of the ball, and the judgment requisite to puzzle a batsman are matters entirely of experience, and can only be learned after the bowler has acquired the art of hitting the stumps with certainty as nearly as possible. I do not think—the exceptions only serve to prove the rule—that the very fast or tear-away bowling is calculated to finish a match on a very good ground, unless the bowler is very superior, unless he can make the ball cut across the wicket, or unless the ball shoot from wet or other causes. Fast bowling is very expensive at times, in byes, and snicks through the slips; and a lucky player, by just turning the ball, may score five runs without any skill on his part. My idea is, that the bowler should bowl well within his strength, and should have as his main aim the attempt to weary the batsman's patience by a well-sustained attack. He must expect to be punished occasionally, but it is often the first sign of hitting in the play of a batsman that serves to encourage the bowler. Obviously the first two points to be studied are precision and a certain command over the ball. Look at some of the best bowlers of the North, and consider how some of them have reached distinction. Why, I believe that the supremacy of the North over the South in the matter of bowling is solely due to the persistent study the Northerners give to the cultivation of the art. In the North of England and in the Midland Counties, perhaps from indirect causes, bowling is greatly fostered. I have in some parts myself seen colliers and labourers of all kinds, during their leisure hours, at practice with a ball at a stone or piece of coal on the road or on the moors, no matter where, so long as they can have something wherewith to bowl, at the regulation distance of twenty yards; and the consequence is, that they can almost bowl with accuracy, though I am inclined to think that they very unwise classify perfection as being represented by swiftness of pace, and do not devote sufficient time to the cultivation of skill in slow and medium-paced bowling."

I should like to advocate the claims of slow and medium-paced bowling myself as superior to that lightning delivery affected by some who have not skill enough to secure distinction where success depends on the amount of brains. You will find hundreds of batsmen who can play fast bowling truly and well, but few who excel when they have to cope with men like Southerton, whose pace is so slow as to allow the batsman ample time to deliberate and fidget himself into a glorious state of irresolution. I will undertake that you make a poll of a hundred cricketers, and that you will find at least two-thirds of the number more attached to fast than to slow bowling. You will ask the reason, probably, and I will answer that it is because the delivery of a fast bowler is in every way
more easy to combat. You may be able to produce exceptional instances, such as those of Jackson, Tarrant, Freeman, McIntyre, and Hill, where fast bowling has been to a certain extent placed in comparative subjection; but the cases on the other side of the question will be still stronger. If I were to place you in opposition to any bowler above the ordinary medium pace, you would feel at home, because you would have every now and again a ball that would enable you to give full scope to that favourite cut of yours, or a half volley that you could play forward for five or six with the assurance that the fieldsmen were not placed deep as they are to accommodate the requirements of a slow bowler. You can play many a fast bowler, as you say yourself, "for a week," because you have acquired the requisite amount of mechanical proficiency to enable you to time the ball with the proper degree of accuracy, and the very fact that the ball so seldom deviates from the direct road from wicket to wicket impacts to your play a feeling of confidence which the peculiar gyrations of the ball that emanates from the arm of a slow bowler would seriously disturb. You are more likely to score, too, from fast bowling, and that is a feature that the best of you is not likely to forget. One lunge, and you may make a hit for five, because the fieldsmen may happen to be just a foot out of the mark, and the ball travels at too rapid a pace for him to secure at the right moment. You know, too, that in pitch the excellence emphatically rests with the slow bowler, as his very action renders him less likely to tire; and to maintain a good pitch in fast bowlers requires a rare amount of muscular power.

Do not accuse me of prolixity in thus making a comparison in favour of slow bowling, for I thoroughly support the views expressed by Southerton with regard to its neglected condition of late, and the injustice of such systematic neglect. You will find that if you are accurate and painstaking you will rarely fail to succeed as a medium-paced bowler. Take care of the pitch, and the pace will take care of itself. Chance for a moment at the unvarying success that attends such bowlers as Alfred Shaw of Nottingham, and James Lillywhite of Sussex, and then contrast the chequered triumphs of such celebrities as Martin McIntyre of Nottingham, who, like the month of March, "comes in like a lion and goes out like a lamb." It may be that the latter is a redoubtable bowler enough, with the qualification that "it is his day," as the technical phrase has it; but then at other times he gets shamefully maltreated, and the uncertainty of his achievements is more than enough to perplex.

You are a medium-paced bowler, then, and you have reached a certain degree of accuracy in your own little sphere. You will have to give your attention now chiefly to studying the special differences that you will have a chance of noting in the play of the several batsmen against whom you will have to contend. You have already learned to acquire proficiency in the method of delivering the ball, but you have still to discover the best means of applying your talents. You have to use your head, and to pit your perceptive faculties against those of many a different foe, so that you have yet a lesson which must not be overlooked. In fact, it resolves itself now entirely into a question of your brains against those of the batsman, and it is essentially your own fault if you fail to succeed. You will have many varieties of opposition to encounter, so that you will have need of all your discrimination, believe me. Beware of experimenting; until you have to some extent sounded the depths you are approaching, for the ball that is easy as A B C to one may be the most difficult that you can give to another; and this cannot possibly be discovered until you have gained some idea of the different styles to which you will have to be opposed.

I say emphatically that it is not given to everybody to be a clever bowler, but that, on the contrary, hundreds fail where one rises to notoriety. See for yourselves the various points that a bowler has to study, and you will be able to estimate the difficulties under which he labours. He must be patient, above all things, and not easily discouraged, or he may as well abandon all hope of distinction. You will find few bowlers who can maintain their position the same after being hit for six; but it is essentially this class of resolute players who do become famous, by means of the sheer dogged determination to succeed. You can no more rely on the bowler who collapses because short-slip allows a ball to pass between his legs, or because point, after fanciful contortions, gets so close to the ball as to make the spectators believe that it was a possible catch, than you can on his equally unfortunate fellow, who is a very demon at the practice nets, but the veriest impostor when called upon to display his form in a match. You must be able to stand a blow or two without flinching, or I am afraid I shall have to discard you, if only for a time. Why, to a good bowler the first hit of a batsman acts as a stimulant rather than as a source of discouragement! In these days of superior batting, indeed, a revolution has been worked in the order of bowling, so that now a bowler, instead of directing his fire chiefly with the view of himself destroying the symmetry of a batsman's wicket—as was the case when the grounds were rough and the ball in better eddying than it is now—has to direct his attention as much as possible to the accommodation of his field, in order to render their co-operation of service in the destruction of the bat.

If you do not implicitly believe in this view of the case, try what chances a bowler will have in a match at single wicket, when fieldsmen are scarce, and there are few props to support him, and you will be ready enough to admit the correctness of the idea. So much for the pluck that is requisite in the composition of a good bowler. Of the other necessary attributes, mention must be deferred until my final article on bowling.

PERFORATED CARDBOARD.

By ROSA PENNELL.


POX presenting a niece of mine with a whole sheet of perforated cardboard the other day, I was rather surprised to see, instead of the contented look I expected, one which seemed to say, "I would rather have had any other present!" I inquired the cause, when she told me she had made book-markers for all her friends, and did not know what other purpose she could use it for. She had not seen the pretty borders cut out with a penknife. They are so greatly varied that it seems hardly possible to add more designs to them; and yet sometimes, by a slip of the knife, you find out a fresh one. I will first tell you how to cut them out, and what things to use for the purpose, and then draw you
some patterns. Use a small, sharp penknife, the smaller the point the better it will be. Place a sheet of newspaper on the table, spread out large to catch the chips, as they make a mess and stick to the carpet if allowed to drop, and are very difficult to get off. Place the cardboard upon a dark piece of wood, so as to show up the white, which makes it much easier to cut true. Before beginning to cut, be very careful to look where you wish to cut to, as this work requires patience and nicety of handling. Sharp cuts should be made, so as not to render your work jagged and untidy-looking. I will now show you some patterns, which you can try. Fig. 1 is the simplest I have, and the best to practise upon. Fig. 2 is the same more elaborated, therefore it is best to cut around your marker like Fig. 1, and afterwards, if you like, finish it as Fig. 2; but the Fig. 1 pattern makes a very effective and firm border. Figs. 3 or 4, 4a, 4b, 4c, should be left until your 'practise hand has become more perfect, as they are difficult to execute.

Fig. 1 is useful for needle-books or other little things that are likely to get knocked about, as it is firmer and less liable to catch than Fig. 2.

The next thing we will try shall be a sticking-plaster case, which is one of those simple, useful things which are so quickly made and yet cost so little, and sell so well at bazaars.

Take two pieces of cardboard of equal sizes. Work on one of them a design in the small letters used for working verses on markers.

Sew round the case a border with the same coloured silk; join them together. Then cut out in plain cardboard a piece a trifle smaller. Then double the size of one piece of your perforated cardboard, fold it in half, and tie a piece of narrow ribbon in the middle, so as to have a bow at the top. Sew neatly in it three straps of white elastic, cut the bottom round, and put it into the pocket formed by the perforated cardboard.

I have made numbers of these, and found they always met with a ready welcome from my gentleman friends. You could work a pretty star, or rosebuds, upon the other side of the card.

I have never been able to get a set of suitable letters; but having had so much trouble about it, I have designed them for myself, and will give you my drawing of them. You will find them very handy, as they take up such a little room (Fig. 5).

In the same way as the plaster-cases you can make very pretty cases for postage stamps, putting on the outside of one side "Postage," and "Stamps," in Roman letters, on the other.

A very pretty needle-book can be made with perforated cardboard lined with silk. The cover should have a cut-out border, and in the centre of one should be marked "Needles," and on the other stick one of those bunches of flowers sold at the stationers for a shilling or so a dozen, according to quality.

I will tell you of a thing not generally known, which is that these flowers can be washed with a soft sponge and cold water, and will look as good as new. After having made the covers, bound them, and joined them together at the backs, cut out some fine white Saxon or baby’s flannel, notch or button-hole the edges, and fix it through the middle with a piece of ribbon tied in a bow at the back. Finish it off with strings.

Another pretty souvenir to give to a young friend is a card case. This should be made of two pieces of cardboard, a little larger than the cards to be placed in it. Work on one side the name of the lady, and the address on the other. Cut a double border all round, and line it with a pretty-coloured cardboard, to show through, and make it stiff. The sides should have a piece of paper folded and gummed in, to form a gusset, like you see in portemonnaies, and an elastic band or narrow ribbon strings finish it off. Another thing for a present for a lady is a fan, which is really very handsome when tastefully cut out. It is easily made. If you take an old fan to pieces, and take one of the sticks, cut the pattern out first in ordinary cardboard, which lay on the top of the other, and cut one like it. Curve it according to what your fancy and the shape of the sticks will suggest, being careful to leave a space to run the narrow ribbon through. The outer sticks should be lined with colour, and the whole finished off with a tassel.

I forgot, when I was upon the subject of needle-books, to tell you of a new kind I have been making this winter. Cut four pieces of cardboard this shape (see Fig. 6). On one work the initials, in Roman letters, of the person you intend it for; on the other, the year. Place the two together, and bind, them all round with narrow ribbon. Join at a by sewing the binding of one to the other; place a bow of ribbon at the back, and string to tie; stick pins all round end side; place two pieces of flannel inside for needles, as is the other needle-book. I have made some of these for some school-boys, and have received in return enthusiastic letters of thanks.

A lady showed me once how to make some pretty handkerchief-cases and baskets in the perforated card. The handkerchief-case should be twelve inches long and ten wide. Two pieces should be cut out alike, a pretty border cut round, and a bunch of bright flowers worked in the middle of one side, "Mouches" on the other; quilt a bit of silk with wadding between, which scent with a little otto of roses, or other strong perfumes; bind it with narrow ribbon, and join it with narrow ribbon bows and strings to match. To make baskets, cut four pieces of cardboard of equal sizes, cut the edge at the top like one of the pointed borders, work a spray of leaves or flowers on each, and join it to the bottom of the basket, then join with little bows down the side.

Another pretty present is dinner-napkin rings. These may be worked in beads on the cardboard, with the name of the recipient or "Bon Appetit" on it. Music-rolls are made in much the same fashion, with "Musique" on them.

A correspondent gave me the following directions for making cornucopias in cardboard:

"Take a piece of cardboard seven inches or nine inches square. Work with coloured wool squares of five holes each way, leaving blanks of exactly the same size between each. The Afghan stitch is prettiest, but tent will do. Sew in each blank a crystal, gold, silver, or wax, bead-line with silk or glazed muslin, bind with narrow ribbon, fold into a cornucopia, and sew into shape; add bows at the corners, and a ribbon across to hang it on the glass by. Pretty mats can be made in the same way, only omit the beads and border, and with quilled ribbon stitched on with gold-coloured braid. And now, as I have told you how to make so many things with the plain flat designs, I think I will teach you how to do the raised work, which forms a very pleasant change from the other. The raised work makes a handsomer box than any other pattern, and also stronger. This work requires great patience to execute. The gum to be used should be the best white gum Arabic. Tell the chemist you want it for eating, and then you will get the proper sort, and you should make it very strong, and use a fine camel-hair brush to apply it. Keep a clean handkerchief by you to press your work with."

To make a glove-box, take a piece of plain cardboard ten
a half inches by three and a half wide for the bottom. Be very particular to cut it even. You will then require two pieces ten and a half inches by two and a half for the sides. A pretty-coloured cardboard should be used, as it forms the lining for the box. It must also be strong enough to give stability to your work, as the raised cardboard, being heavy, requires a firm foundation. You must then have two pieces three and a half inches by two and a half for the ends, and a piece the same size as the bottom for the lid. The next thing to be done is to cut the same shapes in perforated board, except for the bottom, which does not need it. You will be able to tell that your lining-board is cut correctly, as the perforated being the same size you can count the number of holes, and make them exact. Of course, the height of the ends and the sides must be the same. I cannot tell you the number of holes, as it will vary according to the coarseness of perforation used. Cut all round the border, as in Fig. 1, and for the raised work leave one hole each side, and at each end, and cut out a piece of cardboard to size, which gum on. The next piece must be two holes shorter and narrower, and so on until there are no holes left on the top one. For the lid I should work the word “Gloves” on a narrow piece,

![Fig. 8](image)

with a pretty border round. The raised work should then be proceeded with until the piece is just the size for it (Fig. 7). Bind all round each piece separately with narrow ribbon, and sew them neatly together. These boxes sell well at bazaars, and look like carved ivory. They of course need great moisty and cleanliness of work, as, if you leave gummy finger-marks on your work it gives it a very disagreeable appearance, and detracts considerably from its value.

The next thing we will try shall be a photograph frame (Fig. 8), which is very elegant. Cut out a piece of cardboard the size you wish your frame to be. To make it easier for you I will make a little one. Take, say, six holes deep all round, and forty-four holes each way outside. Gum this on a piece of plain cardboard. The next piece will have to be four holes deep and forty-two outside. Place this after gumming it on the top of the other, letting the holes of the one come to the middle ones of the other. It is just as well to give it a stitch or two here and there, as it keeps it in its place. The next will be forty and the depth two. Proceed the same. The last will have no holes at all, and will be thirty-nine across. Bind round the centre a strip of gold paper. Be careful to fix it well round the corners, back it with glass, which should be ginned on, over which place a piece of thick cardboard, with a door cut in it to let the picture be placed in; then round the glass and the two cardboards bind a strip of gold or coloured paper. We will now make a review of all we have learnt, and see what other useful and ornamental things we can manage. In the first place you have learnt in raised work how to make book-markers with carved borders, needle-books, napkin-rings, music-cases, sticking-plaster cases, card-cases, fans, mats, and cornucopias, and in the raised work a glove case and photograph frame.

I will teach you how to make one of those frames with thread over cardboard you were asking me about the other day, and then I will go back with you to the cutting-out. I am indebted to the Queen for the directions, which I have copied verbatim. The articles requiring for making them are millboard, brown sewing cotton of several shades, and eight small steel pins with black glass head-heads. Cut two pieces of the cardboard, each about four inches by four and a half inches square. For a carte-de-visite they must be even, perfectly square, and of the same size exactly. Glue one upon the other diagonally, so as to form a star with eight points and eight angles or corners (observe the distinction between points and corners), equi-distant from one another. Place the carte to be framed in the centre, between two opposite points. Tie the cotton across the cardboard from one corner to another, i.e., along the length of the photograph, the knot, of course, being at the back (the side of the card on which the photograph is not); wind the cotton carefully and tightly round, say twelve or fourteen times, taking care that the threads lie evenly and closely to one another; then take the cotton to the next corner backwards, and wind it round the card to the opposite corner twelve or fourteen times as before, and so on till the whole is covered.
ELECTROTYPING.
By Charles Hibs.

THE SOLUBLE MOULD—A BETTER PLAN—A CAST IN PLASTER—A CAST IN WAX—TO PREPARE THE FIGURE—THE COPPER MOULD—DIVIDED MOULDS.

The elastic mould described in our last article, being made of a material soluble in water, has this great disadvantage, that if the copper deposit be not formed upon it quickly, all the fine features of the impression will be blurred agglomeration of grains of metallic sand; and we have now, more than ever, need of a good, hard, malleable deposit to form the shell of our figure. Therefore we should advise all our friends to give themselves a little trouble, and pursue the following method, which is the alternative one we promised at the conclusion of the last paper.

Bind up the closed mould with oiled brown paper, tied with tape or string. It will be useful also to place a few pieces of thin wood round it, under the string, to serve as props, and to enable you the more readily to move it about. Then cast a

Fig. 1.—Adam Awakening.

away while it is soaking in the sulphate solution. The young electrician might be tempted to hasten the process of deposition, by the means now at his command, viz., increasing the intensity of his battery power, but such a course would be on no account advisable. We have already stated that a deposit too quickly formed would very likely be no better than an
figure in it, in wax or plaster of Paris, according as the subject is large or small. For a large figure, plaster of Paris will be preferable on the score of economy; but wax makes the best casting, and should always be used for small objects. We subjoin precise directions for both.

To make a Cast in Plaster.—Procure the finest plaster of Paris—sold in powder, at any drayalter’s, very cheap. Into a basin of sufficient capacity pour as much water as would, in your judgment, fill the cavity of your mould. Then take your packet of powder, and with one hand shake or sprinkle it into the water, very gradually, while with the other hand you stir up the mixture till it is throughout of the consistency of thick cream.

It is now ready for use, and should be used without delay.

Have your mould ready, and hold it in a leaping direction while you pour in the liquid, rolling or swilling it round as you do so. The principal thing to guard against is the retention of air bubbles in the cast: you must endeavour to let every particle of air escape as you are pouring, before the plaster has time to set. Therefore, pour steadily but gently, and continually roll the mould about—a little practice will enable you to do it cleverly. Also, keep tapping or shaking the mould lightly to ensure the plaster getting into all the crevices.

When the cavity is quite full, let all stand till the plaster has set round the outside well, it being still liquid in the middle. You can pour this out now, and lighten your figure by making it hollow, as are the plaster figures you buy from an image vendor.

After a little while, you will be able to make your figures as light as he, as you get to know by practice the exact moment when the plaster is hard enough to form a good sound shell. Let it stand in the mould for some hours after, to make sure, and then, having untied your bandages, let some careful hand take out the cast, while you hold the mould open as before. If you are only moderately neat-handed and careful, the elastic mould will serve to take many casts from, in this way.

The figure must be well dried before a fire, or in a moderate oven, before you do anything further with it. You will find some excellent instruction for the management of plaster in Mr. Wall’s paper on “Casting,” p. 318, Vol. I.

To make a Cast in Wax.—Melt white wax and resin, equal parts, in a ladle over the fire, adding a little suet, or what is better, deer’s fat, to the mixture. When all are well melted and mingled together, add a small quantity of white lead, and stir it well in.

The whole should be allowed to set, and be remelted two or three times, before being used for casting, in order to ensure that all the ingredients are thoroughly blended together. The resin is wanted to harden the material, and make it retain a sharp impression, while the lead plays an important part in two ways:—it binds the other substances together, and prevents the cast from cracking while it sets; and it also adds weight, which is useful when the figure comes to hang in the copper solution. You will see the importance, therefore, of being very careful with the mixing. Let the liquid boil well over the fire, and stir it about as long as there is the slightest effervescence.

When it appears to be sufficiently well prepared, melt it again for the last time, and allow it to stand till it just begins to set, when pour it immediately into the mould, in the same manner, and with the same precautions as described for plaster.

In this case, as the last, it is only practice that will enable you to judge precisely the moment for the operation; but you will soon acquire dexterity, if you are in earnest. If you pour in the wax too hot, you will destroy your mould; if too cool, it will not take a good impression. Let it have plenty of time to set—seven or eight hours in a cool place—then open the mould, and remove the figure, as before.

Of course you will apprehend that these figures are not your depositing moulds, but only the objects from which moulds can be made. The method we recommend is that you should first deposit upon them, and that the deposits you obtain should serve as the matrices for future deposits. We shall endeavor to render it clear to you how this can be done, but we must warn you that in some stages it will be a delicate and difficult operation.

The next process is, however, easy. Cover the figure well with dry black-lead, in the manner formerly described, and fix conducting wires to it in several places, to make sure of an even deposit all over the surface. You will find that the copper will have a tendency to grow on the prominent parts, and leave the hollows bare, unless you prevent it by the artful arrangement of your guiding wires. The best way will be to form a sort of sling, or cage of wires, the ends hooking under the hollows of your figure, in parts where a slight blench will not be of much consequence (Fig. 1). The wires need not enter; it will be sufficient if they are merely in contact; but you must be sure that every part of the surface has been made conducting with the black-lead. Paint over again the parts when the wires touch, also a small portion of the ends of the wires.

You must allow this to receive such a copper casting as will suffice to make a shell of sufficient rigidity to bear handling, after the figure has been dissoluted out of it. Yet it must not be too thick, for reasons which will hereafter appear. If it is the thickness of ordinary brown-paper it will do. You will see the great importance of having an even deposit. If the copper seems to be attaching itself to some places and neglecting others, shift the position of your wires, or all others twisting them round those which appear to be the best conductors.

It will sometimes be quite sufficient to shift the position of the figure in the solution, or to turn it round. Careful watching, and readiness to see mischief, and to repair it with the dexterity which practice alone can give, will enable you to accomplish with perfect certainty this important stage of your work.

When you have got the copper mould complete and sound, there are two things you may do with it. You may deposit a second figure within it, and destroy it; or you may make it into a permanent mould, and deposit any number of figures within it. If you decide to be contented with producing one object (much the safest decision for a beginner), the first thing you have to do is to get rid of the interior figure. Nip off the ends of your wires (this is better than pulling them away, as that is apt to tear the shell), and boil in a cæsurion for some hours, changing the water several times. This will melt out the wax, or dissolve the plaster, as the case may be.

For a tolerably simple figure in alto reliefo, such as Fig. 2, when you can pretty well see into and reach all the cavities from the back, this will be sufficient; but for a figure like the subject of our first illustration (“Adam Awakening”) it will be absolutely necessary to cut it into at least three or four pieces.

We would not advise you, however, to begin with a complicated work like this, which we have only introduced to show more perfectly the method of sling, etc. Should it be a figure the
interior of which is not easily accessible in every part, you must divide it, for remember you have something else to do besides clearing it from the mold, and that is, to coat it with black-lead; not now for conductivity, for the whole surface is eminently conducting, but to prevent your deposit from adhering to it; in other words, plating it. You will perhaps be obliged to obtain the assistance of some practiced hand for this; but if you are bold enough to essay the operation yourself, get somebody to hold the figure firmly while you divide it with a fine saw in the line that you think will best answer your purpose, then get out the wax or plaster in the manner described, and in the case of plaster make sure by rinsing the parts with a pretty strong wash of dilute nitric acid. Well dry the shells, and coat all the interior nicely with black-lead, and then, having arranged your arterial system of wires, close the parts again accurately at the cut, bind them tightly together with wire, immerse in the depositing solution, and connect with your battery, and leave Nature and electricity to do the rest.

The mould must remain in the solution till a good thick deposit has had time to form, when you will take it out, remove the binding wires, and, beginning at the separation, peel off the thin copper covering till the figure is left bare. Now is the critical moment. It will be very pardonable if you are nervous about the result of all your care and trouble. If the figure comes out perfect and clean, the excitement of success will well repay all the pains you have bestowed. If, on the other hand, there should be an ugly gap here and there, or failure in any form disappoint your hopes, do not be discouraged, but endeavour to fathom the cause; and, deriving valuable lessons therefrom, try again and again, until every difficulty is overcome.

Should you be desirous of retaining your mould as a permanent matrix for further operations, you must bake it up, before removing the figure inside, with something that will make it solid. Wash over the outside with chloride of zinc, and then dip it several times in a bath of melted tin and lead.

The alloy will adhere to the copper, and you must repeat the process until you think it is strengthened enough. It must then be divided with the saw into as many pieces, and in such a way, as will enable its kernel, the figure, to come away without damaging any of its underparts. This will be exceedingly difficult with a complicated figure, but it is not impossible. All the plaster figures that we see exposed for sale have been cast in moulds of many pieces joined together in the way we indicate. It is a very ingenious craft to fabricate these moulds, and not by any means to be mastered by the amateur at his first essay, but an amateur of the right spirit will not begin by attempting the highest walks of his art. You will not commence with such as Fig. 1, but Fig. 2 will be quite within your capacity.

Some electrotypers prefer to deposit on the separate pieces of the mould, and afterwards to join the parts of the figure by soldering.

This is indeed most usually the method adopted at all the large establishments where such work is professionally carried on. It has the great advantage of enabling the operator to see how the deposit is forming, and to regulate it when it is going wrong. But to join a figure neatly together, and "repair" the junctions so that no blemish will be visible, requires the hand of a skilled artisan.

The general advantages of this alternative method are these:

You can easily repair your wax or plaster model, if it should be faulty, and make it like the original; you can depend more certainly upon a good deposit on account of the better conductivity of the material; you can better watch the process at every stage. We conclude with calling your attention to the following

Precautions.—Paint or wash over the interior surface of your elastic mould with sweet-oil before casting in it the wax or plaster figure. Saturate your plaster figure with melted wax before exposing it to the acid of the copper solution.

File off the "burr" left by the saw on the inside of the cuts in your copper shell, otherwise it will make a very ugly mark on the deposit.

Do not forget to stop off the conductivity of your copper mould on the outside with varnish, or the deposit will run all over it. Any kind of resinsous varnish will do.

Have patience, and be careful.

TOY-MAKING AND TOY-GAMES.

THE MAGIC FAN.

ANY one who has moved much about the streets of London must have come now and again on a man engaged in selling a very odd paper article, known as The Magic Fan, and sometimes also called "The Japanese Fan," or "Puzzle-Wit or Trouble-Wit." Round him usually stands a crowd of urchins and street-idiots, observing with admiration the dexterity with which he folds the fan into a host of different shapes. Now, the manufacture of this article is what I mean here to describe. It is one of the most curious toys you will meet with anywhere, and so simple in construction that you can make it in a few minutes.

Get a piece of good stout paper—say twenty-four inches by nineteen, though it may be smaller if you like—and measure it into six equal parts, marking the divisions in the margin with a pencil, as shown in Fig. 1. Double the paper; it will then be as in Fig. 2. Fold one half—the upper half—
outwards, making the fold at a a. When that is done, double inwards the piece of paper you have just folded outwards; this will bring the the points b b to lie on the top of the points a a.

Turn the paper over and fold the other half in precisely the same way. When all is finished, the paper will be like Fig. 3.

Look at the edge a a a, you will find two openings between the folds. Look at b b b, you will see three openings. It is these that are between sixty and seventy; but it is enough for our present purpose to indicate the most interesting of them.

First of all, however, take notice that every time you change the form of the fan, you must pinch the paper well together, so that the folds of the plait may remain strongly marked. You must do this with a motion of the hands, very much as if you were shuffling cards. Unless the folds are kept in order, the fan cannot be worked properly.

To produce the first form, catch the folded paper (Fig. 5) at the foot with both hands, and spread out the top, when it will appear as a fan (Fig. 6). Insert the fingers at a, and pass them round to b, raising the paper; the fan will take a new shape (Fig. 7). Insert the fingers now at c, and pass them round to d; the fan will take a third shape, and will become what one might call a double-action fan (Fig. 8).

Catch the paper by the part now uppermost, pinch that part
well together, the paper will take the form of a sugar scoop, "or any other kind of scoop," as the street-sellers are very
careful to explain (Fig. 9); the part which was uppermost of
the fan becomes the handle, you see, of the scoop.

Flinch the paper into its original form (Fig. 5). Lift up the
upper part, a, bring the lower plaits, b, well together, and
with one hand arrange the upper part, so as to form the head
central folds well together, you will produce something like the
paddle-wheels of a steamer (Fig. 13).

Open the paper out again, catch it at the two ends, and
without any difficulty you will get it into the form of a beef-

tater's hat (Fig. 14).

Make the paper take again its original form (Fig. 5), catch
it at both ends, and fold it so as to represent Fig. 15—this is

![Fig. 10](image10)

![Fig. 11](image11)

![Fig. 12](image12)

![Fig. 13](image13)

![Fig. 14](image14)

![Fig. 15](image15)

![Fig. 16](image16)

![Fig. 17](image17)

![Fig. 18](image18)

![Fig. 19](image19)

of a mushroom (Fig. 10). A new form may be got by raising
part of the double head of the mushroom.

Reverse the paper, and spread out the lower part, so that it
may become the body of a wine-glass (Fig. 11). What was
formerly the head of the mushroom will become the foot of the
glass.

Open all the paper out, and twist it round, it will take the
shape of a Chinese lantern (Fig. 12).

Catch it now by the central part, and, by compressing the
a rosette for a lady's shoe; something like one of those shoe
roses which used to be very fashionable at the court of Queen
Elizabeth.

Draw the paper out, it will be like a table-mat (Fig. 16),
Raise up a and b, Fig. 14, and you will make a dish, as in
Fig. 17.

Press the paper inwards, and the result will be a form like
that of an inkstand (Fig. 18).

Draw the paper out, and let it loose at the foot, you will get
A SENTRY-BOX (Fig. 19). And so on. In addition to these forms, you may produce a spiral staircase, a sofa, a chair, a garden seat (over which you can erect a cover, if you like, to shield it from the weather), a flower-pot, a church-window, a window-blind, an officer’s epaulette, a servant’s cockade, a missionary-box, an old woman’s cap, or “mutch,” as it is called in the North, etc., etc., etc. A little ingenuity and a little patience will enable you to obtain a surprising number of figures.

You should turn the fan boldly about in all directions in quest of new shapes. Do not be afraid of spoiling it, for you can easily enough make another.

ARCHERY.

By MAJOR ROUG.


In the original deed for the regulation and endowment of Harrow School, dated 1590, it is directed, “You shall allow your child at all times, bows, shafts, bow-strings, and braces, to exercise shooting.” In consequence of this clause, it was formerly the custom to hold an annual exhibition of archery, when the scholars contend for a silver arrow, the chosen competitors being attired in spangled dresses of white, green, or scarlet satin. Indeed, it was altogether a ceremonious affair, every hit being saluted with a concert of French hunting horns, and the winner of the silver arrow carrying it home, followed by the whole school in procession, with music, etc., and a ball finishing the day.

On July 5th, 1765, some Iroquois Indians, who had been brought to England, were taken to see the shooting, and getting excited, wanted to be allowed to compete: one of them thought he could beat Master Davies, the winner; and as he probably had studied archery under the best of masters, Professor Hunger, he might have done so. The last time the arrow was shot was in 1816.

Roving is to archery what skirmishing practice is to the rifleman. The competitors have no pre-arranged mark, but wander about and select any object which takes their fancy at the moment to aim at; a tree, a patch in a paling, or a notice-board threatening trespassers with the utmost rigour of the law. A crow is sometimes selected as a fitting target, but unless the first arrow is a very wide one, he is apt to fly away before the second archer can get his shot.

There seems to be no reason why young rooks and rabbits should not be shot with the bow and arrow; our forefathers could hit pheasants, herons, and wild ducks on the wing. A great drawback to roving is the loss of arrows, which renders it a somewhat expensive amusement to those who are not able or willing to manufacture their own.

Flight shooting is simply seeing how far you can send an arrow, and is therefore rather a trial of strength than skill, and not to be compared for interest with aiming at a mark.

The Turks, who are fond of flight shooting, have a contrivance by which they manage to add considerably to the distance attained in shooting; this is a tube of horn, some six inches long, which is fastened to the hand holding the bow in such a manner that the arrow can be passed through it, and so be drawn back several inches within the bow handle. Thus, a small light shaft can be propelled with the force applied in the ordinary way to a longer one. Using one of these tubes, a Turkish ambassador once shot an arrow 480 yards, in the presence of several members of the Toxophilite Society; but this is nothing to the feat performed by the Sultan himself in 1798, who, in the presence of Sir Robert Anjilie, ambassador to the Sublime Porte, drove a shaft 972 yards. Possibly there may have been a breath of wind at the time, and the Sultan shot perhaps with, and not against it.

All works on archery treat of the cross-bow probably because William Rufus was killed by a shaft from one; or because it was the weapon of that historical Mrs. Harris, William Tell; or because Queen Elizabeth used to shoot deer with one; or for some other impractical reason. Those who take an interest in ancient weapons will, of course, include the cross-bow, but it has nothing whatever to do with modern archery. It does not afford exercise, and the skill required for its use is of the same description as that cultivated by the use of the rifle. In fact, you might as well shoot with an archer to the target as with the cross-bow. It is obsolete; but I could not pass it without an apology, for all the many Toxophilite books refer to its confirmation or correction of what is laid down in this treatise, every one held forth upon the poor old weapon. One of its more modern works mentioned above, that of Hansard, contains certain suggestions for the commencement of practice with the bow which are very thorough, and if carried out to the letter, would surely make an archer of any one who was not physically incapacitated in some way.

“The first distance,” he says, “should not exceed ten yards; at which, after a month’s diligent practice, he will be able to strike a tennis ball suspended from a string many successive times. Let him then remove it to twenty yards; and acquire a similar degree of dexterity at that distance, his next step will be the extreme point-blank range of his bow.”

The same instructor likewise advocates shooting at lanterns, after dusk, as the best method of learning to shoot straight, and consoles any ardent Toxophilite, whose enforced residence in town interferes with his practice, with the hint that the gas-lamp opposite his sitting-room is an excellent target: “I do not mean that he is to shoot at it,” he hastens to add, “merely to elevate his arms in the attitude of drawing a bow will assuredly produce the same effect.” Which is almost too confident an assertion perhaps.

A correct eye, strong arms, and a good position, will enable the archer to shoot straight, but “keeping a length is only to be acquired by constant practice. The point-blank range of a bow and arrow is so very short that in target shooting you are never within it, but always have to shoot upwards, so as to
pitch the arrow on the target, as it were, and the further you
are from the mark, the higher, of course, you must shoot, till
you reach the angle of forty-five degrees, beyond which the arc
described by the flight of the arrow will be shortened instead of
lengthened. Archers sometimes endeavour to find the proper
elevation for sixty or a hundred yards by making marks on the
glove of the bow-hand, but the best authorities are agreed that
all such attempts are futile, and that sighting must be left to
the rifleman. It is well to this that such be the case: archery is
a trial of skill, and the interest would be greatly diminished
if the principal difficulty could be evaded by a mechanical
contrivance.

The effect of the wind upon an arrow is very great. When it
is a side wind you must allow for it in a lateral direction; when
an up or down wind the elevation must be modified.

Should the arrow fail off the bow while you are in the act of
drawing, it counts as a shot if it is beyond the reach of your
bow: otherwise not.

**Target Shooting.**—A pair of targets are set up opposite to one
another, at sixty, eighty, or one hundred yards' distance, and
the party (eight being the largest number usually allotted to
one pair) take their stand immediately in front of one, and
shoot at the other till the number of arrows agreed upon has
been expended; when the “end” is over, they all march in a
row across the ground, and proceed to gather up their misses
and extract their hits, the marker scoring each arrow as it is
drawn out. Then they shoot in a similar manner at the other
target, this time in order of merit, the most successful taking
the lead, and the lowest scorer shooting last.

**Club Rules.**

These, of course, vary very much in different societies;
but for the benefit of any archers who are forming a club, and
want a foundation to start upon, we will give the regulations
of the old Reading Club, the East Berks archers, which have,
we believe, been followed by many younger associations.

1. The committee shall consist of the president, with a
   casting vote as chairman; the secretary, who shall represent
   the president, and possess his casting vote in his absence; and
   nine master yeomen, with power to add to their number. Not
   less than two of this committee, with the president or secretary,
   to form a quorum, and to meet at their discretion for the
   ordinary business of the club.

2. On days of bow meeting, the committee shall be on the
ground one hour before the general assembly, to discuss matters
   of business.

3. At the last annual bow meeting, the committee shall appoint
   a day for holding a general meeting of all members of the
   club wishing to vote for the amendment of existing rules
   or the adoption of new ones, but no alterations shall be pro-
   posed which have not been posted conspicuously at a previous
   bow meeting. The president shall then nominate the Lady
   Paramount. Members who have not paid subscriptions or fines
   shall have their names erased, but shall be eligible for re-admis-
   sion on payment of arrears and a new entrance of 10s. 6d.
   The secretary shall lay his accounts before the meeting.
   Officers for the future shall be elected.

4. No candidates for admission shall be balloted for whose
   names shall not have been entered at a previous bow meeting,
   together with the names of their proposers and seconders, one
   of whom must be present. One black ball is seven to exclude.
   Ladies may appoint, in writing, any member to vote or ballot
   for them.

5. The secretary shall act as treasurer, and, with the appro-
   bation of the committee, fix the days for bow meetings (giving
due notice to members), and make all arrangements. Postage,
printing, and all incidental expenses to be charged to the club.

6. The annual subscription shall be—for gentlemen, £1 5s.
each, and for ladies 15s. each, to be paid in advance on the 1st
of May. Every member of the club to pay 10s. 6d. entrance.

7. When two sisters in a family subscribe, they may, in case
   of non-attendance, transfer their rights to other two sisters.

8. No member shall shoot or vote till his or her subscriptions
   and fines for the year be paid.

9. Every member may bring friends to each bow meeting,
giving two days’ notice to the secretary, but they must not be
resident within ten miles, children excepted.

10. The dinner and ball at each bow meeting having been
arranged by the secretary and committee at a moderate rate,
every absent member will be charged 5s. towards the expenses
of the day, unless notice of intended absence be sent to
the secretary two days previously. Members giving notice
will be charged 2s. 6d.

11. Shooting shall begin at half-past one. Dinner, at the
hour appointed by the secretary. Shooting shall be resumed
after dinner, and cease at seven o’clock. Dancing, in morning
dresses, to commence at such time, between seven and eight
o’clock, as the Lady Paramount shall direct.

12. There shall be no exceeding five bow meetings in the
year. The prizes to be shot for at the last meeting.

13. The Lady Paramount may appoint a representative.

14. Members who have been obliged to withdraw their
names, in consequence of a change in the society’s place of
meeting, may be re-admitted without ballot or fresh entrance.

15. The unmarried daughters of members of the society are
eligible as subscribers, without ballot.

**Shooting Regulations.**

1. The Lady Paramount and committee shall have absolute
authority in keeping order on the ground, determining all
doubtful points, and enforcing the regulations by a fine not
exceeding five shillings.

2. Any gentleman appointed by the committee shall call up
shooters in their order, and mark the spot from whence they
shall shoot. Any one overstepping the mark, or not answering
the call, shall lose the turn for that end. Every person shall
fly round to the right, after shooting, the place to be imme-
diately taken by the next in order.

3. Markers shall be appointed by the committee to each
target. No arrow shall be felled from the target save by such
markers, who shall call the value of each arrow, and the name
of the shooter. Any person injuring another's arrow, shall
forfeit two skilings to the secretary, who shall replace it.

4. No arrow in the target shall be scored unless it be marked
legibly with the name of the owner.

5. The score shall be thus reckoned:—Gold, nine; red, seven;
inner white, five; black, three; outer white, one. An arrow
touching two circles shall count for the highest. The highest
score to gain the prize; but no prize shall be awarded unless
twelve ends, at least, of three arrows each, shall have been
shot; twelve double ends being the desired number, time, and
weather permitting.

6. The shooter making the most central hit in the gold, and
the shooter making the greatest number of hits, shall each
receive an arrow of honour. Should either or both of these
fall to the winner of the chief prize, a small prize shall
be given to the next best, in each respective case.

7. Any member having won a chief club prize, shall, at any
future bow meeting, lose the score of the outer circle; having
won it a second time, the black; a third time, the inner white.
8. All bets shall be forfeited to the club fund, and paid on the spot to the secretary, on pain of a fine double the amount.

9. The distances at which the targets shall be pitched shall be regulated by the committee at the commencement of each season.

10. Strangers will be allowed to shoot at all bow-meetings, and, if the highest on the actual score, shall receive from the club some token of distinction, but in no case shall the chief club prize be awarded to them.

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**Fig. 1.—The 'Mudian Rig.**

**BOATS AND BOAT-SAILING.**

**By J. C. Wilcockes.**

**Canoe-shaped Travelling Boat—'Mudian Rig.**

The sketches Figs. 2 and 3 illustrate a light-pulling boat of canoe form, having the stem and stern post curved like the birch bark canoe of the North American Indians, as will strike every one at the first glance, and has been designed by her owner as a boat for use on either salt or fresh water, to be propelled by either pulling or sailing, apart or in combination. The mast being stepped so far forward does not interfere with pulling when the sail is set, thus affording opportunity for using both means of propulsion at one and the same time. She can also be paddled as a canoe when desired, by either a single or double paddle, as may be preferred. She is rigged when sculled, being of sufficient beam (3 ft. 1 in.) to admit of it. Her length is 14 ft. 2 in., and her depth amidships 1 ft. 4 in.
BOATS AND BOAT-SAILING.

Her sail, a working lug, is of a low and square-headed cut, for two reasons—first, that being but a light and shallow boat, it would not be prudent to carry lofty canvas; and secondly, as it was desired to keep the body of the boat entirely unhampered, that nothing might interfere with comfort in stretching out at full length when sleeping on board. No

Fig. 3.—Night Rig.

that this form of sail is more effective to house her in at night. She is planked with mahogany, timbered with American elm at intervals of nine inches, and has eight strakes in her side. Her weight is 1 cwt. 14 lbs. with mast, sails, and oars. No fixed thwart is placed in her, ballast is carried, the weight of the owner with carpet bag and a few odds and ends being sufficient to enable her to bear the amount of sail with which she is fitted. A second sail of triangular shape, which we may term a trysail, is provided. This answers, like the lug, a double purpose. From its smaller

Fig. 2.—Cange-shaped Travelling Boat.
FENCING.

By Major Hough.

CONCLUDING WORDS—COST OF Implements.

A very comfortable arrangement for sleeping can be effected by suspending a hammock, fitted to the form of the boat, from long brass hooks screwed up from the under side into the gunwales. Eyelets corresponding with the hooks should be fixed in the seams at the edges of the hammock. The cooking apparatus which will be carried is one of the Russian patterns.

THE BERMUDA OR 'NUDIAN RIG.

This class of boat has been long in use in the island of Bermuda, whence its name, which is frequently abbreviated into 'Nudian. They are chiefly remarkable for their form of sail, necessitating a very lofty mast, which is, however, very much tapered towards the truck. They draw a good deal of water aft, have considerable beam, and more fullness about the bows than British boats on the European side of the Atlantic, in order to afford support to the mast, which is stepped very far forward. (Fig. 1.)

In a future article this rig and its modifications will be fully described and illustrated, but in the present too much space would be occupied. Her extreme length is 90 ft.; beam 10 ft.; draft aft 3 ft. 8 in.; forward 2 ft. 6 in.; height of mast 54 ft. 6 in.; height of main sail 40 ft.; breadth at foot 27 ft. 10 in.; height of jib 36 ft. 2 in.; breadth at foot 18 ft.; height of second jib 30 ft.; breadth at foot 15 ft.; height of third jib 22 ft.; breadth at foot 10 ft. Her length of counter is 3 ft. only; her length from stem to stern-post, both inclusive, is therefore 27 ft.

Of course the whole of this exercise cannot come into use in a fencing-match of sword versus bayonet. The high-guard is directed against a mounted opponent; the low-guard would come into play when defending an entrenchment against assault: neither would be available in the contest under consideration. But the practice of the whole exercise is desirable in order to gain perfect command over the weapon, which is the principal thing to ensure success. Indeed, if you could acquire the power of wielding the musket and bayonet as freely and easily as your opponent does his sword, he would not have a chance with you. It is the weight of your weapon, and the consequent slowness of your movements compared to his, that put you upon level terms, and thus a large and powerful man is always the most formidable with the bayonet.

We have never seen a dummy for loose play made to represent the sword-bayonet, but, probably, any one armed with such a weapon would not be in the hunt. As the long rifle and bayonet is the most efficient and manageable of all two-handed thrusting weapons that have yet been invented, so the short rifle and sword-bayonet is about the most top-heavy and awkward. In a military sense it is a good weapon enough; good for cutting fire-wood or receiving cavalry in square; but for single combat—well, just try to wield it.

When we said that a considerable portion of the bayonet exercise was inapplicable to the encounter under consideration, we alluded to the directions of the point, not the manner in which the rifle is held; for, to change from the ordinary position of guard to that of low-guard, head-parry, and shorten arms, where the sling is turned uppermost, will be found very advantageous, for the rifle held thus guards your advanced arm, which will be the principal object of the adversary's attack, as it is the only part which he has a chance of reaching while fairly at bay before your point. But the position in question must only be assumed momentarily, for a feint, or as parry to a cut, and, the motion over, you must revert to the original guard; for the action of turning the rifle sling uppermost stiffens the muscles of the arms, producing a rigidity which would aid the swordsman in turning aside your weapon, were you to hold it thus motionless to his breast. For, remember that he has the advantage of leverage, and a slight pressure of his blade against your bayonet will serve to deduct it from the line if you hold it stiffly. You must, therefore, seek to deceive his blade, by passing your point over or under his hilt, instead of opposing pressure to pressure, which, indeed, would be playing his game. As for attempting to bear him down, and settling the matter off-hand by grasping your rifle hard and rushing in upon him, it is not to be thought of; a turn of his wrist would cause your point to pass clear of him, and you would lie at his mercy.

Of course the great object of your opponent is to get within your point, which he cannot do while you keep it steadily in the line. His opportunity lies after a successful parry of your point, so that unless he is exceptionally strong and expert, the first attack must lie with you. Thus, you might probably make a drawn game of it by simply threatening him, without attempting any offensive movement; and if you wanted to keep him prisoner till a relief came to walk him off to the guardroom, that would be all very well; but your desire now is to plant the point of your bayonet on his breast, and that will never be achieved without more active measures.

Your object, as in fencing with the foil, is to find an opening, or make one by rapidly feinting, and giving the real point in
another line; and you have this chance in your favour, that owing to the superior weight of your weapon you may bear down your opponent's sword, and hit him through his guard, if he does not form it strongly.

Should he pass your point, shorten arms at once; theoretically you ought to have no time for such a movement, but practically you often have, for the effort employed to gain his advantage will very likely throw him off his balance, and make him slow in the attack.

For the rest, endeavour as much as possible to use the bayonet as you would a foil; you hold your weapon indeed in both hands, advance the left foot instead of the right, and since you have so much the advantage in reach, there is no necessity for longeing, but the principle is the same. Volting, however, or jumping to left or right, which is condemned by all good masters in the use of the broadsword, may often be practised with the bayonet.

Still more useful will the volt be found by him who takes the sabre; for, indeed, he must leave no stratagem or practice of agility untried, if he would pass unscathed within the opposing point. His principal object is to draw a point, and put it aside with force sufficient to enable him to step up and deliver his cut before the bayoneter can recover his weapon. This is often attempted by making the fourth guard, and then cutting quickly at the adversary's left arm; or, which is the method most in favour, by forming the fifth guard, and endeavouring to seize the muzzle of his piece with your left hand, if you succeed in doing which, you can either disengage it or parry him in the place and manner which suits your fancy best, and at your leisure. For though it is easier to turn his bayonet off to the right, it is more effective to do so to the left.

Another system of defence which is recommended is the broadsword regulation parry; and here the scent is hit off, though not followed up.

The fact is, that this use of the fifth guard is better in theory than in practice. If, as was said above, the bayoneter would charge fairly down upon the swordsman, that, or any other parry would suffice to give the latter his advantage; but in a fencing-match, where the former feints and points, and springs back, it is a very different matter. Unless the swordsman has a very great muscular superiority over his opponent indeed, the force employed to turn the bayonet by any simple parry will be sufficient to prevent his making that rapid riposte which looks so easy on paper. For a second, indeed, his adversary’s arm, at least, will be open to his sword, but it will take him that precious second to recover his weapon for the blow, and the opportunity is gone, the bayonet-point is again in front of his breast. And this is principally the case when the sword is represented by a single-stick, for the lighter the weapon, the stronger must be the simple parry.

But now, instead of adopting the hanging-guard or the modification of it (with the hand lowered and the sword more across the body) which is so constantly seen in these matches, let the swordsman come on guard as he would in fencing with the foil; look upon the weapon he is crossing as simply an elongated edition of his own; and meet a thrust with the round parry. He will be ready to riposte directly the bayonet is turned aside; and for this reason, that the adversary's weapon will be thrown off by a sharp stroke, instead of being pushed away, as it were, by pressure; and you may satisfy yourself while reading this, without rising from your chair, how much quicker recovery is from the one movement than from the other. Press your finger on the table, and then touch this page; now tap the table with the same finger, and again touch the page; can you not do the latter twice in the time it takes you to perform the first motion once?

But it may seem to you that the simple parry might be made by a sharp tap also, as it is in ordinary fencing; but practical experience will show you that the bayonet-thrust is generally made in strict opposition, binding your blade, or trying to force its way by sheer weight; for you dare not make so wide a movement as would be necessary to strike aside a weapon coming with such a momentum from the weight behind it, you must make use of a pushing action to secure the point's clearing your body.

The counter, or round parry, then, is the true defence to oppose to the bayonet, and if it be objected that it is an awkward movement with a curved or heavy weapon, we can only say, choose a straight and light one. Should you further urge that you are restricted to the use of a clumsy description of sword by the terms of the combat, there is but one remark to make, and that is, all the better for the bayonet.

Thus, in this exercise, as in the assault with sabres or broadswords, the value of fencing proper, which is the use of the rapier, becomes evident. He who becomes an expert with the foil has acquired mastery over all weapons, while the acquisition of skill with the sabre, the lance, the schliirig, or the bayonet, is useful for that weapon alone. One illustration will suffice to explain this: compare Captain Chapman’s diagram of the parries of the foil, given in the first of these papers, with the regulation target, showing the broadsword guards in the fifth, and you will find that the latter are merely wider movements of the former.

COST OF IMPLEMENTS.

Best Solingen (king's head) or English foil-blades, are 24s. the dozen; pomмels and guards, 6s. the dozen; foils complete, from 3s. 6d. to 6s. each; gloves, from 5s. 6d. to 12s.; fencing masks (French pattern; don’t have the cheap English masks at any price), 9s. 6d. to 15s.; stick masks (about which you need not be so particular), 19s.; single-sticks, 4s. the dozen; buffalo-huits, 7s. each; jackets, from 14s. to 50s.; thigh-protectors, 14s. 6d.; plastrons, 6s. 6d. to 15s.; spring practice bayonets, 58s. or 70s.

Of course these figures are approximate only; if a club imports its own implements it may get them cheaper. Our own experience, however, makes us confident about this, that the most economical plan is to get the very best articles in the first instance.

CASTING.

By A. H. WALL.

HANDS—FEET—BUSTS—DECORATIVE TILES.

So far, our progress in this pleasing and useful art has been confined to comparatively simple and easy subjects: let us now try our skill with something more difficult. Ask one of your fair friends who has a pretty dimpled white hand, with tapering graceful fingers, to allow you to make a cast of it. If she will not do so as an act of friendship, you
must urge your request in the interest of the beautiful in art, and then she will, rightly enough, feel it her duty to submit. Having her consent, she must rub over her hand a little oil, and then place it in the required position on a bed of sand prepared for its reception.

We need not here repeat the directions we have already given for mixing the plaster and making the mould. Of course the hand must be kept perfectly still during the casting operation, and in cutting away the overlapping plaster, you must be extremely careful of the dainty living little hand beneath it. The best plan is to perform this part of the work with some thin-bladed blunt instrument, such as a spatula, or the handle of a spoon. We give a suitable pose and the cast of a foot in page 105, which is modelled in precisely the same way.

Before proceeding farther with the human figure, it will be as well to experimentalise upon a bust (page 106). This must be cast in two nearly equal pieces, to divide which strips of modelling clay are placed edge uppermost over the head, brought down past the ears, along the neck, and down the shoulders; or, with a suitable subject, the seam which this plan causes may be avoided by placing a piece of clay in the same way round the back of the head, as shown on the same page. First form a mould of this circular piece, and then proceed to cast from the remainder. The strips of clay should fit closely to the bust or head, and be supported at the back of that side of which you cast first with thicker clay, as without such help they might be broken down by the weight and pressure of the plaster. Where you are casting from a bust modelled expressly for that purpose in clay, the inner support afforded by pieces of wood or iron skewers stuck into the head to support the divided strips should be adopted. It will be found easier to mould the bust without its pedestal, and afterwards mount the cast upon one purchased from a plaster-figure moulder. Its cost will be one shilling or less.

Having mastered casting from the inanimate bust, cast about in your mind for some very patient, good-natured friend, who will allow you to model his face for what is technically called the mask, or obtain a cast from his head. If he has a beard, reject him, for then the difficulties of casting would be too serious for a beginner to grapple with. A young boy or girl would be your best subject, and a mask only should be your first cast. The person you have selected should lie on his or her back on the table you work upon, with a pillow beneath the head. A towel must be folded and brought down tightly over the top of the head and under the chin, so as to keep back the hair upon the forehead and temples. The eyebrows and any hair on the face side of the towel must next be well plastered down with soap to prevent hairs becoming fixed in the plaster and pulled off with it, a process which would be anything but pleasant to your subject. A little salad oil should be rubbed over the skin, and two quills or conical pieces of stiff paper carefully inserted in the nostrils to enable your subject to breathe with the face under the plaster. The mouth and eyes being of course closed, you next put on the plaster, which, to avoid an uncomfortable sense of coldness, should be mixed with warm water. Although the subject will not find the process of pouring on the plaster—to the thickness of about a quarter of an inch—a very pleasant one, and while waiting for it to set, will be apt to suspect even infallible stop-watches to be awfully slow, be or she must keep the muscles of his or her face perfectly, rigidly still. A cast thus taken is the most accurate of likenesses, although, being so purely white, it is somewhat not—in the absence of sunken eyes and relaxed muscles—unpleasantly death-like. A good way of mounting a mask is in a suitably deep frame under glass on a background of dark rich velvet. If you wish the eyes to appear open, this effect must be obtained afterwards, before the plaster is hard, by the aid of modelling tools and some little artistic skill on the part of the operator.
A cast from a bas-relief (page 103) will be of use for decorative purposes; and decorative tiles may be cast either from natural or artificial objects.

In one of the most comprehensively useful works of the day, Cassell's Household Guide, the following remarks on the subject of decoration with tiles of this description occur:—

"Round the walls"—of the halls or ante-rooms, for which this style of decoration is most suitable, the article we refer to says—

"as a height of about five feet, runs a sur-face, and the space below this may be painted, wainscoted, or paved with glazed tiles such as are made for the purpose; but it must be remembered that the latter are very cold in appearance, and therefore unfit for any living-room which is to be inhabited in winter. It is above the sur-face that our peculiar form of household decoration is employed, and it is to be kept at this height that the plaster castings may be as little exposed to injury as possible. The decoration itself consists of plaster tiles (Figs. 1 and 2) on which are cast leaves, etc., from Nature, which, fitting into each other and repeating the patterns, produce a diaper. All the tiles may be cast in single design, or it may be varied, and two or more designs made to repeat over the diaper." Colours and gilding may be used to enrich and beautify these designs, with an effect which was seen in the Moorish decorations of the Alhambra model at the Crystal Palace. When casting from a mould, if any pieces should be accidentally broken off, a liquid plaster will serve to reunite them. If holes appear, caused by air-bubbles, a little plaster, partially set, mixed with a little water, may be used for filling them in with. Seams or rough edges may be scraped down and smoothed with a piece of fine sand-paper. The processes of mixing plaster and making moulds will be the same for any kind of subject, but where they consist of ornaments or sculpture deeply undercut, elastic moulds are preferable to plaster, because they can be easily removed without being broken by the projections and undercuttings of the subject. Glue boiled with about its own bulk of water will give gelatine of about the right consistence for making these moulds.

Plaster of Paris casts soon lose their pure whiteness, and are by no means improved by the change. For this reason the plan of painting them is usually adopted, the method being the following—the cast is first coated with linseed oil, until the oil is no longer absorbed. It is then painted with a little white lead, mixed with turpentine once or twice. Before the paint is dry it is to be stippled, that is to say, dabbed all over with the ends of the hairs in the brush. This destroys the brush marks, and gives the cast a kind of uniformly granular effect.

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LA CROSSE.

BY C. W. ALOCK.


You would possibly never have heard of any game bearing such a thoroughly un-English title, but for the irruption of a troupe of Iroquois Indians, who came over to England under the charge of one Captain Johnson in 1867 for a starring tour, with a view to acclimatise the pastime on English shores. I dare say that some of you, perhaps, more enthusiastic or inquisitive after an exercise that bore so mysterious a name, might have succeeded in procuring some information respecting its various attributes; but the majority of you, I feel sure enough, would never even have known of the existence of such a sport, much less gained the slightest acquaintance with its specialities. Yet in spite of all you ignorant folks, La Crosse is one of the greatest institutions of the new Dominion—as essentially the national game of Canada as base-ball is of America. Do not disparage or sneer at the exercise because it bears the traces of an origin more French than English. It is a game of great antiquity, I warrant you, and bears the impress of many a historic association that some of your own favourite recreations will never boast. It is certain that the game was first originated in the backwoods, by the Red Man, and that in all likelihood it became popularised by the French pioneers who first introduced a species of civilisation among the aboriginal possessors of our own Canadian colony. You can trace La Crosse back without any difficulty to a period distant more than a century, so that I must ask you to treat it with a certain degree of respect. It is more than a century, indeed, since a well-devised stratagem of the wily Redkins almost succeeded in surprising the English garrison at Fort Detroit under the shadow of an exhibition game at La Crosse. You will be able to estimate the popularity of the sport, even in its premature state, by the narration of the details of that adventure. It was a clever scheme of one of the Indian chiefs, Pontiac by name, to trade on the support of the English officers, who were in the habit of taking interest in their games, and it was only at the last moment that the plan failed. There was to be a monster match between three of the largest tribes—the Delawares, the Ottawas, and Shawnees; and the game, as usual, was to take place under the shelter of the fort. Such, at least, was the aim of the projector, and to provide for emergencies the sides had to be represented by a considerably increased number of players. It was difficult to frame an excuse for an entry into the fort, but the ball was first hit in as if by accident, and the rush was so continued under different circumstances, until all suspicions of the garrison were effectually lulled. Everything went off well, as it usually does, until the crisis; but right prevailed at the end, as does happen sometimes. The Indians had carefully hid their weapons, and the fort had been entered safely enough, but the garrison smelled this coloured rat, fortunately, before the inner fortifi-
ations had been reached, and a huge slaughter of the cunning incursionists was the natural consequence.

If you are curious about the origin of the name too, you can be easily satisfied; for it is just as given by its first parents, derived from the French word crosse, from the resemblance the bat was supposed to bear to a bishop’s crosier (crosse). It was a universal favourite, you can guess; for Charlevoix, one of the earliest French travellers in the Dominion, saw the game played by the Algonquins on the shores of the St. Lawrence, somewhere between Quebec and the Three Rivers. If you feel inclined to take exception to the rude and savage originators of La Crosse, you will possibly feel inclined to change your opinions when you find that the first club that was started by Canadians in Montreal actually took its name from one of the Indian tribes, the Iroquois, hailing from a locality blessed with the unpromonounceable appellation of Caughnawaga.

You would be surprised at the marvellous strides that the game made in the course of a few brief years. It must have been essentially a sport to suit the tastes of the rough and hardy denizens of Canada, or it would not have advanced so rapidly or been so assiduously cultivated that in a very short time the members of the Beaver Club at Montreal could beat the Indians who had been their instructors. You may remember, some of you, the performances that were given by the Indians who visited England in 1867; and you will certainly have reason to recollect the game, as you saw it under their care, as one singularly exciting and interesting, giving scope for the display of much skill and grace, even if you do not go so far as to realise the strange wildness and beauty that it is said by the enthusiasm of Canadians to possess. A better example, indeed, of the real merits of an exercise than was afforded by those eighteen Indians—Iroquois, Oneicas, Oneitas, Mohawks, Algonquins, or whatever else they were—could not have been provided; and, under the influence of a new sensation, there were not a few otherwise sensible souls who went so far as to predict the complete enthronement of La Crosse, to the utter collapse of football and other such puerile amusements.

You can certainly advance any number of out-of-the-way specious arguments in favour of its cultivation in England; but for reasons unknown, unless you can attribute its neglect to the rank conservatism that prevails in relation to some English sports, the game has gradually dwindled and faded into premature decay. You have most certainly done it a gross injustice, if absolute faith can be placed in the estimate of its virtues as represented by Canadian pens. “La Crosse is a game so wild and exciting” (I am quoting), “so varied and so dramatic, that it interests the spectator as well as the player, and this cannot be so truly said of any other game. It is also a simple game, and one easily understood. Above all, in La Crosse the muscles of the body are brought into exertion equally and at the same time, and there is no danger of losing an eye or splitting off a thumb. Unlike cricket, La Crosse is a game suited for girls, and might be introduced into girls’ schools with great advantage, as the crosse bat is scarcely heavier than a battledore, and there is plenty of healthy running without any danger of blows. It can be played even on the snow; and as well in winter as in summer. It can be played by any number of persons; the ground needs no preparation; the materials for the game are cheap and simple. It employs nearly every player at once, and is capable of infinite varieties, while it furnishes opportunities for the greatest skill and agility.”

I wish that we could use such high-sounding terms in relation to many of our own most fancied amusements; but, making all due allowances for partisanship, there is much that is strictly true in the above description. If you were to ask me to give you a definition that would convey an idea of La Crosse so clearly as to give you a full insight into the style of the game, you could hardly frame a question that would be more difficult to answer. It is hardly hockey, because to strike the ball is against the laws. It is certainly not football, though in some cases it is not unlike the running part of the Rugby game, the crosse bat being used instead of the arm to shelter the ball, and all kicking being strictly forbidden. You may even go so far as to assert that it more closely resembles football than any other sport, with the exception of the addition of the bat, as the main aim of the two games is the same, and victory is scored in a similar way in each case, the object being to drive the ball the greatest number of times into your enemy’s goal. You can hardly find, if you try your utmost, a game so economical in point of the materials required, only excepting football, which is perhaps in this respect the cheapest of all the more favoured English sports. You require no specially prepared ground as at base-ball; nor does it matter in the smallest degree whether the turf is smooth or rough. You require in all a crosse or bat, a ball, neck, according to law, of solid India-rubber, two goals furnished precisely as are those used in the Association game at football, and your paraphernalia will be complete.

First of all, though, you must be acquainted with the nature and form of the crosse itself, which you will be able to derive from the illustration on page 180. It will not be difficult for you now to account for the derivation of the name, for the weapon resembles very closely the shape of a bishop’s crosier, not unlike in its bent curve a stout fish-hook. You had better be acquainted at once with the requirements for a bat, for on its strength and make depend greatly the success that will attend you in the game itself. It may be made either of ash or hickory, but there can hardly be a comparison between the two woods, as, though the former is more pliable and easier to bend, the latter is not only lighter but is certainly more durable as well as infinitely stronger. You will soon learn that the law interferes to prevent any practicable advantage to any individual in the composition of the bat. The first rule enacted that the crosse may be of any length, but that the woven network must not be bagged nor of a greater width than one foot. You will lose rather than gain by the selection of a large cross; for the length will only make it cumbrous to wield; and you are more likely to learn the game easily if you have a bat that you can handle without any feeling of awkwardness or discomfort. You will do well indeed to limit the length of your crosse to four feet, for this will be quite sufficient at all times, and at the outset you will act wisely in using a crosse that will help you instead of one that is likely to impede your movements. Care too will have to be exercised in the matter of the woven network that forms the receptacle for the ball, for anything faulty in its construction will prove a fatal obstacle in the way of your advancement, and you had better make up your mind to pay a good price for a genuine article than study false economy and ruin all.

The only provision, then, that is made in relation to the crosse is that it must not be bagged; and the test in this respect is that it remains flat when the ball is not in it. On the other hand, there is a loop-hole of escape for young beginners in the provision that “a leading or outside string above the level of the others may be used. It may rest on the top of the stick, but must not have anything under to increase its weight.” You can choose your own material, of course, for the manufacture of the network, but you will find nothing so serviceable as the gut that is used to form the face of the English racquet, though moose-skin is much affected for the purpose in Canadian parts.

When you have had an opportunity of handling the crosse you
will see for yourself that the thickness varies greatly, the wood tapers and drooping at the commencement of the bent to allow the ball to rest slightly against the surface of the wood. You will experience less difficulty in deciding on the ball to be used, for the only requirement is that it shall be made of solid indes-subber, and that in circumference it shall not exceed or fall short of a limit of eight or nine inches.

You need not be under any alarm, I assure you, with respect to this item in the materials of La Crocès, for a ball will only cost you a few shillings at the outside, and it will last you, without exaggeration, for years. You have now provided yourself with the active weapons required for the game, and the only other essentials are the goals, that form the lines of defence occupied by each party. If you have ever indulged in football according to Association rules, you can easily picture the formation of the goals at La Crocès, though the latter are much more circumscribed in their dimensions. The goals themselves simply consist of upright posts, as at football, the restriction being that they shall be seven feet apart, and that they shall be surrounded by a tape or bar stretched across from post to post at a height of six feet from the ground. There is also need of a pole to carry the flag marking the centre of the ground, and further of a line drawn six feet in front of each goal, to prevent sneaking in its vicinity, as the law directs, “unless the ball is actually near or nearing the flags.”

You may use your own discretion, or at least suit your own inclinations in the matter of the area of the ground that you propose to cover. It is evident that in this point so much depends on the constitution and capacity of the players engaged, that it must be left to your own judgment to decide. If you have the stamina of the Mohican or the Iroquois, and all of you are fleet of foot and strong of wind, take all the space that you can get in this diminutive island, and make the most of it before the plumb and line of the relentless modern builder drive you into more moderate bounds. Take a lesson from the book of the Indians who fostered and nursed the game, and try for yourselves how a distance of two miles over Blackheath or Wimden Common will test your endurance; but I fancy that you will hardly make the experiment more than once, if you go so far as to make the attempt at all. It is certain that in the early days of the sport such an excessive space of ground was by no means unusual, but the players were savages who could cover with ease any number of miles; and the comparison between them and some of you would be odious to your refined intellects, I have not the slightest doubt. You may take it; however, as a general average, that in Canada at least the goals are usually arranged so as to be about half a mile apart. It does not follow that the ground must of necessity be level and free from inequalities; though it will not be a disadvantage, you will understand well enough, to have your field as free as possible from gravel-pits and mole-hills, and such like inconvenient excrescences. You will find more difficulty when you come to the arrangement of your players, for everything depends on your own disposition, whether you are rash as Hotspur or cautious as Fabius. You have twelve men, as a rule, on each side, so that you have plenty of hands to occupy all the positions that you require, with certain picked players to fill the most onerous posts in the field. Your first line of defence is the goal-keeper, hard as adamant and always collected and ready at an emergency.

Place your next outwork about four yards in front of your goal-keeper, see that you select one of your very best players, one who can turn like a hare, wrench like a greyhound, and run like a fleet, and christen him, in the vocabulary of the game, with a slight infringement of cricket copyright, Point. Then there is cover-point, stationed as the outermost fortification, to act much the same as “flying man” at Eton, to act not only as a defence, but also with an aggressive property to use as he thinks best, at points an active and a passive player. There are two players known as home men, on whom devolve the principal portion of the attack, as their station is close to the enemy’s goal, and their duty is to pass the ball in between the posts whenever opportunity arises. Last of the more responsible players are the fasts, who stand at the central flag, and commence the game, ready with every art that skill can suggest to obtain the first real hold of the ball. When you have taken those necessary precautions to fill the places of the most necessary players, you have done the hardest part of your work. The place and use for the others experience will soon show you.

**WINDOW GARDENING.**

By J. C. LEAKE.

**COMPLETION OF THE INSIDE CASE.**

In order to complete the large case described in our previous article it will be necessary to construct sashes which, when glazed, will enclose the top and the front. Of course the back of the case is formed by the sashes in the window, and the ends by the walls forming the recess in the room. The front and top sashes, therefore, will completely enclose the case, and render it fit to receive the plants.

As it will probably be rather difficult for the amateur to construct a properly-moulded sash, unless possessed of a complete set of joiner’s tools, it will be best, in the first instance, to make the frames of the requisite dimensions, and perfectly square, afterwards bracing on a fillet or head, which will form the requisite rabbit, to receive the glass. The upper sash will, of course, require to be of the same shape as the case, into which it must be fitted, and as that is not square, it will be easier to halve the pieces together at the angles (as previously described) than to employ the ordinary mortise and tenon-joint. The sash should be divided into squares of a convenient size, and not too large, in case of breakage. The bars may either be rabbed or filleted, and should be tenoned into the front and back rails of the sash. When the bars have been inserted, the whole may be screwed up at the angles; taking care that this is well done, so as to prevent the frame from “racking” out of the square. The fillets to support the glass should be bradded upon the lower side of the frame, so as to allow of the insertion of the glass from the top or outside of the case.

The front sashes will be less troublesome to construct, as they may be tenoned together in the usual manner, and will, of course, be quite square. In placing the fillets upon these sashes, however, they should be so arranged as to allow of their being glazed from the inside side of the case; as, being seen from the room, the bead or moulding will present a neater appearance than would the putty employed for fixing the glass in its place. When the sashes are ready, they should be fitted into their places, and hung to the sides of the case with “butt” hinges; and it is better to do this before glazing, in order to avoid the danger of breaking the glass. The glazing may be effected in
THE POPULAR RECREATOR.

the usual manner, but it will be better not to trust to putty alone to retain the glass in its place, as the squares will be rather large, but to place a few brads at intervals, so as to render them secure. Two or three "buttons," such as those used to fasten doors, should be placed upon the frame, to keep the doors closed, and this will complete the case.

The decorative part of the work must, of course, be left very much to the taste of the constructor, which, in a window-case of this description and size, he will have ample room to display. Of course, the decoration of the framework should be in harmony with that of the room in which the case is erected. Thus, if the woodwork of the window is painted, the frame of the case should be painted the same colour; and if grained (as it mostly is), the case should be grained also. As a rule, it will be found that the rustic work which we have before described as being suitable for detached fern-cases, is not suitable when the case is fixed and really becomes part of the room. One exception may be made in favour of the broad bearer, which carries the front of the case. This need not be painted; but a better effect is produced by covering it with encaustic tiles of a suitable pattern, in the manner described in a previous article—for outside window-boxes. If this course of proceeding be considered too expensive, an effect almost equally good may be produced by bradding a slip of linoleum (which may be procured of a suitable pattern) along the beam, and finishing, by securing a slip of moulding upon the top and bottom edges. The joints next the wall should be finished by brackets under the ends, not necessarily as supports, but merely as giving a more complete appearance to the whole. In a case of this description a small fountain may be introduced, and this addition will impart much beauty, as well as afford a ready means of watering the plants.

If there be a water supply which may be applied to this purpose, a fountain may be made with ease, and at but little expense. Perhaps the best plan is to use for the basin one of the common glazed red earthen pans employed for washing purposes in the household, as this can be readily bored to allow of the insertion of the requisite pipes. One hole should be bored of sufficient size to admit two pipes—one for the supply of the water, and a second for that which is to carry off the waste. The supply-pipe must be connected with a cistern or reservoir at some height above the top of the case, and may be brought to a level of about an inch above the edge of the basin. The second, for the escape of the waste water, should be kept at least one inch below that point; and connected with the pipe already mentioned for the escape of the ordinary drainings of the case. For the supply to the fountain, the ordinary "composition" gas-pipe will answer perfectly, and it should be about three-eighths of an inch in diameter. The waste-pipe should be made larger than this—say three-quarters of an inch in diameter—as in the event of this getting stopped, the case would be flooded. When these pipes are placed in position, they should be fixed by pouring round them some Portland cement, which should be pressed into the opening made in the bottom of the pan, so as to render the joint watertight. Some artificial rock-work may also be placed round the pipes, so as to conceal them, of course taking care to leave the opening of the waste-pipe clear for the escape of the water. The outer part of the basin may also be decorated in the same manner, and convenient places may be left in the rock-work at intervals, for the planting of the smaller ferns. For all this work Portland cement should be employed, as nothing else will so well resist the action of water. To the top of the supply-pipe a small brass jet should be secured, of any form which the taste of the constructor may suggest. Of course there must be a tap for shutting off the water.
SKATING.

By a Member of the "London Skating Club."

RACE-SKATING—THE "RUNNERS"—A RACE-MEETING IN THE FENS—HINTS FOR PAST SKATING—THE BEST "TIME" ON RECORD.

There is only one other species of skating that need detain us before we proceed to the study of figures. This is the art of racing, or "running," as it is called by those who are proficient at it.

Almost as soon as the ice will bear, matches begin to be made; race-committees are formed, and prizes subscribed for and advertised.

By a skilful arrangement of dates, the meetings are fixed so as to succeed one another in regular order, and the crack skaters may often proceed from town to town through Hertfordshire and Cambridgeshire, gathering prizes as they go.

It is really well worth a journey from London to be present at the picturesque and animated scene presented by one of these prize-gatherings. When the weather is fine—and the more
existence of the ice is almost a guarantee for a fine day—the whole population of the neighbouring town turns out. Wrapped in their furs and seal-skins, the fair sex attend in full force on the banks of the dykes where the contest is to take place; while the men, in their bright sables, flitting about around the course, look hardly less gay and picturesque. The villages within reach send their contingents of spectators, partly by road and partly via the frozen fens or canals, and the fête is celebrated with almost as much ardour as a grand day at Newmarket.

For the race-course itself a long straight reach is chosen on one of the broadest dykes. Smooth ice is, of course, a desideratum, but it is very seldom that this advantage can be secured. More often, before the competitors start, the surface has been cut to pieces, and spoiled, and generally damaged, in all possible ways, by hundreds of pairs of skates and boots. The course is arranged on the principle of the old Greek or Roman plan than our modern race-courses; that is to say, the competitors start in a straight line from post to post, and then return over the same ground.

At each end of the distance is a strong stake, fixed into the ice, and surmounted with a flag. A rope is sometimes stretched all the way along between the two posts, and in all cases the spectators ought to be kept back by ropes and stakes for a space of ten or twelve feet on either side. When this is done, every person has a fair view right down the course, and can watch the skaters throughout the whole of the race. The only persons admitted within the boundary should be the judges and clerk of the course, who stand close by the starting and turning flags, to see fair play.

When the signal for the start is given, the two men drawn for the first ties are despatched, one from each side of the flag, and they keep their respective places on the right and left, until arriving at the turning-point, when they pass one another face to face, and return on the reverse side. Thus, all chance of collision is avoided, except at the turn, and yet each man is fully aware throughout the race whether he is losing or gaining ground on his opponent.

It is seldom that a race is completed by a single run out and back; for it is not easy, even in the fens, to secure a straight reach for more than a quarter of a mile—and the distance to be run is generally a mile at least. Consequently, the men have usually to return again and again to the starting-flag, and the power of rounding the posts closely and swiftly is an important element of success, just as it was in the old Isthmian and Olympic contests. It is at the turn that the risk of collision is imminent, and some terrible falls occur to the inexperienced. As soon as the first pair have finished their trial, a second couple are started, and the heats continue, as in the case of coursing-matches, until two only are left in to decide the match between them.

A spectator present for the first time at one of these matches cannot fail to be amused and interested. Not only is the pace attained by the skaters extraordinary, their attitude and motions are very different to what the uninitiated might expect. There is a grace and apparent ease of movement, which is very striking, and in the best skaters often inspires the delusive idea that they are not using all their strength and power.

The unlearned do not remember that each of those strokes, which seem so deliberate, covers many feet of ground. The long swinging motion from side to side, means a skilful shifting of the whole weight of the body from one foot to another, and to hurry that process would be to diminish the length of the strokes upon which the speed depends. Probably there is not a more severe and trying exercise in the world than racing on skates. Certainly there is none in which man, by his own unaided exertions, can attain so high a rate of speed.

The action is very much that of fast walking, and those who would excel in it must observe pretty much the same rules observed in training for a walking-race.

The arms, however, instead of being held up above the waist, and close to the body, are swung violently from side to side; the legs, moreover, although they should be kept as straight as possible, can never, in practice, be prevented from bending slightly at the knee.

As the beginner learns to lengthen his strokes—the great object which he must always keep in view—he will learn also to make them straighter and less oblique. Some of the best men only deviate a foot on their alternate feet from each side of the straight line. This directness of stroke is rendered much easier by the form of the skate used, which is quite straight in the blade, without any of that curve that is to be observed in figure skates.

Of the speed attained, and actually attained by skaters, there are many various estimates, and many are the fabulous accounts of incredible distances performed "against time." It was not uncommon to hear a man boast that he could do a mile in two minutes, or equal the speed of a race-horse; nor is it absolutely impossible that with a favourable wind, and on a straight course without turns, such a feat may be performed.

But the authentic reports of times taken lately at these race-meetings show that, under ordinary circumstances, a mile in three minutes is very good going. Two miles seem to have been done on a still day, backwards and forwards, in the usual style, in something decidedly under six minutes. But the ordinary times given at the meetings in the fens are quite unreliable. The distances are very inaccurately measured, and each town—anxious to represent its prize as having been won in the very best time—is inclined rather to under-measure the course than the reverse. It may be pretty safely affirmed, then, that a fair course two miles have never yet been done in one and a half minutes.

HOW TO DRY AND PRESERVE FLOWERS.

THE GERMAN PLAN—ANOTHER WAY—MOUNTING.

WILL you come with me and gather some flowers?—flowers "all dyed with rainbow light, all fashioned with supremest grace." Winter is fast approaching, and we shall very soon be bereft of all the beauty in which we have luxuriated during the past few months; already, "in the flowery garden-beds, the red rose growth wan." Do, then, let us try and preserve some of these beautiful gifts which kind

Flora has so beneficently showered upon us. I know of two ways in which we can successfully do so, and, if you like, you can stand by and watch me while I try these methods, or, if you prefer it, you can make the experiment at the same time. I think that it would be pleasant if we went to work together, for I believe I should be rather nervous if you were closely watching me all the time; and you know that two heads are
HOW TO DRY AND PRESERVE FLOWERS.

better than one. Our experiences might vary, and then it would be an advantage to compare notes afterwards. For myself, I always think it is so pleasant to keep flowers which have come from different places, for they bring to your recollection the very spot on which they grew and the circumstances which surrounded them at that particular time. How often have we not put aside a few such relics of bright and happy day or event, but, sad to say, when we next took a fond look at the treasured memento, what did we find? Only colourless indistinctness. The strongest of imaginations could not perfectly picture those withered leaves and shrivelled petals—could not again endow them with apparent life, and re-clothe them in the gay colours which are gone—faded for ever and aye.

Now I do not think that it is possible to preserve washed flowers, so that our present experiments will be of no use with respect to cherished relics of that kind; for our flowers must be fresh and uninjured by contact with others. But the practical knowledge we are going to acquire will enable us to keep mementoes of places and favourite plants; and not only so, but we shall be refreshed by the sight of their pleasant faces when ineradicable winter has deprived us of their companions which have been left out of doors. Therefore, I think it is quite worth our while to enter upon the work.

I dare say that you have often dried flowers in the ordinary way, and have invariably been disappointed with the result. I have. The flowers had completely lost their original shape and form; their cups, if they had them, were as flat as a blade of grass; round blossoms were pressed square, pistils were crushed, and calices probably smashed; the colours had cozed out;—in fact, every one of them had altered for the worse. Now, if we take care what we are about, and use the proper precautions, and follow the rules strictly, by the methods we are going to try our flowers will retain their brilliancy of colour and also their original form.

Suppose we first of all follow a plan which is widely adopted in Germany for this purpose, and see how we can succeed in that before we attempt any other.

We must prepare some river sand—and there is much to be done with it before it will be ready for our use. Our aim must be to get it clean, and to have all the particles of the same size. We will put a quantity into a pull and pour some water over it, and then pour the water off it; and this we shall have to repeat over and over again, until the water that we pour off is quite clear; then the sand will be clean. The next thing is to dry it; and this will be the sooner accomplished if we spread it out on the lid of a box and put it in the sun.

But I have been told that the grains of sand must not be too small, or they will adhere to the flowers; and again, if too large, they will injure the petals by pressing too heavily upon them; that the particles must in fact be of medium size, and be, as near as can be, all alike. What shall we do?

Oh, yes, of course, put it through sieves! First use a fine one, to abstract the dust, and then through a coarser one, to make the grains uniform.

Now, surely, it is ready for us to begin! Yes, it looks all right. But so we can at once commence to cut the flowers.

What kind shall we choose? I wonder? Peonies and carnations will not crush easily; and stocks, either double or single, are strong flowers. We are not obliged to look out for flowers of this nature, as it is quite possible to have others of another description; only, as we are beginners, it is as well not to attempt the preservation of the more delicate blossoms just for the present.

We ought not to be rash and hasty while we are selecting them. Only those flowers which are in the prime of life should be chosen, or else their colours will very likely fade, or they themselves decay, if they are not taken at the proper time.

Further, they must be perfectly dry; it is of no use for us to gather them in early morn or dewy eve, or when a light shower has left its spangles on the spray. No, the rays of a hot sun must have been pouring down upon them for some hours before we make our venture, for the gentlest and pearliest of heaven's dew-drops would unfit them for our work.

Now we must find a box, and into it we must put some of the sand, just enough to hold the stalks steady. Then we have to place the flowers at a reasonable distances from one another, so that they will not come into contact. The stems are to be upright. Our next proceeding is to completely imbibe the flowers in sand. The sieve will be the best form of shower-bath; and the downpour must continue until the flowers are quite lost to view, at least an inch beneath the uppermost strata of sand; but we must shake the sieve to and fro very gently, or our flowers may be hurt by a heavy shower of sand, and every now and then we must stop and arrange the petals and leaves, place them straight, and see that they rest on sand, for it would be a disappointment to find them crumpled or torn when our work was over.

We must now carry the box as steadily as possible to some warm place—it all depends upon the nature of our collection as to where. If the flowers are large and "flabby," as the term is, into the oven the box must go; but if small and naturally of a dry character, then it will be sufficient if the rays of a hot sun fall upon the contents of the box. But heat there must be, of some description, or else we shall fail in our endeavours.

I am now in a very anxious state of mind, because so very much depends upon our getting the proper amount of heat. If it falls short, then the petals will crumble and wrinkle, for they will not have dried quickly; and if it is excessive, the colours will fade. So you will see at once what a critical time we and our boxes are passing through. The heat from the sun is the most satisfactory, but then the box must be exposed to it for two or three days continuously, and how can we depend on his Imperial Highness the sun shining brightly for three days in succession in this country? I will tell you what we will do. You shall try one way, and I will follow the other. My box shall go into the oven; at any rate it is a more expeditions plan, for two or three hours is sufficient time for it to remain. Now let us take a peep. This we can easily do if we tilt the box up a wee bit, and let the sand run off.

Ah, how nice they look! We will raise the box a little more, until we can get hold of the stalks; but how carefully we must handle them, for they are much more delicate than before their incarceration; but after a little exposure they will be harder. If we hold them head downwards, the sand will fall out from between the petals, and let us also gently blow them. I am delighted with mine. How do yours look? You see they have retained their original form and colour, and they will remain in good preservation for several years.

I think that I had better tell you now, while I remember to do so, that if you are going to preserve flowers like the calceolarias, you must fill the pockets either with sand or cotton-wool, to preserve the outward pressure from damaging the hollow form; and then, with respect to tulips, the pistil must be removed before you bury that flower. The calices of all double flowers should be pricked with a pin in several places, and if you would be at the trouble of placing a piece of blotting-paper or a layer of cotton-wool between the petals of double flowers before you covered them with sand, you would find this precaution an immense improvement to them in their after-life, for the petals of such flowers as narcissus, small roses, stocks, and many other
of that class look flattened one on the other, unless prevented in this manner from becoming so. Scarlet geraniums and laburnums and bright-hued single stocks require great care and attention, for their colours are very fugitive.

And now, if you are ready and willing, we will try another method, by which also we can preserve the natural colour of the flowers, and also the form of their petals. We must observe the same rules as to gathering the flowers. They must be quite dry and free from imperfections of any kind. If they are but just on the eve of beginning to fade, this process will fail; for then the colour will go, in spite of our efforts to keep it fixed.

If you will hold your apron, or, better still, a large handkerchief, then I will cut the flowers, and throw them lightly in one by one; they are much less likely to be damaged in that way. We must take away all the leaves afterwards and leave the stalks between one and two inches long; and then burn away about a quarter of an inch of each stalk, by holding it in the flame of a lighted candle. This is done to prevent the juice from escaping, and the ends of those flowers which have “fleshy” stems we must not forget to dip in a solution of saltpetre and water before we burn them.

It was very thoughtless of me, but I have forgotten to say that we must provide ourselves with blotting-pads when we preserve flowers in this way, and, in consequence of my negligence, here we are with our flowers ready and at a standstill. I beg ten thousand pardons! but we can soon find what we want. A couple of small blotting-pads we can readily buy; now then we can set to work.

We must raise the whole of the sheets from the covers, and make a number of holes in one pad large enough for the calices to pass through. The petals of each flower have to lie flat on the topmost sheet of paper, so we ought to put the holes far enough apart, or the heads of the flowers will come into contact, and that would never do. Now we put the stalk through the hole, and next the calyx. Let us see that the petals of the flowers rest comfortably on the surface of the pad, and before we do anything more we must place pieces of blotting-paper between the petals of such flowers as roses and those that are called “double flowers,” if we have taken any under our care. But I am of opinion that at our first trial it is better to select flowers such as cineraries and single stocks, primroses and periwinkles. However, this by the way.

We have got them all arranged. We must place a few sheets of whitish blotting-paper over the petals, and then we must place the other pad on. Let us see that the two come together exactly. I mean that we must be particular that their edges meet all round, for if they do not, the pressure will not be even.

Now for a piece of fine string, with which to keep the covers and their contents secure and undisturbed.

The placing of these pads is not so easy a matter as it would seem to the inexperienced, for it is quite possible to ruffle a petal in putting on the uppermost pad. The safest way will be, when we have got our flowers properly arranged, and when we have put over them a few sheets of paper, then to turn over that pad on to another, the stalks and calices will then be uppermost. We must press these down quite gently, and then put on the cover and tie them round, as we agreed before.

Shall we bake our pads, or toast them? We must do one or the other. We shall be obliged to put them in front of a bright fire, or else into an oven which is not very hot. I fancy that the toasting process will be the least trouble, for then we can put them between any fire, and I know they have to be continually looked after, so that we should have to be constantly taking them in and out of the oven.

When one side is hot, the pad must be turned over, and then, when that side is hot, the other side must have a turn; and so we must go on until we imagine that they are ready for inspection.

We had better just look at them, for it is difficult to tell how long they will take. Some flowers require a longer time than others, even of the same kind. If they feel at all “fleshy,” they are not yet preserved; so they must be tied up again, and toasted once more. We must be very watchful, for this is a critical time; if left too long they will be scorched and brown, and all their beauteous colours will vanish. Three hours is the very longest time that any flower has been known to take, and, as I have before remarked, it is impossible to calculate to a nicety the length of time that any particular flower will require; so there is nothing for it but frequent inspection.

Well, now they will do; and how are we to detach them from the pad without spoiling them? For I expect that they will be extremely brittle. Our best plan will be to enlarge the holes all round each flower, and then we can extricate them. An ivory paper-knife and a finger will help them out; but we shall have to manage all this part of the work in the most delicate manner possible.

Now they are all drawn out, and we had better put them without delay between some sheets of white paper. I do not intend to leave mine in obscurity, only they must be left out of harm’s way until I have got together the necessary for mounting them, for that is what we may as well do with these.

They look extremely well when mounted and put under glass for table-tops, or as screens. They must always be covered with glass, and kept from damp or a hot sun, or else the colours will quickly fade. Ferns are a great addition to these groups, and they are done in the same way that we have just learnt. Also sprays of such flowers as the laburnum and wisteria add grace and beauty; they want a little more care in the arrangement. As a rule blue flowers do not require heat; the pressure alone is sufficient; and also let me add, while speaking on this, that great pressure is quite unnecessary. It has been the common opinion that flowers must be pressed under heavy weights; all that is required is, that the petals shall be pressed quite flat.

We want some sheets of white cardboard, some gum, scissors, penknife, and camel-hair pencil. We are not yet quite ready, because the gum will want preparing. It is of no use buying that sold in bottles, because it will not be nearly strong enough for our purpose. We must buy two or three ounces of gum-arabic, and on to that pour some hot water, enough to dissolve it, and, added to this, put a tablespoonsful of spirits of wine.

And now we shall need all our patience, while we go through the task of mounting our flowers, they want such tender care and delicate handling; and yet it will be quite impossible to arrange them permanently unless we have previously placed them on the cardboard, and decided in what positions they will look best. I believe the most satisfactory plan to be—although it entails a little more trouble in one way—that of tracing the outlines of the groups either on another piece of paper or else on the cardboard immediately after you have taken off the flowers, and while your decision as to where they are to be is yet fresh in your memory.

A drop of gum on the back of a leaf is all that is necessary for us to put, but I really find it very difficult to manage these fragile beauties, although I do pick them up very daintily and hold them lightly between finger and paper-knife.

Now it is done; the groups are complete. What shall we do with them? They are not worthy of any very important
place; for at our first trial we cannot expect to do very great things; but still we may as well keep them, and this we can do if we make them into pictures and hang them up. So I propose that we get cardboard mounts, either round or oval, and place them over, and then have a piece of glass over that, after which we must find some thick crimson paper, and gums broad strips round, and so bind the glass and the cardboard together, and then no air or dust can creep in, and these groups will brighten our rooms during the wintry weather and the gloomy flowerless days which come year by year.

**SILKWORMS.**

BY J. A. SPARING.

**A SIMPLE REELING MACHINE—RAPID INCREASE OF SILKWORMS.**

E will now endeavour to describe a reeling machine, which is inexpensive, yet suitable for reeling the silk so that it will be fit for manufacturing purposes, and which our readers can either make for themselves, or get any carpenter of ordinary skill to make for them. For this purpose we must refer our readers to the engraving of Pullen's machine on page 136.

On referring to that engraving, it will be seen that the receiving reel is driven by a handle which necessitates the attendance of two persons, one to turn the reel and another to attend to the cocoons.

We will now proceed to show how this may be obviated, so that one person can attend to the cocoons and reel at the same time. The machine is apparently much larger than required for ordinary home use. Instead of the handle on one side, and the toothed wheel on the other side of the receiving-reel, two grooved pulleys should be substituted, and the circumference of the receiving-reel should be about forty-four inches.

On the operator's left-hand side (supposing him to be standing in front of the basin containing the cocoons) there will be seen—in the engraving before referred to—between the operator and the handle, a small standard, with a notch in it to receive the guiding-stick. Instead of this notch, the standard should be left even at the top, and should be fixed to the side of the frame, instead of being at the top; another grooved pulley should then be screwed to the top of this standard, so as to turn freely on the screw, and the upper side of the pulley should be countersunk, so that the head of the screw may be flush with it; and an endless band of string (or, what will sometimes be found more convenient, either round or very narrow flat elastic, which may be procured at almost any respectable draper's), should then be placed over the pulley on the reel and this pulley, so that the band will be half crossed, as shown in the above engraving, in which A is the pulley on the receiving-reel; B the pulley on the top of the standard; and C the standard to be screwed to the side of the frame.

This pulley B should have an upright pin inserted a short distance from the centre, and should be twice the size of the shaft pulley.

The swivel-cross is shown separately in the engraving before referred to, and in lieu of the larger part there shown at the end with the notch. It may be merely a straight piece of narrow wood, with three cross-pieces screwed to it at equal distances. It may be about eighteen inches long, and the three pieces about four inches each, and made of common deal. The centre-piece carries the two small pulleys, which can work on two screws not driven quite home, so that the pulleys turn freely on the smooth part next the head; the cross-piece next the receiving-reel should have on one side a straight wire, and on the other a wire in the shape of the capital letter T, but the top part forming a loop.

The simplest way of making this T-wire is to take a flat piece of wood, about an inch wide and from a quarter to an eighth of an inch thick, and bend the wire round it, and, with an ordinary pair of pliers, twist the short end of the wire round the tail of the T, which is to be inserted in the wood. This loop must be placed over the upright pin inserted in the grooved wheel B, a little distance from the centre, and the straight projecting wire on the other side of the cross-piece must work freely in a hole made in a corresponding upright on the opposite side of the frame.

The materials required, therefore, are:—First, four pieces of wood to form a frame; then four upright pieces, two with grooves at the top to form standards, in order to hold the receiving reel, and one to receive the pulley B, with its upright wire, but the other to have a round hole in it, in which the wire inserted opposite the T-wire is to work freely.

The next thing is the construction of the reel, which may be made by taking a square piece of wood, and inserting two pieces of round iron into each end, to receive the two-grooved pulleys, which should work outside the standards, and fit tightly on the iron. Then four rather stout wires, of equal length, should be inserted through the square piece of wood, fitting tightly, so that they project equally from the four sides; then four pieces of wood should have two holes made in each, but not quite through them, into which the ends of the wires are to be inserted, and fit tightly. These pieces of wood should be made quite smooth, and the wires should be of such a length that the skein will be about forty-four inches in circumference; and a very slight taper should be given to the reel, in order that the skeins may be easily removed.

The round irons to carry the pulleys should be in the centre of the ends of the piece of wood; and to prevent the pulleys,
turning on them, the hole in the pulley should, of course, be the size that will fit, but it is desirable to file a small flat place on the side of the iron, and to have what is commonly called a key-way made in the hole in the centre of the pulley.

If the key-way is placed over the flat place filed on the projecting iron, by inserting a small wedge made of flat wire, and slightly tapering, the pulley will be prevented from turning on it. Having then fixed the standards, and placed the reel in them, the next thing is to fix the two standards—one to receive the pulley $n$, and the other the opposite wire, and then the swivel-cross. The standard carrying the pulley $n$ must of course be fixed at such a distance between the reel and the end of the frames nearest the basin, that the loop before mentioned on the swivel-cross can be placed over it. The swivel-cross should have the end nearest the basin bevelled off, and a hole should be made in it at the end for a screw to pass through into the frames, upon which it will work as a hinge. It will of course be in a sloping position, and the guide-wires next the basin should slightly curve upwards.

It will also be necessary either to have legs, or otherwise to support the frames, in order to raise it above the level of the basin.

The mode of turning the reel is the next consideration. For this purpose, a band must pass over a wheel by the side of the operator, and over the pulley which is fixed on the iron of the wheel on the opposite side to the one driving the pulley $n$.

This may be by a wheel, with a groove in it, fixed to an upright standing by the side of the operator, and having a handle in a convenient position.

It will be seen that on the receiving reel being turned, the pulley $n$ will make half a revolution, the consequence of which will be that the pin in the pulley $n$ will be moved half round, and will show or draw the end of the swivel-rod, and then, completing the circle, will draw or push it back again. This backward and forward motion distributes the silk, and renders it easy to wind. If this motion be dispensed with, there is great difficulty in winding the skin when removed from the reel.

A great source of profit as well as of instructive recreation may be obtained by watching the effects produced by crossing the breeds of different kinds of worms.

The raising of silkworms' eggs is a distinct business on the Continent, and there has been paid in one year $1,500,000 to Japan alone for silkworms' eggs. Incredibly as this fact may appear, it seems almost surpassed by the fact that Italy and France alone require eggs to the value of $8,000,000 per annum. Both Italy and France have suffered severely from the ravages of disease amongst the worms. England appears free from this scourge; and the astounding facts above related will, perhaps, render credible the following calculation of the produce of a single pair of moths, assuming only half the eggs laid to come to perfection, and the accuracy of which our readers may of course test for themselves.

It is well known that the female on an average lays about 300 eggs, but taking this at 200 only, we then get:

<table>
<thead>
<tr>
<th>Season</th>
<th>Eggs Laid</th>
<th>Half Loss</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st season</td>
<td>200</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>50 males</td>
<td>25 males</td>
</tr>
<tr>
<td></td>
<td>50 females</td>
<td>25 females</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>2nd season</td>
<td>300</td>
<td>150</td>
</tr>
<tr>
<td></td>
<td>75 males</td>
<td>37.5 males</td>
</tr>
<tr>
<td></td>
<td>75 females</td>
<td>37.5 females</td>
</tr>
<tr>
<td></td>
<td>150</td>
<td>75</td>
</tr>
<tr>
<td>3rd season</td>
<td>450</td>
<td>225</td>
</tr>
<tr>
<td></td>
<td>112.5 males</td>
<td>56.25 males</td>
</tr>
<tr>
<td></td>
<td>112.5 females</td>
<td>56.25 females</td>
</tr>
<tr>
<td></td>
<td>225</td>
<td>112.5</td>
</tr>
<tr>
<td>4th season</td>
<td>900</td>
<td>450</td>
</tr>
<tr>
<td></td>
<td>225 males</td>
<td>112.5 males</td>
</tr>
<tr>
<td></td>
<td>225 females</td>
<td>112.5 females</td>
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<tr>
<td></td>
<td>450</td>
<td>225</td>
</tr>
<tr>
<td>5th season</td>
<td>1800</td>
<td>900</td>
</tr>
<tr>
<td></td>
<td>450 males</td>
<td>225 males</td>
</tr>
<tr>
<td></td>
<td>450 females</td>
<td>225 females</td>
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<tr>
<td></td>
<td>900</td>
<td>450</td>
</tr>
</tbody>
</table>

The value of these eggs at the present market price would be over £30,000, and that very considerably. We are glad to find that parties are raising mulberry trees extensively for sale, and also raising seed in this country, so that there is some prospect of the silkworm being more than a recreation, especially as the prices of trees are very moderate, and good eggs are under 2s. per thousand.

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**GOLF.**

By Robert Howie Smith.

**HISTORY OF THE GAME.**

That a game which has flourished for well-nigh four hundred years—and which claims its vorticaries in every social grade, from royalty itself down to the vulpine "caddie," who rejoices in a furtive shot or two while his master is at business—cannot boast of a single historian; is a phenomenon almost as incredible as it is inexplicable.

Golf has little or no literature of its own. In this respect it is a singular exception to almost every other out-door recreation. Some sixteen years ago the public were favoured with an admirable treatise on the subject by "A Keen Hand." (Cupar: Whitehead and Oer), who has since made a higher name for himself in dramatic authorship than he was destined to do upon the green he loved so well. Subsequently appeared "A Few Rambling Remarks on Golf," (Edinburgh: W. and R. Chambers), from the pen of one of the most accomplished amateurs of his time. These little volumes, and an occasional paper in a story magazine, perhaps hard up for "padding," exhaust all of narrative and exposition to be met with concerning the national pastime of Scotland.

Disclaiming any intention of supplying such a desideratum, my present duty is to submit a sharp and suggestive rather than an elaborate outline, from which the reader may be able to
acquaint himself with the more salient features in the progress and the practice of the art. With this view I shall have to gather together many scattered fragments, and supplement previous details, so as to bring the information up to date.

The antiquity of golf, gowf, or gowf (for it is indiscriminately designated by all the three variations), is attested by no less an authority than Strutt. According to a passage in his “Sports and Pastimes,” “there are many games played with the ball that require the assistance of a club or bat, and probably the most ancient among them is the pastime now distinguished by the name of golf. In the northern part of the kingdom golf is much practised. It answers to a rustic pastime of the Romans, which they played with a ball of leather stuffed with feathers. During the reign of Edward III. the Latin name communia was applied to this pastime, and it derived the denomination, no doubt, from the crooked club or bat with which it was played.”

This “rustic pastime,” we are further informed, was called “Paganica, because it was used by the common people.” In that case the tools required have been fewer, simpler, and less costly than those employed in our more scientific game—a supposition which amounts to a certainty when we reflect that the competitors were independent of a broad expanse like our links, being “downs” or “commons,” confining themselves as they did within comparatively circumscribed limits. With its crueler implements, however, Paganica may legitimately be regarded as golf in a sort of chrysalis condition. The efforts to assimilate it to hockey, or to football, are said to have fired the minds of ancient writers, and of late times, to have given rise to many attempts to produce a game of this kind.

A century passes, and the descendant of the sovereigns by whom the game had been prescribed grants a monopoly of twenty-one years for the supplying of golf-balls, which were originally manufactured in Holland, while “William Mayne, during all the days of his lifetime, is appointed ‘clubmaker to his Horses.’ James VI., Charles I., and James II. (of England) subsequently ignored the penal laws of their dynastic predecessors, by engaging in and enjoying the forbidden pastime over Leith links. That it was also in high favour with courtiers, statesmen, and soldiers, can be proved from personal memoranda found in old family archives.

The author of “Montrose and his Times” supplies an account from which the following are significant extracts: “1628, the 19th May—For two golf-balls to my Lord 3 lib. 17 sh.; my Lord’s loss at the golf 10 sh.; for two goffer balls, my Lord going to the goffer there (Leith) 10 sh.” Nearly half a century later, Sir Jno. Pownell of Ravechton enters in his diary losses incurred at Leith and Musselburgh to peers and officials, in sums ranging from 13s. to 43 10s., excluding 4s. paid to the boy who carried my clubs when my Lord Register and Newbyres were at the Links.”

Apart altogether from nationality, this attractive sport has sought and gained a footing in divers and apparently ineligible quarters of the globe. Officers, magistrates, and civil servants of the state have made it known and appreciated by the plains of Hindostan. Merchants have found it not unwelcome in China; and an enthusiastic disciple of the elder Morris is determined that it shall bulk largely in the new civilization which is to humanize Japan. Years ago I saw several sets of clubs being packed at Prestwich for Australia, where one would suppose one could drive a ball from the north to the south without any other impediment than the intervening bush. But it was reserved for Captain Thrupp, R.N., to be the most eminent of the pioneers of the pastime. He is the only man who ever played or is ever likely to play golf on the island of
B I L L I A R D S.

By A. G. Payne, B.A.

LOSING HAZARDS (continued)—WINNING HAZARDS—SPOT-STROKE—CANNONS.

As we have said before, we wish to be practical, and to be so we must let our remarks apply to the average of tables, and not take for granted the most perfect specimens in the very best condition, and a new set of balls.

![Fig. 1.](image1)

![Fig. 2.](image2)

This is the general condition under which matches are played, and any one playing a public one for the first time will find that at starting there is something different, though what that something is it is not so easy to tell. He will probably find that he overdoes most strokes, and that at first starting he misses apparently easy shots, as they are sometimes called. On the other hand, professional players who are used to these new match tables, and whose tables at home very much resemble them, owing to the perfect order in which they are generally kept, are unable to play anything like their real game on one out of order, especially with rather old balls, which, owing to being chipped, absolutely rebound at a different angle to new balls.

It is, in fact, generally possible to tell in a strange room how the marker can play without ever seeing him, by one glance of the tables and cues, especially the way in which the latter are topped. It may be taken as a maxim that if a man has not sufficient sense to learn how to top a cue properly, he has not sufficient sense to learn how to play a good game at billiards, and that if a man is too idle or too stupid to keep his table in proper order, that he has never had sufficient energy or brains to become proficient in that game, which above all others requires the greatest amount of patience and judgment.

In every one of the losing hazards we have been speaking of the stroke, if played properly, will cause the red ball to travel along the dotted line down the centre of the table (diagram 1, page 112). In position 1 the red ball will strike the top cushion and rebound about as far as the centre of the table, or a little lower down, as it should be the object of the player to leave, if possible, a losing hazard into one or both of the middle pockets. In position 2, the red ball will strike the top cushion, rebound into basil and out again. Care must be taken, especially on a slow table, to play either sufficiently hard to ensure its coming out of baulk, or sufficiently slow not to bring it in; the former of the two methods being preferable unless the table be very slow indeed. In position 3 the red ball will, as before, rebound from the top cushion, go into baulk, and out again; re-strike the top cushion, and run down the table, and there is, as we have...
skid, always a danger of its going into baulk again. When, therefore, the table is very fast, this stroke can be played similar to No. 4, which must be played with sufficient strength to cause the red to travel in an out of baulk twice over, of course the exact position of the red ball after a stroke of this kind cannot be calculated even by the best of players, but the position of the red, is so far as which end of the table it may go to, is by no means so difficult as some may imagine. Let any one try and place the balls in the position we have pointed out as No. 4 in the diagram—if he be a sufficiently good player to make the stroke at all, for, as we have said, the stroke is by no means an easy one—he will be surprised to find, on making it two or three times running, how invariably the red ball runs to about the same place. By noticing this place, and recollecting it, he may sometimes astonish an opponent by naming his stroke beforehand. For instance, should this stroke occur, as is often the case early in the game, he can say, "I mean to play to go in off the red ball, bring the red in and out of baulk twice, and leave a losing hazard off it next time into one of the top pockets."

He probably will succeed in doing so, and his antagonist will be much less likely to remark, as is too often done, "How these balls do run for you!" There is nothing so likely to stop these foolish remarks, as mentioning aloud before playing where you intend leaving the balls. In practise we would rather recommend this habit, as it has the effect of causing the one who does
so to think more about the game, and it is astonishing at
billiards to see the large number of players who really never
think about position at all. We cannot too much impress such
persons with the importance of watching good players, and
learning from them the first principles of billiards, which is not
so much to keep making a series of brilliant strokes, as a series
of easy strokes.

They should recollect that the great breaks made by Cook,
Roberts, Stanley, and others, are a series of easy winning hazards,
any one of which they themselves could have made with the
greatest ease. It is being able to make the stroke and leave
the ball within an eighth of an inch of a certain spot, that
makes the great player, not the fact of being able to screw
back the length of the table.

There is very little to be said on the subject of winning hazards,
the only difficulty in making them being the extreme accuracy
necessary in taking aim. When any ball is in such a position
that it can be sent into a pocket in a direct line, there is always
a winning hazard possible if the shot on the ball in a line with
the centre of the pocket and the centre of the ball, on the opposite
side of the ball to the pocket, can be struck by the
player’s ball. Fig. 1, positions 1 and 2, will perhaps explain
better what we mean. The red ball to be sent into the left-hand
top corner pocket must be struck on a spot in a direct line with
the centre of the pocket and centre of the ball, and whatever
position the white ball is in, this same spot must be struck, in
order to ensure making the hazard. Position 1 is what is called
a straight hazard; position 2, a cut, though not a very fine one—
the limit at which it is possible to cut a ball, supposing the
player’s ball to travel in a straight line, is at an angle of 90°.

One variety of winning hazards is what is called a double—
i.e., when the player causes the object-ball (i.e., the ball he
plays on) to strike a cushion before going into a pocket. Now,
the question has often been discussed—Is it possible to put side
on the object-ball? We unhesitatingly answer, No.

That a rotary motion is sometimes given to a ball by means
of what is called the ball “kissing,” or by means of the ball
jumping, especially when there is a small hole in the cloth, is
undoubtedly the case; but that it is possible to aim at a ball,
and by any means cause it to revolve on any axis, we deny. We
will however mention, for the sake of explaining and answering
one argument we only very recently heard in favour of it being
possible to communicate side to the object-ball, more especially
as at the same time the instance in point illustrates a most
important feature in the making of doubles—and “doubles,” it
must be remembered, though of very little use in billiards, are
exceedingly important and useful both in pool and pyramids.
The argument to which we refer was that—Suppose in making a
double you cause the object-ball to strike the same spot on the
cushion, starting from the same place if it comes off at a different
angle on different occasions, does it not prove that side has been
communicated to it? The argument is plausible, but unsound,
as the answer to the question is simply, No. Had, however,
the questioner inserted—“Supposing the ball strikes the cushion
with exactly the same degree of strength,” we should have an-
swered—under these conditions we maintain that the ball would
come off exactly at the same angle every time. It is to this
point that we would draw attention, as perhaps on no other do
really good players break down so frequently. Allowing must
be made for strength when a ball rebounds off a cushion. At
present we are considering the case of a double. Position 3
shows the balls placed so that, comparatively speaking, there is
an easy double off the red into the opposite middle pocket.
The dotted line shows the direction the ball would take if the
stroke be played with moderate strength; but now what will
happen if the stroke be played hard? If the red ball be struck
exactly in the same spot, only very hard, it will rebound from
the cushion at a different angle, and instead of entering the opposite
middle pocket, it will strike the left-hand up-side cushion.
Should our readers wish to know why, we must refer them to
our third article on billiards (page 129, Vol. I.), where the case
is fully explained, and a diagram of the direction of the ball on
the table after a slow and hard strike respectively given; also a
chart showing the position of the cushion under impact with the
ball. First, when the ball strikes the cushion gently; second,
when the ball strikes the cushion with considerable force. We
have felt ourselves bound to return to this subject. It explains
so many of what we may call “bad players’ difficulties.” It is so
common to hear in a billiard-room the expressions, “Just look
how that ball came off!” “What beastly cushions these are!”
“What an untrust table this is!” when all the time the only diffi-
culty is the extreme ignorance of the speaker. We are not sure
but that it would be a good maxim to lay down that no player
who has never made forty off the balls in his life should ever
commit himself to give an opinion about a table at all. It will
often be found that their “opinion”—we are speaking of bad
players—is very much influenced by the colour of the cloth, i.e.,
they think a good important point being the position of the
cushion. The ordinary table ought to look a very bright green,
whereas, on the contrary, too often it means, except in the case
of its being quite a new one, that the cloth has been neglected
in such a manner that it has been seldom brushed and never ironed.
Ancient cloth with a sort of tawny tinge is often the
best, as it shows it has been played upon a good deal, and
also received its fair share of brushing and ironing. We would
advise those who possess private tables, that their table is as
one, inferior to public-room ones owing to its being
played on enough.

Old gentlemen who so carefully look up the billiard-balls when
they go out should bear this in mind. Were one ever to arise
with sufficient strength of mind to leave out a set of balls, sat
to tell his page-boy to amuse himself as much as he likes during
the six weeks he is out of town, on the condition that is
brushed and ironed the cloth every day, he would return at the
end of that period amazed with the improvement he would
find in his probably slow table, which would now, most likely,
resemble one in a public-room. But we must return to our winning
hazards, which are generally so simple that they require no ex-
planation, the only important point being the position of the
player’s ball after making the stroke. In this respect winning
hazards differ from losing hazards; in the latter it is often
possible, by putting on side, to vary slightly the spot in which
the object-ball must be struck, but in the former there is no choice
one spot, and one only, as a rule, must be aimed at, and that spot
is, as we have said, the spot in a direct line with the centre of
the pocket and ball. We would, however, observe in passing
that when we say one spot only must be struck, we are not
speaking with strict mathematical exactness, as this would only
be the case were the pocket exactly the same size as the dia-
meter of the ball. But, practically speaking, we are correct for
only one spot ought to be aimed at; the pocket being larger
than the diameter of the ball, a slight variation will not cause
the hazard to be missed. Of course, our remarks do not apply
to the case where a ball is so close to the pocket that it may
be struck in almost any spot, and be in position

Of course, in billiards by far the most important winning
hazards are spot hazards. Nearly all the great breaks on record
have been made by a succession of winning hazards off the red
ball. Cook, the most perfect billiard-player ever known—not
only in the spot-stroke, but even more in the delicate manipulation
of the balls—has made over 750 off the balls without
BILLIARDS.

263

stopping at the spot-stroke. No player in the present day—we are speaking of professionals—can do anything without it. Time and space will not allow, at present, an exhaustive article on the spot-stroke, nor would one be desirable.

Far better would it be for any one who wishes to master the "spot-stroke" to go and see some great player, and watch him carefully; he would learn more by looking on in an hour than he would in a lifetime by reading a work, however good, on the subject. Still, as these pages will probably reach thousands who, possessing a billiard-table, are yet too far away for it to be possible for them to see the present great players, we will, for their sake, just run over the outline of the "spot-stroke," to give them a sufficient idea of it to enable them to practice it to a certain extent.

Suppose then the red ball is on the spot, and the white ball in a straight line with it and the top corner pocket (as in Fig. 2, it is at once evident that if the player can hit the red ball full, thereby putting it in the pocket, and, at the same time, bring his ball back by means of a screw to the same place, that the same stroke will be left over again; consequently, should at any time a player arise who can make this stroke to a certainty, it will follow that when once he obtains this position he can go on scoring for ever. But there is no such thing as certainty, though, to watch the long breaks so constantly made, it seems at times only probable that before long we shall see a case in which a thousand is made off the balls in one break, which, at any rate, a pretty fair approximation to a certainty.

Suppose then, the position we have shown in the diagram to have been obtained, it is inevitable that sooner later the white ball will return, more or less, in the direction shown in the dotted lines terminated by the arrows. When the position first shown has been lost, what the player has to do is to hold the red, and as nearly as possible get his own ball back into the position a, or the corresponding position b, the other side of the red ball. There are several ways of doing this, all, of course, depending upon the exact position of the white ball. First, suppose the ball is in position a, Fig. 3—i.e., not quite in a straight line with the red ball and the pocket, but a little nearer the top cushion—now there is an easy winning hazard left into the left-hand top pocket, of course, but where will the white ball go to afterwards? Let the player try, and he will find that it is by no means difficult to make his own ball follow on in the direction shown by the arrows in Fig. 3, so as to stop in position b, when, of course, he proceeds to screw back as before. If, however, he has miscalculated the position, and his ball has run into the position b, then he has almost a similar stroke to the one just played, and by following through the red he can get his ball into a straight line with the red and pocket, the other side of the red ball.

But suppose the white ball runs into the position marked b, how is the stroke then best played, in order that position may be obtained? Fig. 4 explains perhaps the most common form of the spot-stroke, or rather the position in which ordinary amateur players mostly leave the balls. Position is best obtained by playing so as to cause the white ball to rebound off the top cushion. It will be found that, as a rule, amateurs will require a little right-hand side, or, if playing from the right-hand side of the table, a little left-hand side, otherwise the ball will come off the cushion too near the red ball, and, of course, the nearer to the red the ball is, the more important is the strength; an error of an inch, a foot and a half from the red ball, is of very little moment compared to an error of an inch two inches only from the red ball—in the one case the stroke is easy, in the other nearly impossible.

Fig. 5 explains a not uncommon position—viz., when the red and white balls are very nearly in a line, but not quite, the white ball being rather farther from the top cushion than it should be. Now, if the player were to attempt to screw back his ball, he would probably lose the position altogether, by bringing his ball back too near the top cushion. The best method, therefore, of playing this stroke is shown in Fig. 5. The white ball must be struck high, and pretty freely, in order to cause it to follow on, and obtain position off the two cushions. This is, for an ordinary player, perhaps the most difficult of all the different methods adopted to obtain position in the spot-stroke, as it requires a certain amount of freedom of cue, which nothing but practice will give. There are several variations of the way in which position can be re-obtained when partially lost, such as causing the ball to strike the top cushion, and by means of strong side, return to the same side of the red ball as it was before, or to send the ball all round the table (a very difficult stroke as far as position is concerned), etc. We have, however, treated this most important of all strokes very briefly, because none but advanced players can turn it to any practical account, and when any one is sufficiently good enough a player to be able to "do the spot," as it is called, he will be, in all probability, beyond benefiting from any book on billiards, except in learning the reason why such and such a stroke is easy, and why such a one is difficult. We believe that a great many first-rate players would be unable to give any satisfactory explanation of many of the phenomena that take place on the billiard-table; and all would probably question the statement that if the table and the balls were perfectly smooth, it would be impossible to screw back at all.

In order to learn to play the spot-stroke, it is, in our opinion, absolutely necessary to watch, and watch carefully, good players. No money is so well spent on billiards than in paying to see the first-rate professionals play. Not long ago a great match took place between W. Cook, the champion billiard-player (and who is, undoubtedly, the best player that has ever yet appeared), and Stanley, the latter receiving 200 points in 1,000, when, notwithstanding the latter being caught, he, nevertheless, won the game, principally owing to this favourite break. Stanley is, as an all-round player, very inferior to Cook, but as a spot-stroke player almost his equal, and in his wonderful power of obtaining the spot position, his superior. We have ourselves seen Stanley score two consecutive breaks, each of which was over 200. To watch a match between two such players is worth more than a week's practice, and to see the spot-stroke done once, worth more than being told how to do it a hundred times.

We now come to is to many the most interesting part of billiards—viz., cannons. What young player has not had a flush of delight in making an all-round cannon when he really has played for it? how many more, we fear, have made one, and tried to look as if they had played for it, when they had not? By-the-bye, on this point let us give beginners a word of warning. A really good player always knows what you played for, even if you don't play for anything at all. He could, if he chose, tell you plainly, "You played to hit the red hard, and take your chance of a fluke."

Roberts, sen., in speaking of cannons, says, "Execution at billiards ought not to be cultivated so sedulously as delicate manipulation. Cannons offer all the chances for brilliant strokes, and many players have often been tempted to try them in preference to losing hazards. Cannons are only useful at intervals, and when it is impossible to strike a hazard without detriment to the break on hand."

Beginners should remember that the secret of being a good billiard-player is to know where the balls will be left after
scoring. Now, in hazard striking, whether winning or losing, the position of one ball out of the two is a certainty, as well generally as the position of the third; for instance, take the case of a red winning hazard: the player knows for certain that after the stroke, should he make it, the red ball will be on the spot, and his opponent’s ball in the same place that it now is (for we presume that he is not playing for a cannon as well), the only doubtful position is that of his own ball after putting in the red. Again, after a losing hazard, the position of his own ball is—anywhere within the circle, the position of the white ball, supposing him to play, to go in off the red—fixed, unless he comes too near to strike it, which is, as a rule, easily avoided; the only doubtful position, therefore, again, is that of one ball—the red.

How different, however, is the case of a cannon, all three balls are moved, and no player, however good, could say exactly where any one of them will be.

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ROUND GAMES.

BY JAMES MASON.

PICTURE GALLERY—WHO WAS HE?—HOW, WHEN, AND WHERE?—THE SCISSORS.

HE curtain rises on the tenth evening.

"What is this?" said Alice, picking up a sheet of paper covered with writing, several copies of which lay scattered about on the tables in the drawing-room.

"It is," answered David, "as you may see from the heading, the ‘Catalogue of a Select Collection of Works of Art by British Masters.’ Maggie and I, who are rather enthusiastic, you know, in the fine arts, have gathered it together."

"Have you many first-rate works?" asked Notes-and-Queries.

"They are all first-rate. Indeed, it bids fair to become one of the finest private collections in the country."

"Painting is a costly hobby," remarked John Ferguson.

"True enough," said David; "but it is surprising, too, what a long way a little money will go in getting up a Picture Gallery, if you only make up your mind to be economical. If you saw our collection you would acknowledge that."

"And where is this collection of yours?"

"Down-stairs; in the breakfast-parlour."

"Well," said Notes-and-Queries, "I vote we go and see it before we play a single game." All the rest of us, whom David’s announcement of his Picture Gallery had taken quite by surprise, were of the same mind.

On our way down-stairs we looked over the catalogue, which contained amongst others the following numbers:

1. Portrait of H.M. the Queen.
2. Ready for Action.
3. The Days of Yore.
4. Caught in a Squall off Yarmouth.
5. The Mother’s Gift.
6. Cut to the Heart.
7. Worn out with Play.
8. The Sands of Time.
11. Youth and Age.
15. A Sea-piece.
16. All that Glitters is not Gold.
17. Folly answering Folly.

When we entered the breakfast-parlour, we saw at once that we had been greatly imposed upon. There were no pictures, but, instead, a number of little trifling articles carefully labelled and numbered—the numbers having reference to the catalogue.

David took a long thin stick in his hand, and, in showman and critic style, began to run over the articles exhibited.

"Here," he said, pointing to a postage stamp, "is the portrait of Her Majesty the Queen; long may she reign! The portrait is very carefully executed, and is an excellent likeness. No. 2 is ‘Ready for Action’ (a needle with the thread through the eye); a work of art it is very poetic in conception and feeling. The next number is marvellous in execution; it is called ‘The Days of Yore’ (a couple of old newspapers). No. 4, is executed with mastery and precision; ‘Caught in a Squall off Yarmouth’ (a Yarmouth Boater on a plate). There is something approaching the sublime in No. 5, ‘The Mother’s Gift’ (a piece of sugar-candy). You will see great animation in ‘Cut to the Heart,’ No. 6 (an apple with a fruit-knife stuck in it); and in this piece, No. 7, ‘Worn out with Play’ (a child’s doll wearing the head), you have great delicacy of treatment. See, too, its singular grace, and how rich it is in details."

So David went on, naming the works in his Picture Gallery, and calling attention to their imaginary excellences.

No. 8, “The Sands of Time,” was an egg-glass; No. 9, “Evening Shadow,” was the shadow of the window-curtain; No. 10, “High Tide and Low Tide,” proved to be a piece of string tied round a nail high up on the wall, and another piece tied round a nail low down (high-tide and low-tide!); No. 11, “Youth and Age,” was a small potato and a large one; No. 12, “Hidden Music,” was a Jew’s harp concealed under the table-cover; No. 13, “Hard Cash,” was a pile of halfpence; No. 14, “A View of the Needles,” was just half a dozen of those useful articles; No. 15, “A Sea-piece,” was a pair of spectacles (a sea-piece, as David was careful to explain); and No. 16, “All that Glitters,” was a bit of burnished tin.

"In No. 17," said David, "Folly answering Folly," "you have a great work of genius, astonishing for its power and remarkable for its truth." No. 17 looked, indeed, very like a picture, and had a curtain drawn over its face. We all crowded together in front of it; David drew aside the curtain, and there was a looking-glass in which we saw the reflection of ourselves. We all burst out laughing.

"What a shame!" said Notes-and-Queries, "to take us up so! Your Picture Gallery is a regular swindle!"

"So we meant it to be!" cried Maggie, delighted at the success of the exhibition. "Now let us go up-stairs and play at some round game or other."

The works of art were left to themselves, and we returned to the drawing-room.

"Will it please your Royal Highness to play at Who has hit for the first game?" said David to the Princess.

"Wait a minute," said she, "I am quite out of breath with running so fast up-stairs."

"Very well; I will employ the minute by telling those who do not know how the game is played. Every one in turn says..."
on a famous person and mentions four points about him; the rest of the players guess who he was.

"Who was he?" cried Alice; "may it not be who was she?"

"Oh yes, if you like," answered David. "Now let us begin. I'll give the first character. I know somebody who was called the father of his people; he could strike off twenty heads in succession; he reformed the nation over which he ruled; and remained a savage to the end of his days. Who was he?"

At once John Ferguson answered "Peter the Great," who was the monarch David had in view.

John Ferguson had now to give a character. "I am thinking," he said, "about a musical composer; he was born in Saxony, his manners were very rude; and he was blind for some time before his death. Who was he?"

"Haydn," suggested Maggie.

"No. You must pay a forfeit for every wrong answer."

"Bach," Alice guessed.

"Wrong: a forfeit, please."

"Handel," cried Notes-and-Queries. He was right.

"How stupid of me to forget Handel's blindness!" said Alice; "but one never remembers these things at the right moment."

Notes-and-Queries now said, "I know somebody who wrote the finest pastoral in the language; he was a wig-maker; afterwards he became a bookseller, and he was born about two hundred years ago. Who was he?"

There were five wrong answers to this query. At last Notes-and-Queries answered it himself. "Allan Ramsay?"

"Who was Allan Ramsay?" asked Emily, "I've never heard of——"

"Hush," said the Laughing Hyena, placing his hand over Miss Emily's mouth; "we are supposed to know everything. He is one of Notes-and-Queries' northern stars."

After we had exercised our wits on Queen Elizabeth, Alfred the Great, Nelson, Sir Walter Scott, Henry VIII., Cromwell, and Mozart, we started a new game, something of the same sort, and played at How, When, and Where.

"It is a very popular amusement," remarked Kate, of our new game. "Who is to go out of the room?"

John Ferguson kindly volunteered.

When he had gone we set ourselves to fix on a word, the name of an article, which was to be required to discover. The word, it was agreed by those who passed for authorities on the subject, should be one with several meanings.

"Must the different meanings have all one spelling," asked Kate, "or may the spelling be different, if the sound be the same?"

"Yes, it may," David answered; "sound is everything in the game, spelling nothing."

We fixed on the word "story," which, you see, would stand for a tale, or a division of a house, or something nineteen times bigger than a fat. This last exact definition was obtained from Notes-and-Queries, who said that in some places in Surrey where he often stayed, it was a common assertion that it took nineteen this to make a story, and ten stories to make a lie.

Emily ran to the door. "Come in, John."

John entered, and began to perform his task of finding out what the word was, by asking three different questions all round the company. First he inquired of each one in turn, "How do you like it?" Then he asked, "When do you like it?" and he ended by the query, "Where do you like it?"

To the first question, "How do you like it?" Maggie answered, "With bow-windows." Notes-and-Queries said, "Without a purpose." Emily said, "Very interesting." David said, "Not at all." Alice said, "Nicely papered and painted." Tom said, "With illustrations." And the others were similar.

To the second question, "When do you like it?" "On a winter evening," was Maggie's answer. "When it is one's home," was Notes-and-Queries'. "When one has nothing else to do," was Emily's. "Before there is a skeleton in the cupboard," said David. "When it is flattering to one's vanity," said Alice. "After friends have lived in it," said Tom. And so on.

Now came the third round, "Where do you like it?"

"In a pleasant neighbourhood," said Maggie.

"On the top of another of the same," answered Notes-and-Queries.

"I am sure I know the word now," said John, "it is Story."

"Yes, it is," said the Princess; "Who gave you the clue to it? Whoever did, must go out for a new game."

"I cannot tell; you all assisted in giving it. Suppose you go out yourself."

The Princess left the room; we fixed on "Flower" (floor). She was called in, and asked the various questions.

"I give it up," said she, when she had inquired for the last time, "Where do you like it?"

"Then," said David, "You must pay a forfeit and go again."

The Princess, her ingenuity being sharpened by experience, soon found out the second word; and the game went on merrily for a considerable time.

We were beginning to feel that we had had enough of it—that happens with the best things—when Kate said, "As we are playing these games for the public good, we had better make up a list of suitable words."

"A good idea!" exclaimed the Laughing Hyena, and we set to work, and soon had made out the following:

<table>
<thead>
<tr>
<th>Air</th>
<th>Bow</th>
<th>Corn</th>
<th>Have</th>
<th>Roll</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hor</td>
<td>Bean</td>
<td>Draft</td>
<td>Hair</td>
<td>Sail</td>
</tr>
<tr>
<td>Aisle</td>
<td>Bowl</td>
<td>Draught</td>
<td>Jack</td>
<td>Sole</td>
</tr>
<tr>
<td>Isle</td>
<td>Box</td>
<td>Dram</td>
<td>Knight</td>
<td>Sole</td>
</tr>
<tr>
<td>Ball</td>
<td>Boy</td>
<td>Drachm</td>
<td>Night</td>
<td>Stair</td>
</tr>
<tr>
<td>Ball</td>
<td>Cask</td>
<td>Fair</td>
<td>Main</td>
<td>Story</td>
</tr>
<tr>
<td>Band</td>
<td>Case</td>
<td>Furse</td>
<td>Manet</td>
<td>Tail</td>
</tr>
<tr>
<td>Bar</td>
<td>Cell</td>
<td>Flour</td>
<td>Note</td>
<td>Tale</td>
</tr>
<tr>
<td>Bell</td>
<td>Sell</td>
<td>Flower</td>
<td>Pear</td>
<td>Trip</td>
</tr>
<tr>
<td>Bill</td>
<td>Chest</td>
<td>Foil</td>
<td>Pair</td>
<td>Vale</td>
</tr>
<tr>
<td>Blind</td>
<td>Chord</td>
<td>Game</td>
<td>Poll</td>
<td>Vail</td>
</tr>
<tr>
<td>Blow</td>
<td>Cord</td>
<td>Gun</td>
<td>Rain</td>
<td>Will</td>
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</table>

"How many guesses are allowed to the player in 'How, When, and Where?'" asked Alice.

"Three," answered David, "is the usual number."

"Now," said Arabella, "let me play at The Scissors."

"The Scissors!" said Notes-and-Queries, "I do not think we need play at it. Why, it is just another trick-game like 'He can do little who can't do this!' at which we played last evening. Besides, I don't think it so good a game by any means."

"What is it?" asked Maggie.

"It is simply this. You take a pair of scissors, and pass it to your neighbour, saying, 'I make you a present of my scissors open—in which case you cross your arms or feel careless, so as not to attract attention; or else you say 'I make you a present of my scissors shut'—and then you take care to keep your legs or feet apart. Your neighbour must pass the scissors to the next player, repeating your words and imitating your actions at the same time. Should be failure to notice your movements he must pay a forfeit."

"Well, now," said Arabella, "you have let out the secret, there is no use playing at it."

"It would have been a waste of part of the evening if we had played at it," Notes-and-Queries replied, "and it is getting late."

By settling the forfeits, we then brought the business of the evening to a conclusion.
EGG-COLLECTING.

THE Skylark (Alauda arvensis) is an early breeder, and makes its nest in any slight depression of the ground in pastures, corn-fields, open commons, and meadows. An immense number escape detection, owing to the fact that no one goes through the young corn, grass, or clover during the time of the earlier broods, but the later ones are sometimes laid bare by the reaping.

The eggs, from three to five in number, are of a mottled brown, and, except for a zone of darker hue, they seldom vary.

A far rarer and more local species is the Woodlark (A. arborescens), which is nowhere abundant, and in the north of England is almost unknown. It is partial to a warm soil, and will seldom be found breeding on clay; the nest is in a more compact structure than that of the preceding species, and the eggs are of a much lighter colour, being sometimes almost white, mottled and streaked with ash-brown, sometimes with a slightly purplish tint. It is a smaller and more stumpy bird than the skylark, and the larger size of its crest and the far shorter tail will at once serve to distinguish it, even on the wing. As with all the larks, its nest is placed on the ground; but it is partial to the neighbourhood of plantations and slightly cultivated lands on light dry soil rather than to heavy fallows and boggy moors.

Although the above are the only two species of true larks which nest in our islands, there are three species which, from their general similarity in colouration and habit, have had the name trivially applied to them. The best known of these is the Titlark (Anthus pratensis), one of the family of Pipits, and intermediate between the wagtails and the real larks. Like them, it makes its nest upon the ground, frequenting even more boggy and uncultivated districts, and depositing four or five eggs of a dark mottled ash-brown. It is a strictly terrestrial species, and may easily be distinguished from its congener, the Tree-Pipit (Anthus arborescens), by its somewhat smaller size and by its long and straight hind-claw. It is a great favourite with the cuckoo, and that parasitic bird deposits its eggs in the nest of the titlark with perhaps greater frequency than in that of any other bird; but of this more anon.

The Tree-Pipit (Anthus arborescens), not to be confounded with Alauda arborescens, is also an abundant species, but although we introduce it here for convenience of comparison, it is a later breeder than its predecessor, and its nest need not be sought until well on in May. It may frequently be observed perched on the very topmost twig of some tall tree, rising every now and then into the air, and uttering its song, returning again to its original position.

It is partial to cultivated and wooded districts, its nest being seldom placed far from the foot of some tree, and the usual number of its eggs is from four to five. These, however, vary to a wonderful degree, being sometimes of a rich vinous brown, or others of a deep chocolate, and again of a clay-brown with spots and lines resembling those of the black-headed buntings; indeed, there is no other British land-bird whose eggs vary so much. Its short and curved hind claw, pointing to its arboreal nature, will serve to distinguish it from the titlark.

There is but one more species of pipit known to breed with us, and that is the Rock-Pipit (Anthus roseus), an inhabitant of some parts of our coasts. It is both a larger and more olive-coloured bird than either of the preceding, and is closely allied to another species (A.spinolaetus), which is abundant in many parts of the Continent, and which visits our south coasts on migration, but which has not as yet been proved to breed with us.

The eggs of both species are very similar to those of the titlark, but somewhat larger in size, and those of our bird are invariably deposited in the neighbourhood of the coast, generally on a rocky one, whilst the continental species retires to mountain table-lands to breed. The north of England, Scotland, and Ireland, are the localities in which the rock-pipit is most abundant, and we only introduce it here to clear up the group.

Next in order we will take the members of the Chat family, amongst which the Wheatear (Saxicola rubicola) is the earliest breeder, in spite of its being a migrant and not visiting our shores until the beginning or middle of March.

On arrival it does not lose much time in choosing a site for its nest, which is generally in a hole of some wall or dyke, or very frequently in a disused rabbit-burrow. It is a somewhat loose and untidy structure, and bits of dry grass and other material protruding from the crevices will frequently guide the searcher to the neighbourhood; but to get at the four or five pale blue eggs is often no easy task. Occasionally the eggs are spotted with reddish brown, showing affinity with those of the rest of the group; but as a rule the colour is uniform.

It has been taken for granted by cabinet naturalists that the name ‘‘wheatear’’ had something to do with the time of the bird’s arrival, and that it came when the wheats was in the ear. Either the authors of this hypothesis were unaware of the real time of the wheatear’s arrival, or they were ignorant of the fact that the wheat is not in the ear in March; probably they ignored both of these dilemmas. The truth is that the name is a slight corruption of ‘‘white,’’ and of a good old Saxon word synonymous with ‘‘rump,’’ a word freely printed when required until within the last fifty years, since which it has been considered vulgar. Why it should be more objectionable we cannot say, but the fact remains that ‘‘wheater,’’ many means ‘‘white rump’’—in English, and in every language.

Europe the equivalent is applied to the present species.

A resident member of the same family, though not quite the earliest to breed, is the lively little Stonechat (Saxicola rubicola), which must be familiar to those whose path has led them across any of our gorse-covered commons and uncultivated lands.

The male is especially conspicuous from his black head, imperfect white collar, and reddish chest, as he sits scolding on the topmost spray of a furze-bush, until a near approach sends him flying off with short rapid flight to a station a little more removed from the track.

The first nest may be looked for in April, but there are several broods in the year; it is generally in some heath or furze-covered bank, or down in the very roots of the gorse itself; the eggs, five or six in number, being of a decidedly greenish-blue spotted with reddish-brown, especially at the larger end, where they frequently form a very distinct zone. It is a somewhat local species, and where it is abundant the next species is as a rule scarce, and vice versa.

The Whinchat (S. rubetra) is only a spring and summer visitor to our islands, but while here it may be found throughout the country.

It is a somewhat larger bird than the stonechat, and the female may easily be distinguished from that of the former.
species by the white streak over the eye, and a corresponding streak from the throat to behind the ear, leaving a sort of dark "whisker" between them. In the male these colours are very bright; and, indeed, the adult males of either species are quite unmistakable.

The whitethroat's nest need not be looked for before May, but we mention it here to complete the family. It is placed in pretty much the same kind of spot as the whitethroat's when the country is rough and uncultivated, but the present species also frequents grass meadows and pastures, to which its congener does not seem partial.

The eggs, five or six in number, are of a much deeper blue-green than those of the whitethroat, and as a rule they are less spotted; indeed, they are often spotless altogether, like those of the wheatear; their colour, however, is much more intense than that of the last-named bird.

Having passed the middle of April, it is now difficult to follow any order based upon priority of breeding, and we must take our birds pretty much according to their systematic arrangement. Before doing this we will, however, dispose of the remaining species of owl which is to be found in civilised and populated districts—viz., the White Owl (Strix aluco). It has been severely persecuted by gamekeepers on the one hand, and by ignorant country people on the other, owing to its evil reputation as a bird of ill omen, and, along with a jay, a hawk, and a starling, its distorted form may be found "stuffed" in more senses than one in many a cottage.

Its value as a destroyer of mice is incalculable, and farmers are gradually becoming alive to its worth; but unfortunately it has been found to make good plumes for hats, and to mount up well for fire-screens; so that of late years the persecution ceased by greed of gain has been even more cruel than that caused by the keepers' hate or the peasantry's fear.

Yet, in spite of all this, a pair or two may be found in almost every parish, and the fact of a church-tower or a barn being generally selected as a site for its eggs, has doubtless much to do with the preservation of the stock, for it is not every one who can go bird-nesting in such places.

The eggs, white, as with all owls, are seldom more than four, although six have been known, and they appear to be laid in batches of two, a considerable interval often elapsing before a second clutch is deposited.

There is yet another owl which occasionally breeds, or did breed until recently, in the eastern counties, and that is the Short-eared Owl (Asio flammeus). It is a frequenter of wet uncultivated land, and, owing to the process of reclaiming and draining, the counties of Cambridge, Norfolk, and Suffolk, scarcely know it now. A few years ago we saw a nestling from Essex; but it is to the moors of Northumberland, and to the still wilder ones of Scotland, especially in the west, that we must go with any reasonable certainty of finding the breeding-place of this bird; so we need say no more about it here, beyond stating that it deposits its eggs on the ground, without making anything worthy of the name of nest.

In these days of pheasant worship there are but two species of hawks which the collector has a chance of finding in the home counties, and these are the kestrel and the sparrow-hawk.

The Kestrel (Falco tinnunculus) is a long-winged species, and is in other respects a true falcon, although its prey consists principally of mice, voles, shrews, and small birds, also small hares, cockchafers, and grasshoppers. It owes its local name of "windhover" to the way in which it constantly hovers motionless over the fields in which its prey is concealed, dropping down like a stone the instant the intended victim offers itself to the fatal pounce. But, in spite of its usefulness, a "hawk is a hawk" to our ignorant game-preservers; and, indeed, it is by no means easy to convince some of our keepers that this is not identical with the rapacious and short-winged sparrow-hawk.

The kestrel is rather an early breeder, and eggs may safely be looked for in April, the site for its nest being frequently in some old crow's or magpie's nest, which it slightly repairs and lines afresh with a little dry grass. In more rugged country it frequents ledges and crevices of rocks; and, indeed, an old and disused quarry, especially if somewhat overgrown with ivy, is a favourite resort.

The eggs, four or five in number, are generally of a deep mottled reddish-brown; occasionally the ground colour is nearly white, with red blotches, and zoned—a very handsome variety somewhat resembling eggs of the sparrow-hawk. In common with eggs of all the true falcons (at least all the known European species), they can always be distinguished from those of any other European birds of prey by having the lining membrane yellowish-white on shining it against the light and looking through the hole; whereas, in eagles, buzzards, harriers, and other hawks, this lining membrane shows green.

The Sparrow-hawk (Accipiter nisus) is a short-winged species, and it is undeniable that he is a great scourge to young game and to small birds, in fact anything which he has strength to clutch and carry off.

The male is very much smaller than the female, but in audacity he is in no way inferior; and numerous instances are on record of his boldness in attacking domesticated birds, and dashing himself to pieces against glass or wire-netting.

As regards the breeding of this species, we have never known it to nest anywhere but in a tree, generally in one which affords an excellent look-out, and there it deposits four or five eggs of a pale blue ground colour, blotched with deep red, often so that the ground colour is almost obscured.

It is also said to nest in rocks, and no doubt in localities where woodlands are scarce it adapts itself to circumstances, like other birds. It is also said to breed in April, but we ourselves never found eggs even in the south of England before the first week in May.

There is another true long-winged falcon besides the kestrel, which, although of irregular occurrence, is yet one which our collector has as good a chance of finding in the home counties as anywhere else. We refer to the Hobby (F. plummatus) a wood-frequenting hawk, and one to which the eastern and southeastern counties offer especial attractions. It is needless to say, that although from its size it can do little injury to game, except to poults, it is remorselessly destroyed by keepers; otherwise it would be found breeding every year in many places. It still comes over to the New Forest with tolerable regularity; and not many years ago it might be found breeding in Epping and Hainault forests—the former now much resented, the latter an empty name.

Of course there is a premium on its eggs; and as the birds are frequently shot in addition to robbing the eggs, we have long ago disposed of any individuals which could be supposed to return to the scene of their youth from force of attraction; but uneducated individuals do come over from the Continent every year, ignorant of the fate in store for them until it is too late; and so the hobby still maintains itself in our scanty list of raptorial breeders.

It is very late in nesting, rarely before the middle of June, and in this country it seldom lays more than three eggs, generally in some old nest. These are as a rule of a lighter colour and more closely flecked and mottled than those of the kestrel; but we have seen numbers of eggs of both species which were
perfectly undistinguishable, so that all unidentified eggs are utterly worthless.

"Hawk" naturally suggests "pigeon;" and as the two principal species of the latter family are early breeders, we may as well take them here. The largest, the well-known Ring-dove, wood-pigeon, or cushat (Columba palumbus), usually begins to lay in the month of April, and little need be said about the flimsy platform of sticks on which its two white eggs are deposited in almost any tree.

species, until we get to the northern and western sea-cliffs, and till then we shall defer our notice of it.

The pretty little Turtle-dove (Streptopelia turtur) has long been known as a regular summer visitor to our southern and central counties, but within the last twenty years its numbers have vastly increased, and its range has extended much further north.

It makes rather more of a nest in proportion to its size than the wood-pigeon does, and generally places it lower down, often in quite low fir and yew-trees, and in what may fairly be termed bushes. In our juvenile days the eggs were looked upon as a great prize, and a pair were worth a dozen wood-pigeons' in "swoop," and in spite of their white colour they were "good" for a clutch of moor-hens' or a couple of coots' eggs.

The mention of these reminds us that we have somewhat delayed our notice of them, the latter especially being a rather early breeder.

It is not every one who can get admission to the private water, sedgey lakes and pools, in which the Coot (Fulica atra) makes its reedy nest in our more cultivated districts, although in the wilder portions of our islands every suitable locality is certain to be occupied by several pairs. It is rarely that the nest can be reached without a boat or punt, and it is no easy task.

The Stock-dove (C. umbra) is really so called from its custom of breeding in "stocks" or stubble, otherwise hollow trees and pollards, and not because it is the original stock of our domestic breed, which owes its existence to the blue rock-pigeon.

The stock-dove may easily be recognized by its somewhat smaller size, and by the absence of the white on each side of the neck which the wood-pigeon has. As we have said, it lays its two eggs in stubbed pollards and hollow trees, and its predilection for rabbit-burrows has long been known; of late years that energetic naturalist, Mr. Harting, has also found it nesting on a raft of Kingsbury church-tower, and also in the cliffs of Dorsetshire, where it had long been considered to be the rock-dove, until he cleared up the question.

We are not aware of any breeding-place of the last-named
In Fig. 1 you see Barabatapoff, the world-renowned Magician of Morocco. He is made by putting the hand into the position shown in Fig. 2, dotting the point of the first finger, so as to represent a comic face, tying a knot in the corner of a handkerchief, and placing it on the tip of the finger to represent a cap, and then draping the rest of the handkerchief about the hand, to do duty for the magician's robe, as shown in Fig. 1. The great thing required for the successful
exhibition of Babastapoff, is to supply him with plenty to say—prophecies, jests, scandal, conundrums, and every variety of nonsense.

Another diversion, in which the hand plays the principal part, and which may, without much straining of the term, be included under the heading 'toy-games,' is the exhibition of the Dancing Highlander. For this performance you must get an old glove, and cut off the thumb of the first two fingers to about the extent shown in Fig. 3. Next get a pair of little socks (Fig. 4) made to fit the fingers; they should be of white linen or calico, and you can paint them with water-colours. The shoes are to be black, and the stockings plaid—say red and green lines. To prevent the colours running, they should be mixed with very little water. Draw on the glove; then pull the stockings on the first two fingers, pilling out that for the first finger so as to be equal in length to that for the second. Fasten, on the back of the glove a copy of Fig. 5, which you should have prepared beforehand. Whistle a tune for the 'Highland Fling,' and let your Highlander dance to the music. If you manage it well, the performance may be made to afford immense gratification to many a juvenile audience.

A third hand-game is the Apple Woman—and I may as well explain how to make her, when touching on this branch of the subject. Double your fist, as in Fig. 6, and draw a face on it in bold dots and lines. Make a sort of cap with a frill, to fit your hand, and drape your handkerchief round it, to represent a shawl, or—which is the simpler plan—make your handkerchief answer both for cap and shawl, as it is quite possible to do with a little ingenuity. Pin the shawl about the old woman's neck.

To make her appear to speak, move the knuckle of the thumb up and down, at the same time imitating a cracked, shrill, old voice. Move the thumb to keep time with the conversation, and the more emphatic the talk is the better. When she has done expressing her sentiments, stick a pipe in the old woman's mouth.

This form of the talking-hand is very old. An example of it is to be seen in Hogarth's first plate of the 'Election.' It was made use of too, very ably, by Albert Smith, in his well-known entertainment, 'Mont Blanc.'

I shall now describe to you three toys of the balancing order, and the first of these is what has been called Pegasus in FIGHT. It may be made out of a toy-horse, which should have its centre of gravity about the middle of its body. To this toy-horse fasten fancy wings, so as to make it look like the fabled charger of poetry, placing them behind the shoulders. Next attach a wire to the under part of the horse, as shown in Fig. 7; the wire is to be bent in a curve, and loaded at one end with a ball of lead. Set the hind feet on a table, just at the edge, so that the ball will be able to rock to and fro beneath it. When this is done, you may make the animal move up and down without the least danger of its falling to the floor.

The horse can be made to descend lower or rise higher, in proportion to the length of wire, if it be properly curved and fixed in the figure. It furnishes a very good solution of a popular paradox in mechanics, viz., a body having a tendency to fall by its own weight, how to prevent it from falling by adding to its weight on the same side on which it tends to fall. Instead of wings, you may put a dragon on the horse's back.

The second toy of this class is the Steady Tar (Fig. 8). Get a bottle, put a cork in it, and stick a needle in the cork. Now carve the figure of a sailor—but it may be a policeman or a soldier, or whoever you like—out of cork or pitch, and mount him on a hard wood ball. Through this ball run a wire, which you must bend into a half circle, and to either end of which you must fasten a small ball of lead. The hardwood ball is then to be placed on the needle, and the figure may be spun round, and tipped in any direction; it will always recover its erect position.

The third toy is the Quintain, but I am afraid it is too ingenious in construction for you to make at home for yourselves. The process of manufacturing it has been thus described by one of the great toy-makers of the day:—"Carve the bust of a man with a fierce face; on the face gum a Turkish beard and moustaches; let one arm be extended, half bent, holding a wooden scimitar, and the other bear a shield, adorned with an opening, crescent-shaped, in which hangs a little bell. Lead the base with lead, and poise it on a pin on which it shall freely revolve as to move at a touch, even if of a feather. Now, whoever, trying to make the ball ring with his finger, does not thrust at it very quickly, the figure, turning round, will deal him a smart blow on the forefinger knuckle with its sabre."

CHESS.

By John Wisner, the English Champion.

THE SIMPLER END-GAMES—KING AND QUEEN, OR ROOK, OR TWO BISHOPS, OR TWO KNIGHTS AGAINST KING.

The International Chess Tournament, which has just closed at Vienna, is by far the most important chess event of late years. The idea of gathering together the eminent players of all countries to contend for a prize is probably peculiar to the chess community. No other pastime, in fact, admits of it. Cricket is played well only in England. Not even our antipodean and transatlantic brethren make much of a figure at the game. Good whist is, perhaps, confined to England and France. Golf players look queer even on Putney Common. Base-ball is not practised out of America. And so on. Chess only is the game of all countries, and of almost all ages. An international tournament which shall cover a large portion of, at least, Europe, is quite practicable, provided the inducements for players to come from a great distance are sufficiently strong. The first contest of this kind was held in England in 1851. The competitors embraced Englishmen, Frenchmen, Prussians, Austrians, Hungarians, and Russians. The chief prize was won by Herr Andersen, a professor of mathematics in the University of Breslau. The next was also held in London in 1862, and Herr Andersen was again the victor. The prizes that year were very numerous, and the number of competitors great. Paris had its congress in 1867. The Emperor gave a prize of a magnificent vase, a sum of money being added; Herr Kolisch carried off first honours. During the war of 1870 a tournament was held at Baden, when the redoubtable veteran, Herr Andersen, won the first prize for the third time.

In 1873 Vienna was selected—an international exhibition being almost always made the raison d'être of these meetings. Owing to the high entrance-fee, the difficulty of spending so long a space as six weeks in a foreign capital and the hopelessness of inferior players contending with the best representatives from foreign countries, the number of competitors was restricted to twelve. Herr Andersen, victorious
KING AND QUEEN AGAINST KING.

This is the easiest of all check-mates. The queen possesses so great a command of the board, that the adverse king is easily driven to a fatal square at the corner or side. But this command of the board increases the danger, in this case, of stale-mate. Young players, with king and queen, frequently place the adverse king in a position where he is not in check and yet cannot escape (Fig. 2).

The mode of operation is this:

1. K to K 6  
2. K to Q B sq.

If you check with the queen, he gets away for a move or two. If he go to Q sq., you can mate at once on two different squares.

2. K to K 6  
3. K to Q sq.

He has no other move, and you now mate on Q 7 or Q Kt 8.

Here mate is given in three. I have often seen a beginner, with a similar position, unable to accomplish the operation in fifty! In one case a tyro distinguished himself by stale-mating his adversary on the 40th move.

As this ending occurs most frequently between opponents of little skill, I give another example in Fig. 3. Here the doomed king is further from the side, and a little more time must be spent in driving him to the proper square.

1. Q to Q B 6  
2. K to K B 4

You leave him but one square to go to, and that is a square near the side.

2. Q to Q 6  
3. K to K Kt 4

This is his best square.

3. Q to K 6  
4. K to K B 4 or 5

And you mate as in the preceding case.

You can force mate in seven moves, no matter what positions the king and queen may occupy.

KING AND ROOK AGAINST KING.

In this case also the mode of winning is easy, though it requires more time, as the rook is much less powerful than the queen. An example of mate with king and rook has already been given amongst those designed to exemplify check-mates.

Fig. 4 is designed to show the general style of procedure.

1. K to K R 6

(Confining the king to his two files of the board).

1. K to Q 2

It is to be observed that in this species of ending, the king

2. K to Q Kt 2  
2. K to K 2

3. K to Q B 3  
3. K to B 2

4. K to Q 4  
4. K to K 4

5. K to K 6

It is indifferent whether he go to the right or to the left.
THE POPULAR RECREATOR.

can approach and attack the rook, thus gaining time. He can never do this with the queen.

5. K to B 3
6. K to K 3
7. K to B 5
8. K to K

Had he moved K to B or K to sq., you would at once have played your king in front.

9. B to K 7 ch.
10. K to B 7 ch.
11. K to B 7 sq.
12. B to K 6
Or anywhere on the same file.
13. B to K 8, mate.

In all cases it is necessary to drive the black king to the side of the board, and force him in front of your king, except only when the adversary is on either of the rook squares. Your king may then stand either on Kt 6 or R 6.

KING AND TWO BISHOPS AGAINST KING.

In this case also the two pieces win. You confine the black king as before, and bring up your own king. It is important to observe, however, that you must drive the king not only to the side, but to a corner square, or to a square adjoining the corner (Fig. 5).

1. B to Q B 5
2. K to B 2
3. K to B 3

Had you gone to Kt 3 he would have crossed the line.
4. K to Kt 4
5. K to Kt 5
6. B to K B 7

White, by his last move, prevents Black from ever returning to K sq.

7. K to B 6
8. B to K 7
9. K to Kt 8 ch.
10. B to Q 6 ch.
11. B to Q 6 ch.
12. B to Q 5 mate.

I may here observe that you must not be content with studying the foregoing examples. Place the pieces in different positions, and, employing the principles laid down here, endeavour to force mate.

KING, BISHOP, AND KNIGHT, AGAINST KING.

Happily for the beginner, it is seldom that he is called upon to effect mate with this force. Unlike the three preceding end-games, the mate with knight and bishop is difficult. Indeed, it is not likely that the tyro could effect it within the limit of fifty moves. The problem is a fine study, well worthy of careful examination, and highly instructive. But it will require considerable knowledge of the powers of the chess pieces before this ending can be perfectly mastered.

This being so, I shall not enter into an elaborate exposition— that would require too much space—but shall present the following test position, from which others may be worked out. It was analysed very many years ago in the Chess Chronicle, and is an excellent specimen of play.

Let it be promised that to effect mate with the knight and bishop, the adverse king must be driven not only to a corner square, but to one which is commanded by the bishop. In Fig. 6, the king stands upon a corner square not commanded by the bishop, and must, therefore, be taken across the board.

1. K to K B 7 ch.
2. B to K 4
3. B to K 7
4. Kt to K 3

It frequently happens that in these end-games you must play a waiting move in order to get possession of a certain square. In this case, White prevents Black from returning to knight square.

5. K to K 7 ch.
6. K to B 6
7. K to Q 6
8. B to Kt 6 ch.
9. Kt to Q B 5

White here repeats the manoeuvre of move 4. This play of the knight is an important element in this species of ending.

9. K to Q B 5
10. K to B 7

The waiting policy again.

11. Kt to Kt 7 ch.
12. K to Q B 6
13. K to Kt 6
14. B to K 6 ch.
15. Kt to B 5

And the king must go to the corner.

15. K to B sq.

It is necessary to gain a move again, for if you play 16. Kt to Q B 6, Black is stale-mated.

16. K to Kt sq.
17. Kt to Q B 6 ch.
18. B to B 6, check-mate.
A.—Black, at his fourth move, had the choice of K B sq. or Q sq. It remains to consider the consequences of playing to the latter.

5. K to Q 6
4. K to Q sq.
3. K to Q B 2

Black now gets a little way into the centre. There is no possibility of preventing him; but he is soon driven back again.

6. Kt to Q 7
6. K to Q B 3

His best; but he might have played 6. K to Q Kt 2. In that case you confine him equally by 7. B to Q 3.

7. B to Q 3
7. K to Q B 2

Again he is shut out.

8. B to Q Kt 5
8. K to Q sq.
6. Kt to K 5
9. K to K 2
10. Kt to Q B 4
10. K to Q sq.

These combinations to confine the king are very singular. Only by degrees can he be driven to the corner square.

11. K to Q 6
11. K to Q B sq.
12. Kt to Q R 5
12. K to Q sq.

White here guards Q Kt 2, which is of more importance than Q sq.

13. Kt to Q Kt 7 ch.
13. K to Q B sq.
14. K to Q B 6
11. K to Kt sq.
15. Kt to Q 6
12. K to K 2

Observe that the position is now exactly similar to that in the first variation, only inverted. The final check of the knight is given on Q B 8, instead of Q B 6, and the last square but one of the black king is Q R 2, instead of Q Kt sq.

16. K to Q B 7
17. B to Q B 4
17. K to K 2

Here, again, White delays a move to avoid stale-mate.

18. Kt to B 8 ch.
18. K to K sq.

BIRD COLLECTING AND STUFFING.

THE CARCASS PROCESS—PREPARING IN SPIRITS—SETTING UP.

In sandpipers, stint, plover, and in fact amongst most of those known as waders, the beginner may find some difficulty in getting the feathers along the wings to lie smooth, straight, and in their natural position. This is especially the case with the long feathers called “tertials,” which come down from the thin or innermost wing-joint, and in many species reach nearly to the points of the wings themselves; but a little care and manipulation whilst the skin is drying will overcome these difficulties.

With herons and similar long-necked birds, the neck should be bent from the shoulder, and it and the bill laid parallel with, or even under one of the wings; the long legs should also be bent forward at the joint, for economy of space; they can, of course, be relaxed without difficulty, in case the bird should be wanted for mounting at a future time.

Any clotted blood that may adhere to the feathers can be removed when dry by the thumb and finger nails, if there is not much of it, but where any considerable extent of the plumage is stained, recourse must be had to water, and the application of plaster and water alternately will soon cleanse the worst stains. For removing grease, we prefer benzine, followed by plaster alternately, until the plumage is thoroughly clean, but the pristine beauty and gloss of the feathers can never be quite restored; the greatest care should therefore be exercised to keep the plumage free from soils at the very commencement of operations.

There is a way of preserving small birds which has been found to answer in warm climates, where time is an object, and also with travellers who are willing to do what they can for their ornithological friends at home, but who have neither leisure nor inclination for thorough skinning. This is by means of carbolic acid in crystals, a most valuable antiseptic, and one which every collector should carry, as a crystal or two placed in the throat and vent of any bird will contribute to arrest decomposition for some hours.

As a preservative it has not as yet been found to succeed well with birds above the size of a sparrow; and in many cases specimens prepared solely with carbolic have lost their feathers within a twelvemonth. The plan employed is as follows: the vent is opened, and the bird is neatly “drawn” and cleaned; cotton wool with a few crystals of carbolic is then inserted in the abdominal cavity, the eyes and brain are also extracted through the bill with tweezers, and the cavities filled in a similar way, and crystals are also pushed down the gullet as far as possible, so that the whole body may be thoroughly saturated with the liquid into which the crystals are soon dissolved. The body is in fact tarmed into a ham, and as it naturally shrinks in drying, the appearance of the specimen will never be very gratifying; all you can say is, that by this means you have a recognisable mummy of a bird which otherwise you would not have had at all, on the principle that “half a loaf is better than no bread.”

The use of carbolic is, however, in its infancy, and it has lately been found that skins so prepared may be relaxed by the usual plan of wrapping them in moistened cotton-wool, and may afterwards be very neatly skinned by a clever manipulator; it is, however, an operation requiring far more care and experience than ordinary skinning, so that we warn our readers not to be disheartened if the first attempt should not prove a success.

Birds preserved in spirits can easily be skinned after being dried, either in the air or in plaster, and in cases of rare and little-known forms, where the anatomy is of importance in determining the affinity of the species, it is often desirable that the entire body should be thus preserved. It is not, however, within the power of every traveller or collector to send home, or to carry about with him, jars of specimens in spirits, and in most countries, not excepting our own, the Custom-house authorities contrive to throw many difficulties and expenses in the way. We speak feelingly, having been but very lately severely mulcted in payment of duty on some birds in alcohol which we had procured for the use of an eminent anatomist, whose guarantee and reputation we fondly hoped would have satisfied the most suspicious of our modern Cerberi; however, there was nothing for it but to pay full duty.

One more remark upon collecting in foreign countries, and that is, that it is of the utmost importance for the intending traveller to know what to look for in the countries he is about to visit; otherwise, with all the zeal of a new-comer, he will probably exhaust his energies at the outset upon a number of well-known objects, and will be proportionately disheartened at learning that everything he had obtained was already familiar to naturalists at home.

There is, however, no district in the world so well-
worked that there is not something left to be done, and if our traveller had only consulted some competent naturalist before starting, he would have been directed to some hitherto neglected group, respecting which we are in want of further information; and in working at this with a settled purpose, he would have gained laurels for himself, and have done good service to science. For it is to science we wish to lead him, even, although we have avoided scaring the beginner with abstruse theories, hard names, and complicated systems of classification; nevertheless, we firmly believe that what was originally undertaken as a mere pastime, may in many, if not indeed in the majority of cases, be productive of some higher aims than the occupation of an idle hour.

Let the traveller who has already had some practice in this pursuit freely communicate with naturalists of larger and wider experience, such as the heads of any of the departments in the British Museum (for here we do not restrict ourselves to birds alone), or to the able secretary of the Zoological Society, and let him say, "I am going out to such and such a place, is there anything that requires special attention? if so, I only require to be posted up, and I will do my best to get it." The answer will, of course, depend upon the locality to be visited; but he will probably be much surprised to learn, with regard to some places which he thought "every fellow knew all about," that there is an absolute dearth of precise information, and of local collections. We need not go far for an example; the ornithology of France is at present very little known; and as regards its dependency, the island of Corsica, only a few hours' steaming from Marseilles or Genoa, its avifauna is absolutely unknown to us from any modern writings. Reasoning from analogy, we have of course a very fair idea of the species which ought to be found there, but respecting their distribution, we have positively no exact information. Yet France is the native country of Buffon, Cuvier, Degland, Gerbe, and others; but they have most of them been cabinet-naturalists, and observations on the local distribution and habits of species have been sadly neglected, in favour of dry skins brought from afar, and the rage for making species out of specimens of whose life-history they were entirely ignorant.

And although we have selected France to point a moral, from the fact of her being so near home, there is no lack of opportunities for the young naturalist in our own islands, and carefully dated local collections can never fail to be of service.

We have advocated local collections, but the systematic acquisition of "British birds" is a very different thing. By all means collect in any part of the country which you may visit, and if at the time of migration you come across some species of uncommon occurrence, and one which is not likely to breed with us, we see no harm in your doing your best to secure it. But it is far otherwise with some of the rarer visitors and breeders in our islands, whose skins are eagerly sought after, not because they are in any way different from Continental specimens, but because they are "British-killed," and ten times the usual price can be obtained for them by the dealers who find their interest—and an uncommonly good one too—in pandering to this mere "amor habendi." There is nothing in the plumage of a British-killed hoopoe to distinguish it from a Dutch or German specimen, yet that unfortunate bird, which visits us almost every year, and which would breed with us, if only allowed to do so, is no sooner remarked than it is the general object of pursuit, and the fortunate possessor of a perfectly unmistakable bird shows it exultingly to his friends, exclaiming "British-killed!"

It is the same with the Golden Oriole, and many other species; and it is to the greed of mere collectors that we owe the tricks of dishonest dealers, who in these days know their customers full well, and by the aid of steam are frequently enabled to procure specimens—of let us say the Black Woodpecker—in the flesh, killed in any locality which their invention can supply. We trust that our readers will refrain from hunting down rare visitants from similar motives, and if they should not be capable of restraining their own feelings, when the tempting opportunity is presented to them, at least, we beg of them not to offer inducements to others to procure specimens, and above all, let them not buy such from dealers. Of course, there are honest dealers, whose word may be relied upon, but there are also others of whose doings we could, if it lay within the scope of the present article, give some most instructive details.

We do not advocate the mounting or setting-up of birds, because they not only occupy far more room, but when mounted they are also far less available for comparison and examination. Yet, as some of our readers may be inclined to try their hands at setting-up their specimens, we will offer a few observations on the subject.

Would you be surprised to hear that bird stuffing is much easier than bird skinning? At first sight the remark appears paradoxical, for a bird must be skinned before it can be stuffed. Most true, and yet any professional taxidermist will tell you that for ten men who can mount a specimen, only one can turn out a really well-made flat skin, and if you ask the village barber, whose shop-window is adorned with some very fairly-stuffed birds, you will, as likely as not, be horrified at the skin which he will produce in fulfilment of your order. To mount a bird well, in a life-like attitude, is, however, a very different matter, and out of the number of bird-stuffers to be found in this country, the real artists, and men who know how a bird should be set up, may be counted on the fingers of both hands—we might almost say on one. Few of our taxidermists have had the time or the inclination to study Nature; and we see the result of their ignorance in the distortions and caricatures which disgrace, in a greater or less degree, every museum in the kingdom. Matters are better than they were; and it is slowly becoming the practice to mount only a sufficient number of specimens for the instruction and amusement of the general public, the bulk of the collection being retained in skins; but the venerable caricatures which have come down to us from the dark ages of ornithology still exist, and we can only hope that as a warning to the present and future generations they may prove of some service, before they finally drop to pieces from pure old age. How long a mounted specimen will exist with care we cannot positively say, but there are examples that are a century old, if not more; and for the benefit of the possessors of such rare birds as the great aunt, we trust that their duration may be for yet another or for many centuries.

The mere mechanical part of bird-stuffing is as follows:—Having skinned your bird in the ordinary manner, do not tie the wing-bones together as if you were making a skin, but proceed to make a false neck of the natural size, of cut tow, for cotton-wool is too soft for most birds. Then, you make a false body of any tolerably hard substance, indeed, a cork whittled to about the right shape, and slightly wound round with tow, is as good as anything for moderate sized specimens. The false body is now placed inside the skin, and a wire of a thickness proportionate to the size of the specimen is run up through the sole of each foot, and along the specie of each leg, taking care not to split the skin; these wires are driven right through the body, and out on the other side, sufficiently to allow of the ends being turned down or clinched, when they are drawn back until
BOATS AND BOAT SAILING.

BY J. C. WILCOX.

BERMUDA BOATS—THE GAPP-SAIL AND ITS APPLICATIONS.

As in this rig the sail hoists far above the shrouds, and it is evident that hoops cannot travel up the mast higher than their point of attachment to it, a special arrangement is required to keep the upper part of the sail close to the mast. This is managed by what is termed a "jack-stay," consisting of a piece of wire-ropes, reaching from about two feet below the hoist of the sail on the afts of the mast to within a few inches of the deck. At the upper end an eye is spliced into it, which is cased with leather, to prevent abrasion of the mast.

This eye, or loop, being passed over the mast-head, cannot slide down lower than, say two or two and a half feet below the shrouds, because a small cleat of wood is nailed there against the mast to hinder it.

This jack-stay of wire-rope is led down inside the hoops, and at its end just above the deck, through a strong iron eyebolt secured to the mast, where it is fitted with a screw, by aid of which it can be made almost as taut as a heavy bar of metal.

The sail above the shrouds is provided with heads of hard wood—drum-wire is the best—which are attached to the luff of the sail at intervals, as shown in the engraving. These being perforated, slide readily on the wire jack-stay, either when the sail is hoisted or lowered.

Although a long period has elapsed since this form of sail was first introduced to the notice of British yachtsmen, it does not seem at all probable it will ever supersede the rig to which the nation has been previously accustomed. Many yachtsmen who have resided in Bermuda speak very highly of these boats, and have had craft of different sizes built to compete with British vessels, but the results have been encouraging in only a few instances, and not sufficiently often to influence the built or rig of our yachts in general.

When close-hauled or beating to windward this form of sail is very effective, but when running or going before the wind the rake of the mast causes the wind to strike the sail at an oblique angle, and much of its power is in consequence lost.

BERMUDA-RIGGED Yawl or DANDY.

This is an example of the same sharp-headed sails as the preceding, being, in fact, a modification of the Bermuda or Mudian rig. She has four sails instead of two, which disposition of the canvas enables it to be very easily handled. We may term her a "Mudian-rigged yawl or dandy, as she carries a mizenmast stepped very far aft.

Her four sails consist of a jib, foresail or staysail, mainsail, and mizzen. The scale of the drawing is the same as that of the preceding Bermuda boat, namely, an eighth of an inch to a foot. Her extreme length is twenty-eight feet six inches; her length from the forepart of the stem to the afterpart of the sternpost is twenty-five feet eight inches. Her beam is nine feet six inches; draught of water aft four feet eight inches, and forward three feet.

This vessel is fitted with a short bowsprit and a bocan for the jib, hence termed a "jib-boom." There is no fixed boom for the mainsail, but one is provided for running before the wind; the rig, however, is quite open to the use of a fixed mainboom, if it is preferred to a shifting one. The advantage of dispensing with the use of a fixed boom is that it leaves the whole of the afterpart of the boat clear.

As in this boat no spars are required at the head of the sails, there is no other weight than that of the canvas to bear, when setting them, consequently she is a very light one to work; so light, indeed, that I have known a yachtsman of twenty-four tons gotten under weigh by one man only. This boat is not quite half that size. Both this and the following boat are
sufficiently large to allow of comfortable cabins being fitted to them if desired.

The mainsail and the mizzen have each two halliards, answering to the peak and throat halliards of other rigs. The throat halliards are led through a sheave in the mast, just below the point of attachment of the shrouds and forecastle of the mainmast, and in the same position in the mizzen. The forecast passes through the bowprit, under a cleat firmly nailed to the stem, or through the stem, and, being brought in over the gunwale, is secured on board.

in any other rig; and this, combined with the fact that less strength to do the work is requisite, renders it the most economical which has ever been invented.

For light winds a large jib should be provided, which should hoist to within two and a half feet of the sheave-hole, and extend back far enough to overlap the foresail to half its breadth. Light duck is the proper material for this sail.

**BERMUDA-RIGGED SCHONER.**

This boat we term a "Bermuda-rigged schooner" as she has

![Diagram of a Bermuda-rigged Schooner](image)

The heads or upper corners of these sails are hoisted by halliards passing through sheave-holes in the masts just above them. In the mainmast a sheave-hole should not be cut through the line of the middle of it, but a hole for the sheave, formed by flattening the mast a little and placing a cheek to keep the sheave in place, with a pin through it. On the other side of the mast another sheave will receive the foresail halliards. For the jib halliards sheaves are also provided on each side of the mast, at the proper height, and a block for the jib, fitted with clip or sister hooks, to hook into the head of that sail. Thus, only one block is used aloft, and fewer blocks are required than in any other rig.

There is less wear and tear of the general outfit in this than two masts, and the mainmast is rather taunter, or the more lofty, of the two. She has three sails only, a jib, foresail or fore-try sail, and mainsail. This fore-try sail is often called a fore and aft foresail.

The scale of the drawing is the same as that of the Bermuda-rigged yawl or dandy, namely, three-eighths of an inch to a foot. She is the same length, but one foot less beam; which is admissible, because her masts are not quite so lofty. Her dimensions, applied to the scale will be: extreme length, twenty-eight feet six inches; length, from the foreside of the stem to the afterside of the sternpost, twenty-five feet six inches; greatest breadth, eight feet six inches; draught of water aft, four feet two inches; draught forward, two feet eight inches.
A boat of this size can be arranged with cabins or not, according to the wishes of the owner, and may have either one or two.

She is also of sufficient depth to allow four and a half feet of height under the fore-deck from the level of the platform; but for a main cabin it would be necessary to provide an arched booby-hatch, as it is termed, to give the same height, as a considerable deduction from the height must be allowed for ballast.

If a large cabin should be required in a boat of these dimensions, the beam of the mainmast, as usually placed, will be found to be much in the way, and it ought to be raised to the level of the under-side of the hatch, the connection with the boat's sides being maintained by an angle-iron of this form, firmly bolted to the boat's frame, deck, and roof of the hatch. Thus, the head-room under the hatch will not be interfered with by the main beam. I have seen this arrangement perfectly answer the purpose.

have each one sail spread by aid of the gaff, namely, the mainsail; the dandy or yawl has also a small sail at the stern, a lug mizzen. It is quite exceptional to use any other form of sail in a dandy as a mizzen, but there are instances in some craft of the spitsail, gaff-sail, and Mudian in this position.

The schooner and the ketch have each two gaff-sails, the first-named has a gaff-sail, termed a fore-and-aft foresail, on the foremost, and a gaff mainsail and mizzen.

The mizzenmast of a ketch is stopped not so far aft as that of a yawl, which also serves as a distinguishing mark between them.
The Aquarium.

By W. A. Lloyd.

During this autumn (August, 1873), I was sent for to be consulted about a large public aquarium now being erected, from indications of my furnishing, in the new Zoological Gardens of Frankfort-on-the-Main. In the barber's shop where I was operated upon each morning, I saw a glass globe containing sparklingly clear water and a couple of unusually nice-looking small gold-fish. The globe was exactly of the shape and size of my first one (page 189, Vol. I.), and it stood on a broad shelf near a window having a northern aspect. The remarkable cleanliness and freshness of the whole thing struck me, and I began to talk with the shop proprietor about it, and I asked him, among other things, how often he changed the water; and he, with a little triumph, answered, "Never, now." So I inquired of him why never? why now? and why he so emphasized the now.

Upon which he entered into details, and said he had had the two fish for about two years, and, like other people, he changed their water at regular intervals, which were longer (a fortnight) in cold, and shorter (a week) in warm, weather. Then, that he had long possessed as a little household ornament a lump of coral, which at length he put into his gold fish globe for decoration's sake. He fished it out of the globe for my inspection; it was a round mass of about the size of my fist, and was of the kind known as "brain-coral," or "brain-stone," of a rough texture, and covered nearly all over with little shallow pits, in which the soft animal part of the coral had once lived in non-British seas. Large quantities of it, as well as of branching coral, and mushroom-like coral, and innumerable other forms, are being constantly brought from abroad for decorative and natural-history purposes, but the only time in which this craniiform-like coral has been imported to England alive, was in the beginning of the year 1873, when they were shown in a living state in the north room of the Crystal Palace Aquarium, where they were stolen some months ago by some fiend, as I duly announced in the newspapers. I hope the thief is now reading this. I am, indeed, sure that he or she is reading it, for every aquarium-keeper everywhere will study these articles of mine. I feel I am not vain in thus alluding to myself, because I am so absolutely different to every one else, and move in an orbit so peculiarly and exclusively my own, and therefore I can say and do things which would not sit well on other people. Besides, I am unaffectedly anxious to point out my own errors whenever I can find them.

My Frankfort barber, however, proceeded to tell me that after the coral had been in the water in its globe for a week or two, it gradually changed colour, and from white became brown, and that after this had happened the water got perceptibly better and clearer, and the fishes did not gallop at the water's surface as they did before when the time for changing the water approached. He changed it, however, but more from habit than from necessity, and replaced the mass of coral.

Then things went on so prosperously, and the water continued so clear, that he thought he would leave it alone. And so he did, and, to his great astonishment, the water continued as clean and healthy, month after month, as though he had kept on changing it. He added that indeed it was better than before, as a little disturbance in the health of his fish always occurred after each change. (This is often the case, as one introduces some alteration of condition with new water.) All the barber had to do, therefore, was to keep the inside of the glass now and then, and let what he rubbed off settle down or disappear, as it would do; to scrub off occasionally the superfluous vegetation from the coral (though the hollows or pits hindered the brush from removing what grew in them, and the fishes, being, like others of the coral family, omnivorous feeders, ate some of the plants); to re-supply the loss of water resulting from evaporation; and to give the fishes daily a small earthworm each as animal food. Occasionally, but rarely, he turned out and cleaned everything separately, and put them all back, with the same old water. Finally he added, with an innocently knowing air, that the coral had done it all. And so it had, but not in the manner that he imagined, for he supposed that there was some virtue in a kind of latent life of the coral, as he knew that it was an animal product. So when he got to this point, he was in a state of hopeless mental fog, out of which I could see he would never emerge without help. Therefore I told him that the fact of the coral having been once alive was not directly connected with the good it had done his gold-fish, and that its rough surface served merely as an excellent medium for the growth of minute vegetation, which appeared upon it through the action of light, and then I proceeded, in German, of course, and in words as plain as I could select, to explain the chemical action of plants and animals on each other. That he readily comprehended, but he could not get over the fact of the vegetable having come, he having planted none. So I took him outside of his shop and pointed out other vegetables growing nearly everywhere, as moss and other plants of a more humble kind, on the sides and top of a brick wall; on the trunk of a tree; on some wooden railings; on a piece of flagstones which was not trodden upon; and in sundry other places, besides much grass which was flourishing here and there in places where no hand had ever sown it.

Then I explained how extraordinarily persistent Nature is, in thus making vegetation grow everywhere, in land and in water, chiefly for oxygenating purposes, as in his fish-globe, and I remarked also that although one associates such vegetation as trees, shrubs, flowers, and grass, mainly with what is termed "the country," yet for people who have eyes to see, and brains to think, the least rural parts of the least rural towns and cities are all crowded with some form or other of vegetation, which, however, need not necessarily assume the shapes of what are commonly known as "plants." So, taking my barber into his shop, I detached with a penknife a little of the vegetable from...
the coral mass, and with the conventional pocket microscope known as Tomkins’s “Diatom Finder,” which, in addition to pocket lenses of varying power and kind, every aquarist should possess and carry about with him, I showed him its beautiful structure, of a regular spiral thread coiled in a semi-transparent tube-like sheath of a lovely golden-brown hue. He understood it all, and was much delighted; but when I ventured on telling him that it was not aesthetically correct to put a dead coral into an aquarium, whether fresh-water or sea-water, merely for the sake of decoration; and when I gently rescrutinised against the incongruousness of the thing, and remarked on the violation of the rules of abstract art which the act implied, because an aquarium should contain not the deserted houses or coralline of dead animals, but the homes of living ones; and that to do anything which even remotely suggested the reverse, was in aristocracy—then my barber shook his head, and would not have such reasoning at all, and he averred that nothing was so good as coral for decoration, let alone all other considerations.

He accepted my chemical explanations, but disdainfully rejected my art views. He was like Simoons, in the face of “The Spitalefield’s Weaver,” who, though he allowed himself at last to be persuaded that the word “suit,” was not pronounced “suit,” (a, u, su; 1, it, suit), but, on the other hand, most distinctly averred that “bouquet” should be pronounced “bucket.” However, this poor Frankfort barber, in sticking to his dead coral in an aquarium, was committing no worse than precisely the same perfections that many fine ladies I have known to be guilty of, as to dead corals, and dead shells in aquaria. And indeed, the vulgarity of realism, as opposed to the refinement of idealism, runs in art like a deeply-seated and irremediable plague through all classes of society, from a journeyman mechanic in his two poor rooms in the third floor of an obscure house, to a nobleman in his mansion with a dozen carriages not thought of as a very great luxury. I was once asked by a lady to annotate, in manuscript, her copy of Eastlake’s “Hints on Household Taste,” but I found in the fashionable shops of only one long London street so many costly vulgarities, that a brief comment on them all would have filled a book as large as Eastlake’s. I do not know whether any one has ever remarked on the manner in which detail of heavy and cumbersome drapery, wigs, and other portions of dress was over-elaborated and made too prominent in a realistic fashion, in French statuary art during the century or centum and a half which preceded the Revolution of 1789, and which with singular faithfulness presents a reflex of the stifled and artificial state of society during that pontentious time. See many casts of such statuary, in busts and in full-length figures, in the Crystal Palace.

But here we have a German hair-cutter, hair-curler, and shaving, who, without knowing anything at all of science beforehand, yet actually kept an aquarium in the most scientific manner that could possibly be devised. In spite of the art-wrongness of the thing, coral has been from quite remote times (say a hundred years ago) used for such purposes as I have named, and doubtless it will continue to be so employed. Indeed, Mr. Gese, in his “Aquarium,” gives directions for its use in this manner, so it is useless to try to persuade folks against it. I fear; but it must follow, therefore, that coral under such circumstances has, in past times, freely vegetated in water, and that people have kept aquaria therefore on the compensating principle, but without knowing it. If this Frankfort barber had done what I have narrated before the first compensating aquarium was set up by Dr. N. B. Ward in 1842, as he or some other person might have done, and doubtless did do, yet he could not be said to have invented aquaria, as what was done was done unconsciously. But if the barber had made this self-balancing arrangement either accidentally or purposely, and had shown contemporaneously and publicly why he did so and so (as Ward and Thynne did), and how it was done, then he undoubtedly would have been the inventor.

A Scottish baronet, Sir John Graham Dalrymple, kept living marine animals in his house in Edinburgh for more than fifty years—from 1795 till his death in 1851—and he wrote about them five turgid quarto volumes published at sixteen guineas. But Sir John changed his water, and kept a man intensively employed in getting and carrying it from the sea. I have the most direct and positive evidence that Dalrymple knew nothing of the value of vessels of different proportions (as to shallowness, etc.) for various animals, and he understood nothing whatever about the action of plants and animals on each other; and therefore, though he did all this good work, he never once thought of inventing an aquarium. Yet, for all that, he must certainly have grown vegetation, most probably without recognising it, and he must have benefited by that vegetation without being aware of it. But, as the intention of benefiting by it was absent, he did not invent aquaria, and he did not therefore keep aquaria knowingly. In the Entomological Magazine for 1832-1833 are some papers by Mr. J. S. Bowerbank, on the circulatory system of insects, where he records that he kept those insects in small aquaria containing water and plants supplied from the ponds where the insects were found. He thus associated them, however, rather from a notion of providing the creatures with the general surroundings of their actual habitats than from any knowledge he had of the chemical operations of plants and insects or other animals on each other, and such operations are nowher expressed at that time, though twenty years later, as we have seen (see page 190, Vol. I) Dr. Bowerbank did know of them. Therefore, though he thus early went so very near the discovery of the compensating principle, he did not actually then (in 1832) attain it, because of his unconsciousness of it.

But Mr. J. Jenner Weir recently told me that he, so long ago as this very year 1832 (or about), associated certain plants and aquatic breathing creatures in an aquarium of unchanged water, for the sake of illustrating the mututal dependence on each other of the two sets of organisms, vegetable and animal, and that he did so with success, though he did not in any way publish the fact at the time.

It is to me a matter of profound astonishment that Dalrymple, a wealthy man, who lived a long life of learned leisure, constantly among living captive marine animals (of the same kinds as those to which I devote myself), and who was eminently of so reflective a disposition that he may be said to have been overlastingly chowing over such creatures, and yet, for all that, that he did not “put this and that together,” and intentionally associate plants and animals, and so make an aquarium. The thing is still more strange when it is known that several chemists had published the theory in its abstract form before and during Dalrymple’s time.

The oddness of the omission, however, is eclipsed by the fact that in 1833 I met at Hamburg two learned German biologists, who kept domestic aquaria, with plants growing in them, and who yet completely repudiated the theory of plants and animals in their chemical relation to each other. One consequence of this was that the Guide-Book of the Hamburg Aquarium contains not one word about the influence of plants on animals, and in 1835 I heard the late Mr. D. W. Mitchell, secretary of the Zoological Society of London express himself to the same effect in the aquarium of the Society’s gardens.
These opinions, however, proceeded merely from want of considering the very small amount of Vegetation needed in aquaria. What is required for all purposes—chemical purposes (as distinguished from purposes of food)—is that the plants be small in bulk, but large in number. In a recent French book on Acclimatation, by H. de la Blanchère, it is stated that the more the plants belong to the inferior organisms, the greater their oxygnerating power, and that cryptogamic plants have a greater power of vivifying water on account of their greater evolution of oxygen, and that Mora. St-Hilaire has found that brown algae in the aquarium of the Society of Acclimatation in Paris (the first public aquarium constructed by me) produce a constant and enormous evolution of oxygen. He then goes on to point out that these lowly organised plants live in obscurity, in cavities where but little light penetrates, and they there elaborate incessantly the vital gas which they furnish to the fishes around them.

Finally, Blanchère remarks, "Is it not a marvel that this cycle of composition and decomposition, established for ever and ever, which protects life from death by an admirable chemistry, redoubles its efforts whenever decomposition redoubles its intensity."

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**BAGATELLE.**

By A. G. Payne, B.A.

**TABLES—THE BALLS—HOLES—MISSISSIPPI.**

As a scientific game, bagatelle can no more be compared to billiards than draughts to chess, or nine-pins to cricket; yet in many respects it has great advantages over billiards—the first and chief being, that in the majority of private houses bagatelle can be played and billiards cannot. Another point in favour of bagatelle is, that a beginner does not necessarily make that exhibition of himself the first time he plays, as he would at billiards. The element of chance enters so largely into the game, that very often the smallest child in the party will make the largest score, much, of course, to the delight of the small child, and it is to be hoped of the party generally, though, of course, it is somewhat trying to the feelings of the next eldest child present.

We well recollect many years ago, at about the time of life when we wore our first jacket, playing our first game of bagatelle at an old country house, called Holly Hill, and in our very first attempt getting the black ball into the middle hole (the nine), thereby scoring 18, and experiencing a greater thrill of delight than was ever caused by our winning in later years a public billiard-match at St. James's Hall. But we must first describe the game.

Bagatelle-tables vary considerably in size, the smallest being about 5 feet long by 1½ wide, and the largest 12 feet long by 3 feet wide. These tables are, however, very rare, and are only intended for what is called the cannon game; they are to be met with as a rule in small rooms which possess a room long enough but not wide enough for a billiard-table, as no reasonable person would have a full-sized bagatelle-table in preference to a full-sized billiard-table. We will, however, for the present confine ourselves to bagatelle as played in private houses.

Fig. 1 represents the table, which it will be seen is round at one end and square at the other; a and b are two small spots, the use of which will be explained by-and-by. The round holes marked from 1 up to 9, are as many cups let into the table, and of sufficient size to exactly fit half of each of the ivory balls, of which there are nine, viz., four white, four red, and one black. It is very important, in order to play the game well, that these balls should not only be the same size, but the same weight, as, should one be heavier than another, it will be impossible to calculate the direction (exactly) in which they will go after striking one another. The balls are struck with either a cue (Fig. 3) or a mace (Fig. 4); of these two the latter will be found the easiest, especially, as is often the case in private houses, the top of the cue has been fastened on with a tin tack. But, as these pages are intended for instruction, and will probably be read by all who possess a bagatelle-table, we will tell them how to top their bagatelle-cue with a proper piece of leather. We must first, however, apologise to those who have a top to their cue, and we can assure them that they are in advance of the age. Most bagatelle-tables, which are generally folded up and stored away in some very remote part of the back drawing-room, possess, as we have already said, a mace and a cue; but, as far as our own experience goes, we have never seen this latter instrument with a top. Now, a top to the cue is certainly an immense assistance in hitting the ball correctly. If the cue is a very small one, a thin piece of leather must be chosen, but if the cue be of a fairly good size, a thick piece will be found best. First, with a sharp knife cut a small square piece of leather, bigger than the top of the cue. Next, with a file scrape the top of the cue till it is quite smooth and flat—and by flat we mean, be sure that the surface is exactly perpendicular to the length of the cue, or otherwise the top will be found to be slanting. Next obtain some good hot glue, and having first warmed the top of the cue
and the piece of leather, this latter by placing it on the hob of the fire-地方 for a few minutes, apply some glue to the flat surface of the cue and press it on the leather, and continue to press it for some time. The cue and square piece of leather fastened to it should now be put away for at least twenty-four hours, when the glue will be found to be quite hard. Now take the cue and press the top down on a piece of board, keeping the cue upright, and with a very sharp knife cut the leather round, taking care in doing so not to take little slices off the cue itself. Having done this the top can be smoothed and made to look neat and finished by means of a sheet of rather fine sand-paper. A small piece of chalk will be found useful to rub the top with, as it prevents it from slipping.

The size of the cue ought properly to be somewhat in proportion to the size of the balls. When these latter are very small, a full-sized cue, such as is used in billiards, will be found to be far too large.

We recollect trying a billiard-cue on a small bagatelle-table not long ago, but the result was somewhat similar to that of trying to eat an egg with a soup-ladle.

As we have said before, beginners, and especially ladies, will find the mace the easier to play with; should, however, the cue be preferred, we have annexed a diagram (Fig. 5) of the position in which it ought to be held. It will be found, however, that it takes some time to get accustomed to this position, and that at first the cue has a tendency to wriggle from side to side. In using the mace the chief point is to make it push the ball, and not hit it; great care, therefore, should be taken to ensure it touching the ball before playing the stroke. Perhaps the best test of a good stroke is the sound. If on playing there is a sharp crack heard, it is in consequence of the end of the mace not being kept close enough to the ball. A slow, steady push ought to be accomplished without any sound at all. Before commencing the game it is of the utmost importance to get the table as level as possible. Most bagatelle-boards are made to shoot up, and are placed, when open, on a large table. Now it will be found that an ordinary round drawing-room table, which rests on one central leg, is not steady enough for the purpose; it is therefore desirable to choose a dining-room table that rests on four legs. In order to see whether or not the board is level, take five or six of the balls and roll them all together down the table, should they all roll on one side, some cards must be placed underneath, till it is found that the balls have no tendency to roll one way more than another.

At the commencement of the game the black ball should be placed on the spot marked a in the diagram. The eight red and white balls being taken off the table, or kept close against the side of the table nearest the player, one of them is placed on the spot marked b. The player then has to strike the black ball with the ball he plays with. Should he miss the black, the ball (his ball) is taken off the table altogether, whether it runs into a hole or not. In every board that folds up in the middle, it will of course be found that there is a crease in the cloth where the fold is. Any ball that runs back over this line is considered dead, and is taken up; the player, therefore, at starting should be careful not to hit the black ball too hard, for it is of much more consequence that it should not be dead than any other, and for this reason, "the black ball counts double."

The object of the player, therefore, at starting should be to strike the black ball so as to send it into or near some hole that is marked high. Of course, the centre hole, being marked nine, would be the best; but then it is very difficult, the first shot especially, to put the black into the nine, and in attempting it there is considerable danger of knocking it into the one, the lowest marked hole of all. We would recommend moderate players, therefore, at starting to aim at the black ball rather on the right-hand side, so as to send it in the direction of the next highest-marked hole, viz., the eight. The effect of this stroke is very often to send the black ball into the eight, and at the same time the ball played with, which of course rebounds in the opposite direction into the seven, thus making twenty-three in one stroke. It is obviously very bad play to hit the black ball on the left-hand side, as, should the black be sent into the seven and the white ball into the eight, only twenty-two instead of twenty-three would be scored; and it is evident from the symmetry of the table that one stroke is just as easy to be made as the other.

The black ball being once hit, it is not necessary that any ball should be hit previous to scoring; when therefore the black ball has been hole at starting, it is the best play to simply try for the remaining holes in their order of merit. But, as we have said before, the nine is
nine. The dotted lines on the diagram (Fig. 6) show how each of the principal holes can be obtained, and it will be observed in each case that the cushion is struck first. To commence with the easiest, viz., seven and eight. The dotted lines show the direction of the ball; but what will be found to be the greatest difficulty is the strength. If the stroke be played too hard the ball will not go into the hole; and if the stroke be played too slowly the ball has a tendency to fall under the cushion.

This latter is, as a matter of course, the fault of the table or board, but, as it is almost universal, even in large boards well levelled, we think is desirable to mention it. The stroke requires a happy medium between running right over the hole, and not reaching the hole at all, that nothing but practice will give.

Bagatelle-boards of course differ greatly, and the coarser the cloth, the harder it is necessary to play. The six and the four can be obtained not only by hitting the cushion in the points we have shown in the diagram, but by playing for them directly. We would recommend our readers to try both ways of playing, and see by which means they score most, as boards differ. As a rule, on a really good level board, and with balls of a fairly good size, it is quite as easy to obtain these holes by playing for them directly as off the cushion. The nine is always an attractive shot, and must be played for by hitting the top cushion on either side of the five hole; the ball will be found to rebound in the direction of the dotted line on the diagram, but we warn our readers against making any measurements; the exact spot differs on different tables, and varies with the elasticity of the cushions, the material of which the cloth is composed, and even the temperature of the room. The diagram will be found, however, a sufficiently good guide to enable them to find out, with a few trials, the exact place on any table at which to aim to obtain any hole required.

The best method of getting the black ball into the centre hole (the nine) at starting is to hit it dead full and sufficiently hard to cause it to jump over the one hole. The two things to be guarded against are—first, not hitting sufficiently hard, consequently sending it into the one; secondly, hitting it too hard and not quite full, bringing it completely back over the partition line along the centre of the board, and thus making it a dead ball.

When the player has failed to hole the black ball, his first shot, it remains an open question whether it is desirable to continue to play at the black with the view of putting it in somewhere, or of commencing to play simply for the other holes either directly or off a cushion. He must, in deciding between these two courses, be guided very much by the position of the black ball.

One of the very worst places into which the black ball can get is right under the round cushion; as the effect of hitting it when in this position is generally to make it run round without going into any hole, and very often it will be found that three or four or even more balls are entirely wasted in knocking it about without any result whatever. A very good medium course to take is, to play and secure, say the seven and eight, and then to play at the black ball, and of course try and get it into the nine hole in the middle, and thereby score the eighteen all at once.

For this purpose it will be found best first to get the black away from touching a cushion; of course when this is done, should it run over any hole, to put it in that same hole; it must be struck on a spot in a line with the centre of the ball and the centre of the hole and on the opposite side of the ball. For instance, suppose in Fig. 7, A is the hole and B the ball, and it is desired to knock the ball into the hole. The ball must be struck exactly on the spot marked R, i.e., in a line with the centres of the hole and ball, and on the opposite side of the ball to that in which the hole is.

Bagatelle-players may possibly consider these directions so self-evident as to be entirely unnecessary, but they should bear in mind that, as a rule, bagatelle-players are not billiard-players.

A good billiard-player would not require any directions at all to learn the game. The bagatelle table has generally a quantity of small holes for scoring on each side of it, somewhat similar to a cribbage board. Each person has two pegs to score with, the last peg is always the one to be moved. The object of there being two pegs, is first, it is generally easy to recollect the number last scored, and consequently if one gets accidentally knocked out it is easy to replace it; secondly, the number of holes between the pegs always show how many each party made last time.

And now a few words about keeping a table. It is most important that a bagatelle board be kept in a dry place, and also in a place where the temperature is uniform. By uniform temperature we mean—do not allow one part to get hotter or dryer than another, as the wood of which the board is made will be sure to warp.

Now, it stands to reason that, unless the board be kept tolerably level and fairly true, it ceases to be a game of skill at all and becomes one entirely of chance. To show to what a pitch of perfection some bagatelle-players attain, we may mention the fact that we have repeatedly seen a good player put the black ball in the middle hole, and the remaining eight in the other holes in alternate colours red and white.

Of course this would not be possible except on a very good and accurate table.

There are several variations of the game of bagatelle, by far the most important being what is called the “cannon game,” about which we shall have more to say another time; but there is one variety which it is as well to mention at once, viz., the game called Mississippi. This game is played with a bridge (Fig. 2), which will be generally found in all folding bagatelle-boards. This bridge consists of nine holes, numbered from one to nine, and is placed as high up the table as possible over where the cups are.

All the nine balls are played with, the black ball counting double or not, as agreed upon between the two players. The object is to hole the balls, but a side cushion must be struck first, or otherwise the number obtained counts to the adversary. It is, however, very inferior to the ordinary game, both in interest and science.

Bagatelle, like billiards, requires a steady hand, a good eye, and above all things a good temper. It will be seen sometimes that when a person fails to score he hits hard, and very often the only result is that he sends the balls right round the table and off again over the centre boundary line; whereas by a little patience he might have made a good score, as it often happens that when balls all run together, perhaps in the very last ball to play, by playing right in among them, and thoroughly scattering them, three or four balls are sometimes holed in one shot.

It is, of course, exceedingly annoying sometimes to be beaten by pure luck, as is often the case at bagatelle; but then it should be borne in mind that good play must tell in the long run, and that the better the player can keep his temper the better will he be able to play.

In our next article on bagatelle we will proceed to describe the cannon game.
THE appearance of the chrysanthemum seems as expressive of autumn as the violet is of spring, and thrice welcome are both these flowers, for the sweet colour of the latter brings hope of bright days in store for us, and the cheery faces of the former enliven our gardens and brighten our rooms when all the other blossoms have forsaken us, and we are left flowerless.

"Winter sylph," winter beginneth, in the language of our Saxon forefathers, and the sooner we begin to prepare for its quilled, and the variety in colour and shade gives one plenty of choice—yellows and browns, white, cream-coloured, and reds—you can make a nosegay as large as you like, composed entirely of chrysanthemums, and yet it shall be devoid of all appearance of sameness.

This flower is one of the easy ones to imitate, because there are no separate petals to take up one's time and patience. As with the aster, and one or two other flowers that have before been described, so with the chrysanthemum, "rounds" are cut advent the better, for anon we shall be sadly at a loss for bouquets for our tables.

There will come a day when even the chrysanthemums will have withered away; we had, therefore, better make some betimes which will not fade.

I fancy that everybody who pursues this recreation will find more interest in the forming of each specimen if they knew somewhat of the history of the flower they are copying, and so I shall just mention that the chrysanthemum is not a very old inhabitant of our country—barely a hundred years has it been established amongst us—and yet it is now almost as largely cultivated by us as it is by its compatriots the Chinese, for from the land of China it came. It received the name by which we know it from the Greeks, who much admired the "gold flower."

As you doubtless remember, the heads are solitary, and on long terminal peduncles; some are tasselled and some are out of different sizes to form the rosette. Let us study the diagrams which have been provided for our help. Here we discover four rounds (Figs. 1, 2, 3, 4), differing a little as to size, but not in shape; then we find four more patterns, one inside another.

With the largest in this cluster (Fig. 5), we have nothing to do at this moment.

For our flower we want thin paper, and then we must cut out seven rounds, and, having done this, the next proceeding is to take the pin-tool and mark a line from each point down to the centre of the petal; this indentation must be more or less distinct, according to the class of chrysanthemum you are copying.

When each of the seven rounds have been carefully manipulated in this way, take the stamens (Fig. 6), and, having affixed it to the pedicel, slip on the smallest round, and then the next in size, and so on, until the whole seven are clustered together. If
you will hold the peduncle downwards, and let the petals glide into their places, you will not be obliged to handle them so much, and the flower will look all the fresher when completed. The calyx, and must be cut out in green paper of a thicker kind than that you have been using for the petals; cover the peduncle with brownish-green paper, and the flower is completed.

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 6.

Fig. 5.

finished. Then perhaps it will be necessary to crumple the whole a little; this depends on the appearance of the natural specimen. The outside round to which I alluded, i.e., the one in the group which is more broadly outlined than any of the others, repre-

The chrysanthemum has usually a number of leaves attendant on its blossoms, so it will be advisable to buy some at the same time that you get the stamens, and then the whole effect will be more natural.
THE WHITE ADMIRAL—THE PURPLE EMPEROR.

In a few favoured woods and forests, chiefly in the south, as for instance in the New Forest and Black Park, the graceful White Admiral (Limenitis sibilla) may be met with from the end of June to the end of July. It loves to thread its way through the mazes of the thicket, and occasionally to emerge into the open rides and clearings, floating on the air without apparent effort, its wings scarcely betraying a trace of movement, stopping now and then to taste the sweets of bramble blossoms, for which it shows a remarkable partiality. There is no insect which inherits a more elegant flight than the White Admiral. Its wings, which expand from two to two and a half inches, are black, with a cast of brown, and a broad white band, which is broken, or interrupted, at a point near the centre of the fore wings, runs through the middle of both wings; there are also two small white spots near the tip of the fore wing and another near the hind margin. On the under side, which is very beautiful, the ground colour is pale brown, mixed with orange brown, and the white markings of the upper side are repeated; and, moreover, the parts nearest the body of the insect are of a delicate pale silvery blue tint.

THE PURPLE EMPEROR.

In colour the back is of a bright full green, blending gradually into a paler tint at the sides; the minute raised points yellowish; a white spiracular stripe conspicuous from the sixth to the anal segments, with a central yellow blotch on each segment; the edging of the branched spines white, beautifully relieved by a crimson or red-brown stripe beneath, beginning on the sixth, or generally the seventh, and ending on the tenth segment; the ventral surface bluish-green at the divisions, and grass green across the centre of each segment, and whitish green on the two or three last segments; the pro-legs tipped with pink; the head pale pink or green, with a crimson or brown stripe on each side of the face; the mouth pink, the mandibles black, the whole face thickly studded with yellowish obtuse spines, with a few black ones, the longest pair, on the crown, black; the sub-dorsal spines reddish, and crimson at
their tips, where they are branched with black, and below they are yellowish." Can any one conceive a handsomer creature? Nature seems to have out-done herself in the production of such rainbow tints upon a humble worm.

This caterpillar feeds on honeysuckle, to a stem of which, previous to its coming change, it suspends itself by the tail and end of its body. The chrysalis is green of various shades, and brown; the former colour being divided from the latter by a brilliant golden streak; there is a golden spot on each side of the tail, three silvery spots decorate the under side, and the head and its prominences are embellished above and beneath with similar spots and streaks.

As the Purple Emperor (Apatura iris) belongs to the same family (Nymphalidae) as the White Admiral, we will take him next. This noble butterfly measures from two and a half inches to three and a quarter, the females being considerably the larger of the two sexes. The male is blackish brown, with a rich purplish-blue gloss, which gives it a very splendid appearance when looked at in certain lights and aspects. A broken white band and white spots, similar to those of the White Admiral, adorn the middle of the wings. The female is destitute of the purplish-blue gloss.

The haunts of his Majesty are oak woods in the south of England, in which localities he arrogates to himself the possession of the topmost twig of the highest oak, as the throne on which he sits in state, and woo beside the lankless insect who dares to come betwixt the wind and his nobility! for should such an occurrence take place, he darts ferociously at the offending interloper, and quickly puts it to rout. Sometimes he will quit his post to do battle with a rival monarch, when they generally soar high up into the air, until they look like little specks; occasionally three or more will take part in a sort of triangular or quadrangular duel. Now, if we are to capture him as he sits in state, we may try our luck with a net which has a handle of twenty, thirty, or even forty feet long, otherwise we cannot reach him from the ground; but this is a very clumsy contrivance, very difficult to manipulate, and, except in very experienced hands, singularly ineffective. In the next place, having first carefully marked in our mind's eye the twig on which he sits, we may climb the tree, and thus approach the royal presence, until we arrive within striking distance. But before attempting this, it is advisable to be provided with forty or fifty feet of string, for the purpose of connecting one end of it with the net, and another with a button-hole, in order that our movements may not be encumbered by the implement. When we have got into position, we can then pull the net up after us. Of course, however careful we may be in climbing, we are pretty sure to disturb our quarry; but the odds are, that if we keep perfectly still and have patience, he will return again to his throne, when it will be our fault if we miss him. It is not to be supposed that every one could, even if he felt inclined, accomplish this feat, so let us see in what other way the proud thing can be got at from the ground. He may be shot with the finest dust shot and a small charge of powder, but this, we fear, would disfigure him; or a charge of water may be used instead, and this is the plan pursued in South America for bringing down humming-birds without injuring their plumage. The only other suggestion for capturing him on his seat of glory is by means of a captive balloon. It is always advisable to find a locality in which this species occurs where the oaks are stunted—and there are few such localities.

We will now suppose that none of the methods are practicable, that our reader is no climber, no shot, no aeronaut, and that he cannot get at his imperial throne, as the latter sits complacently perched on his eminence, doubtless looking down upon his pursuer and regarding his movements with calmer equanimity. The other alternative, which certainly involves less exertion, discomfort, injury to clothing, and danger to life and limb, consists in endeavouring to entice his purple majesty down to our own grovelling level. They say the way to an Englishman's heart is by tickling his appetite by means of dainties; and so it is with the Emperor, who, like a thorough epicure, prefers his course of game high; in fact, the more it possesses the better he seems pleased with his fare, and the more likely he is to accept our invitation to dinner. A dead cat, stot, or weasel, if sufficiently hung, has been known to tempt him within reach of an ordinary net.

For dessert his majesty prefers overripe fruit, particularly gooseberries; and for a "fin done" after dinner, a little rum and sugar spread upon an oak trunk, a compound which renders him condescending in his manners. Besides these, he may sometimes be seen regaling himself ("liquoring up," as the Yankees call it) at puddles, or the edges of ponds, or on wet mud, which we dare say he prefers to pure Adam's ale.

Another way would be to pin or harness a brood female to the trunk of a tree, when there can be little doubt but that there would be war declared between the emperors of adjacent oaks for the possession of the empress. The caterpillar may be obtained in suitable localities, by searching under, or by shaking over a sheet, the sallow bushes, upon the leaves of which it feeds, and at which we stand a good chance of meeting with the female in the act of ovipositing. It is in July that the Purple Emperor holds his haughty levee.

But if our reader, having "interviewed" H.I.M. should fail to secure him, let him not lament, as Sir Joseph Banks is said by Peter Pindar to have done, under similar circumstances:

"Gone is my soul's desire, for ever gone!"
"Who's gone?" the cur'ouser straight replied;
"The Emp'ror, Sir; with tears Sir Joseph cried
"The Emp'ror of Moscow—thought my own!
To unknown fields behold the monarch fly!"
Zounds, not to catch him, what an ass was I!"

Let him recollect the wording of that well-worn, but still famous old proverb, "there are as good fish in the sea an ever came out of it," and that the wisest thing he can do is to dry his tears and cast his net once more.
PHOTOGRAPHY.

By J. C. LEADB.  

LANDSCAPE WORK—PREPARATIONS.—THE DARK TENT—HOW TO MAKE IT, AND USE IT.

It is scarcely to be expected that, having obtained some proficiency in the making of negative pictures, the amateur will rest satisfied with portrait work alone. The ease and rapidity with which views of places—either remarkable for beauty or interesting on account of some historical or other associations—may be obtained by means of photography is so great, that it is no wonder that landscape work should have become, as it has, one of the most important and interesting branches of the art. Nor is its work confined to objects which are merely beautiful or interesting.

At the present time some of the most important facts in science are recorded by its means; and photographs of great engineering works are produced as registers of progress made in their construction.

During the construction of the great Holborn Viaduct, photographs of the works were made at stated intervals; and, apart from their interest, as showing the details of the work, they formed a faithful record of the progress actually made from time to time, and thus serve as guides to the amount of work to be made to the contractors.

From these facts it will be seen that the branch of photographic work of which we are about to treat is one of great interest and importance, and as it is, besides, that branch which the amateur is most likely to practise and excel in, we shall endeavour to consider it very fully, and make our instructions so plain and definite as to render failure all but impossible if ordinary care and attention be rendered thereto.

Of course there are various methods of making negatives out of doors by means of plates prepared at home; but of these we must defer our description, contenting ourselves at present with an account of the best and most certain of all processes—that with wet collodion.

For the production of negatives out of doors some alteration and modification of the apparatus is necessary. For instance, the ordinary portrait lens is not suitable for the best work, although it may be made to answer for small pictures; but the most important part of the landscape photographer's equipment is the "dark tent," or operating chamber, in which the plates are prepared, and which has to serve the purpose of the operating room employed at home.

This tent should be light and portable, and, while not cumbersome, should be large enough for convenient working. Of dark tents there are many, and of them might be told the tale of many very "moving accidents by flood and field," which, although they seem laughable enough now, were anything but comic to those concerned at the time of the occurrence.

In one instance, the writer, having travelled a long distance in order to secure a view, had just prepared a plate, and left the tent to expose it in the camera, when a sudden gust of wind toppled tent, chemicals, and all into an adjacent ditch, where it lay a perfect wreck, scarcely worth picking up; and so it came to pass that all the chemicals were lost, there was nothing for it but to gather up the fragments and return home, sadder and wiser.

But to return to the subject of the most suitable tent. The amateur has two classes from which to choose. Some operators prefer a tent which will contain within itself all the necessary chemicals and apparatus. This plan has its advantages undoubtedly, as when travelling it is easy to see the one parcel safely stowed in the guard's box or under the seat of a railway carriage; but for ourselves, we should advise that the tent be kept entirely separate and distinct from the other portions of the apparatus, and that a separate box be made to contain the camera and chemicals. Perhaps the best form of tent, and certainly the easiest for construction by the amateur, is that devised by the writer, and which has been most extensively employed by many distinguished amateurs and professionals. This tent is exceedingly simple, very light and portable, and may be set up for use in less than a minute. We shall at the outset suppose that it is desired to work plates of about nine inches by seven, and shall therefore describe a tent which shall be large enough for that purpose.

The first thing required will be a shallow box or tray of wood, which will at once form the bottom of the tent and the operating table. This should be made of dry pine, about half or three-quarters of an inch in thickness. The size of this box will be regulated by that of plates to be worked in the tent. For a nine-by-seven plate the base should be about two feet by eighteen inches. To the outer edges of this board should be screwed a wooden rim, about two inches deep, as shown in section at Fig. 1. This will form a capital operating table of convenient size. The top will consist of a light board, say half an inch in thickness, and of exactly the same size as the base; round this must be screwed a fillet of wood, as indicated in Fig. 2, and this fillet must be so placed as to fit into the tray which forms the base of the tent. These two parts form the groundwork of the tent.

The next thing will be the covering, which should consist of two thicknesses of black "twill" and one of yellow calico, which latter should be placed on the inside. As these materials may be procured of a yard in width, this forms a good limit to the height of the tent. This covering should be secured at the edges by small tacks to the inner side of the bottom tray and the inner side of the top fillet, taking care to nail it very closely, so as to exclude light, and make it very secure. The covering material should be made to extend along the back of the tent as shown in Fig. 3, over the two ends, and for six inches each way along the front. Each thickness of covering material will, therefore, require to be two yards in length, and the edges in front of the tent will require to be neatly stitched, so as to unite the thicknesses.

In order to ensure that the tent standing square when erected the lining should be fixed both at the top and bottom, quite parallel with the base and cover.

In order to stretch the lining and erect the tent, two stout rods will be required, which should be rather longer than the height of the tent, when the top is raised, to the extent allowed by the lining. It will now be seen that if these rods are inserted at the ends of the tent, and pushed firmly up, so as to stretch the covering out tightly, a box will be formed, having for its base the shallow wooden tray, a, Fig. 3; for its cover the top-board, b; and for the back and ends, the tightly-strained lining; and if the work has been well and properly done, this box will be almost as firm and rigid as if made of wood.
The next thing will be to provide a curtain, which may cover the opening left in the front of the tent. For this purpose the same material—namely, black and yellow lining—may be employed, and it should be large enough to reach some little distance round the edge to the ends of the tent, and to fall quite loosely.

This curtain should now be secured to the top by strings of tape inserted in small eyes placed upon the cover of the tent, and to the sides by strings of the same material fastened both upon the curtain and the sides of the tent. Of course, as this curtain is intended to wrap round the operator when at work, and exclude light, it should be made very full, and also be long enough to fall at least two feet below the bottom of the tent.

The method of using the tent will now be readily seen. The curtain is lifted at the bottom, and the operator takes his place in front of the opening. The curtain is then dropped, and lightly wrapped round, so as to exclude the light, when the whole of the table will be available for the purpose of performing the necessary operations of coating, exciting, and developing the plate.

It will be observed, however, that the interior of the tent is (or should be) at this stage perfectly dark, and as some light is required in order to properly conduct the various operations, it will be necessary to remove a small portion of the outer black linings in order to admit it. A space of about ten or twelve inches by six or eight should, therefore, be marked upon the black covering at the back of the tent, as shown in the figure at c, and the two thicknesses of black lining then carefully cut out. In lieu of this cutting an equal thickness of fine yellow calico should be inserted, and carefully stitched in, when it will be found that there will be an excellent light by which to work, corresponding to the yellow windows of the permanent operating-room at home.

The whole tent should now be secured, by means of a movable screw, to the top of a firm tripod or other stand, of a height suitable to the operator, when the tent may be said to be complete.

As, however, there will of necessity be considerable slopping of solutions and water in the course of working, it is advisable to have a tray of gutta-percha, with an outlet-pipe inserted in the bottom of the tent, as shown at d, and this pipe should be long enough to reach the ground, and convey the dirty solutions to a safe distance from the operator’s clothing. It will soon occur to the operator that some little additions may be made in the way of fittings; but of these we will treat as we describe the working.

In order to close the tent when not in use, the curtain should be unfastened, folded, and laid down on the bottom of the tray.

The supports should then be withdrawn, and similarly placed, when the top may be allowed to fall upon the upper edge of the tray, the lining being carefully folded towards the centre of the tent.

The whole will be enclosed in a flat box, about three inches in thickness, which may be secured by the passing round it of a stout strap.
DRAUGHTS.


By George Frederick Parson.

Nothing so certainly shows the true skill of the draught-player as a well-played and ingenious opening.

It cannot be too often stated—and statement is useless without remembrance—that a game well opened is half won, and that between equal players the loss of a man is fatal; or, if not immediately fatal, causing at least an unnecessary waste of time and thought.

Having already shown you the three principal openings—the Old Fourteenth, the Single Corner, and the Laird and Lady—I may now proceed to explain some of the less frequently played but not less interesting modes of beginning the game.

One of the best of these is

THE GLASGOW.

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<td>1. 11 to 15</td>
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<td>2. 8 to 11</td>
<td>2. 22 to 17</td>
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<tr>
<td>3. 11 to 16</td>
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The last move of the Black is the variation which gives the name to this opening. The move 4 to 8 would have made the game the Old Fourteenth. White's best reply is

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<td>4. 16 to 23</td>
<td>4. 27 to 11</td>
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A better move than 26 to 19, which would lose a man by 10 to 14. Both the next moves are forced.

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<tr>
<td>5. 7 to 16</td>
<td>5. 20 to 11</td>
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<tr>
<td>6. 3 to 7</td>
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</table>

White may now either bring out Black's corner man on square 4 or play out one of his own men—23 to 24, and then 24 to 20, or 25 to 22. The latter is generally considered the best.

Suppose it made, then Black takes the man on square 11, and the position is as follows, leaving Black with an excellent game:

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Now, let the game be played out from this position, and it will be found that, though White may make a draw, the slightest mistake will lose him the game. This opening, then, is a good and safe one for the first player.

THE ROUTER.

This is an opening often adopted by young players. It is curious and interesting, but in many respects inferior to the Old Fourteenth, the Single Corner, and the Whittier. In order, however, to show its peculiaries, it will be best to play a game throughout.

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<td>1. 11 to 15</td>
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<td>2. 9 to 14</td>
<td>2. 22 to 17</td>
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<td>3. 6 to 9</td>
<td>3. 17 to 13</td>
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<td>4. 2 to 6</td>
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This last move of Black's is better than allowing White to take the man, as it strengthens his position, and places his adversary in a somewhat cramped position.

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<td>5. 8 to 11</td>
<td>5. 29 to 25</td>
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<td>6. 4 to 8</td>
<td>6. 24 to 20</td>
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<td>7. 15 to 24</td>
<td>7. 26 to 19</td>
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<td>8. 11 to 15</td>
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White may now either move 32 to 28, and get man for man, or 27 to 24, and temporarily stop Black's advance. The latter is perhaps the better.

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<td>9. 14 to 17</td>
<td>9. 21 to 14</td>
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<td>10. 9 to 18</td>
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Better than 10 to 17, which would lose a man by White's reply, 25 to 21.

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<tr>
<td>11. 18 to 27</td>
<td>11. 32 to 23</td>
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<td>12. 10 to 14</td>
<td>12. 19 to 10</td>
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<td>13. 6 to 15</td>
<td>13. 13 to 9</td>
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<td>14. 7 to 11</td>
<td>14. 23 to 19</td>
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<td>15. 15 to 18</td>
<td>15. 22 to 15</td>
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Giving man for man, and presently leading to another exchange.

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<td>16. 11 to 18</td>
<td>16. 31 to 26</td>
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<td>17. 18 to 23</td>
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Going to king, which cannot now be stopped by White, who is obliged to move upward in order to avoid the impending attack.

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<tr>
<td>17. 19 to 15</td>
<td>17. 26 to 22</td>
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<td>18. 23 to 27</td>
<td>18. 34 to 19</td>
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<tr>
<td>19. 27 to 31 x</td>
<td>19. 26 to 22</td>
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<tr>
<td>20. 14 to 17</td>
<td>20. 22 to 13</td>
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<tr>
<td>21. 5 to 14</td>
<td>21. 20 to 16</td>
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<tr>
<td>22. 31 to 27</td>
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Or Black might have moved 3 to 7, when White would have gone into square 10, and Black into square 11, with an even result, man for man.

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<td>22. 16 to 11</td>
<td>22. 16 to 11</td>
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<tr>
<td>23. 27 to 23</td>
<td>23. 11 to 4 x</td>
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Which forces the man for man, and gives Black an advantage of position.

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<td>25. 14 to 18</td>
<td>25. 25 to 21</td>
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<td>26. 18 to 22</td>
<td>26. 21 to 17</td>
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<td>27. 16 to 19</td>
<td>27. 15 to 10</td>
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<tr>
<td>28. 19 to 15</td>
<td>23. 17 to 13</td>
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</tbody>
</table>

If Black missed this move, he would lose, and the White player would have a very good position.

Thus we see that although the best moves are not necessarily the most difficult, yet to play the best moves is not at all an easy matter. It requires a great deal of thought and skill to see the best move, and even then it may not be the best move, as the move of the adversary must also be considered.

In conclusion, we may say that draughts is a very interesting game, and one that requires a great deal of thought and skill to play well.
winning a king for a man, a very neat series of moves on the part of White.

29. 15 to 6       29. 9 to 2 x
30. 12 to 16      30. 2 to 7
31. 3 to 10       31. 4 to 8
32. 16 to 19      32. 8 to 11
33. 19 to 23      33. 11 to 7
34. 10 to 14      34. 7 to 10
35. 14 to 18      35. 10 to 14
36. 22 to 26      36. 14 to 10
37. 29 to 31 k    37. 10 to 15
38. 18 to 22      38. 15 to 18
39. 22 to 25      39. 30 to 21

By this series of moves White regains his man.

40. 1 to 5
41. 31 to 24
42. 24 to 19
43. 19 to 15
44. 15 to 18;

and Black wins with the following position:

The next opening of importance is known as the Will o' the Wisp, a variation of the Old Fourteenth. It leads to a smart give-and-take game, as will be seen by the example appended.

WILL O' THE WISP.

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The last two moves give the specialty of this opening.

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<td>5. 27 to 23</td>
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<tr>
<td>6. 8 to 11</td>
<td>6. 26 to 22</td>
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<td>7. 6 to 19</td>
<td>7. 22 to 18</td>
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<td>8. 1 to 5</td>
<td>8. 18 to 9</td>
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<td>9. 5 to 14</td>
<td>9. 29 to 25</td>
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<td>16. 24 to 29</td>
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<tr>
<td>17. 11 to 15</td>
<td>17. 13 to 9</td>
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</tbody>
</table>

The last move of the White would appear injudicious, but we shall presently see that it was not made without thought.

18. 6 to 13       18. 20 to 16
19. 15 to 24      19. 27 to 19
20. 12 to 16 x    20. 31 to 6

taking three men, regaining his piece, making a king at his next move, and winning the game. The strength of the position will be seen by a glance at the diagram.

BLACK.

WHITE.

Now, whatever Black does, White wins the game. Try it, and you will find that though both sides run up for a king, the White is able to win a man by attacking the black men on squares 10 and 11. Of course, many variations may occur in this, as in other openings, but the general scope of the game is well seen in this example.

Another opening occasionally selected by young players is THE WITCH.

In the game appended White moves first.

WITCH.

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<td>1. 22 to 18</td>
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<td>2. 8 to 12</td>
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<td>3. 25 to 22</td>
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This is the opening, which, so far, is a perfectly even game. Presently, however, it will be found that the player with the first move has a material advantage.

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<td>7. 23 to 22</td>
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<td>18. 31 to 26</td>
<td>18. 22 to 31</td>
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<td>19. 32 to 27</td>
<td>19. 31 to 24</td>
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<td>20. 28 to 3</td>
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GYMNASTICS.

11. 16 to 20  11. 23 to 18
12. 14 to 23  12. 27 to 18
13. 20 to 27  13. 32 to 23
14. 8 to 11   14. 29 to 25
15. 11 to 15  15. 18 to 11
16. 7 to 28   16. 25 to 22
17. 16 to 20  17. 31 to 27
18. 3 to 7    18. 22 to 18
19. 7 to 11   19. 18 to 15
20. 11 to 18  20. 23 to 7
21. 2 to 11   21. 21 to 17
22. 11 to 16  22. 27 to 23
23. 20 to 24  23. 19 to 15
24. 24 to 27  24. 23 to 18
25. 27 to 11 K 25. 18 to 14
26. 31 to 26  26. 15 to 11
27. 26 to 22, 27. 26 to 22,

and the game is drawn, with the following disposition of the forces—

BLACK.

The amateur will, however, do well to play out the moves from the position indicated. He will soon find that he can prevent the black man from advancing beyond square 17; stop the man on square 12, make two kings, and win in the usual way with two to one.

The last opening I give in this chapter is ingenious, as it leads to a short and rapid game known as

THE ALLIANCE.

BLACK.  WHITE.
1. 10 to 14  1. 23 to 18
2. 11 to 16  2. 24 to 19

This constitutes the opening, so far, perfectly even and good.

3.  8 to 11  3. 25 to 22
4.  4 to 8   4. 30 to 25
5.  6 to 10  5. 18 to 15
6. 11 to 18  6. 22 to 6
7.  1 to 10  7. 25 to 22
8.  9 to 13  8. 22 to 17
9. 13 to 22  9. 25 to 9
10. 5 to 14  10. 28 to 24

GYMNASTICS.

By WAT BRADFORD.

EXERCISES IN DETAIL.—THE LEAPING-POLE—LEAPING-BOPE—SIMPLE GYMNASIUM APPARATUS FOR HOME APPLIANCES.

A part from the individual use of a command over a leaping-pole, as a means for leaping obstacles that could not be cleared by the spring of the legs alone, the exercise is of general use in giving precision to eye and hand, making the former to calculate distance with rapidity, and engendering nerve in the system, as well as being of a healthful nature.

A pole should be of ash, 8 to 10 feet long, in diameter 1\textfrac{1}{2} to 1\textfrac{3}{4} inches, according to the weight of the pupil; and at the lower end there should be an iron spike and clamp to prevent the pole from splitting in its contact with the ground, and from slipping while the weight of the pupil is upon it—the latter contingency might bring about a serious accident. It is never safe, unless in very soft ground that ensures a firm hold, to leap with an unshod pole.

The pupil should learn to leap with either hand uppermost. The hand which is to be uppermost should so hold the pole that when the pole is held at right angles across the body, the palm of the hand is uppermost; the other hand may be in the same position or the reverse way, palm downwards, at option. We prefer the latter, but it is a matter of choice, i.e., of feel in the grip.
Whichever hand is upwards, that foot corresponding should be advanced in the spring, and the pole should pass during the spring on the same side of the body as the lower hand. In jumping width, the body should spring with the feet leading, behind, and the body descend by itself, and alight facing the obstacle just cleared.

A solid obstacle of height cannot be well leaped without leaving the pole behind, for the butt of the pole, being fast fixed and as it descends the pole should leave the ground, remaining in the grasp and return to its normal position of rest at right angles to the body.

In jumping height, the legs should, after leaving the ground, swing round straight out and rigid, till at the highest point the body lies almost horizontal to the ground (Fig. 2). As soon as it has cleared the obstacle, the hands should swing the pole away in the ground by the weight of the body when passing over it, would prevent the pole from following over the barrier, and the weight of the body, bearing it against the barrier, with the end stuck fast, would either break the pole or tear it from the grasp.

The first practice should be taken in a standing posture; the pupil will thus learn to guess the distance at which to "take-
off" for his leap, and having ascertained thus much, will progress to a running- leap to clear greater obstacles.

In the running- leap it should be borne in mind that the relation of the hands to the side of the body on which the pole is to pass is the same as in the standing- jump, and that the foot from which the final "take- off" or spring is given should be the one corresponding to the lower hand (Fig. 1). The foot corresponding to the upper hand leads in the jump and landing, and is taking the lower position, if the exercise is practised to any great extent, so that the body may not acquire any one-sided development. The exercise verges very nearly upon "athletic sports," and by many is classed with them, in contradistinction to gymnastics. At Lillie Bridge it takes its place as one of the performances in the Champion Athletic Meeting. Nevertheless, it is here introduced as a gymnastic feat, partly from its assimilation to its congener, but undoubtedly purely gymnastic.

Fig. 7.

Fig. 9.

the first to leave the ground in the spring. The eye should, during the run, be fixed steadfastly upon the obstacle to be jumped, and the eye will in time learn to discover the distance for the "take- off," and the step will time itself, so that the proper foot is ready to take- off in the proper place.

The main art of pole-leaping consists in so timing the steps at the approach to the obstacle, that the "take- off" comes in the proper place, without any sacrifice of speed in the run up, to enable the steps to time themselves with due accuracy.

With a growing boy it is well that such an exercise should be practised with both sides of the pole, with hands alternately

Fig. 10.

tic feat, leaping with the rope, which we next proceed to detail.

LEAPING WITH THE ROPE.

This is almost invariably a gymnastic feat. The "giant- stride," which is akin to it, and which is detailed later on, requires an out- door apparatus. Each exercise is of value, in exercising simultaneously the back, loins, arms, and shoulders, as well as the lower limbs.

The single leaping- rope should be suspended from a beam or ceiling in a gymnasium of limited space. One of the ropes which serve for a pair of movable parallel rings can be utilised
for this purpose. Underneath it should be placed, pro tem., a pair of posts, each standing separately on the floor upon rectangular feet. The posts should be bored with holes to admit pegs which carry the leaping-bar, which can thus be varied in height. A sort of coloured cloth or flag should hang from the stick to facilitate the eye in judging the distance for the "take-off," especially when such posts are used for ordinary jumping, without the aid of pole or rope.

The exercise is very simple. The hands should grasp the rope, one above the other, with arms at full stretch, body facing the leaping-bar (Fig. 3). Now jump from the feet, throwing the body slightly to the rear as you rise, so as to give space for the feet to pass in front of the bar. Let the body fall at the hips in the shape of the letter V, legs rigid, arms bending simultaneously at the elbow-joint, and the body drawn up to the arms, so that the elbow-joint hugs the body (Fig. 4). Now shoot out the legs and throw back the head and shoulders, till the body lies as near as possible parallel to the ground, the arms—from the elbow-joint to the hand grasping the rope—being perpendicular to the body (Fig. 5).

In this position the body will swing from the rear, to which the spring was first made, over the barrier; and as it is clearing the arms and loins, lower the legs, raise head and shoulders, and the body descends erect on the other side.

In leaping width with the rope, grasp the rope about three feet more or less above the ground; step back till the rope is taut, holding the rope in one hand only, the corresponding feet in advance; spring backwards, and, as soon as the recoil takes place, which is almost instantaneous, grasp with the other hand above that already holding the rope, and, squaring the body to the rope, swing forward, bringing the legs forward, feet close together, legs rigid, and feet higher than the hips. As the swing comes to an end, drop the feet, let head and shoulders incline forward; lose the rope, and descend erect.

This exercise may be varied ad lib., by making the body swing, not once only, but twice or oftener after the first spring, before loosing the rope and descending. In fact, it may be reduced to a simple swing, the feet taking off with a backward spring at the return of each swing of the rope, as in a sitting-swing.

The rope also may have bars set in knots at different lengths to facilitate the grasp, especially for girls, for whom a sort of rope-swing like this in a house, on a spare landing, will form a healthy exercise—opening the chest, strengthening the back and lower limbs, and causing more exertion of the whole frame and that with circulation of the blood, than an ordinary sitting-swing.

A couple of ropes, about two feet apart, suspended from a bar or ceiling, can be applied to various gymnastic uses.

1. If fastened to the ground perpendicularly, with cross-bars inserted in loops at regular intervals, a rope-ladder is formed, which can also be left hanging loose and pendent.

2. Rings inserted at equal lengths give the apparatus known as the "pair of rings."

3. A single bar (in place of the rings), and joining the ropes, gives the ordinary "trapeze."

4. Either rope used singly, its fellow being coiled up out of the way, gives a leaping or climbing-rope. This is about the simplest and easiest gymnastic apparatus that can be fitted up for family appliance.

VAULTING.

This is a species of gymnastics which, though at first practised upon a fixed gymnastic apparatus, can, when mastered, be greatly utilized in ordinary out-door exercise. Many a rail or gate that is too formidable to be cleared at a single spring of the feet from the ground, without the body touching the obstacle, can be easily jumped by the process of vaulting.

The exact motions of the exercise will be best followed by analyzing the different methods of vaulting:

1. Vaulting in three motions:

   Stand in front of the bar, and place the hands upon it, about eighteen inches apart, and spring with the feet till the arms are fully extended, parallel to the body (Fig. 6). Then raise one leg, still extended, at full length, till it rises level with the bar; rest the hollow of the inside of the foot upon the bar (Fig. 7); bring the other leg up in a similar manner, and as it reaches the level of the bar, clear the bar with both feet by a spring from the foot resting upon it, and descend grasping the bar, and facing it on the other side.

2. To clear the bar in two movements:

   Spring similarly to the first exercise, till the arms are extended perpendicularly upon the bar, and thence, with a strong downward pressure of the wrists and swing of the legs from the hips, throw the legs clear over the bar, and descend as in the previous case.

3. To clear the bar in one movement:

   Grasp the bar as in the preceding exercises, and spring with the feet simultaneously with the pressure and extension of the arms, throwing the legs to the side and clearing the bar without touching it, as in Fig. 8, and descending as before.

N.B.—Each of these exercises should be practised alternately from the right and left, so that the pupil may learn to vault to either side.

The exercise may also be varied by loosing the grasp with the inside hand upon the bar as the legs swing over, and descending grasping with one hand only. This will pave the way for vaulting an obstacle generally with one hand only, which will suffice for an obstacle of medium height, though in clearing a higher obstacle the use of both hands will be found necessary.

When vaulting has been sufficiently mastered to be transferred from the gymnasiaium to the open country, the pupil will learn to loose both hands as he alights, so as to be able at once to progress on his way.

An obstacle that is too high to be cleared by the direct spring in one movement, can still be manipulated by the process in one of two, or in three movements, aids the elevation of the body as a spring by a rest and spring with the feet on the bar. Therefore, for this reason, as well as for the sake of learning intermediate stages of progress in the exercise, we detail each variation of movement.

The vault in three movements can also be varied, so that the leading foot and leg descend alone to the other side of the bar, the body thus falling astride of the bar—an exercise continually in use in gymnastics, and of practical value for springing into the saddle of a horse without the aid of the stirrups.

Before quitting this exercise we may describe a variation of the vault of use more exclusively as a gymnastic exercise for strengthening the fore-arms, shoulders, and loins, and engendering activity, but not of such fixed practical use as those exercises already detailed. This is what is called in the gymnasiaium the "vault by the back lift."

The position is the same at the outset as in the previous exercises; but the legs, instead of swinging round the body, and so clearing the bar, rotate over the head, with the whole body from head to heels in a vertical line. The arms, at the commencement of the spring, extend as before; but as the legs...
PERFORATED CARDBOARD.

When the frame is about half completed, drive one of the pins half-way into each of the points of the star, and when the whole is finished drive them all home (they will serve to keep everything in its place), and tie the end of the cotton to one of them, to prevent its becoming unravelled. Brown paper should be pasted on the back, which can afterwards be covered with silk, and a ribbon attached by which to hang the frame. Five or six shades of cotton can be used, to give variety and relief.

Another kind friend gives me her experience. She first selects very strong millboard, and on it, with ruler and compasses, she draws the figure of two squares of the desired size, as if crossed diagonally over each other, and when she has prepared several she sends them to a stationer's to be cut.

One of her frames measures five and a quarter inches in the square, and the smaller one only three and three-quarter inches. She then pastes thin unglazed white paper over them smoothly on one side, cutting the paper half an inch larger everywhere than the millboard, and turning it over at the back, cutting a slit at each point and angle that it may fit closely to them. When this is quite dry the points and angles are coloured over the edges back and front, and for a small space on each side, with thick Indian ink, or lamp-black water-colour. This is done because the cotton cannot cover quite to the extremity of the points and angles. Place the carte or picture to be framed in the centre, to preserve which some people put a piece of tale over it, and others a piece of glass the size of the square, filling up the crossing ways by gluing on cardboard of equal thickness, to make all even; and this is, in reality, the best plan, being much more durable, although more trouble at first.

I have seen, at different times, an extremely great variety of experiments made with cotton frames, as to mixture of colours, etc., but am decidedly of opinion that nothing looks so well as shades of brown from buff to black, as they have a great resemblance to inlaid wood. Brooks' place real cottons are the best for the purpose. A nice buff, three shades of brown, and black, making five in all, are sufficient; and as the frames I have are much admired, I will give the disposition of the colours, as a help to those who may try the work for the first time. My larger frame has eight strands of cotton together, commencing with one set next the picture of buff; then one of black buff again, three shades of brown, beginning with the lightest, then black, buff, black again, the three shades of brown from the darkest buff, black, buff, black, which completes the frame.

I think you will find these directions plain, and I will now tell you how to make one of the bed-room lables you were speaking of. Cut out a piece of cardboard the shape of the diagram shown in my last paper, Fig. 3, page 170, and work one stitch up and one

alights, facing from the bar instead of towards it, as in the previous exercises (see Fig. 10). Other kinds of variations or motions in vaulting will occur to the pupil as he studies the exercise; but, as they might be multiplied ad infinitum without any tangible difference in teaching or result, it would be superfluous to enter more fully into this subject.

PERFORATED CARDBOARD.

PHOTO FRAMES—HANDBACKBOX.

Boxes—Geometrical Patterns.

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I think you will find these directions plain, and I will now tell you how to make one of the bed-room lables you were speaking of. Cut out a piece of cardboard the shape of the diagram shown in my last paper, Fig. 3, page 170, and work one stitch up and one down all round it. Then cut out a straight piece like the second diagram, which, you will see, is just half as much again in length as the back. This, after working a border, and 'Cleaning is next to godliness,' or 'Every little makes a nickel,' as a motto on it, is joined to the back, and bows sewn on at the sides and top to finish it off. A piece of white paper is then folded like a sugar paper, with a bow sewn to the point, and this is pinned inside, and is easily removed when it becomes soiled.

The proportions for the handback-box are twelve inches by six for the sides, and nine inches by six for the ends, made in the same way as the glove-box, but lined with quilted silk.

A kind friend of mine, upon seeing my alphabet for the small letters, kindly sent me hers, that she used to work from in a Moravian convent, and, as they are more artistic than my own production, I now give them here, with a very pretty border she gave me at the same time (Fig. 1).

My readers cannot have failed to observe that when two surfaces of perforated wire are looked at so that the light may be seen through both—as may be observed in the common meat safe—that an elegant waving appearance is formed by the two perforated surfaces, similar to that given to watered and moiré fabrics, the secret of which process is simply passing them double through heavy rollers.

Now this effect, ever changing and ever pleasing, may be arrived at with perforated cardboard, provided the objects made with it are of a square or otherwise of a flat surface, the effect being more or less apparent as right angles are preserved, but still palpably observable in rounded surfaces. Many objects must suggest themselves to the reader, Chinese lanterns, decorations for social jubilees, fly-resters, night-light screens, temporary ventilators, where fresh air with a broken draught is requisite, fire screens (always bearing in mind that the board is double and one more or less distant from the other), temporary enclosures or covers for objects of vertu, and others, will doubtless occur to my readers.

We have seen coarse perforated cardboard made use of as a facile sieve for the separation of granules of a variety of materials used in domestic economy: and, again, for the purpose of classifying the sizes of beads, as a gauge for the thickness of needles, as a means to determine distances—for we have only to count the holes for the several measurements required, and, placing the point of a pencil through the exact scale is thus acquired, without having to resort to the damaging point of a compass—for instance, if we required a scale gradually diminishing for a piece of worsted work or formation of a self-made pattern, say from one inch to the thirty-second of an inch, or even less, we should take our first inch, reduce the next according to the desired scale, and so on, to the extreme we are
in search of, it will be obvious that to do this by any other way would, in the first place, require very expensive implements, which, in the hands of a tyro, require a previous education.

There is another use which a slip of perforated cardboard can be applied to. I gave the drawing of a crimping tool in my article on "Ornamental Paper Work," page 39, which is also used to perforate at equal distances, here we have the same facility, as through these perforations, by the aid of a sharp lead-pencil, distances may be accurately defined.

But now we come to what I conceive to be the most important of all the uses of perforated cardboard as mechanically applied to the arts, as it affords opportunities which are alone equalled by the kaleidoscope, with more than the facility of that wondrous instrument of forming endless geometrical figures as seen on the walls of the Alhambra, on encaustic tiles, and more recently in the exquisite patterns introduced by the various floor-cloth companies for the decoration of their durable materials.

Perhaps, to facilitate the more correct drawing of these geometric figures, it would be well for the student to rule fine lines at different angles to intersect the perforations, thus forming a guide to uniformity of figure. It may be objected to, that such an aid possesses a limit more or less cramped and restricted, inasmuch as figures thus created are all of a straight and angular character; this, however, is not the case, and such an error must be scrupulously guarded against, to prove which we would refer to the method of teaching drawing by the late Mr. Henry Sass, who in the elementary paths of the art inoculated and insisted upon all round or convex objects being looked upon in straight lines, a dot being placed by the student at each extremity of convergence, it being so much easier to render a straight line adaptable to the swelling and flowing of the object to be pictured than to attain it without first deciding upon its more or less departure from a straight line. This being the practice of perhaps the most successful teacher of modern days, and followed at the same studio by Messrs. Redgrave and Cary, I need not apologise for calling in such evidence of confirmation of my views.

If, therefore, the object intended be wholly of a rounded form, or partially so, the alteration is as facile as the means are perfect.

It must be well borne in mind that I am speaking of drawing round, and not of cutting, as the latter must be more or less square, unless we destroy the peculiar formation of the material.

As an excellent instance of what may arise from the prick of a pin, we may state that it was a close relative of our own who first gave the suggestion to the Messrs. de la Rue of the now universal application of perforation for postage-stamps of this and other countries, cheque and receipt-books, fly-leaves, and other detachable papers, he having for some while, for the convenience of separating stamps requisite for a large correspondence, to save waste, tightly detached several stamps by perforation, conceived that the above firm, with their lace paper machinery, could render it remunerative to themselves and publicly beneficial.

The very old practice of stencilling is commonly known—that of a piece of paper or thin metal possessing perforations representing any name, writing, or patterns—nothing therefore can be easier than to cut out a name, an address, the Grecian key pattern, etc., with scrupulous accuracy, with perforated cardboard, and then, applying a sponge or brush with colour, the inscription may be transferred to walls, doors, ceilings, and elsewhere.

We have seen some very beautiful embellishments done by this simple means, more particularly when an extra finish is given to the design by a shadow line, heightened by a touch of light here and there with yellow or liquid gold. In this way a mansion or show house in Berkshire has been entirely decorated by the hands of the daughters of its proprietor.

My young readers will also find that most elaborate doll furniture may be made of perforated cardboard, cut out into pretty patterns, and lined with various coloured papers. The gold and silver cardboard is most appropriate for this purpose, but the most economical way is to use the plain perforated cardboard, and afterwards wash it over with liquid gold, as otherwise, the gold board being expensive, it naturally, in carving, is wasted, and many pieces cannot be used at all.

While cutting out patterns lately I have been using an old drawing-board, and a friend suggested to me that if I had a groove made all round and cut very deep, it would be very handy to sweep down the cuttings, instead of allowing them to fall upon the table.

This ingenious idea I have followed out, and certainly can recommend it to my readers, as the great thing in all work is to cultivate a spirit of neatness and cleanliness, and also to make our work pleasing to ourselves and others by having not only our materials, but our waste, in as compact a space as possible.
CARD GAMES.

THE good old game of cribbage was, until a very few years ago, one of the most popular of the few card-games suitable for two players, and was, consequently, with euchre and piquet, often the favourite evening amusement of the quiet and steady, but limited family circle described as "without encumbrance."

Of late years, however, the introduction of besique and zetpas, and their rapid advance in public favour, has sadly impaired the popularity of cribbage; still, the fact of its being essentially a quiet game will no doubt always enable it to maintain a high position among card-games, especially among the senior members of a family.

Cribbage is remarkable for the great variety of the chances of scoring which it presents by different combinations of the same cards. For this reason it is considered by some people to be a useful game, as fostering the habit of rapid mental calculation; it certainly sharpens the perceptive faculties, and for this reason should not be "despised," as it was by Mrs. Battle; but then Sarah Battle loved whist, and "the vigour of the game," and consequently could not stoop to any less enthralling amusement, or one requiring less mental vigour and action; and it must be confessed that cribbage cannot compare with whist as an exercise of skill and mental ability; but the same may be said of any other card-game ancient or modern.

Cribbage is played with a complete pack of ordinary playing-cards and a cribbage-board, perforated for two or more players, with a series of sixty-one holes, placed usually in two rows side by side, and with a larger space between every set of five holes, for convenience of counting, the sixty-first hole, or "home," being placed a little apart from the rest.

For three players a triangular board is best, but for two or four players the usual form is oblong, with the two rows of holes running the full length of the board on each side. Two pegs are required for each person scoring, and the score is made by taking out the back peg and placing it the required number of holes in advance of the other, until "home" is reached by the winner of the game.

The value of the cards is the same as the number of "pips" upon them—ace counting as one, and so on up to ten; but the "court cards," that is, the knave, queen, and king, each count as ten in number, and follow the ten in the above order when forming a sequence.

The various modes of scoring are, first, by obtaining combinations of cards which will make fifteen, every such combination scoring two either in hand or in play; second, combinations of cards of the same number or kind, two of the same cards, either in hand or play, counting two for a pair, three of the same cards counting six for a pair royal, and all four similar cards counting twelve for a double pair royal; third, sequences, that is, any three or more cards following each other in rotation of number, these score one for each card in the sequence and any number of sequences that can be made by combination with different cards, may be counted; and fourth, by fineses, that is, when all the cards in hand are of the same suit.

Besides these, if in play thirty-one is counted by any player, he scores two for it, and if not, one is scored by the person playing the nearest card to that number, but not over it.

The knave of the suit turned up also counts two "for his heels" if turned up, but only one "for his nob" if held in hand.

The game of cribbage most in vogue is called "five-card" from the number of cards dealt to each player.

It is played by two, three, or four persons, and in the latter case partners are chosen, as at whist.

Six-card and eight-card cribbage are sometimes played by two persons; the latter is, however, very uncommon.

In five-card cribbage for two players, the deal is decided by the lowest card, cut in the usual way, and the non-dealer at once scores three by placing one of his pegs in the third hole, going up the outside row from the end nearest his "home."

The cards are shuffled by the dealer, and then cut by his opponent, who takes a portion of the cards from the top of the pack, and places them on the table; the dealer takes up the remainder, and deals to each five cards, singly and alternately, commencing with his opponent, and he then places the rest of the cards upon the portion cut.

Each party now examines the cards dealt out to him, and throws out two cards upon the table; these four cards constitute the "crib," and belong to the dealer. The non-dealer must first throw out his crib cards, and the crib must remain on the table unexposed until the hands are first played and counted.

The crib being formed, the non-dealer must now cut the pack upon the table by lifting a portion of the cards, and the dealer then takes the top card of the remainder, and places it exposed on the top of the pack; this is called the "turn-up card," and if it is a knave, he at once scores two.

Play now commences by the non-dealer laying one of his cards on the table, and calling out the number it represents; the dealer then exposes a second card, calling the number made by the addition of the two cards—if this is fifteen, he scores two for it, or if it is of the same value as the first, he scores two for the pair.

In this way cards are played alternately, until thirty-one is reached, or until neither can play without exceeding that number.

If either of the players count thirty-one, he scores two for doing so, but if he have no card in hand that he can play, he says to his opponent, "Go." The other player then plays such cards as he is able, and if neither of them make thirty-one, the player of the last card scores one "for last."

If the second player scores two for a pair by playing a similar card to the first, and the first player has another similar card, he may play it, and score six for the pair royal, and if the other can play the fourth similar card, he can score twelve for a double pair royal; thus, if the first player holds two queens, and plays one, and the second plays another queen, he scores two; the first player then plays his second queen, and scores six, calling thirty, and if neither of them have an ace, he scores an additional one for last; again, if each player holds two sevens, or any lower number, twelve may be scored by the player of the last of them after having scored two for the pair, and his opponent having scored six for pair royal.

Sequences may be scored in play in the following manner:
If the first player play a seven and the second score two by playing eight, making fifteen, then, if the first player holds six or nine, he may score three by playing either; and if the other have the good fortune to hold the right cards, he may score four by continuing the sequence.

It does not matter in what order the cards of a sequence are played, and if both players hold low cards, good scoring may be made in this way——Suppose A holds ace, two, three, and B holds four, five, six; if A played three, and B five, and afterwards A two, then B would score four by playing the four; A would follow with the ace, scoring five, and B, by playing the six, would score six, and an additional one for last.

When the last is scored, the remaining cards are not played, but the non-dealer first places his cards exposed on the table, and scores every combination he can make with his own cards and the one turned up; the dealer then exposes his cards, and scores in the same way, and he afterwards scores in addition all the combinations he can make with the crib cards and the turn-up.

The cards are again shuffled, and dealt by the opposite party, the deal and crib passing alternately from one to the other, and the play proceeds, until one of the players pegs the sixty-first hole, and wins the game.

The most important part of playing this game is the selection of cards to be discarded for crib, for it will be seen at once that as two cards are contributed by each player, the crib consists of four cards and the hand of but three, so that if favorable cards are thrown out the crib may and usually does count more than the hand.

If a player is selecting for his own crib, he will of course place in it the best cards he can spare, that is, without spoiling his hand, for of course the combinations of the three cards in hand are certain; whilst as only two are laid out for crib, there is the element of doubt as to their advantageous combination with the cards thrown out by your opponent; but when laying out for your opponent's crib, our opinion is that it is best always to give cards that will "balk" the crib, unless by so doing you spoil a very good hand indeed.

The cards most likely to help a crib are pairs, ten and five, or two cards following each other in a sequence, especially such cards as seven and eight; whilst the best cards to balk a crib are those which are the furthest apart in value, such as king and a low number, as ace, two, or three; never throw into your adversary's crib cards which are within three points of each other, or pairs, unless absolutely compelled, or unless very early in the game, when you have a chance of making up for any loss you may suffer by doing so.

The sequence is much better retained in hand than the flush; you can only count four by a flush in hand, even if the card turned up be of the same suit as those you retain; whilst any one of five cards turned up will help a sequence, and if it is a pair with any of the cards held, eight will be scored for the two sequences and pair, besides the number of fifteens that can be counted; for instance, if you hold the sequence six, seven, eight, and either seven or eight be turned up, the score is twelve, the extra four being for the two combinations of seven and eight; the same score is made if four, five, and six be held, and any of them be turned up.

Pairs royal are very good cards to be retained, as are also court cards with fives. One of the best scores that can be made is by retaining two fives and a knave; if a five of the same suit as the knave should be turned up, the score would be fifteen, i.e., eight for the four combinations making fifteen, six for the pair royal, and one for his nob.

When within two or three holes of home, especially if your adversary is near, retain cards most suitable for counting, in order to count out if possible, and play so as to prevent your adversary scoring; for this purpose low cards are most useful, or two low cards and a ten—the latter may enable you to prevent your opponent counting fifteen, by going beyond that number, if you cannot call it yourself, and the small cards enable you to play all out if you cannot call thirty-one.

Flushes in crib do not count unless the card turned up be of the same suit as those in crib.

The rules with regard to pegging are very strict, if the game is played de rigueur.

If any player should score more than he ought, his adversary may not only put him back, but may add the number so put back to his own game; if a player even meddle with his pegs unnecessarily, his opponent may score two points, and if he take out his front peg, he must put it behind the other.

So, also, if a player neglect to score the number of points he is entitled to, his adversary may add them at once to his own score.

In dealing, too, if the adversary's cards are exposed, he may score two and call a fresh deal; and if the dealer give too many cards, the non-dealer may score two, and elect to have a fresh deal or the surplus cards drawn out of the hand.

In three-hand cribbage, after dealing five cards to each player, the dealer lays out the next card for crib, and each player adds only one card from his hand, so that both hands and crib consist of four cards each.

The player on the dealer's left hand leads, and when thirty-one or a go is called, the next player leads again, and the play is continued until all the cards have been played out, before proceeding to show.

In this game it is not an unusual thing to score sixteen in hand or crib, and as many as twenty-nine may be scored if a player hold three fives and a knave, and the other five of the same suit as the knave be turned up. In throwing out for crib, of course the hand is the principal thing to be considered, the least useful card being laid out, unless it be a five or a knave.

In four-hand cribbage the same method is adopted, except that the dealer does not lay out a card for crib from the pack; each player lays out one. This game is always played by partners, who must be cut for, and sit in the same order as at whist, that is, partners opposite to each other, one person marking the score for himself and partner.

It is not an uncommon practice in this game, and in six-card cribbage, which it much resembles, to make the score 121, by going twice up and down the board before marking the end hole.

Six-card cribbage, which is only suitable for two players, varies but little from the five-card game, except that the players commence on an equality in scoring, no holes being first pegged by the non-dealer.

Six-cards are dealt to each, and two are laid out for crib, so that the hand consists of four cards, and the crib of the same number.

All the cards are played out, as described in three and four-hand cribbage with five cards.

It is not, however, so good a game as five-card cribbage and the game with eight cards is still worse, as the chances of making large scores with a larger number of cards increases in arithmetical progression.

A fortunate deal might give the game to the dealer in one hand without a chance for his adversary.
JOINERY AS A RECREATION.

By Ellis A. Davidson, Author of “Drawing for Carpenters and Joiners,” “Drawing for Cabinet-Makers,” “Happy Nursery,” etc.

HOW TO MAKE A DOG-KENNEL.

We have said so much about old boxes, and what can be made of them, that we are afraid we shall be deemed bores if we devote any more space to the subject.

And yet we should like just a parting word to say that if you have had a pretty little dog given you, you could make a very nice kennel for it out of a small tea-casket, which you can obtain from any grocer.

Take off the lid, cut the two ends in a pointed or gable form with your saw, and reduce the sides to the exact height of the lower points of the gable. The pieces of the sides thus removed, and part of the lid, will make the roof, which is to be nailed to the edges of the gables.

An opening for the doorway must, however, be cut in one of the ends before the roof is nailed on. Having marked the shape for this with a piece of chalk, begin to saw at the edge where the gable side is nailed to the bottom.

You will soon penetrate the wood, and be able with your small saw to cut out the shape. A strip of wood should be nailed on the inside against the sides of this doorway, to keep the widths of the boards of which the box is made strongly bound together. You can cut the curved top of the opening with a chisel or your pocket-knife.

Two cross-pieces should be nailed under the bottom to raise the kennel slightly above the ground, in case that might be damp. Bore a few holes in the upper parts of the gable for purposes of ventilation. Put a piece of old matting or carpet inside, and you will have a neat and comfortable home for “Minnie” or “Flo.”

You may strip off the queer-looking paper with which the tea-casket is covered, and give the kennel a coat of paint; and the original purpose for which John Chinaman designed it will never be even guessed at.

Now this is all very well for a “Minnie” or a “Flo,” but when you come to have a dog which means business—a “Bob,” or a “Jack,” a “Spot,” or a “Casan,” whose bark is to be the terror of surreptitious visitors to your garden, the exhibition of whose teeth is in itself an argument which suggests “Keep your distance”—you will require a residence corresponding with the dignity of the occupant; and as it will not only be exposed to all weathers, but will have to protect our canine friend from their inclemency, it must be strongly made and well joined.

Let us advise you not to nail the four sides together like a merry box. The kennel so made would always be coming to pieces, you would constantly be mending and patching, and the result would be a constant source of annoyance to you.

The structure, then, should be built as a real little wooden house, on a proper skeleton, shown in Fig. 1.

The size here taken is two feet for the width of the front from a to b, and the height from a to c is also two feet. The length of the slanting pieces or principals will be formed in the following manner. Draw on the floor of your workshop a line two feet long, a b, Fig. 2, and in the middle of it draw a perpendicular, c. Make this perpendicular half the length of the line a b, namely, e n. Then the lines a d and b d will be the length of the slanting pieces, and a d will be the slant at which you are to cut the tops of the uprights.

The tops of the slanting pieces will then meet in a right angle at the top, and you must be careful in this, as it will save you much trouble in subsequent operations.

The slanting pieces are to be halved together at top, as shown at e in Fig. 1, and are to be joined in a similar manner at c and d, the uprights being cut as shown at f.

These slanting pieces should not, however, be fastened on until the two cross-pieces g and h have been fixed, so that the squareness of the gable side may be ensured.

The cross-piece g is to be of the same thickness as the uprights and principals—viz., one and three-quarters or two inches square. The ends are in the first place to be “halved,” and then cut to the dovetail shape, recesses being (at i and j) cut to receive them in the uprights, to which they are to be firmly screwed.

The smaller cross-piece h is to be only one inch square, and is to be halved on to the uprights, recesses being cut at k and l.

To these two cross-pieces the uprights m and n are to be attached, their ends being halved, and a space of one foot being left between them. A good strong square frame will thus be formed, to which the gable piece may now be attached.

It will be seen that all the pieces being halved together, the frame will present a perfectly flat surface for the subsequent attachment of the boards which are to cover it. The uprights for the back end are to be in every way the same as the front, but only the lower cross-piece g will then be required, as there is no doorway to arrange for. The squareness of the end before attachment of the slanting pieces may be secured by nailing one of the boards which are subsequently to cover the end across it.

The frame for the two ends being thus completed, the side-pieces o and p are to be added. They are to be of the same thickness as g, and are to be halved and dovetailed in the same manner, and in proportion they should be about two feet six inches long. The sizes, however, must depend on circumstances.

Now proceed to lay down the floor, which should be made of at least three-quarter-inch-thick boards. These are to be laid across in the direction of the gable ends, resting on the side-pieces o and p, and cut at the ends precisely “flush” with them.

In the board nearest the doorway recesses must be cut to allow for the corner uprights, and also for m and n. These must be recessed sufficiently to allow of the board projecting three-quarters of an inch beyond the horizontal m and n, that it may be flush with the outer boards to be subsequently added.

In the distant board only single recesses for the uprights will be required.

If the kennel is a very large one, it will be necessary to add a cross-piece in the middle under the floor boards. Several holes should be bored in the floor, either with a gouge or with a “centre-bit.”

The boards are now to be nailed on the sides. They should
be of three-quarter-inch "stuff," nicely edged and planed on both sides. They are to be exactly the length of the skeleton as it now stands, their ends being flush with the uprights at the gable sides.

The bottom board is to be cut out so that whilst a foot is formed at the angles, a vacant space is left between them in order that a current of air may pass under the floor. Several holes of about a quarter-inch diameter are to be cut in the top boards at the part which is overhung by the roof; and as similar holes are to be bored in the gable point of the end, a thorough ventilation will be ensured, a matter which is of the utmost importance, but which is too often neglected by those who keep animals.

The boards are next to be nailed over the gable sides. Those at the back will extend quite across, and will be all of the same size until the commencement of the slanting part is reached. In cutting them for that part, lay them one at a time on the skeleton, and mark the slant on them with a pencil, in order to guide the sawing.

In the front, the lowest board must be cut away at the bottom, as was shown in the sides, and a portion must also be cut away for the commencement of the doorway. The next two boards on each side will be only six inches long, and will be nailed at one end to the corner posts, and at the other to the smaller uprights u and n.

The fourth board must be cut in an arched form, which will complete the doorway; and above this the gradually diminishing boards will follow, completing the gable end.

It must be pointed out that if the kennel is for a very big dog, its necessary size will require that a ridge pole should be added. This is a piece of square wood (same thickness as the uprights) placed from point to point of the gables, resting on blocks nailed within. This gives strength to the structure, but will not be wasted in a kennel of the size we are adopting.

The roofing boards are now to be fixed on. They must project over the gables and sides so that water may run off clear of the walls.

The boards on the one side should exactly reach the point, but on the other side they should pass beyond it, the edge of the boards of one side being flush with the surface of the other. Two strips of wood nailed over the ridge in the manner shown in Fig. 3, will secure the joints against the penetration of rain, which is accomplished in the other joints of the roof boards by nailing smaller fillets over them.

The whole kennel should be well covered with two good coats of paint.
SPINNING—FLIGHTS OF HOOKS—BAITS—THE CHUB—WARINESS AND DEFEAT.

SPINNING, which, in comparison to trolling, is as fly-fishing is to the use of the live bait and float, approaches almost as near to elegance in the art, when properly followed, as does the feathered lure.

We have already said that spinning differs from gorge-fishing by reason that in the former the angler strikes immediately upon feeling a seizure of the bait; in the latter the fish is allowed to reach it. Hence the terms “snap” and “gorge.” Spinning for the most part is a successful mode of angling, but we have known otherwise good anglers who could never acquire it, at least to practise it with the results which ought to be attendant upon it. The philosophy of spinning consists in imitating the gyrations of a wounded fish, which it is well known is preferred by the pike to one in full health and vigour, not only because it more easily falls a prey to the devourer, and thus saves the trouble of

a perhaps fruitless chase, but it is an implanted instinct in the creatures of the water, as it is equally so in many inhabitants of the earth and air, to select those organisms for their food which are about to die, and would otherwise become putrid, and encumber the element in which they had existed.

Pike, perch, and trout generally come in for the first chance, and are ever upon the watch for their fellows who are incapable in the slightest degree of taking their own part. If the dying or dead fish should escape these enemies, it sinks to the bottom and provides food for eels; if it escapes the eel, it becomes provender for a multitude of larve and animalculae; if it rises to the surface, the birds of the air pounce upon it, according to its freshness; and if stale, and rejected by the wise feathered epicures, the carrion crow and other gross feeding birds, and the rat, make of it a meal.

Although, as we have before said, these hooks for spinning, in comparison with the gorge-bait, are not concealed, they are so to a certain extent when in rapid rotation.

We believe we have tried in our time almost every conceivable style of flight—as the hooks, when arranged, is termed—for spinning, and the following simple method was long a favourite with us, and is still made use of when a more refined arrange-
work out the barb of such hooks as were already fast, and which would otherwise have sufficed to insure his exchange from his native element into one less suited perhaps to his taste, but more congenial perhaps to ours.

"The great size and thickness also of the bait used contributes material loss complained of, as it should be always recollected that to strike a No. 1 hook fairly into a fish's mouth requires at least three times the force that is necessary to strike in a No. 5, and that this is still more emphatically the case when the hooks are whipped in triangles.

"For example, let us suppose that a jack has taken a spinning bait dressed with a flight of three or four of these large triangles and a sprinkling of single hooks—say twelve in all. The bait lies between the jaws, grasped crosswise. Now it is probable that the points of at least six of these hooks will be pressed by the fish's mouth, whilst the bait also to which they are firmly attached is held in his teeth as by a vice. It follows, therefore, that the whole of this combined resistance must be overcome, and that at one stroke, and sharply, before a single point can be buried above the barb.

"The grand principle in the construction of all spinning tackle is the use of the flying triangle as distinguished from that swallowed upon the central link. A fish constructed with flying triangles can never fail to be tolerably certain, in landing, at least, a fish when once struck. There are, however, many degrees of excellence in such flights, even in the item of 'landing'; and as regards the 'spinning' of the bait, not one in a hundred of those that have come under my notice has been in the least calculated to make a bait spin with the regularity and rapidity requisite.'"

Mr. Pennell, in the above three sets of spinning tackle, confines himself to the question of 'flights,' that is, the hook portion of the spinning trace, and he is wholly with us in the substitution of flying triangles kept to form the bait by short links of their own; for triangles of any other hooks whipped on to the central link, there is some judgment to be exercised even here as to the length of the gimp—that is, the play to be allowed to these flying triangles according to the presence or absence of impediments in the water fished; for though by a subjection of the rapidity of spinning these triangles may be kept more or less within a certain distance of the fish, the area of their gyrations may or may not increase the danger of fouling amongst foreign substances.*

Pretending that we consider it a capital error to spin with a large bait, we give the above as the exact sizes necessary for all ordinary purposes.

"There would be no reason," says Mr. Pennell, "for using No. 2 with two triangles instead of one, if it could be assured that all the fish run would be in proportion to the bait, as in that case they would be certain to take the one large triangle well into their mouths, when, of course, they would be hooked." It frequently happens, however, that small pike run at a large bait, in which case their seizure might occur where no hooks were placed to receive them. The hooks must not be too small, as the pike may probably escape being struck, and if too large the bait will not spin.

To some observations (we believe of our own) in the Field, the same accomplished writer, speaking of kinking and leads, told us that the most grievous drawback to which the spinner is subject is undoubtedly kinking. Even the most artistical performers are often the victims of this infirmity. The remedy for this evil hitherto recommended by the masters of the craft is "to take off the trace, and trail the running line two or three times across the nearest grass-field."

This plan is at best but a temporary expedient, besides costing much trouble and—what a fisherman can even less afford—much time. The cause of annoyance is, moreover, certain to return in half an hour more vigorous than ever. This vice lies not in the line but in the lead.

"Hitherto the lead has always been fastened to the trace by the line passing through a hole in the centre, and the result is that it offers no resistance worth mentioning to the rotary motion of the trace, which thus, instead of being confined to the space 'below leads,' extends upwards to the running line, and produces kinking; whilst, at the same time, the leads cannot be materially increased in weight without rendering the tackle useless; abolish twisting, and kinking becomes impossible" (Fig. 1).

To cure this any one of the following plans will suffice:—

The most simple is shown in Figs. 2 and 3. A. The trace; B. the lead; C. separate link by which it is fastened to the trace; D. swivel. Thus it will be at once seen that to twist the line above the trace the suspended lead must turn a somersault over the main line, which all the spinning below the lead would be unable to effect.

These leads are likewise made of the shape shown in Figs. 3 and 4, which prevent the friction of the lead on the suspender. We are perfectly satisfied with the above, but Fig. 4 is likewise recommended.

We object, however, to the acute angle formed by some leads, and consequently their likelihood, in progression or retrogression, to catch weeds or sunken grass.

The best baits for spinning are bleak, dace, gudgeon, and above all the smelt, when stiff and fresh; for trolling, gudgeon, roach, and Rudd; for live bait, gudgeon, dace, and roach; for trout, minnows, bleak, stone loach.

We have killed many pike with sprats and pilchards, but the want of consistency and hook-hold in the lip is very much against their use.

We have not said much of the spoon bait, and the host of artificial contrivances for spinning, with which, perhaps, from the absence of faith, we have rarely committed much execution. Still, we know for a verity, these babbles have been fatal is other hands, and in one or more notable instances they have equalled, if not excelled, the natural bait.

Do not listen to anything about weather in reference to pike coming on and off the feed. They fill themselves generally once in twenty-four hours, and if they are at all sluggish during the winter it is on the first and second days of a white hoar frost. Wind is always favourable to jack fishing, because then their prey cannot see their way about so well as at other times for the disturbance of the water, and stray into places of danger.

THE CHUB.

The chub is a much despised fish for the table, but redeems its character when severe frosts are prevalent, at which period its flesh is not only firm, but sad, and possesses much good flavour.

Although the chub has an obese body, thick and seemingly empty head, and inflated face, and it is help Shakespeare—who, in his Bodham says, must often have pulled them out of the Avon—to the simile—

"I never saw a fool lean; the chub-faced pop
Shines sleek with full-crammed fat of happiness,"

he will afford the angler no mean sport, if fished for with a light and fine tackle.

While upon the subject of spinning it may be remarked that

* Since writing the above, we learn that our notion of an improvement in Mr. Pennell's tackle has been anticipated both in the Field and in his "Book on Angling," but as the arrangement is one which merely, as we suggest, shortens the play of the flying triangle, we need not detain the press to give a diagram.
the chub is occasionally caught thus with gudgeon or minnow; or largest chub, one of five and three-quarter pounds, falling to our lot in this way. At certain seasons the chub, dace, and the leaner roach are somewhat difficult to distinguish; and often our best Thames fishermen are bewildered for a while by their close resemblance. There cannot, however, be any mistake in his mode of taking the bait, and his after conduct, which are remarkable. The chub never minces his meal, but swallows it whole, unless it is too large for that purpose, leaving the teeth, which are expedient too often your hook, or hookless line, returns to you minus the fish.

The plan is, therefore, to let him have his first run, provided there be no entanglements in the way, and as this is generally a start of surprise, you have him to an advantage, if afterwards you keep a tight line upon him. The best baits for chub are small frogs, dangled on the surface of the water, smails, minnows, grasshoppers, lob-worms, and the pith of the backbone of the bullock. The chub spawns about the 26th to 30th of May, and takes placed in his gullet, to do the masticating offices generally accomplished in the mouths of other fish.

Directly a chub feels the hook, his dash is of a grand character, and your tackle must be equal to the occasion; for although he seldom fights greatly after this in the open waters, he always makes for the roots of trees, holes under banks, where, by getting the line at an angle over or under any sunken purchase, you have very little power over him, by which greaves—called "scratching" on the Trent, but in fact tallow refuse—as bait, very soon afterwards; but it is in the colder months they are fullest of place, and afford the greatest sport to the angler. Perhaps, however, with a light fly-rod and large red or black palmer fly—an imitation of the hairy caterpillar—the greatest amount of play with this fish is to be obtained. A worm is often used, as in fly-fishing, but it requires very tender treatment.
They are a very shy fish, but this fact adds to the pleasure of betraying them, which may be done from the bank behind the screen of an old pollard or bush; but beware showing even the point of the rod over the spot where they lie.

The chub is never found upon a muddy, and seldom upon a marly, bottom, and it always attains the greatest size upon clean and rough gravel, not upon sand.

If you will, you may begin to fish for him about the middle of June in sharp and shallow streams, where he will be found securing himself; after this process he resorts to deep holes under trees, the roots of which extend into the water, and in and about the woodwork of weirs, and the piers of bridges. He again comes forth into comparative shallow streams in November.

Chub of five or six pounds are common in the Trent, Colne, and a few other rivers, and these, from their retiring disposition, are mostly taken at the break of dawn, while the mist is on the water, the greatest quietness being observable by the angler and all around.

The water should be clear, and that clearness which is the effect of a severe frost is the best. Indeed, the finest chub are taken when the ice adheres to the line at almost every cast or swim.

In chub fishing the rule of waiting for them at any particular spot does not obtain, as in the case of roach, etc.; and if fishing with frog or grasshopper on the surface, you must search for them in their homes, stalking, in fact, with the stealthy steps of an Indian trapper, and get your tackle at times through spaces in the foliage of trees not larger than a half-a-crown.

To do this seconda artem, have an exceedingly light but strong Nottingham line, no float, and at about an inch above the hook, a small perforated bullet; your frog, secured by the skin of its back, and well balanced, together with the line and bullet, is drawn up to the top ring, and the whole inserted—point of the rod first, with as little chance of disturbing a twig as possible—through any available aperture in the bush.

Having got clear and riverward, let the line travel, which it will do by the weight of the bullet, down to the water, and when the bait has reached the surface, let the creature paddle about at its will, being still held on the surface by a taut line.

Should you see a chub rising gradually—the white leather mouth of which you will plainly discern before the rest of his body becomes visible—increases the agitation of the bait, as if the creature was attempting to escape the fish, and do not be too eager to give it any additional facility to take it, or you will excite the suspicion of the chub.

Directly, however, he has taken it, strike firmly but not strongly; then, according to the nature of the surroundings, you must give and take with your victim.

When he is exhausted, you must stoop down, and, either with gaff or landing-net, secure the fish from under the tree, bring it to land, and then, by taking off the hook and bullet at the loop, you can easily draw the line through the branches of the trees and replace the tackle.

This is a most deadly way of killing chub, and we have known more than a hundredweight taken in a day with a single rod by this means. The young frogs are generally secured by a landing-net on the marshes, or amongst the wet grass of the meadows, and we have known them bred for this purpose in a cistern from the ova and tadpole stage.

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Canoes and Canoeing.

By Lamont Young.

Making and Rigging Up.

One people like to have bilge keels, bilge pieces, or rubbering pieces, placed on the bottom, and they are very useful in all travelling canoes, as, from the constant rubbing and knocking about—dragging the canoe over various obstacles, the lands or angles of the planks are saved from being quite rubbed away, so as to loosen the nails and make her leaky. A piece of ash, oak, or birch, is the best wood to use, as it stands wear and tear better than other woods.

The shell of the canoe having been finished, the whole should then be well rubbed down with glass-cloth stretched over a flat piece of cork; every imperfection in the wood should be rubbed and worked till it disappears, the finish being given by a good rub with finer glass-cloth, the keel, stem, and sternpost being fined down to the requisite size to take the copper or iron band that is to be fixed for the purpose of saving the woodwork from the wear of constant work and travel. When all is finished, the canoe must have about four coats of the best varnish laid on, care being taken that each coat is dry before the next is put on. Every part on deck and bottom must be well covered, and the inside of the well, as far as can be reached, up to the part which is painted fore and aft. If properly done, she looks, when finished, like a piece of well-made furniture, and the varnish will last for a long time; but if it shows any sign of wear, a fresh coat should be given, by which means the canoe will be kept as tight as a bottle. All the spars, paddle, and every piece of wood-work, must be kept varnished, as they will otherwise look dirty and neglected.

The interior fittings of the canoe are usually bottom boards and stretchers; the former are narrow half-inch planks which fit close on each side of the keel and reach about five inches from it to the small strip of wood, about three quarters of an inch wide, which is fixed parallel to the keel on each side of it, so as to form a fixed guide for the bottom boards. At each end of these boards is fixed across them a small piece of wood as a stop, or guide, so that they may abut on the timber forward and aft on which the bottom board rests, and, when firmly placed, they cannot move. These boards are a little longer than the opening of the well; the stretcher is either a piece of plank shaped as in Fig. 4, page 80, and resting against sloping pieces of wood, exactly as in the stretchers of boats, or a piece of plank is made to work on a central bolt or pin of iron or steel, which is fitted into the keel and the second car-
line or beam, so that it can be made to play or rock from side to side, and, by having wires or lines fixed to each side, and led aft to the yoke at the top of the rudder, the canoe can be steered by the foot, whilst both hands are used in paddling—a very convenient way of fitting the stretcher, as a slight pressure of either foot will cause the rudder to act and turn the canoe to the side on which the pressure of the foot is applied. All these fittings must be fixed prior to putting on the deck.

The hull being completed, and coamings in place, the next thing to do will be to decide on the kind of covering for the well that is to be used—whether an indiarubber apron, a hatch of wood, or a composite of the two materials; in the apron two pieces of half-inch wood (deal or cedar) are cut of the same length as the well, and about four or five inches deep at the widest part, which is just where the knees come when paddling, and is then sloped in either direction, so as to have the form shown in Fig. 1. The sheet of indiarubber is then nailed through a strip of leather, with copper nails along the edge of the two pieces of wood, which are placed on either side of the well at the time of nailing, so that the fit may be exact. The rubber is fitted exactly along the edge, and in the front, where there should be a broad hem, into which a piece of stout cord should be run, so as to take the strain. A good way of keeping the apron in place is to screw a cleat of strong wood to the inside of the side pieces, so as to fit over the coaming and keep the whole thing stretched; the end next the body may be cut to fit the figure in any way most suited to the fancy, but a good way is to cut about eight or ten inches into the middle of the cloth from the upper end, and let in a triangular piece, the centre of which can, in rough weather, be buttoned to the upper button of the paddler's waistcoat, and thus prevent any broken water from coming on board.

The wooden hatch is simply a piece of cedar screwed to the same shaped side-pieces, and cut away in a semicircle to fit round the waist when the hatch is slid into its place, and if a strip of wood is nailed across just above the semicircular hole, it makes a capital table, as the strip prevents anything from rolling off, and one can read a book whilst paddling with both hands and steering with the feet, and in some cases the cover is made of wood for half its length and waterproof the remainder; but after many years' trial, the wooden hatch, under all conditions, is found the best; if in very rough water, the hatch can be fastened down in front by a line fixed to a stud on the left side of the deck, and passing over the extreme point of the hatch, where it is kept by two small brass studs at either corner, then through a small brass thimble fixed to a stud on the right side, the line coming to a cleat near the paddler. By this way of keeping the hatch from being washed off there is no danger to the canoeist being kept in the canoe if it tumes over, as the hatch can rise from behind and work on the front, as if fastened by a hinge, and the paddler is free in an instant.

The writer, some years since, when fastened into a canoe with a hatch fixed in this way, was turned over in the Thames by a steamer, and found himself free immediately, from the perfect working of this plan.

There are many kinds of rigs adopted in canoes, such as the standing-lug, sprit, lateen, China, shoulder of mutton, sliding-gunter, fore and aft, and in fact any that may suit the caprice of the canoeist; but the lug, for general purposes, is the best, as it is so easy to manage, and comes down instantly on the halyard being let go. In some cases a main-lug, mizen, and foresail are used, but in journeying a single lug of such a size as the canoe can bear in a breeze is the best, such as is shown in Fig. 1, p. 60; but minus the jib. The spars required in this rig are mast, yard, and boom, which are best made of good white or yellow pine, that wood being strong and light. The height of the spars should be determined by what can be got into the well, as, for travelling, it is best to be able to stow away spars, sails, etc., under the deck; masts and yards can be made to divide like the joints of a fishing-rod, and in most of the racing canoes of the present day are so constructed; but spars for journeys in one piece are preferred. At Fig. 2 is shown the way of fitting the mast of a canoe to be sailed with the lug. The head of the spar is a little smaller at the point where the strap of the block will come, and the bottom of the mast, about two inches above the deck, has a piece of boxwood containing a brass sheave let into it, the elongated ends being screwed to the spar, and over each of them is driven a strong brass ring, which is then pinned to the mast, and makes a very strong piece of work. This sheave should be fixed on the right hand side of the mast, looking forward. When the sail is hoisted the halyard passes through the block at the mast-head and then leads through the sheaf at the bottom to the cleat within reach of the canoeist. The yard and boom can be any length, and the sail must be firmly laced to them, so that it may set flat when hoisted. The main-sheet can be fixed to the boom at any point that may best suit the traveller, and pass round the cleat. The sail is best made of strong cotton sheeting, which is wide enough to let the sail be cut without a seam; the fore and aft leeches had better be bound with strong cord, the head and foot must be hemmed, and brass eyelets should be fixed into them, so as to lace the sail through them to the boom; two or three rows of reef-points should be put into the sail; each place where they are fastened must have a square piece of the cotton, three-quarters of an inch in the side, sewn into the sail, and through these the reef-point must pass. At the edge of both the fore and after leech of the sail brass eyelets, rather larger than those at the head and foot of the sail, must be fixed to pass the earings through, to secure the sail to the boom when shortening sail, by taking in a reef.

The tack of the standing lug is fastened to the bottom of the mast, near the point where the boom works, and when the sail is hoisted it keeps it in its place.

The spritsail rig is what is seen in boats every day, the sail being extended by a long pole, which is put into a snorter at the upper end of the angle of the sail, and is pushed up to the full extent the sail allows; the lower end resting in a loop fastened round the mast, so that when it is raised a little the sail is further stretched, and the rope runs on the mast, keeping the sail in its place. When necessary to shorten sail with this rig a brail is used, which gathers the sail close in to the masts,
and keeps the centre quite tightly folded up, the only part loose being that portion from the lower end by the mainsheet, to the part where the brail keeps in the sail.

The lateen is simply an elongated lug-yard, which reaches from the lower fore-end of the sail close down by the stem, much further aft than the lug-yard, and is a rig generally used in the Mediterranean and on the coasts of Spain and Portugal. The China rig is a very good one for racing, and is a large lug-sail extending a good way in front of the mast, about a third of the way from the deck, close to which, on the mast, it is fastened, the sail being kept extended at various parts by light canes, or deal rods, passing across the sail from leech to leech, and very tightly fixed to the leeches, and in one or two places in the sail, the reef-points being fixed on the sail in a line with the various rods that come in succession in the places where the reefs are required. These China sails set very flat, and enable a boat to sail close to the wind; a line is usually wound round the mast, passing through eyes in the rods, or yards, and so arranged that when the sail is hoisted to its full extent the rods are all kept firmly pressed against the mast, yet the moment the halyard is let go the sail is released, and comes down at once. The other rigs are not much used in canoes, and need not be further referred to here, as our articles on the sailing-halb-boat will give such a description of them as to enable one to make them for his own canoe.

The paddle is used of different kinds, from the seven-feet double-ended one to the nine and ten feet; and in some cases, where the canoe is fitted with a rudder, the paddle is one-bladed and short, so that the propelling power is only on one side, like the American Indian canoes, the rudder being used to counteract the tendency of the canoe to go in one direction more than another. Again, paddles are made in two parts with a joint in the centre fitted with brass, some having a spring which secures the paddles together, so that they cannot come apart, and others are without springs, to enable the blades to be set at right angles and form a reeding paddle, i.e., a paddle that, when going against a strong head-wind, does not present the flat of the blade to the wind, but the edge, thus preventing loss of power and additional labour to the paddler. The blades of paddles vary: they are usually from seven to nine inches in width, and are made as light as they can be consistent with strength; some are made hollow like the oars and sculls used on the Thames, but for travelling, steering, and general purposes, they should be flat, with a centre-rich like an oar, for strength. In all cases the ends should be strapped round with sheets of copper, to prevent their splitting. All paddles should have a stout indiarubber ring placed round the loom, six or eight inches above the blade of the paddle, to prevent any dip, but on no account should leather cups be nailed to the paddle, as they invariably cause the paddle to break at that point, the wet soaking into the wood where the nails are driven. One good from having the paddle to divide is that you may use a longer paddle on journeys, and, when divided, it stows beneath the deck easily. Paddles should always be made of yellow pine, as this wood is the lightest and strongest that can be obtained for the purpose.

There are various kinds of fittings used in canoes. For storing small articles wanted at any moment there is nothing better than fixing to either side of the well under the deck pieces of net, which are secured both above to the edge of the coamings and to the timbers just outside the bottom boards, either end being open, so that the hatch can take anything out in a moment—the sponge, odds and ends of lines, blocks, oars, lunch, books, etc., are always at hand. Lockers are fitted in some canoes, but are not of much value, though some—made so square boxes let into square holes in the deck, and easily removable when locked—are ingenious. The best kind of locker is to have the hatch made to fit securely when closed, and then lock up with a padlock. In those canoes fitted with rudders there are various ways of steering; a good way is to have a rod fastened to one end of the yoke, and then to pass it through a brass eye or loop of cord near the right hand of the canoeist, who can, with one hand, easily manage the craft. This is better than yoke-lines, which require both hands. The best plan of all is steering with the feet with a revolving stretcher, the connecting-lines being copper-wire, or else the wire-cord used for pictures, and swivel-clips being at either end to aid in their instant removal if required.

The back-board is a very essential part of the canoe's equipment. The kind generally used is made of two strips of oak eighteen inches long and two and a half inches wide, fastened together with two cross-pieces, as in Figs. 8 and 4, the lower of which is about half in its under part so as to rest and freely work on the after coming with each movement of the canoeist's back. The idea of this back-rest is that it supports the back on the two side muscles without touching the spine, which rests between the strips. It is kept in place by a piece of cord passing through a hole in the deck, round the lower cross-piece, and then fixed with a firm knot. When out of the canoe the board lays quite flat down on the deck out of the way.

The painter is another necessary part of the equipment, as by it the canoe may have to be lifted, dragged, and secured under any emergency, and must be strong enough to fulfill all these conditions, and not fail at the moment when most required. It is usually fastened to the boat by passing through a hole in the top of the stem and sternpost, where it is knotted. There are many kinds of rope used, but most of them kink badly when wet. The best under all circumstances is found to be tanned rocket-line, which is made expressly for use on the coast in life-saving, and answers its purpose admirably, the chief points in its favour being its great strength, durability, and softness when wet, ensuring freedom from kinks. When on a journey the painter should always be ready for instant use, and should be coiled up on the top of the hatch, or behind the paddler, who can seize it in an instant, and jump ashore. The fore part can be passed round a cleat, to keep it steady.

Seats of various kinds are used, as the boards on a long journey get harder for every mile that is travelled. Some have air-creations, others merely stuffed seats, as in boats, or cane seats, like a chair with the back and legs cut off. But for general travelling a cork life-belt is most useful, folded up, and an extra pilot-jacket on it, which makes a capital soft seat. The cork belt found best is not the sort used on the coast, of solid pieces of cork, but that made from waste bottle-corks, in double layers, which is quite as floaty as the other, but folds up in a smaller space, and feels softer to the body when worn. Inflated indiarubber belts are often used, but are not so lasting as the cork.

The cooking apparatus is a very important part of the equipment; that invented by "Rob Roy," and bearing his name, is very useful, but very dear, the price in many cases prohibiting canoeists from purchasing it. A good apparatus of tin, costing about 16s., and big enough to cook for two, can be bought at a timber's in Bedford Street, Covent Garden. It is heated by a spirit-lamp with three burners, and cooks very quickly and well, having been tried well on a six days' trip from Oxford to London—chops, stews, soups, and other dishes, were done to perfection.
CONJURORS, especially amateurs, for whom we write, will often find it useful to have a few tricks at their disposal which turn the laugh against a too-forward child. We described in a former article how sometimes a little girl who sees too much, and is apt to talk too much for the performer’s comfort, can sometimes be silenced by being induced to guess wrongly, whereas the rest of the audience laugh at her for thinking herself too sharp. For instance, in palmimg, to place the article really in the hand, and then draw away the other in an awkward and clumsy manner, and apparently slip something into the pocket.

The child is almost sure to say, “Ah, but I saw you put it in your pocket.” You can smile, pretend to look annoyed, and say, “I am afraid you are too sharp”; then touch your pocket, and say, “You are quite right, here it is; now see if you are sharp enough to see me pass it back again.” Of course, all this time the article, whatever it is, is in the hand. You touch your pocket with your other hand, say, “pass,” then opening your hand, lo and behold, there it is. The probability is that the child will hold its tongue for the rest of the evening.

Suppose, now, some young gentleman, at the age when jackets are usually worn, becomes particularly troublesome. I once saw one completely silenced as follows:—The conjurer, taking a piece of chalk, and stooping down and drawing an imaginary circle on the floor, said, “If any one stands in the middle of the room here, I can exert a sort of mesmeric influence over him which will render him unable to jump over the line I shall draw.” Then, turning to the young gentleman in question, he says, “Are you a good jumper, sir? Do you think you could jump as far as that?” placing his hands about three feet apart. On receiving an answer in the affirmative, he says, “Will you come and stand here?” The conjurer then stoops down, as if about to draw a line on the floor, at the same time saying, “Now, do you think I shall be able to draw a line over which you cannot jump?” The youth will in all probability say “No.” When suddenly the conjurer draws a line round the boy’s body, about two inches below the waistcoat and jacket, and then says, “Now, sir, let the company see you jump over that line.” The only method of doing is obvious, the unfortunate young gentleman returns to his seat, and if he be naturally pale will probably for once be found to have a beautiful colour. The joke should be tried with caution, for if practised on a naturally shy and timid boy, it is absolutely cruel if many persons be present.

We will now proceed to describe a trick, which we fear cannot be made at home, but can be purchased at a small cost at any of the conjuring trick shops. The trick is as follows:—The conjurer first places on a small table an ordinary glass tumbler, in his hands he holds an egg and a white pocket-handkerchief. Placing the egg on the handkerchief, which he first throws over his flat hand, he places it—the egg—in the tumbler, using the handkerchief as a cover. He next produces from his pocket a small square piece of coloured silk, which can be examined by the persons present if wished. Pulling up his sleeves, he rolls the silk together into a ball with both hands, when, on opening his hand, the silk has entirely disappeared, and in its place is an egg. On lifting the handkerchief from the tumbler, the egg has disappeared, and in its place appears the piece of silk. How, then, can this trick be done? Fig. 1 represents the imitation egg, that has to be bought at the conjuring shop, which is hollow, with a large piece cut out of one side, but when held in the hand with the hole towards the palm, has the appearance of being a perfect egg. This sham egg is placed in the pocket with the piece of silk previously. Next obtain a real egg as nearly as possible the same size, shape, and shade of colour as the imitation egg, blow it, which is easily done with a little patience, by pricking a small hole at each end, and blowing with the mouth through one of them. It will be found best afterwards to put the egg-shell into cold water in a saucepan, and place it on the fire till the water boils; this has the effect of strengthening the shell, and rendering it less likely to break. Next run a small fine white thread through the egg, fastening a small knot at one end to prevent it running through, and fasten the other end of the thread to the centre of the white handkerchief, at a distance from the centre, just under the egg’s length, less than half one of the sides of the square of the handkerchief. As both the egg and handkerchief are white, the white thread will not be detected. Then, with the handkerchief in the right hand and the egg in the left, you first call the attention of the audience to the fact that you intend placing the latter in the tumbler and covering it over with the former. In the left hand, at starting, must be rolled up into a minute ball a piece of silk the same size and colour as the piece in the pocket. The best kind of silk for the purpose is that which is called Chins silk, which will roll up very small indeed under pressure, but will instantly regain its size on the pressure being removed. This little ball of silk can be best hidden between the thumb and first finger, as low down as possible. In placing the egg in the tumbler, the handkerchief must be thrown over the top of the tumbler, from the audience towards the conjurer, i.e., the front of the tumbler must be hidden before the whole is covered; in this instant the piece of silk concealed in the hand must be dropped into the tumbler. Next the conjurer takes from his pocket the small piece of silk which, as we have said before, is exactly the same size and colour as the one just dropped into the tumbler. In taking this out he must at the same time take out the egg, or if he prefers it he can give the piece of silk to any one to examine, and then get the imitation egg into his hand afterwards on the pretext of fetching his wand. On retaining the silk he, in rolling it up, must contrive to push the whole of it into the hollow imitation egg.

When this is done, care of course being taken to prevent a small piece from sticking out, which once happened at an evening party at which we were performing, and to our discomfiture caught the eye of a sharp little girl about ten years old, who remarked on the circumstance aloud. The egg can then be shown in the hand, but of course cannot be given to the company to examine. Should this latter be desired, it must be changed into a real hard-boiled one, similar to it in size and appearance. The conjurer now walks up to the covered tumbler, and taking the handkerchief somewhere about the middle, slowly uncovers the glass, in which of course appears the silk; he must, however, be careful not to let the egg make the tumbler ring on its being lifted up by the thread. He will also find it as well to roll the handkerchief together quickly into a small ball, thereby crushing the blown egg. This gives the effect to the handkerchief of being absolutely innocent of containing anything, much less an egg.
Perhaps some curious young gentleman might like to ask us the question, why must the egg be hard boiled? For a very good reason, viz., if it be accidentally dropped, by no means an unlikely occurrence, it will not make a mess on the carpet.

We promised some time back, in answer to one of our numerous correspondents, to explain the secret of the great extinguisher trick; we will do so, but fear that our explanation will somewhat disappoint him. The trick of bringing out the feathers from the hat depended on the simple reason that not one person in a thousand knows into how small a space an immense number of feathers can be pressed. Again, few know, except perhaps housebreakers, who often keep a small boy for the purpose, in what a small space a human body can be hidden.

The table which is invariably used for the purpose is a strong one, standing on four legs, it is almost always covered with a green cloth, is of an ornamental appearance, and the end of the cloth or the ornamental binding round the edge has always a long fringe. The conjuror lifts up this fringe, and shows you that the table does not contain a hollow space within which a person could be concealed; but you should bear in mind that he does not keep the fringe lifted during or after the performance of the trick. The table is so contrived that, after lifting up the edge of the cloth or fringe, a part falls down, somewhat on the principle of the opening of a gigantic concertina. The trap-door in the top of the table lifts up but not down; but is contrived so that the person after getting inside can bolt it, as otherwise the pressure of the body might cause it to rise. This is the real and only secret of the great extinguisher trick, which has so often puzzled hundreds of thousands of persons. The trick looks best when a young girl is covered, who, though small in figure, makes up to a considerable size by means of flounces. A white book-muslin dress, nicely got up by a French landlady, gives a person a most imposing appearance, though of course the whole dress could be squeezed into almost nothing. The trick looks worst when performed on a small boy in buttons. On a man the size of “the Claimant” the trick could not be performed at all. There are, however, one or two variations to this trick, one ingenious one we think worth mentioning. The performer on this occasion was taking off an Eastern magician, and wore a long loose robe with a girdle, somewhat similar to a Turkish-pattern dressing-gown. On this occasion the person covered was, as we just now mentioned, a boy in buttons—and a very small boy indeed he was. The table had no fringe—no cloth—and the top was not thicker than an ordinary inch board, yet the boy was covered. The conjuror retreated, fired a pistol, knocked off the cover, and the boy was gone—where? As we said, the conjuror wore a long loose robe, behind which the boy was concealed when he walked backwards, most probably by holding tight on to two shoulder-strap. The performer had only a few steps to take to a wing of the stage, whereupon...
the boy immediately slipped down unperceived. The cover, of course, had an opening down the back, through which he slipped while the performer was holding the cover on, and in doing so of course kept close to it. This method of doing the trick is, however, very inferior to the other.

We some time back mentioned the hat trick, which we said was popular principally on account of the audience receiving toys, sweetmeats, etc., out of it. There are, however, several articles brought out of the hat which seem impossible should be all in at once. Perhaps the most favourite are the silver cups, one of which is represented in Fig. 2. It is quite possible to bring fifty or more of these cups out of one hat, and when placed side by side upon a table or board placed upon two chairs, they make a most imposing and dazing show. The secret of the trick is that a dozen of these cups take up very little more room than one, as they, although all of exactly the same size, yet, owing to their shape, fit one inside the other. Our readers will at once see what we mean by rolling up two pieces of paper the same shape and size. In performing this trick, great care must be taken to bring out one cup only at a time, and in doing so to avoid rattling them all together. The effect, too, is heightened by the performer separately and leaving a few in the hat; for instance, suppose he has fifty cups, bring out forty-five, and leave the remaining five in the hat, though of course not one inside the other, then turning the hat to the audience, you can beg them to observe that notwithstanding all these cups have been out, the hat is nevertheless still quite full.

Figs. 3 and 4 represent a still better illusion; a quantity of small reticules can be brought out of a hat, each one of which seems big enough by itself to take up the whole of the space inside. Fig. 3 represents the reticule as it is when brought out of the hat, and Fig. 4 as it is when in the hat. The two corners fold inwards. The front, back, top, and bottom are all of the same size, and fold over one another. When folded, by pulling the string the two corners are made to rise, which has the effect of keeping up the remaining sides square and firm.

Perhaps the most effective of all the various articles brought out of the hat are cards. Every one knows what a tremendous display even one pack of cards makes if spread all over the room. For instance, give a child of five years old a pack of cards to play with on the floor, and see what a show he will make of them, and yet everybody knows into how small a space the fifty-two cards can be collected. Now, imagine a hat packed as full as possible of packs of cards, and then think what a tremendous display could be made by judiciously scattering them. In fact, a hat nearly full of cards can be made the means of apparently almost covering a fair-sized stage. Hence, the trick can be made more effective by leaving some fifty or a hundred in the hat, and by keeping the hat upright and jumping it up and down, the hat appears fuller than ever. Herr Wiljalba Friell did this trick to perfection, but then he combined the powers of a first-rate actor with that of a wonderful conjuror.

Of course, as the hat gets exhausted it has to be re-filled.
This is best done by having the various articles it is desired to bring out packed together in small black bags which will fit easily into the hat. These bags must be placed on the ledge at the back of the table, or the ledge at the back of the chair, and must be slipped into the hat as quickly as possible while the conjuror is talking to divert attention.

SKATING.

By a Member of the "London Skating Club."

THE OUTSIDE EDGE—THE FIRST LESSON IN FIGURE SKATING—ITS DIFFICULTIES EXPLAINED—FIVE GOLDEN RULES.

F any one would only invent a royal road to learning, no one in the world would be more grateful to him than the unfortunate toilers at the "outside edge."

It is to be doubted whether there is any single object of ambition of a tolerably modest kind that is really so difficult of attainment as this first step to figure skating. It is the very pons asinorum of the beginner, a bugbear of the most substantial and painful order; and, like many first steps, it is worse than any of its successors, the more elaborate figures. "Co n' est que le premier pas qui coûte" is a pretty true maxim, at any rate on the ice; and disheartened strugglers will do well to remember that when once the outside edge is mastered, they are on the high road towards success.

In order to overcome the really great difficulties which beset the learner of this first problem, it is advisable first to point out what they are. By explaining them some of their terrors may be mitigated, and some of their reality diminished.

The grand secret of the apparent impossibility of the movement depends entirely on one circumstance—that is, the fact that while executing it the performer is obliged to stand in a novel and wholly unnatural position. It is novel because it is unnatural; for the effect of standing in such an attitude on dry land would be simply to tumble down flat on one's side on the floor. But although impossible in a drawing-room, it is no longer so upon the ice, for the reason—mechanically speaking quite an obvious one—that it is rectified by the centrifugal force. This we will explain immediately.

Skating on the outside edge means simply resting on the outer of the two edges of the skate on either foot—that is to say, on the right-hand edge of the right foot, or on the left-hand edge of the left foot—and thus describing a curve which bends outwards, instead of inwards, as was the case in skating on the inside edge.

A glance at the diagram on page 251, where the two movements are contrasted, will at once explain the nature of the curves.

All this sounds very simple, and it naturally occurs to the learner that by simply inclining the ankle outwards the necessary effect can be at once produced. Unfortunately, on trying the experiment, the desired result does not "come off."

It soon becomes evident that an entire change in the posture of the body, as well as in the mere position of the foot, is an absolute necessity. In effect, the principal weight of the body must be thrown outside of the perpendicular line which ascends from the edge of the skate that is on the ice. Technically speaking, the line of gravity must be brought over from its natural position between the foot to a place outside of one of them. This is a destruction of balance which is required of the human figure in no other sport or exercise.

Hence its novelty and terrors, and hence the exaggerated difficulties which an elderly man invariably feels when asked to venture on it.

How are these terrors and difficulties to be overcome? Confidence alone will master them. And confidence is only to be acquired by a bold bravery that makes light of an occasional fall, or by a long course of slow and tedious practice, infinitely more disagreeable in the long run. The struggle must be one for confidence in a principle hitherto untried—that of the centrifugal balance—against the well-tried and long-recognised maxims of ordinary gravitation. No wonder that the struggle is often long and desperate, and often abandoned as hopeless.

Ingenious Mentors have discovered a variety of devices for helping their pupils over this grand problem. Most of them, however, need be mentioned only for the purpose of warning beginners against them.

We will take the worst, and, perhaps, also the commonest plan first. It consists in a method of crossing the legs alternately in front, and putting each foot down as far as possible on what may be called the wrong side of the other. Thus the right foot, when lifted from the ice, is set down a long way to the left of the left foot; and while this same right foot is on the ice, the other is taken up from behind it and swung round till it crosses the right foot in front, and is then set down in its turn on the right of the right foot.

The system is a successful one, inasmuch as it is sure to compel the skater to use the outside edge; but a plan better calculated to spoil utterly the style of the beginner could not well be imagined. It makes the action of the skater depend entirely on the swing of the leg, and the crossing of it in front of the body; and these are the very means that ought not to be employed by any one who wishes to skato well.

The power of skating on the outside edge ought to depend simply and solely upon the laws of balance, and not one whit upon the movements of the foot which is for the moment of the ice.

Other wiseacres will recommend you to keep one foot only on the ice, and to slide along upon the flat of the skate, that is, upon neither one edge or the other, in a straight line, trying all the time, however, to lean as much as possible to the outside, and, as they promise, succeeding at last in the attempt. This process is sometimes, no doubt, successful, but not always; and the absurd, helpless, and undignified posture rendered necessary by it, as well as the bad falls which almost always result, are too much for any but the most determined aspirants.

By far the simplest, safest, and best method is the following:—Skate the ordinary forward roll, already described, keeping at first both feet on the ice, and leaning equally on each. Then
gradually, instead of leaning, as is natural, on the foot which is doing inside edge, begin to rest more weight upon the other. After a bit, raise the foot which is doing inside altogether off the ice, putting it down again when there is any danger of falling.

By thus lifting each time for a longer space the "inside edge foot," you will learn to use the other with more and more confidence, until at length whole strokes can be completed on the outside edge alone.

The progress from the first step (Fig. 3) to the third (Fig. 5), and the intermediate stage (Fig. 4), will be understood more easily by the accompanying cut.

The greatest care must be taken throughout not to allow the foot which is off the ice to get in front of the other. This is one of the most important and at the same time the least known and observed maxims of forward skating. Only on rare occasions, and then only for the shortest amount of time, is the knee of the leg on which you are skating perfectly and unwittingly straight and unbent.

Here are five simple rules: only follow them to the letter, and you will have well learnt your first and most difficult lesson in figure skating. You will be able to do what not one in a hundred of the grand figures and contortionists can accomplish — to skate properly on the simple outside edge forwards.
FIREWORK-MAKING.

By C. T. Brock.

INTRODUCTORY—HISTORICAL—PREPARATIONS—SQUIB-MAKING—PAPER-ROLLING—HAMMING—COMPOSITION.

AVING undertaken to write a series of articles for The Popular Recreator on fireworks, I will introduce myself to the reader as the Pyrotechnist to the Crystal Palace Company.

Mr. C. T. Brock—I am rather particular about the initials—the gentle reader; gentle reader, Mr. C. T. Brock.

Now, sir, that we know each other, I feel a little more at my ease. I am about to teach you how to make fireworks. I will assume that you have never dabbled in the art; indeed, I should prefer that you have not, as in that case you will have nothing to unlearn—the most troublesome part of all learning.

You must know that I am considerably proud of the firework displays at the Crystal Palace; but I am, perhaps, equally proud of a certain skill in every branch of the fiery art. It will be my endeavour, in these papers, to show you how to make the best possible squib, Roman candle, or rocket, etc., etc., and, besides, to make it in the best possible way.

In advising you as to the making of fireworks, I am almost inclined to say, as Punch did to persons about to marry, “Don’t!” but I know how irresistible playing with fire is; and if amateur firework-making is to take place, it is well to show how it can be well and safely done.

I have at Nunhead twenty-four work-sheds, in each of which a different branch of the work is done. Each of these sheds is from twenty to fifty yards from any other. When these four and twenty distinct branches of the work meet or succeed each other in one room, or in two or three sheds, there is the risk of a serious accident. You will probably see the necessity of strictly obeying the injunctions which I shall lay down to avoid danger, in the proper place. But as to “the proper place,” I have misgivings that these remarks are scarcely appropriate here, and that my inexperience as a writer will lead me into diversions and wanderings now and then, for which I will beforehand ask your pardon.

I feel that you will expect, at least, some sketch of the history of fireworks; but the fact is, I do not know much about it, as the various books on the subject contain very conflicting statements, and are not of much interest. In our school days we were taught that the Chinese printed before Caxton, and used gunpowder before Roger Bacon heard of it. Well, firework historians tell us that the Chinese were the first to make fireworks; that these remarkable people either used their invented gunpowder for the purpose of amusement, or even that they used its components to make a plaything before the life-destroying agent was known. But I am rather sceptical, and I do not think that much is known on the subject at all. Strange books, describing fireworks and giving illustrations of them, appeared at the beginning of the seventeenth century; but I think the fireworks spoken of were rather as ideas to be carried out than as having any actual existence. If you are interested in the subject, you may care to know that the following works are in existence, although I am unable to say where you can get access to them. I am indebted to Victor de Pontigny, Esq., of Norwood, for a peep at them and others of greater instructive value, if of less rarity, which that gentleman possesses:—A treatise on “Artificial Fireworks, both for Warres and Recreation,” London, 1629; Babington’s “Pyrotechnia, a Discourse on Artificial Fireworks,” London, 1635; an article on fireworks in Bata’s “Mysteries of Nature and Art,” London, 1635; Frier’s “Traité des Feux d’Artifice,” Paris, 1747; a “Manuel de l’Artifices,” Paris, 1757; Jones’s “Artificial Fireworks,” London, 1776.

The first historical firework fact which interests us is the appearance of fireworks in Europe in 1530. Haydn’s “Dictionary of Dates” gives the date of the first public display as 1588, but does not say where it took place. Another date interesting to us is 1607, when, as Macanley tells us, £12,000 was spent in England to celebrate the Peace of Bux-wick, at the conclusion of William III’s Continental fighting. The Peace of Aix-la-Chapelle was celebrated in 1748, by firework displays. In the Green Park, London, a large building was erected called the Temple of Concord. This was a Richardson show sort of building as far as I can gather, and the effect was doubtless produced by piercing the painted canvas and burning lights behind, as “set pieces” were often carried out until very recently. This may be new; it will help to understand accounts of the marvellous fireworks of old.

It is difficult in all things to render to others a faithful account of what one has seen; but I think fireworks, owing to their transient glories, suffer, or perhaps I should say gain, more than most things. People have given me glowing descriptions of what they have seen, or believe they have seen, in India and elsewhere; but, without in the least desiring to deceive themselves or me, they unconsciously exaggerate. I know from the means at command about what the results must be. I always take a grain of salt with the descriptions I read of the fireworks of old. The old “glories of Vauxhall,” which elderly gentlemen of the present day cherish—well I know what they were; and without depreciating them, I must say that the impression produced on the young minds of these old gentlemen considerably exaggerated the glories aforesaid. I have heard my own displays spoken of in the same way. Marvellous effects seen by the individual—perhaps transported by a fervid imagination—but certainly not seen by others or intended to be seen.

In 1814, Sir William Congreve superintended for the Government a great display in St. James’s Park. Another temple was reared, and a Chinese bridge built over the ornamental water. Of this bridge, by the way, a good story is told. Canova was asked what had struck him most in London, and he said “that Waterloo Bridge should be the result of private enterprise, and the paltry bridge in the park the work of Government!” This unfortunate bridge took fire before its time, as I have known fireworks to do much more recently. This 1814 exhibition was to celebrate the hundredth anniversary of the accession of the present reigning family.

The last and grandest series of exhibitions of fireworks undertaken by Government were those given in the parks in May, 1836, after the peace with Russia. No special devices were attempted, but small wheels, fountains of fire, and cascades
I mean small, very small, with the exception of the fountains of fire, as compared with our Crystal Palace wheels and cascades — took their place. The aerial fireworks — shells, rockets, parachutes, etc., were vast in number and grand in every way.

When it is borne in mind that, until Chertier wrote his "Nouveaux Recherches sur les Feux d’Artifice," in 1840, the producing of colours had scarcely received attention from pyrotechnists, and that in the grand displays previous to this date there was no colour worthy of the name, a comparison with the fireworks of the present day will seem absurd. I should like you to feel as I do, that we have gone on improving, and that we have now attained a height which the pyrotechnists of old, and those of other countries in the present day, did not and have not attained.

Chertier was followed a few years later by Tessier,* a chemist, but more scientific and less practical than his predecessor. To Chertier belongs the honour of inaugurating the modern phase of tinted fireworks. Before his time, no blue colour had been produced by pyrotechnists. Tessier’s book is scientific, but, unlike Chertier’s, it contains little actually new.

The chief merits of these two French writers consist in their having introduced new materials into the manufacture of fireworks, and perseveringly experimenting with them until some sort of success was achieved.

In about the year 1856, when the Governmental fireworks to celebrate the peace with Russia were in preparation, considerable secrecy was made of Chertier’s recipes, which were closely followed by the authorities at Woolwich Arsenal. Mr. Southby, by far the cleverest pyrotechnist of that time, assisted in the preparation of the Governmental displays in the parks, and became possessed of a copy of Chertier. I know at least three people who each claim to have discovered the merits of Chertier, and to have introduced his work to English pyrotechnists.

When I first devoted myself to this colour-producing branch of the art, I felt that these haphazard results arrived at by Chertier and Tessier were reducible to a perfect system; and I take credit to myself for having invented such a system.

A perfect colour-giving fireworks is one which gives the greatest illumination, combined with the perfect combustion of the chemicals used; that is to say, there must be no waste of material, no excessive quantity of any one chemical, as in that case, instead of improving the colour, it goes to spoil it.

I find that this perfection is only occasionally obtained by MM. Chertier and Tessier, and then necessarily by accident. By my system, I know that there is one way, and only one way, to obtain a perfect colour from any given material; it is no longer a question of trying over and over again different proportions until the best formula is obtained.

All rules have exceptions, and I have to depart from my system under certain circumstances. Perfect combustion is required in the aerial fireworks; the considerable smoke given off forms a background for the colour and helps the effect rather than harms it; but in coloured lights to be burned on the ground, the point to be aimed at is to secure the best illuminating light with the minimum quantity of smoke. Therefore perfect combustion one has to forego.

I should like to add, that the idea of reviving the pyrotechnic art and business by a competition of "artists" at the Crystal Palace was a boyish idea of mine, and that it was only after very great perseverance that I was permitted to carry out my plan. The success of this competition was even beyond what I had predicted. Of the displays given at the Crystal Palace since then I will not speak.

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I must prefix my instruction by remarking that all my teaching will be thrown away unless you are successful in getting pure chemicals, and the same description of papers, tools, etc., named in these articles. This is the starting and perhaps greatest difficulty which has to be surmounted. To overcome it, I propose to offer to supply you, not only with the tools and appliances, but also the chemicals, named in these articles. It is so difficult to get tools accurately made when one has to go to local ironmongers or smiths. To me it will be an easy matter, and, as I shall charge but a small profit, the cost to you will be considerably less than it would be if you obtained them of tradesmen wanting in the necessary technical knowledge. You will thus, if you please to take advantage of my offer, be sure that you get exactly the same quality of chemicals, paper, etc., which I use, and which you could scarcely obtain otherwise. You could not easily purchase the papers I mention in small quantities, the dealers would object to break bulk, but with me it will be immaterial. I should like you to believe that I am not "vaunting my wares" in this matter, but rather that I am desirous to take trouble to assist you in your efforts to make good fireworks. The great difficulty I have is to get absolutely pure chemicals; and yet, if I were not to get them, accidents would be unavoidable, and the results, especially in the matter of coloured fireworks, would be failure.

SQUIBS.

The squib seems naturally the fittest firework to begin to learn to make. That known as the "halfpenny squib" is the best for fun and amusement. It burns quite long enough to satisfy one; the penny-sized squib would simply burn longer, the report would not be very much louder. A good squib should burn brightly and fiercely; it should throw out a good shower of brilliant sparks; and the report should be loud. It should be so fierce that if it be laid on the ground it will move.

Rolling Cases.—Inasmuch as my remarks on rolling squib-cases will apply generally to dry case rolling (i.e., the rolling of cases from papers which are not saturated with paste), I trust you will pay particular attention to this portion of the present paper, and endeavour to perfect yourself in this branch of the art.

The very best paper for making squibs is the brown paper known as Arbourfield. It is exceedingly strong, yet pliable. The weight, imperial size, is 70lbs. to the ream. The white paper, which is simply used for the sake of a clean and neat appearance, should be of demy size, of the weight of 131bs. to the ream.

Paper Cutting.—The student having obtained these papers, will now take a sheet of the Arbourfield brown paper, cut through the fold, then cut each half sheet the long way of the paper into three, and each of these parts into four, thus having twenty-four pieces of squib paper for every sheet cut up. A sheet of the white paper should then be cut through the fold, then cut each half into quarters, and each quarter into quarters, thus getting thirty-two squib papers out of the sheet.

Posting.—Take any thirty sheets of the white squib paper, hold them between the forefinger and thumb of the right hand tightly, and between the forefinger and thumb of the left hand somewhat loosely. Bend the papers down with the left hand until the lowest sheet extends a little beyond the edge of the one above it, and that again beyond the one above it, and so on. While the papers are held in this position by the left hand, grip them with the right forefinger and thumb, and repeat the operation just described, until each sheet is made to overlap the one above it sufficiently. Now lay them down on your work-table with the edges away from you, and pass the thumb-nail down
the papers (beginning with the edge of the bottom paper) until each sheet shall overlap the other by about the sixteenth of an inch. Then, commencing at the top (the bottom paper actually), paste the edges of the papers from side to side, until all are pasted. The paste should be clean and smooth. While pasting, hold the papers firmly under the forefinger and thumb of the left hand, to prevent them shifting from their position.

An expert hand might paste a gross of papers ready for rolling, but an amateur should start with twenty or thirty only, as the paste dries quickly, and it becomes troublesome to separate the papers.

A few hints on making your paste.—Use the best flour you can get, and add a little powdered alum, which will thicken the paste. Make it rather too thick than too thin, as it is more easily reduced than thickened. Do not make too much at a time. Several additions to the flour and alum are sometimes recommended, but I do not approve of them.

Having pasted the white papers, place them on your worktable at your right, letting one corner of the papers project beyond the table, so that you can readily take them up one by one. The brown papers, which are not to be pasted, place to your left hand, so arranged that they also can be taken up singly.

Rolling.—For your hand roller get a one foot length of steel wire, of No. 4 gauge.

Now take the brown paper lengthwise with the left hand. Hold the roller firmly in the right hand, and place it about one third up the paper. Put the near end of the paper over the roller, at the same time being careful to keep the paper even at the sides; fold in the paper under the roller, and roll until within half an inch of the end. All this should be done by one bold roll of the hand, but only an expert can do it in one movement; the student will at first find it necessary to tuck the paper under the roller with the nails of his fingers.

To roll the brown paper in one movement, a very strong pressure of the fingers (at about the second joints), and a free bold movement is requisite. It cannot be done slowly or hesitatingly.

Now take up one of the white sheets and insert it in the last turn of the brown paper, and roll to the end, when the narrow edges which have been pasted will be quite certain to hold, and thus you will have the complete case.

I should like you to practise the case-rolling well before you proceed further; the time will be well spent; hours will be saved hereafter.

I have endeavored to be very precise in the foregoing, and if the instructions are followed, you may learn to roll cases of this description in a rapid and perfect manner.

I have known three gross of halfpenny squib-cases to be rolled in an hour, without any help whatever, and with no preparation beyond the cutting of the papers. But three dozen will perhaps be as many as the student will be able to accomplish at first.

Choking.—The next operation is that of "choking" the cases. The best and quickest plan necessitates the use of a machine, an engraving of which is given on p. 256. By means of this little machine the "dubbing-in" of the squibs may also be done. I will now explain these two terms. The former means the partial closing of one end of the case by squeezing it, while an aperture is ensured by a nipple. It is the reduced aperture which causes or increases the force of the composition. The second term is applied to the closing-in of the squib at the report end.

If you have this useful machine, you will take the case to be choked in your left hand, and insert it over the nipple, and give three or four chops with the handle of the machine while you turn the case round, to ensure even pressure. For dubbing or closing-in you will have, at the proper time, to insert the other end of the case between the converging plates of the second aperture of the machine. Manufacturers use a somewhat similar machine, but worked by a treadle, instead of by hand. The pressure on the treadle raises a weight, which, in falling, acts as the handle of this present machine does. Of course, the treadle, in releasing a hand, is a great improvement where time is an object. As many as twenty gross of squib-cases may be closed or twelve gross choked, by a man in one hour by the treadle machine.

In the absence of the machine, the choking can be done, although in a slower and less satisfactory fashion, as follows:—Get a piece of hard wood, three or four inches long, rounded off at one end to fit the squib-case loosely. Into this end fix a piece of wire, in thickness one-third of the inside diameter of the squib. The wire should be half an inch out of the rounded end of the tool.

Now get some stout thread—that known as "No. 4 sealing-thread" is the best, and is also useful for other parts of our work. Make one end fast to a post, and tie the other end round your waist, leaving a yard of loose string between yourself and the post. Take a case in your left hand, and pass the string round the best or most evenly rolled end, at a quarter of an inch down; insert the nipple of the tool you have made, according to the directions I have given you, and then exert your weight to tighten the string, at the same time keep twisting the case round. Should the paper not yield sufficiently, it may be necessary to take a second turn of the string round the case. It will be well with cases choked on this plan, to tie them together at once by means of two half hitches round the choke. As this plan of tying is invariably adopted by the pyrotechnist, you may as well at once learn how to accomplish it.

Tako the choked case in your left hand, between the thumb and forefinger, so that the tail of the case is towards the wrist. Take the string in your right hand. Fix the end of the string between the case and your left thumb. Now extend the second finger of the left hand away from the case; pass the string over the tip of that finger, and with the tip of the right forefinger pass the string under that which is stretched tightly between the case and the left finger. While the string is in this position put the tip of the second finger of the left hand on the choke of the case, and gently slide the loop over the case into the choke. This is a half hitch. Repeat the operation, and you have the required tie. This is almost exactly the way an expert hand ties two half hitches; but so rapidly is it done, that it would be very puzzling to learn it from seeing his action.

The string will be continuous. Place the second case close against the first, with the string lying in the choke above the case, and proceed to tie as described. After tying about twenty, draw the string very tight. Then cut the string very close to the choke of each case. The cases are now ready for filling.

More Tools.—The tools you now require are a copper funnel and a rammer. The funnel should be shaped like an extinguisher, about five inches in height. The mouth should be about two inches across. The lower end must be carefully filed down until it just fits into the unchoked end of your squib-case, and it should be perfectly smooth.

The firework-maker usually makes his rammer in this way. He gets a piece of brass wire, about fifteen inches long, and of two-thirds the diameter of the roller. He then makes a cone of brown paper like a sugar parcel. The wire is then pushed down into the paper cone and through its point until there is only an inch of the wire above the point of this sugar-paper
cone. The paper is then tied to maintain the same position, and the wire is driven into the ground. After melting about half a pound of lead, it is poured into the paper cone so that it completely covers the wire, thus forming a weighty handle by which to ram the composition in the cases.

It is very important that the bottom of the wire should be perfectly flat and smooth. Hold the wire in a vice, and hammer up, so that, besides flattening the bottom, you will slightly thin it. Then file round carefully to remove all trace of roughness, and file the bottom also to make it perfectly smooth and flat. The rammer will also act more rapidly if, instead of the wire being perfectly smooth, notches are cut in it with a flat file. To cut these notches, file horizontally one-third through the wire, so that in descending the rammer the wire must be cut with.

You now require a nipple, upon which to place the choked end of the case during filling. Take a piece of brass wire, and drive it into a base of wood, rounded off, as in the case of the tool described for choking the cases. The same measurement will, of course, apply.

One other preparation before filling is advisable. It is to have a tray in which to place the cases when filled. This tray should consist of a board say eight inches long by three inches wide (for laying the squib on the). Two inches from each end of this flat board raise the sides of the tray to a height of six inches.

Composition for Squibs.—One part charcoal, eight parts meal powder.

This recipe, with good charcoal, gives the best possible squib. There are other recipes, including saltpetre and sulphur, but they are not comparable with the above, provided that good charcoal is obtained. Mix the ingredients well together, and rub the composition through a copper sieve (say 24 mesh) three times. Under the sieve lay a sheet of paper.

Filling.—Take the funnel and the rammer passed through it in your right hand. Lay the case to your left, with the mouths or unchoked ends towards you. Place the composition at your right hand. You are now prepared to make squibs.

Pick up the mouth of each case delicately between finger and thumb, that it may not be soiled. Fit the choked end of the case on the nipple before you, and insert the wire; let the funnel rest gently in the case. Half fill the funnel with the composition and commence to ram, taking care not to raise the hand high, but to proceed by quick short blows. About sixteen or eighteen such blows will be sufficient. If the case be filled by fewer blows, it is certain that the hand has not been raised too high, that too much composition has been taken down by the rammer, and instead of the case being evenly filled, the composition has been jammed. When the case is about half an inch more than half full, make a mark with a file round the wire at the point level with the top of the funnel.

Having filled the first case to the desired height, take the funnel (with the rammer still through it) in the right hand, and with the left take the case gently and lay it, with the choke away from you, on the tray in front of you. Lay them regularly, side by side, and in tiers, until the tray is full. Then lay two pieces of wood about eight or ten inches long across the squibs horizontally, one in front of the tray's sides, and the other behind. These pieces of wood will extend beyond the squibs as the base of the tray does. Over these ends you pass string round, so as to hold the squibs tightly and compactly, as in a press.

Now turn your sieve upside-down, and lay the tray on its side, so that the mouths of the cases rest on the sieve wire. Tap the edges so as to expel the loose composition. Clear away this waste, and reverse the tray so that the edges are downward. Now take some P grain powder and pour it into the mouths of the cases until full. Place the tray in a vertical position, and give it one complete turn over, by which you will expel sufficient powder to enable the drawing or dubbing-in to be done.

Now lay the cases choke downwards on the sieve again, and tap, somewhat hardly, the mouth-ends with a flat piece of wood, in order to make the powder settle down. The squibs are now ready for drawing-in or closing the ends.

DUBBING-IN.—The best way to do this is by means of the little machine already described. In the absence of the machine, I recommend the following plan:—Take an ordinary bodkin, and fit it into a little wooden handle, rounded so as to fit the palm of the hand comfortably. With the point of the bodkin turn in the inner fold of the paper, and turn it down on to the powder. Continue to turn in until you get to the outer paper, which you will "choke" in the manner already described. Then tie off, but give three half-hitches instead of two.

Your next operation will require touchpaper.

Touchpaper is usually made of 15-lb. blue double-crown paper. Dissolve one ounce of saltpetre in a quarter of a pint of water. Lay the paper open, and with a sponge quickly wet each sheet completely; now hang them up to dry. You may as well make enough to serve you for some time. You should not have to make touchpaper again for a long while.

When the touchpaper is dry, brush it, straighten out a single sheet, and carefully fold it; cut through the fold, cut the half sheet again in halves, then cut these (quarters), the long way of the paper, into nine strips; divide each of the nine strips into seven, so that you will have sixty-three pieces of squib touchpaper for each quarter of a sheet of the blue double-crown paper.

You should cut these regularly.

Priming.—You now have to prime the squibs, and for this you will want fuse composition. Here is the recipe:—Four parts meal powder; two parts saltpetre; one part sulphur. Mix well together. Make the composition slightly damp with water, so that it feels like flour rather than like sand when you use it. Rub well together; you need not use a sieve.

Dip the choke of the case into the fuse composition with pressure sufficient to make it adhere. Take the squib in the left hand, letting the choke end rest against the tip of the forefinger; insert one piece of the touchpaper lengthwise between the case and that finger, so that half the paper is above the squib; tuck in one end and roll the paper, which will go twice round, then twist it at the top, which will be sufficient to hold it on to the squib.

Tying off.—After this, tie your squibs round the choke with two half hitches, as you did after choking, red thread (two-thread size) is usually used. This will hold the touchpaper on securely. Now out the threads closely. The squib is now complete, unless the closing-in has been done by the machine, in which case it will be necessary to dip that end into glue. Pyrotechnists add read lead to the glue; this hastens the drying and improves the appearance. Throughout the operations it is necessary to handle the squibs delicately, in order to ensure a neat clean appearance.

The following are the tools and materials which I have referred to, and which you will require to make your squib:

70-lb. Arbourfield, 13-lb. white demy, and 15-lb. blue double-crown papers.

No. 4 sealing-thread, and two-thread red thread.

Meal powder, P grain powder, charcoal, saltpetre, sulphur, glue, red lead, paste.

Roller, choking, and closing machine (or choking-stick, and a round-handled bodkin), funnel and rammer, wooden tray, copper sieve, file, sponge, &c.

Of the much larger descriptions of squibs known as runners, and under other names, I will speak later on.
THE Flying Cones is one of the most curious and eccentric of toys. To acquire the art of playing with it needs some perseverance, and perhaps even natural cleverness, but it is worthy of having a little trouble devoted to it.

In appearance it is like Fig. 1; two cones fastened together at the apexes. The material of which the cones are manufactured is generally hard wood, and they are made hollow, a hole being placed at one side, so as to produce a humming
sound when the toy is being spun. The spinning apparatus consists of two thin sticks; those used for playing at the Graces (see p. 123, Vol. I) will do very well. A string about a yard long is tied to the tips.

When you begin to play, you lay the cones on the floor or on the table, which you please. Then you take a stick in each hand, and slip the string under the toy so as to catch it just where the two cones are united, being careful to have it nearer the right-hand rod than the left-hand one. You next raise the rods, at the same time making such a movement with the right hand as to set the double cone revolving on the string. It is shown upon the string in Fig. 2. By a sort of whipping movement, first with one hand and then with the other, it is kept spinning, and when it is spinning in earnest it will begin to hum.

As soon as the toy begins this humming music, a good player considers himself entitled to do pretty much what he likes with it. He flings it up in the air and catches it on the stick again, stretching the string tightly to receive it when it comes down; he makes it execute a series of leaps like a practised rope-dancer, or he catches it on one of the sticks and makes it roll up it towards his hand; and if there are two players, each having a couple of rods, they throw the spinning toy from one to the other. Indeed, a great deal of amusement can be got out of the flying cones.

To make the Miniature Camera, by means of which you can see what is going on behind you, get a small pill-box, a little bit—a half an inch square will do—of looking-glass, and a small piece of beeswax. You need not for the purpose break a looking-glass—they say there are nine years of bad luck in store for any one who does that. In the shops you will get a bit almost for the asking. Bore a small hole in the centre of the lid of the pill-box, and another in the side, and then, by means of the beeswax, stick the bit of looking-glass across the bottom of the box, at an angle of forty-five degrees to the axis of the disc. Now, by looking through one of the holes in the box, you are able to see things passing behind you, for the reflection of these is obtained in the looking-glass through the other hole.

The complete apparatus will look as in Fig. 3.

The Animated Serpent is a simple and pretty toy. Get a piece of card—it must not be too thick—or thin sheet-copper or brass will do. The size is of no great consequence. Draw upon it the form of a coiled-up serpent, as shown in Fig. 4.

Cut out the serpent with the point of a sharp penknife, and fasten a thread through the tip of the tail, just in the place marked by the letter c. When this is done, fasten the other end of the thread to the mantelpiece; through the weight of the card, the head will fall some distance below the tip of the tail, and, as there is always a current of air passing up the chimney, the serpent will begin to revolve with considerable rapidity. The reptile may be made more like the genuine article by striping or spotting the body with green and black, and placing two glass beads on the head to do duty for eyes, when it will look as in Fig. 5.

By way of variety, one may provide a slender piece of wood as a stand, and fix a sharp needle at its summit, and pass the needle through the serpent’s tail. It is an improvement to paint the wood in imitation of a tree. The animated serpent may be held over a candle or a lamp, or indeed, in any upward current of air.

A Demon Bottle is rather an odd affair. It will only obey the commands of its possessor, and lies down or stands erect as he wishes; to other people it pays no attention. Cut a little bottle (see Fig. 6) out of pith of wood, and, at its base, fasten half a bullet a. Down its centre bore a hole b, and to fit this hole get a steel pin. When you would have the bottle lie down, secretly insert the pin, which will counterbalance the weight of the leaden bullet. If you wish it to stand erect, withdraw the pin. The Demon Bottle will be found to excite much wonder among the uninitiated.

A toy somewhat similar to this is the Obedient Soldier, who will only lie down at the word of command. He is made of pith, and is loaded with lead at the base. He is standing in the position of “shoulder arms,” and into the barrel of his gun, which is made hollow, a piece of solid steel wire is fitted. Yes see him in Fig. 7. When the wire is inserted he lies down; whenever it is withdrawn he starts to his feet. The great difficulty is to insert and withdraw it so cunningly as not to be observed, but that can be got over by practice.

The Tee-Total is a kind of top, or whirligig, with several sides, spun round by the finger and thumb. The fortune of the player depends on the side that comes uppermost when it ceases to spin. Long ago tee-totums had only four sides, marked with the letters s, n, m, and p: s meant “take all,” n stood for “half,” that is, say, half of the stake; m represented “nothing,” and p was “put down,” namely, a stake equal to that put down at first. Now the toy has been improved, and is made with many sides and figures, but the games played with it have not materially altered. Nuts and confections are the usual stakes in tee-total games.

The manufacture of Paper Purse has been popular in this country for— I really don’t know how long—certainly for a very long time. Here is how they are made:—Take a square piece of paper, and fold it into three equal parts; it will look when folded like Fig. 8. Fold it again into three additional equal parts—the pieces for folding are indicated by the dotted lines in the Figure. When this is done, you will have in your hand a small square of thickly-folded paper. Now take hold of two of the corners between the finger and thumb of each hand, and pinch the paper into the star-like form shown in Fig. 10. This is just like the shape of the paper-head of the dart described on page 125, Vol. I.

Open all the paper out now, as if you were going to begin again from the very beginning, only do not press it flat, to take out the marks of the folds which will be impressed upon it, as in Fig. 9. Catch the corners a b and c d between the finger and thumb of each hand, and, twisting the thumb of the right hand away from you, and screwing round the left hand corner the reverse way, humour the folds of the paper till you get it into the shape shown in Fig. 11. To do this, the folds will have to overlap in such a way as is hardly possible to describe or paper. Turn now to Fig. 11. Fold a to b, c to d, e to f, and, having got the purse into the form of Fig. 12, insert g in the slit marked by the letters h i. The purse now is closed; to open it, withdraw the tongue g.

These purses were once made of morocco leather, I have been told by the same kind informant who has communicate to me the method of making them of paper.

By means of the Magnetic Wand a number of very pleasing experiments may be performed. It is made of a rod of yew compass wood, about ten inches long by a third of an inch thick. A hole is drilled in this rod, and in it is placed a strongly magnetised steel wire. At each end of the wand a little ivory knob is screwed on—the knobs being differently carved, so that one may distinguish by the touch alone which is the north and which the south pole of the steel wire.

A Magnetic Swan admirably illustrates the properties of the wand. It is made usually of cork, and has a little piece of
strongly magnetised steel run through its body. It is then covered over with a thin coating of white wax, and when it has got glass beads for its eyes, looks quite handsome and natural. Should you try to manufacture one, you must take care to have it so loaded and balanced as to float properly. Place it in a basin of water, and hold in your hand the magnetic wand. Turn one end of it towards the swan, and it will come as a living swan might, in expectation of being fed; turn the other pole of the wand, and the swan will turn back.

Many floating figures, such as fish, boats, tritons, and syrens, may be made in the same way as the swan.

The Dancing Pea is another very curious toy. Get a pea, two small pins, and a broken piece of tobacco-pipe. Run the pins crosswise through the pea, and defend their naked points with sealing-wax, to prevent any mischief that might arise from their striking one’s face. Now place the pea, catching it on one of the pin-points, upon the stem of the tobacco-pipe, which is held in the mouth, then throw the head back till the pipe assumes a perpendicular position, then commence blowing. The pea will dance in the air in a most amusing manner, being borne up on the column of air.

Instead of a pea, one may use a pith-ball; and a quill, or a brass tube, will do quite as well as the stem of a pipe. The pins, it has been remarked, are not absolutely necessary for the success of the experiment, indeed, their only use is to secure the elevation of the ball to a certain distance above the orifice of the tube before it is set adrift. If the ball could be set off at a distance from the orifice, such an expedient would be unnecessary. A continuous and steady stream of air cannot be commanded at the point at which the air issues.

BILLIARDS.

By A. G. Paton, B.A.

ACCURACY OF PLAY—ALL-ROUND CANNONS.

It is evident that cannons are far more difficult to make well, i.e., with due consideration for position, than either losing or winning hazards, for the reason we mentioned, that all three balls are of necessity moved.

Fig. 1 is an instance of a very ordinary cannon, which occurs in almost every game, which is perhaps as good an instance as can be given, as the position of the balls after the stroke is very evident; the red ball is close under the top cushion, and the white ball about six inches away from the side cushion; the striker is in hand.

Now it will be at once seen how very important an element is strength in playing this stroke; if it be played just strong enough to bring the white and red balls together, the striker will have a first-rate break left next time; but should the stroke be played too hard, and the balls separated, very probably the player will not be able to score next time at all.

It is in playing these little easy simple strokes that the really great players, such as Mr. Cook, the present champion, show their power, not in those wonderful screws and forcing-hazards, which appear so much to delight and dazzle the young amateur.

That Cook can make such strokes there can be, however, no doubt. We give an extract from Land and Water of November 8th, 1873, in which there is an account of a stroke which Mr. Cook thought the very best that he had ever made in his life; also a description of the way in which he makes the very cannon we have given as our first specimen in Fig. 1.

Land and Water states:—”We are inclined to think there are certain points of play in billiards in which Cook, the present champion, excels any other player, either of the present day or of bygone times. Perhaps on no point is he so great as in his wonderful knowledge of strength, even when the balls are struck very hard indeed.

“As an illustration we would mention a stroke which Cook made in an exhibition match with Bennett last Saturday. Cook had been playing the spot stroke, and after a considerable number of hazards, lost the position by the white, i.e., his own ball, stopping so near the spot that it could not be spotted, and, consequently, in accordance with the rules of the game, had to be placed on the centre spot on the table, immediately between the two middle pockets.

“There are, we believe, few players who would have persevered in playing for the ‘spot,’ under these circumstances; but Cook, apparently without a moment’s hesitation, sent the red ball with a bang into one of the bottom pockets, his own ball round the table with the exact strength to stop within a foot of the spot in a dead straight line with the top pocket. “Of course a round of well-merited applause followed, and Cook himself afterwards informed us that he considered it perhaps the very best stroke he ever made in his life. When men can be found who not only in a match play for, but make such strokes, what may not happen in the billiard world in the next ten years?

“About that time ago it was not uncommon to hear it said that we should never see any one like Roberts; and we recollect a marker, an old man at some rooms in Oxford Street, who used to maintain the opinion single-handed, against the jeers of almost every one who frequented them, that billiards was yet in its infancy, and that before long Roberts’s breaks would be thought nothing of. This old man seems truly to have had the gift of prophecy, and we wonder what the old riddle of the room in question says to the present handicap, which takes place at the Guildhall Tavern on the 8th of next month, where three men are handicapped to give Roberts 120 points in a game of only 506 up, two second-class players give him ten, and four more start level with him.”

In fact, the billiard world moves quite as fast as any other world, and the great guns in it are advancing with as rapid strides as they are in the world itself.

There are old gentlemen still living who can recollect being astounded with the first 68-pounder ever made, which is now a mere pop-gun.

So Cook, who corresponds to the Woolwich Infant of his day, may, for all we can tell, be considered nothing to some great player who may arise, and may, perhaps, never make less than 1,000.

Another peculiar point in Cook’s play is his extreme accuracy. For instance, suppose the red ball is touching the top cushion, and Cook plays from baulk to cannon on to it off the white ball placed on either side of the table (vide Fig. 1), an ordinary easy cannon, which any moderate amateur player could make almost to a certainty. When, however, Cook plays this stroke, he always strikes his ball so accurately that he cannot dead fall on to the red ball, thereby making his own ball to kiss off it.
without scarcely moving the red ball at all. Now, most amateurs who have any knowledge of position-play know that the usual difficulty in bringing the balls together in this particular stroke is not so much bringing up the white to where the red is, but to avoid knocking the red ball away to some unknown place.

Were Cook to play this stroke only occasionally, there would be nothing remarkable in it, but during a series of matches which we have had the pleasure of witnessing, we do not recollect a single occasion on which he has played to cannon dead on to the ball that he has failed to succeed. Such accuracy is indeed remarkable, and can, we should imagine, be only acquired by one who must be gifted with extraordinary powers of sight.

We do not know whether Cook is a volunteer, but we see no reason why the same eye and steady hand that enables him to distance every one at billiards should not equally serve him were he to enter at Wimbledon: at any rate we make the suggestion.

On reference again to Fig. 1, it will be seen how exceedingly important is the cannon we have there given to a professional player who, like Cook or Stanley, often makes a couple of hundred off the balls. The small curved line off the red shows the probable direction of the striker’s ball after kissing the red dead full.

Now the position in which the balls are left enabled a player such as we have mentioned to make as a rule another very easy cannon, which brings the red ball over one or the other of the top pockets, when on the following stroke it can be put in and the spot stroke obtained, which is what nearly all the first-class players are continually trying for, as to them it often means simply turning the game straight off.

But we have before warned, and would again warn indifferent players from playing for this stroke until they have to a certain extent mastered it. When we say mastered it, we mean that they can frequently make ten or twenty hazards running. We have ourselves seen a gentleman, who not long ago played for one of the Universities, make over a hundred off the balls at this “spot stroke.”

Fig. 2 gives two more specimens of cannons, one a very common one, as it frequently occurs the second stroke in every game, especially among rather inferior players, who do not play with sufficient knowledge of strength to know how to give a miss in baulk at starting properly.

It will often be observed that at the commencement of the game a player will, instead of leaving his ball in baulk in the...
BILLIARDS.

supervision of a good player, is, through constant care and attention, in a state of perfection. Evans finds that when he leaves his room to play on another table, that, until he gets thoroughly accustomed to it, he makes a similar mistake in every stroke he plays.

But to return to our cannon, Fig. 2. It will be found easiest to spot the ball rather to the right in the D, and play the stroke with a little right-hand side.

This is, however, one of those strokes in which even a first-rate player cannot tell with any degree of certainty the exact position of the balls afterwards.

The stroke is, however, an easy one, for the reason that the player has so many chances of making it if he makes only a slight error in taking aim. If he hits the red ball rather too hard, or puts on too much side, he has still a good chance of scoring the cannon by his ball striking the left-hand side cushion in baulk.

On the other hand, should his ball strike the red ball too thin with insufficient side, he will still very possibly get the stroke of the bottom cushion.

We would, however, warn our readers and billiard-players generally against ever spotting their ball exactly on the middle of the baulk in order to play at the red ball. This is especially important in the game of pool; the reason is that the spots which are placed up the middle of the table will very likely affect the movement of the balls, and will sometimes even be the cause of a miss, which is, of course, at pool, most disastrous.

Now, possibly, those who are accustomed to play on first-rate tables may laugh at these cautions; but we would remind them we write for our readers; we cannot ignore the whole world for the sake of a few men so narrow-minded that they cannot enter into the above-mentioned cause, we maintain the subject is worth mentioning—apertus duct.

The position denoted by the dotted lines in Fig. 2 is one that frequently occurs—viz., a ball in baulk somewhere near the bottom cushions, another ball out of baulk, but no losing-hazard left off it.

The error generally committed by young or inexperienced players, in attempting these strokes, is that of putting on side.

As we have said before, side is more often put on when it is not wanted than omitted to be put on when it is; and the cannon here given is a very good instance in point.

The proper way to play for this cannon is to cannon on to a spot on the top cushion, half-way between the two spots on the top cushion, that would be formed by the intersection with the top cushion, of two lines drawn through the two object-balls parallel with the length of the table.

No side, therefore, must be put on at all. These cannons are much easier than many people imagine, and we would
strongly recommend players to practise or even try a few, in proof of what we say. The probability is that many moderate players, should they attempt some, will at any rate find that they so nearly succeed in canning that a new light will dawn upon them.

The usual way in which tyros play for the stroke we have pointed out, is, they spot their ball (vide diagram) considerably to the left, and then play to get the cannon off two or three cushions.

The stroke should be played, if anything, rather on to the left of the ball in baulk, as there is a chance of getting it off the bottom cushion if missed on the left-hand side, but there is no chance of getting it off the bottom if the striker's ball comes down the table too much to the right.

In playing this stroke there is always some danger of the balls kissing, i.e., the striker's ball and the red ball, for we suppose the stroke to be played off the red ball on to the white. This is generally owing to the red ball being hit too full. If the red ball be struck in the proper place, it will very frequently be found that after striking the left-hand side top cushion, it will rebound across the table into the right-hand top pocket.

Good players almost always play for what is often termed in billiards the double event.

[In all the diagrams the shaded ball is supposed to be the red.]

Fig. 3 represents another all-round cannon. The opponent's ball is supposed to be in baulk somewhere near the left-hand bottom cushion, and the red where the shaded ball is in the diagram.

Now, decidedly the most obvious way of playing for the cannon in this case, supposing the striker's ball to be in hand, is to hit the red ball the other side to that shown in the diagram; but it will often be found easier to play the stroke in the way we have depicted in the diagram, as there is but little chance of the ball kissing, and a good chance of bringing them together at the end of the stroke.

The red ball must be struck rather sharply and with a good deal of strong right-hand side. The ball, too, should be struck high in order to ensure its running.

In every instance we have hitherto given of cannons it will be observed that there is no losing-hazard possible. Now it is a good maxim at billiards never as a rule to play for a cannon when there is a losing-hazard; but it must be borne in mind that there is no rule without an exception.

When, for instance, the striker's ball is in hand and the other two balls out of baulk, but rather near the baulk-line. Now, in a case of this kind, there may probably be a losing-hazard possible off either the red or white ball into either of the middle pockets, besides a cannon; yet the cannon is so easy, and the position in which the balls may be left afterwards so evident, that the cannon would undoubtedly be the game, and by means of the cannon both red and white ball would be placed over the middle pockets with losing-hazards off them possible, and in a much more favourable position for obtaining the right degree of strength to bring them down again for the hazard afterwards.

But still cases do occur at billiards, where it is exceedingly difficult to decide as to whether the cannon or a losing-hazard should be played for. Now, there is an old-fashioned maxim at whist that says when in doubt, play a trump. So at billiards, we should say as a rule, when in doubt, play for the hazard in preference to the cannon.

When the choice lies between an all-round cannon, where the position of the balls afterwards is very uncertain, and an easy hazard, there can be no doubt but that as a rule the hazard is preferable; when, however, the cannon is easy, and the position of the balls tolerably evident, while, on the other hand, the hazard is difficult, there can be no doubt but that the cannon is the correct game.

Cases, however, can and often do arise, in which it is almost impossible to decide; say, for instance, the losing-hazard and the cannon appear equally easy, and the position of the balls after each equally difficult or easy, whichever the case may be.

The proper course to take is then to choose that stroke which apparently in the end will leave the best break.

Fig. 4 is an instance in point of a position in which it is extremely difficult to decide what is the best game to play for.

The player's ball is in hand and the red ball in baulk a few inches away from the side cushion, about midway between the baulk-line and the bottom pocket.

The white ball above the middle pocket to the left of the table, but in that position where an easy white hazard is possible if off it into the right-hand top pocket, if the striker spots his ball on the left-hand spot in baulk. This hazard is depicted in our diagram by the dotted lines.

But by placing the ball rather towards the right of the n, a very easy cannon is possible off the top cushion, as shown by the ruled lines in the diagram.

In fact, this cannon would be to many players easier even than the losing-hazard, as, should the ball come down the table too much to the left, there is still a good chance of getting the cannon off the bottom cushion; while, on the other hand, should the ball come down the table too much to the right, there is also a probability, unless the stroke has been very much overdone indeed, of getting the cannon off the side cushion; so that in reality the cannon has to be made, not simply on to a space the limit of which is in ordinary strokes three times the diameter of the ball, but on to a space nearly three times as wide.

There is an advantage, too, in playing for the cannon, inasmuch as it brings the red ball into play. Yet in this stroke we have mentioned a really first-rate player like Cook would play for the hazard, and for the following reason: both strokes to him would be certainties, but after the losing-hazard he could, with that wonderful knowledge of strength about which we have been speaking, tell almost to an inch the position of the white ball, and would, consequently, by playing the hazard rather harder than usual, bring it down near to the baulk-line, where, on the following stroke, he could play to cannon on to the red, so that he could pretty well tell the position of the balls afterwards.

Not so however an ordinary amateur player; with him there would be considerable danger of miscalculating the strength, and by playing the stroke rather too hard, bringing the white ball into baulk, which, with the red ball in its present position, would be very advantageous for his opponent; we should, therefore, recommend the cannon in preference to the hazard in this particular position.

On the other hand, however, were the positions of the balls reversed, i.e., were the red ball above the middle and the white ball in baulk, there can be no doubt whatever but that the hazard is the game. In fact, the losing hazard off the red counting three, and off the white only two, often determines the play when the game is doubtful.

It will be seen from this that it is quite possible that what is the game for one man is not necessarily the game for another.
EGG-COLLECTING.


W

We have found coots’ eggs on a high piled-up nest of flag, six or seven, of a stone-colour spotted with black dots, early in April, and at the same time we have also found those of the Moor-hen (Gallinula chloropus), although, as a rule, we consider this species a later breeder, and it certainly breeds twice in the season.

The term moor-hen is a misnomer, for the bird may be found wherever there is a river, or mill-pond, or on any reed-fringed stream throughout the kingdom. It may often be seen on the lawns of private houses not far removed from water, and in many cases it seems to seek protection from the neighbourhood of man’s habitation, and abandoning the sedge and reeds, it has been known to establish its nest in the lower branches of some yew, cedar, fir, or other ornamental tree.

Its nest is constructed of flag, and the eggs, of a yellow-ochre ground spotted with reddish, are often very handsome, especially before they are blown, when they have a rose pink tinge. As the nests are placed in much drier sites than those of the coot, they can often be reached without even the trouble of wading, or sometimes without wetting one’s feet.

On the great lake in Gatton Park we once found seven coot’s and three moor-hen’s eggs in the same nest; those of the former considerably incubated, those of the latter being quite fresh.

There was no possibility of any human being having visited that nest before us, so it would appear that the moor-hen was seized with a frantic desire to lay before she could get her own nest ready, and was thus driven to avail herself of the first receptacle she could find.

The young of both these species present a very quaint appearance in the down, but they soon lose this on assuming their feathers.

Of the family of Wagtails there are but three species which habitually breed in our islands. The best known is the Pied Wagtail (Motacilla alba), the familiar frequenter of our lawns and roads. It can always be distinguished from its Continental representative, M. alba, by its much darker colour, especially on the back and rump, but in other respects we are aware of no particular differences either in food, eggs, or habits, and as we believe that some of the Continental species occasionally nest in various parts of this country, they will probably interbreed. Indeed, considering that our bird is a migrant, and goes as far as Africa in winter, it is surprising that this insular species or variety, whichever our readers may choose to call it, is so easily distinguishable, for it can certainly be recognised at a glance.

The nest of our pied wagtail is generally situated in or near the banks of some stream or pond; a recess in a wall is also a favourite place, and the sides of an outhouse, a stock, or an arbour, are not unfrequently selected. It is constructed of roots and dried grasses, lined with finer materials and hair; the eggs are whitish, so closely streaked with grey as to present an almost uniform colour; they are also frequently spotted and blotched with the same tint, and some varieties are very similar to those of the common house-sparrow.

The nest of this species is a great favourite with the cuckoo, and it is upon the resemblance in the colour of the egg of the latter to those of the foster-parent that the advocates of assimilation lay great stress.

The next commonest of our regular visitants is the Yellow or Ray’s Wagtail (Motacilla flava), which, though seldom found far from water or moist land, is yet partial to corn-fields, fallow-land, and commons, as localities for its nest. Its eggs are of a mottled yellowish-grey colour, sometimes scrolled with an irregular black line towards the larger end, like those of some of the warblers.

This is another of our insular species, distinguishable from the nearly allied Continental yellow wagtails (for there are several) by its greenish-yellow head and yellow eyestreak. The best known of the Continental species has a grey head and white superciliary streak, besides other points of difference; but there are other closely allied forms, and altogether the Continental wagtails appear to go through so many phases of plumage, and their nomenclature is in such a horrible muddle, that it would only confuse our readers, instead of instructing them, if we entered into the question. We should not even have said so much as we have, but for the fact that one, we don’t say which, of the Continental forms, has recently been reported (on good authority) as nesting in the North of England, not far from Newcastle.

Our readers must not forget that there is a grey-headed wagtail amongst the regular breeders in this country, and one which, though a frequenter of mountain streams and burns, is yet to be found here and there by the side of most of our trout rivers, especially if they flow through somewhat narrow valleys.

This is the Grey Wagtail (Motacilla cinerea), which may always be recognised by its extremely long tail, and in spring by its black throat. It was formerly supposed that its breeding haunts were confined to the north of Europe; but subsequent investigation has shown that it nests in all suitable localities down to the Mediterranean, and perhaps in North Africa. Generally speaking, wherever there are trout streams you will find the grey wagtail; not that the fish and the birds have any immediate connection, but the streams that suit the one are also attractive to the other. The swift-flowing rivers of Devon, Wales, Cumberland, and Westmorland, are those in which we are certain to find this species in abundance; but a few pair nest in Buckinghamshire and Herts, and for this reason we include them here. If there should happen to be an old bridge or mill near where you find a pair of birds, the nest will probably be situated in a croc高职 of the rafters, or a hole in the masonry, and there you will probably discover five eggs, similar in some degree to those of the former species, but rather lighter in colour.

Every trout fly-fisher knows this bird as it flies along the burn, and lighting on some boulder in the midst of the swirl of the stream, now raising now spreading the long tail with its white outer feathers, its bright yellow breast and black throat relieving the too-often monotonous dull grey of the encasing valley. It is easily recognisable, and very tame; so if you have an artist’s eye for a bit of colour and contrast, we trust you will not wantonly shoot it, although it must be admitted that it is only during the breeding season you will get either male or female with the black throat.

Let us now review the nesting haunts of the various finches, a tolerably numerous family. The most thoroughly representative member, as well as the best known, is the port and lively Chaffinch (Fringilla coelebs), whose “pink-pink” may be heard in every garden and orchard in England.

Few can be unacquainted with its closely-woven, compact
nest, ornamented with lichens, moss, catkins, or any other material which may seem to its taste either beautiful or useful, as assimilating with the branch or fork in which the edifice is placed. It is partial to old fruit-trees, a lichen-covered knot of which the nest then so closely resembles as to render its detection extremely difficult to an inexperienced eye; but there is scarcely any tree or bush in which it may not be found at one time or another.

Our bird rears at least two broods in the course of the season,

but as a rule the first nests, constructed in April, are the most beautiful and ornate. The eggs, four or five in number, are of a bluish-green, blotched with reddish, overlaid with spots and streaks of darker colour, often in the shape of an incomplete zone; and nearly uniform blue varieties are not uncommon, principally in the second nests of the season, when the colouring matter appears to become exhausted.

Although its congener, the Brambling (F. montifringilla), which comes down from the North in autumn and winter, has never been detected breeding with us, we may remark that the eggs are so extremely similar as to render reputed specimens obtained from dealers utterly worthless without some well-known collector's writing upon them.

The breeding haunts of this species must be sought in Norway, Sweden, and Russia, where it is extremely abundant; and in the far North it takes the place of the chaffinch entirely.

The Greenfinch (F. chloris) is another very common species, and its loose nest is frequently placed in the thick ivy which twines round the trunks of trees, as well as in evergreen and other bushes. The eggs are of a white ground-colour, spotted and scurried with russet and darker markings; sometimes a blue tint suffuses the whole, but as a rule the eggs are suffi-

The Chaffinch.
most collections. But leaving Scotland, its only regular habitat in our islands, occasional nests have been found in many counties of England, Surrey being, perhaps, the most favoured, and this is not surprising when we consider that the species is found breeding on high ground as a rule as far south as the Atlas Mountains of Africa. As an occasional breeder within our limits we notice it here; also because, as we have said, the eggs are so similar to those of the greenfinch although, in a series, they are frequently rather larger.

But lest our readers should fancy their greenfinches to be crossbills, we would just mention that the crossbill is a very early breeder, and has eggs in February and March, long before any greenfinches have thought of such things. For the rest, the females of each are sufficiently alike when merely seen on a tree by some rustic, and if any yokel should tell you early in March that he has found a “green linnet’s” nest, we should advise you to go with him to the spot and see for yourself. But we do not expect you will be frequently disturbed by such reports: a similar slice of good luck only happened to ourselves once, when a lad brought in a nest with four eggs, which he said were “bullfinch’s, as he had seen the cock bird.” No doubt he had, the cock crossbill, which is all red, for besides being utterly unlike real bullfinches’ eggs, the very idea of that bird’s nesting in the first half of the month of March was quite preposterous. One of these eggs is before us as we write, and is precisely similar to authentic Scotch and Swedish specimens around it.

The common Brown Linnet (F. cornubiana) may be found nesting on every furze-clad common or rough unenclosed land, besides frequenting in lesser numbers the hedges and outskirts of enclosures. The nest is frequently quite low down in small bushes and ling, but the furze-bushes are after all the favourite situation.

The ground colour of the eggs is generally much bluer than those of the greenfinch, the spots more minute, and the eggs as a rule are much smaller. The nest is sometimes rather pretty and warmly lined, and the eggs are usually five in number.

There is another linnet, well known as a cage-bird, and secured in large numbers by the bird-catchers, but—which is only to be found breeding in any abundance in the northern districts. Increased attention of late years has, however, shown that the Lesser Redpoll (F. linnaria) may be found if carefully looked for in most of those counties of England which contain any wild commons and uncultivated land.

It is a late breeder, and the nest is an exquisite structure of roots, moss, and dried grass, with an outer lining of hair, the interior being composed of white catkin. We well remember unpacking a nest sent by a friend from the “north country,” and taking the catkin lining at first glance for some cotton-wool placed underneath the eggs to prevent them from breaking. The eggs are of a beautiful bluish ground spotted and blotched with reddish and purplish black.

Thanks to the bird-catchers, the gay plumaged Goldfinch (F. carduelis) is yearly becoming more rare throughout the country, especially in the neighbourhood of the metropolis and larger towns. Its nest, even more compact and beautiful than that of the chaffinch, is generally placed in the fork of some fruit-tree, often an apple or pear-tree, although other sites, such as bushes, and even hedges, are sometimes selected. There can be no mistaking the exquisite structure, generally lined with thistle-down, the outside made of moss, fir-spines, and lichens, although the latter are not used to nearly the same extent as by the chaffinch. The eggs are somewhat like miniature greenfinches’, but the spots are darker as a rule. It is not an early breeder, and we never found the nest much before the middle of May.

One of the latest of the finches is the well-known crimson-breasted Bullfinch (Pyrrhula vulgaris), which constructs its nest towards the end of May or beginning of June, generally in some blackthorn or other low tree away from habitations. We have, however, found it nesting in gardens and orchards, but as a rule it seeks the woodlands during the breeding season.

The sparrow principally composed of dry roots and hair, with some moss, and a basis of sticks—not a very neat affair; and the eggs have a so decidedly blue ground colour that they can easily be recognised: they are spotted and zoned with purple-black.

The Hawfinch (Coccothraustes vulgaris) is the largest of our British finches, and from its tremendous bill alone the bird itself is quite unmistakable. It is one of those species which has been steadily on the increase in numbers, and is now to be found in almost all the southern and central counties, whilst in former days it was a very rare bird, and its principal, indeed
almost its only known breeding haunts were in Middlesex and Essex, principally about Epping and Hainault Forests, where there were numbers of hornbeam trees, to which this bird is very partial. Living as we did some years ago on the confines of those woods, the hawfinch was never a rare bird to us, and we have taken as many nests as most people.

The nest is sometimes a very shallow and flimsy structure, consisting of a platform of small sticks lined with roots, and adorned with pieces of lichen; but we have found some really beautiful specimens, the white lichen being used in great profusion. The slightest nest we ever saw was a couple of years ago in Surrey, in a wild crab-apple; there was next to no platform, and the nearest wisp of dried roots, on which three eggs were laid. We never found more than four eggs, though we believe five are sometimes laid, and from the first week in May they may be looked for. They are of a bluish-grey and sometimes of a yellowish clay ground colour, streaked and blotched with ash and black, their scrollings sometimes approaching those of the Buntings.

We now come to the ubiquitous House-Sparrow (Passer domesticus), and it is difficult to say where it does not make its nest. How it occupies martins’ nests, and the story of how the martins united against an aggressive pair, and fairly plastered them up alive, has been told a score of times: we do not believe the story a whit, but it is in print, so it must be true.

The nests, which are situated in trees, are generally well constructed, domed, and warmly lined with feathers, the eggs being of an ash-grey, blotched and streaked with darker colour; some varieties are very similar to those of the pied wagtail. As a rule it breeds in the spring, like other respectable birds, but practically some nests may be found during a large portion of the year.

It is what the author of “Lothair” calls a social parasite, and having been introduced, we cannot say, into the United States, and also into our Australian and New Zealand colonies, it has adapted itself to circumstances, and is at present increasing and multiplying at a rate which promises to make it a nuisance.

Our other British sparrow is a far rarer and less obtrusive bird—the Tree-Sparrow (P. montanus). In some counties, especially in the north, and also in Cambridgeshire, we can state from experience that it is extremely abundant, and in few is it altogether absent, although from its general resemblance to the preceding species it often passes unrecognised.

It may, however, be distinguished by its smaller size, coffee-brown head, and black patch on the white cheeks, which are plain in the house-sparrow; the sexes, also, are alike, except in brightness of colour, whereas the female of the house-sparrow is different in plumage from the male, as every one knows. There are other points of distinction, but the above will be ample for recognition.

The construction of the nests of both species is very similar, but the tree-sparrow, when nesting in the thatch of barns and outhouses, makes the holes for entrance from the outside; it is also very partial to holes of pollards and other trees, and we have repeatedly found it occupying the hollows excavated by the sand-martins. The eggs are of a firm and glossy texture, smaller than those of the house-sparrow, and, as a rule, more deeply coloured, although there is a good deal of variation.

It is now time to consider a group which is placed by systematists between the larks and the finches—namely, the Buntings. The largest of these is the common or Corn Bunting (Emberiza citrinella), frequently known as the “bunting lark” by country people, from the colour of its plumage, its general appearance resembling the sky-lark. It is, however, a larger and heavier bird, and may easily be recognised even on the wing by its laboured and dipping flight, very different from the light soaring motion of the lark. Of course, there are other strong points of difference for a naturalist, but we are writing for those who are not yet experienced, and who, perhaps, have never compared the birds in their hands.

The nest is placed on the ground, either in the herbage of some bank, or in some corn or clover-field, rarely in a grass meadow; it is a compact structure of bents and roots, and the eggs, four or five in number, are of a white ground, suffused with a vinous tinge, sometimes very richly so, and blotched with darker markings and scroll, very much as if they had been written on with red and black ink, and then wetted, so that the colours had run together. In some the zone of the larger end is very distinct; and altogether they are amongst the handsomest eggs to be found in a country ramble.

The best known of the family is certainly the Yellowhammer (E. citrinella), whose curiously-scarled eggs may be found amongst the bird-nesting trophies of every village lad. The name, we may observe, is generally written “yellow-hammer,” but there is no excuse for the cockney insertion of the h, the word being old Saxon, and retained in modern German.

The nest is usually concealed amongst the herbage of some bank or hedge-row, and we have occasionally found it in a bush as much as three feet above the ground; but this is unusual. The grey-white eggs, vinous-tinted and streaked with black, like marks made by flies just escaped from the inkstand, are familiar to any one of country experience, and are certain to be amongst the spoils of the very first season. The first nest is made in May, and fresh eggs may be found until the first week in July.

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ROUND GAMES.

By James Mason.

COUNTING-OUT RHYMES—THE GRASSHOPPER AND THE ANTS—I LOVE MY LOVE WITH AN A—THUS SAYS THE GRAND MUFTI—SIMON SAYS—HUNT THE RING.

THE first game for the eleventh evening of the Round Game Club had been decided on. It was to be “The Grasshopper and the Ants.”

David was about to take the post of Grasshopper, and sacrifice himself for the general good, when Tom interfered.

“What is the use of your taking all the hard work on your own shoulders?” he said; “let us count out somebody to be the Grasshopper. Stand in a ring,” he added, addressing all who were present. Then he began to count out by means of the following rhyme:

“Hickory—Dickory—Dock—
The mouse ran up the clock—
The clock struck one—
The mouse was gone—
O—u—t spells our!”

At each phrase of the rhyme he pointed with his forefinger
to one of the players in the ring. The last phrase fell to
the lot of Maggie. Fate had fixed on her to be the Grass-
hopper.

"Now," said Maggie, "if you have finished your discussion,
we shall begin The Grasshopper and the Ants. You will be
so kind, ladies and gentlemen, as to imagine that you are a
colony of industrious ants, and that I am a poor, unprofitable
grasshopper."

Maggie then wrote down on a piece of paper the name
of a particular kind of grain. She let no one see what she
had written, and, advancing to the ants, made a profound
bow, and said, in a supplicating tone, "My dear friends and
neighbours, I am very hungry, and I know how kind and hospita-
ble you are; would any of you lend me a little provision of
some kind to help me through the winter?" Then she turned
to the Princess—"Your goodness of heart is well known; I am
sure you will aid me with a trifle."

"I have nothing," said the Princess, "but a grain of
wheat."

"Thank you; wheat does not agree with me. And you"—
Maggie addressed herself to David—"have you nothing better
that you can offer?"

"I can spare a grain of barley," said David.

"I do not care for it."

From other players Maggie, the hungry Grasshopper, got in
turn the offer of apple-seeds, grains of Indian corn, canary-seed,
mustard-seed, grasshopper, and many other catables of the same
sort. But none of them were to her mind, that is to say no seed
mentioned happened to correspond with the name written on her
piece of paper.

"I implore you, of your generosity," she said to John Fer-
gusson, "to grant me relief!"

"I have some clover-seed at your service," said John.

"Thank you; I will take it with pleasure, and may Providence
reward you!" and Maggie, rejoiced at having reached the end
of her task, showed that "clover-seed" was what was written
on the paper.

John Ferguson, in accordance with the rules of the game,
had to pay a forfeit and become Grasshopper. Maggie ceased
playing the grasshopper part, and became an ant.

The second stage of the game was now begun.

"Neighbours," said John Ferguson, "I have made a very
hearty meal, thanks to the kindness of one of you. A little
exercise would now be a good thing; I should like a dance.
Now, what dance would you recommend?" Here he wrote down
the name of a dance, as Maggie had done with the name of
the grain.

It was suggested that he might do well to dance a minuet, a
polka, a waltz, a quadrille, the lancers, a reel, a schottische,
and the Highland fling; but John shook his head as each was
named, and respectfully declined shaking his light fantastic
feet in any of them.

"You might dance a hornpipe," said Kate.

"The very thing!" exclaimed he, showing his paper, and,
executing two or three preliminary steps, he danced over to
where Kate sat, took that young lady by the hand, pulled her
to the centre of the room, and said, "You are Grasshopper
now!"

Kate, after paying a forfeit, began the third stage of the
game. "I, as Grasshopper be it understood," said she, "in-
tend to dance; but how can one dance without music? What
musical instrument do you think should be played?" She
wrote down the name of one herself.

The violin, the trombone, the French fiddle, the guitar, the
bassoon, the harp, the flute, the kettledrum, the violoncello,
the street-organ, the flageolet, the clarionet—all these were
suggested, but the suggestions were treated with scorn and
contempt.

"The trombone," said the Reporter.

"You must pay a forfeit," said Kate; "that instrument
has been named before; Alice named it."

The forfeit was paid.

"The piano is as good an instrument for dancing to as you
could wish," remarked the Laughing Hydra.

The piano was what Alice had written down, so the Laughing
Hydra became Grasshopper, and the game entered on its fourth
stage.

"I have had enough of dancing," yawned the Laughing
Hydra; "and am now rather tired. I should like a nap. Tell
me, my friends, what sort of a couch I should sleep on."

One suggested a couch of moss; another, one of rose-leaves;
another, one of hay; a fourth, one of sand; a fifth, one of
straw.

The couch of straw was Tom's idea. It corresponded to
what the Laughing Hydra had written.

When Tom had taken his place as Grasshopper, "I would
sleep with great pleasure," he said, "were it not that I am
afraid of being pounced down on by some hungry bird. What
bird do you think is my greatest enemy?"

"The hawk? the raven? the pigeon? the swallow? the
blackbird? the owl? the lark?" No; it was not one of these.
Half a dozen more birds were named; then Emily named
the robin.

"Yes," said Tom, "it is the robin; and now the game of
The Grasshopper and the Ants is at an end."

"Suppose," said Arabella, "that we had been a long time
at each round of naming what the Grasshopper had written on
his piece of paper, would he have had to go on and on, putting
questions to the company till some one named it?"

"That would depend altogether," answered David, "like so
many of the other little peculiarities of these round games,
on the mutual understanding of the players. Sometimes, in
all but the last stage of the game, one round is considered
enough. If the grain, or whatever it is, is not discovered
then, the Grasshopper pays a forfeit, and goes on to the next
question."

"Well, let us proceed," said the Princess, "to the next
game. It is to be, I Love My Love with an A."

"Is it?" remarked Notes-and-Queries; "don't you think
it would be absurd for me to talk of loving my love with an A,
or B, or any other letter?"

"Think of the public," said the Reporter; "when we began
we agreed to play at everything, and if you object to playing
this game our collection will be sadly incomplete."

"Remember that the eyes of Europe are upon us," said the
Laughing Hydra, "and that we must do everything that is
expected."

"Play away then," said Notes-and-Queries; "I withdraw
my objection."

"I am to begin," said David. "Now, you must clearly
understand that each player is to take a letter in turn, and that,
for every mistake or hesitation, a forfeit must be paid."
David cleared his throat here, and went on: "I love my love with an
A, because she is Amiable; I hate her with an A, because she
is Affected; she comes from Auntermunchy, she lives on
Anchovies and Ale, her name is Angelica, and I shall give her
an Amethyst for a keepsake."

Kate began: "I love my love with a B, because he is Bene-
vvolent; I hate him with a B, because he is Bankrupt; he
comes from Babylon, he lives on Berries and Bacon, his
name is Benjamin, and I shall give him a Beehive for a keepsake."

It was now Tom's turn. "I love my love," he said, "with a C, because she is Content; I hate her with a B, because she is Cunning; she comes from Calabria, she lives on Cake and Cabbage, her name is Clara, and I shall give her a Cake for a keepsake."

"As for me," said Arabella, "I love my love with a D, because he is Domestic; I hate him with a D, because he is Domineering; he comes from Damascus, he lives upon Ducks and Dates, his name is Daniel, and I shall give him a Dagger for a keepsake."

John Ferguson was the next. "I love my love with an E, because she is Earnest; I hate her with an E, because she is Envious; she comes from Egypt, she lives upon Eggs and—Eggs and—and—"

"Forfeit!" exclaimed David.

So the game went on, down the alphabet, producing much fun and—especially in the difficult letters—many forfeits, in addition to that of John's. And we came to the conclusion that it was a good amusement for giving one a command of words—quite as good, indeed, in this way as any game we had ever played at.

_Thus says the Grand Mufti_ was what we turned our attention to next.

"Who is to be the Grand Mufti?" asked Emily.

It was speedily settled that it was to be the Laughing Hyena. He was the one best qualified for the part, for he was the most active of us, being continually in motion—arms, head, eyes, and all. The fan of the game consisted in the Grand Mufti making what motions and grimaces he pleased, and we had to imitate them exactly, a forfeit being required for every mistake or omission. I may also observe that it was necessary for the Grand Mufti to prefix each movement with the words, "_Thus says the Grand Mufti._" If he did not say precisely these words, or if he omitted to speak at all, his action was not attended to.

_Thus says the Grand Mufti_, said the Laughing Hyena, and he rose from his chair. Every one stood up with him.

_Thus says the Grand Mufti_, and the Laughing Hyena heaved a deep sigh. So did we.

_Thus says the Grand Mufti_, and the Laughing Hyena put his arms akimbo. We followed his example.

_So says the Grand Mufti._ Our leader here stood on one foot. We all remained as we were, with the exception of Alice and Tom, who had to pay forfeits.

The changes of position and the other actions of the Grand Mufti now came thick and fast. He laid his hand on his heart, he sneezed, he laughed, he sat down, he rose up again, he twirled his imaginary moustaches, he shook his head, he shut one eye, he nodded, he pointed with his finger, he pulled long faces, he coughed, he did a thousand and one other things. And sometimes he made a movement without saying anything, and at other times he said _"So says the Grand Mufti._" and somebody was always sure to be caught in the trap.

At last the Laughing Hyena, saying _"Thus says the Grand Mufti._" jumped on a chair. There was no help for it; we had all to do the same.

_Thus says the Grand Mufti._ and at once he began to open and shut his mouth like a pair of nutcrackers, to whirl his left arm round like a windmill, and to strike out vigorously with his right. It was only he who could do it. Any one of us could have accomplished one of these motions singly, but all three at once! that was beyond our power.

The Laughing Hyena hopped down from his perch. "You must all pay forfeits," he said; "and the game is finished."

Tom here said that he knew a game very like the Grand Mufti. _They call it Simon Says,"_ he told us.

"Let us play at it," said Alice; "how does it begin?"

"In this way. You all sit down—yes, just where you are, and I—I am Simon, you know—stand here. I clench my fists so, keeping the thumbs pointing upwards. You are all to do the same. Now, whenever I say Simon says do this or that, you must obey me. Are you all ready to begin?"

"Yes," said David; "go on."

"Simon says turn down," cried Tom, and he turned down his thumbs. We immediately turned down our thumbs too.

"Simon says turn up. Tom turned up his thumbs, and we turned up ours.

These two movements he went on repeating about a dozen times, till they had become a sort of habit.

"Turn down," said Tom. Five of us had to pay forfeits for obeying this order, it not having been preface by the necessary words.

_"Simon says turn up,"_ Tom exclaimed, making a mistake himself, for our thumbs were already up. For this blunder he had to pay a forfeit, and was deposed from his post of leader.

Kate took his place, and she held the office of Simon till she fell into a mistake by moving her own hands instead of keeping them quite still, when she said "turn down," omitting the "Simon says."

Emily looked. "It isn't there," she said; "oh, how shall we manage?"

_"Will a wedding-ring do?"_ said Notes-and-Queries; "I have one on this bunch of seals; it belonged to my great-great-grandmother."

_"Well,"_ said David, "we must make it do for want of a better; but it is too small. I thought I had put a brass ring, just the right size, on the mantelpiece, but I must have mislaid it.

We all sat in a circle, and round and round the circle a string was passed. Every one took hold of the string with his hands, the palms being downward. On the string was placed Notes-and-Queries' great-great-grandmother's wedding-ring—a heavy and handsome relic of antiquity. Maggie was appointed hunter, and took up her station in the centre of the circle.

The ring was slipped along from hand to hand, and whilst all hands were moving it was the hunter's business to find out where it was. Maggie stood like a cat watching a mouse, and sprang now to one player and now to another, thinking that he held the object of her search. At last—after much laughing and much teasing on our part (for many a player often made believe that he had the ring when it was at the other side of the circle) Maggie was successful, and caught the wedding-ring in David's hands. David now became hunter. After him the chase was taken up by the Princess. And after that—

And after that we spoke of going home. Then all who had paid forfeits did pence. After that we spoke again about going home. And an hour after that we really did turn out into the night!
GOLF.

By Robert Howie Smith.

THE HISTORY OF THE GAME (continued).

It is utterly impossible to fix, with anything approaching to accuracy, the period about which golfers banded themselves together for the systematic pursuit of the pastime, under codified laws. The institution of the Honourable Company of Edinburgh Golfers is said "to be lost in antiquity; but the first of a regular series of meetings, signed by President Forbes, of Culboden, bears date 1744." That great patriot and judge was so enamoured of the game, that he engaged in it enthusiastically both in and out of season, having been known to have a round or two of Leith Links when they were covered with snow. Although only incorporated by a magisterial charter at the beginning of this century, the Edinburgh Burgess Society dates from 1735; while the Bruntsfield Links Club was organised in 1761, and the Crail Society in 1786. With the exception of the latter, these are all in prosperous and vigorous operation. But towering above all kindred associations stands the Royal and Ancient Club of St. Andrews. Its birth-year is variously stated as 1750 and 1754, and down to the present day it has inscribed on its books the name of almost every golfer of repute. With a membership of 1,100, comprising the nobility and gentry, all the learned professions, celebrities in arts, sciences, and letters, the army and navy, etc., its influence is paramount in everything affecting the interests of the craft. Always exercised with enlightened discretion, that influence has been weighty for good not only in conserving but in extending the game on the best basis. The old cathedral city on the shores of Fife has long been the Mecca of golfers; and there are few who deem their curriculum complete until they have graduated, with or without honours, at the "Queen of Links."

The "Manuscript," published in 1857, gave a list of Scottish clubs, which numbered only nineteen. Now there are nearer fifty in robust activity. In an interesting brochure, which embodies a mass of floating gossip about golf and golfers, issued in 1863, the compiler ventures the statement that the game "is comparatively unknown in the west of Scotland." His obliviousness to the existence of the Prestwick Club is all the more extraordinary that the championship had then been played for under its auspices and over its green for three years. Considering that it was founded only in 1851 by the late Earl of Eglinton, this society has been creditably conspicuous in encouraging the art which has since spread in the vicinity, two promising clubs having of late years been established at Girvan, in South Ayrshire, and in Glasgow, where the Queen's Park has been secured as the scene of operations. Crossing the border, we find that golf had made its way into England at a very early period. The Royal Blackheath Club claims no mean history, stretching as far back as 1698. Of course the natural inference is that it owed its origin to the Scottish residents in London, who did not wish to leave the national pastime behind them on their native links. Their ranks have been recruited from time to time by their Southern brethren; and such apt pupils have the tyrants become, that in an international match recently, they discomfited their teachers. Yet it was long before the game was acclimatised here. A number of officers of the Scots Greys, stationed at Manchester in 1815, successfully introduced it on Kersal Moor, where it has been uninterruptedly played ever since; but the club is limited to a dozen members. The greatest accession that has been made to the roll for many years is the Royal North Devon and West of England, which, dating from 1864, is already showing symptoms of an energy and a liberality which quite eclipse some of the best and the oldest sister associations north of the Tweed. The Burrows of Northam are exceptionally well adapted for golfing purposes, and are being annually frequented by increasing numbers. Wimbledon, too, can turn out a strong contingent, the London Scottish Regiment of Volunteers having, in 1885, formed a club for practice on the common during the months that it is not monopolised by the National Rifle Association. Powerful societies have also sprang up at Hoylake near Liverpool, and at Almouth in Northumberland; while two are growing at Putney, and Crookham, Berkshire. It will thus be seen that, with such a widely-ranged organisation, and the numerous medals, cups, crosses, and other prizes periodically offered for competition, golf has had an impetus imparted to it which renders its future radiant with hope.

Not the least interesting feature in the development of the art is the number of professional practitioners to whom it affords honourable and lucrative employment. The father of this body was the late Allan Robertson, whose memory is respected almost as much for his personal qualities as for his golfing ability. To show that his successors have made no great strides in advance of the veteran, none of them have yet excelled his feat of holing St. Andrews Links in seventy-nine strokes—although they have had seventeen years to try—and only two of them (Morris senior and Morris junior) have ever scored that minimum. A glance over the list of those who gain their livelihood on or from the links favours the theory propounded by Mr. Galton, that athletic prowess runs in families. It is even more striking here than in his tabulated pedigree of Tyne oarsmen. Thus we have the Morriesses (5)—the father, his two sons (St. Andrew's), his brother George (Carnoustie), and his nephew John (Hoylake); the brothers W. Dunn (Leith) and J. Dunn (North Berwick), with Tom Dunn (Wimbledon), son of the former; the brothers W. Park and D. Park (Musselburgh); and the brothers A. and T. Strath (St. Andrews). Besides these "clannish" groups, the principal professionals of the day are R. Kirk, Blackheath; W. Dow, R. Ferguson, and A. Greig, Musselburgh; R. Dow, Montrose; R. Andrew and W. Macdonald, Perth; C. Hunter, Prestwick; J. Anderson, J. Fenton, and T. Kidd, St. Andrews; and J. Allan, "Westward Ho!" All of them have distinguished themselves on many a well-fought field, and for the younger worthies of the order there are more tempting triumphs in store; while two are

Recognising the desirability of providing some annual criterion to test the comparative merits of professional golfers, the Prestwick Club, with praiseworthy enthusiasm and liberality, subscribed in 1829 for a challenge belt, which should be open for competition to the world, and held permanently by the player who should carry it off three years in succession. The trophy thus offered consisted of red morocco leather, richly ornamented with massive silver plates, all bearing appropriate devices illustrative of the game. Its cost was thirty guineas. I remember well that it was then deemed very improbable that the greatest expert in the art could credit himself with the championship and the belt three years running. The sequel demonstrates the precipitancy and the presumption of that prophecy, begotten, no doubt, by the "wish being father to the thought." For a long time the contest was reduced to
an annual match between the two most skilful professionals who have wielded a club for two generations. In 1869, W. Park, of Musselburgh, secured the gordon in 174 strokes (three rounds of Prestwick Links, or 36 holes), his great rival, Tom Morris sen., being second in 178. Next year the latter won, in 163, Park taking 167. In 1862, Morris was again first, in 163, and Park second, in 178. The following September saw the tables turned, when Park once more asserted his supremacy in 168 strokes, Morris treading closely on his heels, in 170. The autumn meeting of 1864 put Morris in the front with 167, his opponent having to content himself with the fourth place in ten strokes more—177. In 1865, however, the spell was broken by the late Andrew Strath, who won the championship with the lowest score at which it had ever been achieved—162 strokes.

Again Park bore away the palm in 1866, having completed the three rounds in 169 strokes, Morris being fourth, in 178; but when they next encountered each other the Musselburgh hero had to lower his flag, Morris scoring 170 against Park’s 172. With this ends the triumph of the old school. Another generation arose that not only remembered Joseph, but remembered Joseph too well. Lot the facts speak for themselves. The crowning incident in the contest of 1868 was the neck-and-neck race between old and young Tom Morris for the place of honour. In the last round for the championship there was only one stroke between the father and son, but the former never succeeded in reducing the lead. Tom Morris jun. stood first in 154 strokes, and Tom Morris sen. second in 157. That a striping not then eighteen years of age should have carried off the highest reward of golfing skill and science in the severest strokes in which it was ever won (making allowance for the alteration of the course), was a marvel in the sporting world which has never been paralleled. The old man greeted his boy’s success as cordially as, if not more so than, if the congratulations had been showered upon himself. The year 1869 witnessed a repetition of the same achievement, when young Morris took premier honours in 157 strokes, his father being credited with only 196. Without being a tipster, I then predicted that the youth would become the permanent custodian of the challenge belt, unless it were wrested from him by some of his more experienced contemporaries, which I did not believe probable. It was not. When the struggle came, in the autumn of 1870, Morris jun. redeemed the promise of his antecedents by distancing all competitors with the splendid score of 149 (the best on record), while his father registered 162. Having thus fulfilled the original conditions by carrying off the belt three times consecutively, it became his absolute property; and this annual trial of professional prowess ceased, at least in so far as the donors were concerned. But the laudable example they had set was happily followed, and a prize similar in purpose has since been got up, on understanding that it is to be played for in rotation over the greens of Prestwick, St. Andrews, and Musselburgh. It has taken the form of a silver cup, which is inalienable, as it can never pass into the possession of the winner, but he receives compensation in pecuniary accompaniments and a medal to commemorate his victory. The “glorious uncertainty of the law” finds its twin-brother in the “glorious uncertainty” of golf, seeing that the laureled youth has just had to succumb to a promising outsider, named Tom Kidd, who made two circuits of St. Andrews links 36 holes, in 170 strokes, Morris jun. scoring 183. The difference of the greens renders any comparison difficult; but, without derogating from the merits of the new luminary, this is by no means first-class play, and he must improve considerably upon this form if he be ambitious of retaining the proud title with which he has been so fortuitously crowned, as the Champion of 1873.

Two years prior to the institution of the belt, the first golf tournament for amateurs was held at St. Andrews, where, in July, 1857, thirteen of the clubs of the kingdom were pitted against each other, all being represented by two “crack” members. At the close of three days’ competition victory lay between Blackheath and St. Andrew’s in the final tie; the former defeating their opponents by seven holes, and being awarded a handsome silver cup. In 1858 the match was arranged on a different and a better principle, the competitors being drawn in pairs, the beaten players retiring at the end of the rounds which had proved fatal to their pretensions. Twenty-eight gentlemen entered the lists from all parts of the empire, and the two who remained in for the closing struggle were Mr. R. Chambers Jun., Edinburgh, and Mr. D. Wallace, Leven, Fifeshire. A more exciting tourney has never been witnessed, the candidates for the blue ribbon of the links being all even and only one hole to play. They had previously “tied” twice, and might do so again. But no! Mr. Chambers secured the home hole, and by a single stroke was declared champion. The following year the course was changed to Bruntfield, Edinburgh, where the thirty-five entrants were divided into three classes—the first starting from the scratch, the second receiving twelve strokes of odds, and the third twenty. The result so little justified the wisdom of handicapping in such contests that the experiment has never been renewed; indeed, the tournaments have fallen into desuetude, except on a merely local scale.

In this connection I may add that a new challenge trophy for amateurs has recently been presented and competed for at “Westward Ho!” According all credit to its spirited promoters, it is and must always be more nominal than national. Doubtless it will constitute another attraction to the delectable Barrows of Northam, but it can never entitle the holder to be recognised, in the broad sense, as the champion of the year. The arena, inviting though it be, is too remote and inaccessible to be entered by others than those who can bear the tax on their time involved in a long journey and visit to North Devon; and therefore there is little prospect of the struggle being so widely representative as to confer proportionate distinction upon the successful competitor. Nevertheless, the inauguration of such a contest in such a quarter is a gratifying proof of how deeply the love of golf has struck its roots into English soil.

THE AQUARIUM.

By W. A. Lloyd.

COLLECTING VEGETATION—SUCCESS—OLD IDEAS ON AQUARIA.

Now while in the main this is truly and well expressed, we have no direct evidence, at least I have not met with it, that the plants increase their oxygenation in proportion as it is needed. But it is certain that the coniferous growths which come by the action of light from invisible spores in the water are, for aquarium purposes, more useful than any other forms of vegetation, and, moreover, there are very many plants, cryptogamic and others,
THE AQUARIUM.

which will not flourish at all when placed in aquaria ready grown.

But, before entering upon that, I should like to say something about a subject respecting which I have for the last eighteen years received more letters and had more conversations than upon any other: I mean the use of scavengers in aquaria, both marine and fresh-water. By scavengers are meant certain animals to remove what is called dirt, or to prevent its formation, or to hinder the excessive growth of vegetation. The earliest instance known to me of the application of the word "scavenger" in the sense here used, or rather as the removal by animals, of impurities from water generally, occurs in 1830, when Mr. J. Gwyn Jeffreys so employed it in a scientific paper, though Liensa, long before, gives the specific name "depositor" or "cleaner," to a certain swimming crab. The late Mr. Cornelius Varley, before 1841, employed pond-snails as cleaners of certain aquatic plants he kept for microscopic purposes, and in the year last named they were so used, and there exists printed evidence to prove it.

In 1840 Warington employed them for the same purpose, and he states that he successfully introduced them to consume the older and decaying leaves of Valisneria, as well as to remove the growth of conifex which came on the sides and other parts of his vessels. Now, quite independently of the fact that if conifex thus grew without being visibly introduced, and that, therefore, no Valisneria was wanted at all for oxygenating purposes, Warington's results never agreed with mine, for I have never been able to obtain any species of British pond-snail as Limnaeus, Planorbis, Physa, or Ancylus, which, if they eat much food at all, were not indiscriminate in their appetite, and devoured what they were not required to eat (as healthy and growing Valisneria), and did not consume what was intended for their consumption. The same remarks apply to such marine plant-eating mollusks as the periwinkle (Littorina) and the top (Trochus), when attempted to be employed for this purpose, with the additional evil of the periwinkle's habit being to spend a great portion of its time out of water, and of course not feeding on scavenging, and that the top is of delicate organisation, and usually dies (in a streamless aquarium) instead of doing any work.

The ear-shell (Haliotis), named in a foot-note, p. 218, is almost the really good and industrious remover of vegetation, and it acts to work with a constant vigour and appearance of intelligence which is quite surprising. This attribute was accidentally discovered by a lady, who had one in my old vivarium jar (p. 57, Vol. I.), and she found that its sides were kept clear of excessive plant growth, while other jars standing by it in the same window were much overgrown. This was in 1820, in London; and the same individual Haliotis kept the same jar in good condition in Hamburg till 1867, when it died, and its shell is now carefully preserved. This mollusk has bred in the London Zoological Gardens, so doubt because it constantly fed on the plants continuously urged into growth by constant light. But it, too, is not particular as to its kind of food, and it devours what one most wishes to preserve. Of course all the zoophagous creatures—as crabs, lobsters, shrimps, prawns, and most fishes—assist in removing by devouring any dead animal matter which may be present, and thus preserve purity by converting dead into living organic matter; and there are some creatures, as the carps and the grey mullets among fishes, and also some of the marine crabs, as Pisc, which consume both animal and vegetable substances.

Bivalved mollusks, too, are the swan-musul in the fresh-water series, and the oyster and common edible mussel among the marine ones, also assist in maintaining the purity of water in aquaria. These creatures for the most part move about very slowly in their adult state, and in some instances, as Ostrea Amomi, and others, they never move from one spot during all their lives after they have once settled down; hence, if they cannot pursue their food, it must be brought to them, and accordingly they open their shells a little, and from between them they protrude two tubes, which are sometimes long and sometimes short, or, as in the oyster, mere slits not appearing outside the shells. Into one of these tubes or openings, a current of water flows (being actuated by organs termed cilia), and from the other tube or opening the same water is ejected, and as it passes through the creature's body, it not only aerates its blood by bringing fresh surfaces of oxygenated water with it, but all edible particles floating in the water are arrested and consumed, and consequently the water is thus deprived of such particles, and made so much the clearer; and even what is not arrested by this process is consolidated, and so made less diffusible in the fluid. Woodward, Gwyn Jeffreys, and Gosse, all mention this process, which indeed is carried on by all sedentary creatures feeding on fluid food in the same way as, e.g., Anactis, and the various tubicolous worms, as Serpula and Sabella.

It may, however, be rightly doubted whether these fluid feeders (the term is a convenient one) really do a greatly appreciable amount of purifying service in large bulbs of water. I believe if one could separate the work they do in this manner from all other sources of purification, it would be found to be very inconsiderable. To reason out the whole question fully would take several printed pages, but this is the conclusion I have arrived at from many years' experience. But there is another mode in which animals clear water when it is made turbid from the presence of insoluble carbonate of lime (chalk) in suspension, namely, the creatures give out by their breathing an excess of carbon, and so convert the insoluble chalk (carbonate) into a soluble and therefore clear because invisible bicarbonate of lime.

In inland parts of the Continent, as Hamburg, Berlin, Hanover, Vienna, and elsewhere, sea-water for aquaria has been obtained in a cloudy state, and the curators of aquaria in such places get to read in all aquarium books that oysters will clear such water by consuming as food the causes of turbidity, and as living oysters can be purchased in such places, they naturally are placed in aquaria as depurators, and when they as naturally clear the water by giving out much carbon, and while they live because of their great hardness, the real source of their purifying operation has not been suspected, or was not till lately. But of course, when once oysters have so cleared chalky water, they should be removed, or they will render it turbid again. In fact, all or any animals, and even all forms of even dead animal matter (as food, etc.) assist in thus purifying water—only of course the greater the aptitude to decay when dead, or the greater the liability of the animal to die when alive, the more caution should be used in the introduction of them. But oysters are convenient because they are hardy, and they are only objectionable when suffered to remain in aquaria longer than is necessary, and when they are, as in some establishments, scattered about by thousands, so as to make the tanks appear as paved with them, in a monotonous and ugly manner.

In summing up the whole question of the employment of scavengers in aquaria, and while admitting that all creatures by their consumption of food assist in keeping the whole world (both in and out of aquaria) free from "mather out of its place," usually termed "dirt," yet we should in our management of aquaria endeavour to do with as few such scavengers as possible. Thus, by regulating light we can control the growth of vegetation so that we may get just enough, and not much
more; and by being cautious as to the introduction of animals in right numbers and of proper kinds and sizes, and as to feeding them so that they may get enough, but not so much that they leave a great deal undevoured. If we do this, and, in addition, if we adjust the amount of aeration, so that the oxygen (which the water readily absorbs) may attack and render harmless the organic matters—animal and vegetable—the presence of which is unavoidable in large aquariums, then, and then only, can the scavengers be dispensed with to a very great extent, and they can be treated, as all inhabitants of aquaria should be treated, as guests. But, otherwise, the number of scavenging servants employed will wrongly far outnumber the guests, and eventually will be treated the untidiness which is wished to be avoided.

In no large or small aquaria I have ever made or managed, have I been so successful as in the one now in the Crystal Palace. The machinery works so continuously and so efficiently, day and night, and the light is admitted, and the animal and vegetable food is introduced, in such an exact manner, that every tank is not only clear and bright, but no manual cleaning is ever necessary.

It must be understood, of course, that the forms and proportions of the vessels shown at pages 375, 376, and 377 are not absolutely necessary to be preserved, they merely are the best and simplest shapes I know of for aquaria with curved sides. For example, the gold-fish globes represented at pages 189, 245, and 246 never fly, as far as my experience goes, and do not crack from unknown causes (as some other kinds of glasses do occasionally); and this is probably because they are made and annealed purposely to contain water. Only, if they are filled too full, their air-absorbing surfaces of water decreases rapidly (see page 190), and if one only half fills them, they leave an incompleteness of aspect which is unsatisfactory to a neat-handed student.

Perhaps the glass vessels which hold the greatest amount of water in the most advantageous manner, and which cost the least money, are "propagating glasses," used by horticulturists to invert over plants which they wish to force quickly, or to protect, by converting them into little conservatories.

The knob at the top, which, when thus employed terrestrially, serves as a handle to the glass, is, when employed aquarially, inserted in a hole in the centre of a turned wooden stand, and when provided with a glass cover, a very neat little aquarium is the result. Sometimes the shape may be varied.

From what I have already said (pp. 246, 247, and elsewhere) it will be seen that before animals are put into an aquarium, living and growing vegetation must be present. At the beginning of the world, the very first animal ever created, even supposing it to have been wholly a carnivorous creature, could never have existed unless the very first plant ever created had preceded that animal. Why? Because only the plant could decarbonise the air for the animal, and thus make it pure.

Consequently, when we set up an aquarium, we follow Nature; and we not only do so from choice—we must.

Well, then, twenty-six years ago, when we have the first written and printed record of an aquarium having been arranged on the compensating principle between plants and animals by Mrs. Thynne, with a previously-stated avowed purpose beforehand (that is a most special point, beforehand), it was the custom to send to the sea for such plants, as that lady did (page 189); and we have seen also (page 189), how the two next experimenters, Gosse and Warrington, did precisely the same thing. It was quite natural that these pioneers should have done thus; and indeed it would have been odd had they done otherwise, for, wanting to establish an ocean garden, they obtained ocean plants for it, just the same as they would have done had they wished to form a terrestrial garden. Infinite would have been the pains taken over the setting of these sea-weeds, as one can see from reading Mr. Gosse's instructions for obtaining them, as given in his "Aquarium," first and second editions, both commencing at page 21, this being the first work, in point of time (published in 1854 and 1856 respectively), containing practical instructions for the formation and management of aquaria; and the book was so much in request for this purpose, that the "Chapter of Directions" was afterwards republished as a smaller separate volume, and it, too, ran through two editions.

Dear me! oh, dear me! what elaborate apparatus was wanted in those old days (dear as to memory and dear as to expense) for collecting a few living marine algae for such simple arrangements as the three glasses I have figured at pages 373, 376, 377. What a sum they—the algae—must have cost. Here is the list of the paraphernalia put prominently forward by Gosse as being absolutely necessary as a first step:

A pair of wading boots; a large covered collecting basket; two wide-mouthed stone jars; one wide-mouthed glass jar; three glass phials; two strong hammers; two strong iron chisels (steel tipped). And then, these weird implements were directed to be used during a particular state of the moon, and so the whole thing had a strange witchcraft effect. And I think that a later author (Mr. G. H. Lewes) adds a powerful iron crown-bar, wielded by a strong-backed man.

Then came the inland transmission of the plants, pucked with waste sea-seed to prevent injury, in a tin vessel enclosed in a basket, and forwarded by fast train, and thence, if a railway station was some distance from their final destination, by special messenger. People in those 1853 days were very enthusiastic and very rich, and coals cost one sovereign a ton, not two.

Similarly, had they desired to make a fresh-water aquarium, or what then came to about the same thing, a fresh-water garden, they would have bought or begged some Valisneria, as I did, or they would have helped themselves to plants from the nearest river, brook, or pond, and these would have been duly transferred to the aquarium.

Mind, I was as bad as other people in these sea-seed collecting vagaries; indeed, I was much worse, for not having the time or money to collect them myself, I got other people to do and to provide all these things gratuitously, and, of course, uselessly. Quite uselessly as far as absolute chemical necessity was concerned in the aeration of the water, for now the same result are far better and more philosophically obtained by carrying out the law which provides that all the chemically essential plants in an aquarium, marine or fresh-water, will in course of time make their appearance whenever the water is exposed to day-light at a temperature which does not retard their growth by excessive cold, or destroy them by excessive heat. I mention "day-light" because I have no experience of artificial light.

"This is useful knowledge." Those words formed the burden of a vulgar song, which ill-naturedly ridiculed mechanics' institutes on their first formation, and which was sung at and to me and to others of my walk in life, when we were trying to educate ourselves, and be fit for something higher, but not better, than the trades to which we were apprenticed.

But this is useful knowledge, that which to an aquarium maniac like myself seems above all other human learning; that which enables a marine aquarium to be set up in a London garret by any poor London boy or girl or other person who can buy a second-hand pickle bottle for a halfpenny at a rag and bone shop, and who can beg or otherwise get a pint of sea-water, real or artificial, and who can get access to a street heap of oyster-shells. I know all about it, for I have done it, garret and all!
GYMNASTICS.

By Wat Bradwood.

THE GIANT-STRIDE, OR HUSBY-GURDY.

This is essentially a school exercise, and requires an outdoor apparatus, frequently found in preparatory schools for smaller boys, but not in larger schools, where the superior class of outdoor games take precedence of everything else.

The apparatus consists of a stout spar or mast some eighteen feet and upwards in length, planted in the ground to the depth of some six feet. The spar should be strengthened or "shored up" underground by beams slanting from it, buttress-like, into the sub-soil; but these buttresses are best buried completely underground, the spar springing clear from above the ground, with no buttress visible. The reason for this will be seen later on.

The top of the mast is shod with iron, and round it revolves an iron cap in a socket, to which are attached four hooks, and to each hook a stout rope, reaching to within a foot of the

As in its practice it is closely allied to the exercise of leaping with the fixed rope, it may not be out of place briefly to allude to it.

It affords more variety and interest to boys than the more humdrum formality of leaping with a fixed rope in a gymnasium, and from the fact of being a gregarious pastime, has attractions on that score alone.

Fig. 1.
Fig. 2.
Fig. 3.
Fig. 4.

THE GIANT STRIDE.

VOL. II.
ground. For the upper portion of the ropes, within eighteen inches of the hooks, chains may with advantage be substituted, as being less liable to fray. The last three feet of the ropes should be knotted every four or five inches, like a rosary, to strengthen the grasp of the hands.

The exercise consists of two sorts, one, the ordinary "gyrdy-gurdy;" the second, jumping with the ropes.

Each exercise may be varied by supporting the body either by a grasp of the hands only upon the ropes, or by sitting upon a cross-stick passed through a loop at the end of the rope at a length sufficient to allow the feet to touch the ground when the rope is extended some eight feet or more from the base of the mast. A length of rope, therefore, for the sitting posture must be slightly longer than for an upright progression. But the sitting posture is decidedly the inferior of the two, and only to be recognized as a variety.

In the upright posture, the boys—each rope being manned—grasp the rope about three feet from the ground, and stand back from the mast till the grasp is raised, by the tension of the rope, to the height of the face; but exact details of these depend more upon the heights of the spar and of the boys.

They then go round the mast with a swinging run, the centrifugal force keeping the ropes at full stretch and the bodies continually off the ground to a much greater extent than in the stride of an ordinary run.

The mode of progress in the upright posture may be either in alternate strides, striking the ground with each foot in turn, and timing the stop so as to touch the ground at even distances; or the progress may be by the double swing of both legs simultaneously, the feet being kept together as they strike the ground, and both legs swinging round as one piece between the strides, while the body is for the time off the ground by the support of the rope and centrifugal force.

In the sketch on p. 273, Figs. 1 and 3 are doing the double swing, and Figs. 2 and 4 the stride.

In jumping with the ropes, a string should be held up at one point of the compass or other, the other jump, if at all, being the opposite side the circle, the continuation of the diameter. But the height cleared will be less, when two obstacles are jumped at either side if taken in the ordinary run round, than if there is only one jump, for the ground cleared in descent from the jump, will bring the body on alighting too near to the next jump to allow of a sufficient run to it. When jumping height, the double swing is useless, and even the "stride" should be so far modified as to admit of the feet being brought nearer together at the last final spring.

The arms should pull the body up at the same moment the feet springs. The last foot to leave the ground should be that nearest to the spar, the inside one in going round the circle, and from it the main spring should come. It also should be the first to alight, the outside foot following and passing it on reaching the ground, to preserve the balance.

If the outside foot should be the first to strike the ground, the inside foot only can only follow by dint of turning the body round with the back to the mast, and the tendency of the spring from the toes will then be to drive the body towards the mast, instead of centrifugally from it, and a fall, or perhaps a bump against the base of the mast, will probably be the result.

In jumping, the greater the height the greater the tendency of the body in alighting to come back in an ellipse, shoving the spar in its descent, instead of swinging round in a circle; for the centrifugal impetus at the moment will be almost expended in forcing the body over the barrier jumped. For this reason the pole should be free of "shores" and outside supports, that might trip the feet and cause a fall. If the spar is springy and elastic, as is probable, those on opposite sides of it can facilitate each other's jump by pulling all their weight in the opposite direction as the one jumping rises to his leap. Eight feet or more in height can be cleared by an active boy upon a twenty-foot mast.

The sitting posture hardly admits of or deserves much notice. It consists simply of short quick paddles with the feet to obtain impetus, varied by springing both feet from the ground when once in motion, others suffering the body to swing round by its own impetus. It is needless to say that the body should face the mast when sitting.

Height may be jumped in a sitting posture as in the standing, remembering the same rules with reference to taking off and alighting. In this posture it is still more necessary, for the legs are not so free to save a fall.

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CARD GAMES.

BY GEORGE TINDALL.

VINGT-UN—SPECULATION—MARRIAGE.

In presenting our readers with instructions for playing a series of round games with cards, our aim shall be to choose such as will afford innocent and agreeable recreation to the family circle, and help pleasantly to while away a long winter's evening, to the exclusion of all those games whose only element of interest is the excitement of gambling, and which thereby arouse and foster the most evil passions in man's nature.

It may, however, not be unprofitable here to consider that, as almost any game, even the most harmless or the most beneficial, such as cricket and rowing, may be lowered and degraded by betting, and by this means be made the vehicle of gambling, so the converse of this is equally true, and nearly every game most associated in men's minds with this common vice, may be played in such a manner as to afford nothing but pleasurable and healthy excitement. Viewed in this light, even round card games, played with counters, furnish a wholesome stimulus to the mental powers, foster a spirit of emulation, and encourage habits of forethought and perseverance; and in their proper position as purely evening—and especially winter evening—amusements, assist the more vigorous out-door recreations in realising that much desired end, a "mens sana in corpore sano."

Guided in our selection by this idea, we shall have no trouble in naming many old and favourite games suitable for our purpose. Vingt-un, speculation, loo, Pope Joan, marriage, and others, at once suggest themselves; most of them are lively, mirth-provoking games, whilst some of them actually become hilarious if entered into with spirit and energy, as they often are, especially by young people; whilst others are more or less sedate, and spirit de play is in this country, as they continue to be on some portions of the Continent, will be discarded because it is difficult even to describe these games unassociated with ideas of stakes and betting, much more to play them without imbibing some of the spirit of gambling.
CARD GAMES.

In these round games some kind of counters are required, and
they may be purchased cheaply at the toy-shops. Formerly
small fish of ivory or bone were used, but the more common
 counters now procurable are round discs of bone of various
 sizes and colours; it is well to have two or three sizes, to
 represent different values; each of the larger sizes may be con-
 sidered as worth six of the size smaller, or any other number
that may be decided upon. Any other objects, however, if
at hand in sufficient quantity, may be used. We have
seen the small and pretty shells sometimes brought in such
quantities from the East Indies used for this purpose, and
thought them the best counters we ever used.

The counters should be in possession of the mistress of the
horse—for these are games in which all can join—and should
be distributed by her to the players at, say, a penny per dozen,
and be bought in again at the close of the game.

We will commence with Vingt-un, not because it is neces-
sarily the best of these round games, but for purely personal
reasons, because it is associated in our minds with more
pleasant recollections of merry and agreeable evenings spent
around the table in easy curtained rooms, with brilliant lights,
a cheerful fire, and charming company, than any other.
It is a game which does not check conversation, but rather encourages
it, which stimulates wit and invites to repartee, whilst the
hours flee all too quickly, and the time for breaking-up is met
with regret.

Any number of persons may join at Vingt-un; indeed, it is a
pleasurably game with more than four players than with a lesser
number. It is played with a complete pack of cards; and
each person plays his own game, although two may join in
a partnership, so far as counters are concerned, if they choose.

The players being seated round the table, the deal is decided by
some person taking the cards, and after shuffling them, com-
commencing dealing them to each person in rotation face upwards,
the person to whom an ace is first dealt becomes the dealer, and
the player on his right hand is the proper person to collect the
used cards, for which service he is sometimes complimented with
the name of "pony," or "pate."

The numerical value of the cards is the same as the number
of pips upon them, except the ace and the court cards; all the
latter count ten, and the ace counts, at the pleasure of the
holder, one or eleven. The main object of the game is to pro-
cure cards which will make twenty-one, or, in French, vingt-
un—hence the title of the game—and this is accomplished in
two cards only, by the possession of an ace with one of the
court cards or a ten; when this occurs in dealing it is called a
natural vingt-un, but if more cards have to be called for, which,
with the two dealt, form twenty-one, the combination is called
an acquired vingt-un.

The cards are first shuffled and cut to the dealer, who then
deals to every player—commencing with the one on his left and
including himself—one card, face downwards. Each player looks
at his own card, and decides how many counters he will stake
upon it, and these he places on the table in front of his card.
The dealer looks also at his card, and, if he chooses, he may cry
"double," in which case all the stakes are doubled in amount,
without option. The dealer now gives to each player a second
card, again including himself, and as the cards are given, each
person examines both cards, and if any of them have cards
which amount in value to twenty-one, the receiver must at once
expose them, crying at the same time "vingt-un," and he
succeeds to the deal, except this happen in the first deal of any
player, which exempts him from loss of deal.

Each player must pay to the first receiver of a natural
vingt-un double the amount of the stakes they played for,
except those who also have a vingt-un.

After the two cards are dealt round, the dealer, commencing
with the player on his left, asks whether he stands; if he does
not, the same question is repeated to the next, and so on around
the table; but if he does not, then the dealer must give him
another card, this time face upwards, and as many more as he
requires in the same way, until he decides to stand, or until his
cards amount to more than twenty-one, when he is out, and
must pay the dealer the amount he played for. When the dealer
has given each player the cards required, he turns his own hand,
and may give himself as many cards as he thinks proper, but if
he have a natural vingt-un, or acquire one, each player must
pay him twice the amount of stakes he played for, and if he had
doubled them, they must of course pay him four times the
original stake. If, however, he do not obtain vingt-un, but a
number below that, he must pay to each player holding a higher
number, the amount staked, or double if he cried, and each player
holding the same number as himself or any smaller number,
must pay to him in the same way. But if he give
himself cards which make over twenty-one, then he must pay
to all who are in the game, that is, have not previously thrown
up their cards.

The pony now collects the cards from each player, and the
dealer commences again with the remainder of the pack, and if
he exhaust them before a natural vingt-un occurs, he commences
again with the whole pack, and continues the game until there
is a change of deal.

It must be decided before commencing play what shall be the
extreme limit of the stakes. Six counters is very usually
the highest stake allowed, and is quite enough to make the
game interesting, for in this case, if the dealer doubles and a
vingt-un occurs, twenty-four is the number of counters to be
paid by those who laid the full stake—any quantity from one to
six may be laid, at the discretion of the player.

The principal points—indeed the only ones requiring atten-
tion in this game—are the decision as to the amount to be staked
on the first card, and when to stand, if a vingt-un is not obtained.
If the first card dealt is an ace, of course the player will
stake the full amount allowed by the game, as that is a neces-
sary card for vingt-un, and no one of four out of twelve
cards will complete it. Most players will also stake the maxi-
mum amount, if any of the cards of the value of ten are turned
up, but cautious play would decide upon staking three or four
counters in this case, as only one card in thirteen will then
complete a natural vingt-un; still, as the chances are great of
having at least twenty dealt, it is worth while risking a
moderate amount, as only a vingt-un or the same number
can win the stake; but if six or a lower number is first
received, the player will not do well to risk more than one or
two counters, as the chances are very much against his making
a good hand.

It is always advisable to stand if your cards amount to
seventeen; indeed, strictly speaking, in the majority of cases
it is advisable to stand at sixteen, as the chances are eight to
five in that case against your drawing a card that would not
make you over twenty-one; still, the desire to obtain a better
hand will generally decide one to run the risk, and, indeed,
sixteen very rarely wins the holder his stake, unless the dealer
overdraws himself, the possibility of his doing which should
always be borne in mind.

If the dealer find his first card to be an ace, he will, of
course, cry double as soon as the players have staked their
counters, and most persons having the lead would double if
they had received a ten; whether this is the best course or
not, must be left to the individual discretion of the player, the
game is certainly more exciting when these risks are run; it
would, however, be bad play to double on a... below nine.

If both cards dealt to any player be of the same value, he
may, if he choose, place each card separately on the table, and
ask the dealer to place one more on each; he will thus hold
two hands, and may stand or ask for more cards on each of them,
and may win or lose the same stake on each that he placed on
the original card. It is quite possible for a player in this way
to hold a vingt-un in each hand, and if he originally staked
six counters, the dealer, if he had doubled the stakes, would
have to pay him forty-eight, unless he had the good fortune
to obtain a vingt-un; indeed, it is within the bounds of
possibility for a player to acquire vingt-un four times in
one hand, for if both cards originally dealt to him were aces,
he could divide them and ask for another card each, and
if each of the second cards were aces also, he could again
divide them, and ask for a repetition on the whole four cards,
and as there are sixteen cards of the value of ten in the pack,
he might receive one on each of the four aces. If the dealer
give himself two similar cards, he may divide them, deal
another to each, and play each of them in the same way, and the
players have no option but to risk the amount of their
stakes to each of his hands.
The odds in this game are somewhat in favour of the dealer,
as he has the option of doubling the stakes, and ties pay to
him. The dealer before commencing may sell his deal, if any
player offer sufficient for it.

Speculation is a merry noisy game, and a very amusing one,
if six or more players are engaged. It is exceedingly simple;
and no one, however inexperienced in card games, need hesitate
in joining it.

Counters must be purchased in the same way as at vingt-un,
and an entire pack of cards is used, which have the same value
as at whist, that is, the two of any suit is the lowest, and ace
the highest.

In this game the players do not stake any number of
counters they please, but a certain number, say three, is decided
upon beforehand, which at the commencement of the game each
puts in a small tray called the pool, placed in the centre of the
table, but the dealer must put twice the stipulated number of
counters in the pool, so in this case he would stake six. The
person who turns up or acquires by purchase the highest trump,
wins the entire pool.
The deal having been decided upon in the same way as at
vingt-un, the cards are shuffled and cut, and the dealer, com-
encing at his left hand, deals to each player singly and in
rotation, including himself, three cards face downwards, and
then places the remainder of the cards on the table, and turns
up the top one for trump.
The players must on no account look at or expose their cards
before playing, but must retain them before them on the table.
Play commences by the player on the left of the dealer taking
up the top card of the three dealt to him, and turning it over
in front of the others; if it is a trump, he may dispose of it, if
he chooses, to any one willing to speculate upon it, if he can get
a bid sufficiently high to tempt him, or he may retain it, and
if he do not sell it, or if the card, when exposed, be not a trump,
then the next player in rotation exposes his top card, and so on,
until a higher trump is turned up, which the possessor may
again endeavour to barter for a still higher sum than the
last, and this goes on until all the cards are exposed, when the
owner of the highest trump takes the pool. But if a person on
turning up a trump disposes of it to another player, then the
party on the left of the purchaser turns up the next card,
Polo, or Hockey on Horseback.

Within the last two or three years, a game which possesses some of the elements of entire novelty, and yet is at the same time akin to a few of our old-fashioned sports, has been introduced into this country from the East. "Polo," or "shaughan" — the former word meaning a ball, and the latter a game on horseback — is known by various designations in India, Persia, and Tartary, where it has been played for many centuries. Each nation, and in fact each tribe, has its own name for the same popular amusement; just as what is termed "hockey" in England is called "shirty" in Scotland, and "hurling" in Ireland. But, whatever the multifarious names by which the game now under consideration is known in the countries where it originated, that which has been adopted for it, and is likely to be maintained here, is "polo," while the more descriptive designation, rarely used by players, is "hockey on horseback."

The latter term will convey, in brief, an idea to the reader of the nature of a game which is now rapidly becoming so great a favourite among those classes who have means as well as leisure, that our survey of popular recreations would be incomplete without a description of it. Polo clubs are springing up, or are already in full activity, in many counties both of England and Ireland, especially in places like Aldershot, where the officers of cavalry regiments are located; but wherever a suitable ground can be found, and a few good ponies can be brought together for the play, attempts are being made to engage in it.

For the ground it is necessary to have a long and level space, well-turfed, that the feet of the ponies may not be injured. The dimensions may be anything between 200 and 400 yards in length, by 50 to 150 in width, according to the space of suitable ground available. If less than the former size, there is not sufficient scope for free play without more than the usual risk of injury either to horse or rider; while the conditions of the game, which we shall presently explain, render it undesirable that it should be extended over the larger area indicated.

The next essential after the ground is a suitable pony to each player. Ponies are better than full-grown horses, being more nimble in their movements, and also better adapted to a game in which the player has to reach with his stick from his steed's back to the ground. The animals should be strong and active, well under command, and trained in some measure to the character of the sport. The necessary training, if a pony be fit for the purpose, is easily acquired by a little private practice on the part of the rider, using a stick and ball — the latter the animal soon learns to follow.

If two players turn up the same combination in one hand, the stakes on that chance go to the person who first shows it. The deal in this game goes round in rotation, and each dealer pleases himself what number of counters he stakes, but it is well to decide beforehand what shall be the maximum number allowed.

This is purely a game of chance, and suitable for a mixed company.

Here the goal-posts are represented by the dots marked A and B respectively. The posts at the one end are usually surmounted by red and at the other by blue flags, but of course any other colours may be used to distinguish the respective sides. On the margin of the ground, at the points marked C, other flags should be placed, to indicate the centre; while additional flags may be fixed at intervals, according to the size of the ground, along the boundary, to enable the players to distinguish more readily when the ball has been struck beyond the line. In such a case it must be again thrown into the ground at the point where it has gone off. At the points D the player from each side is usually stationed to guard the goal of his party, by striking the ball back, if possible, when it comes in dangerous proximity to the posts. The body of the players are drawn up in the first instance at the positions
marked X X, facing their opponents, with the adversaries' goal in their front.

The whole object of the game is to drive the ball from the centre of the ground, where it is thrown at starting, through one or other of the goals at the farther extremities; each party therefore endeavouring to strike it between their adversaries' goal-posts, for which, when successful, they score one.

Play may be commenced in either of the following methods:—The ball may be thrown by an umpire into the centre of the ground, between the opposing ranks; or it may be placed previously in the same position, without the intervention of a non-player. In the former case, the moment the ball reaches the ground the various horsemen charge at it, each side being naturally anxious to give the first hit towards the opponents' goal. Whom, on the other hand, the ball is already lying upon the ground, a single horseman on each side is selected to ride off in the first instance, and endeavour to gain the earliest stroke, his companions following some little distance in the rear, looking out keenly for the result of his attempt. The method of throwing the ball between the players has been found somewhat hazardous; for, with a number of horsemen charging simultaneously from opposite directions towards a common centre, a misstep is likely to result to some of the players at the very outset of the game; besides which, the umpire who has thrown the ball must himself, in some cases, spurn his horse to get clear of the onset. The other plan is therefore now more generally adopted.

The character of the play which follows may be better left to the imagination of the reader than conveyed by description. Immediately the ball is struck, the whole of the players, goal-keepers excepted, gallop after it, every one endeavouring to obtain a hit which may either retard the approach of the ball to the goal of his own side, or send it to that of the opponents'. Considerable dexterity, both in horsemanship and in aim with the polo-stick while riding, is required to play the game with effect; and there is plenty of opportunity in its incidents for the display of both courage and coolness. Now and then a player who may be leaning from his pony in the act of striking the ball receives an awkward blow from the stick of an adversary, who, in the heat of the contest, has just made a sweep at it from the opposite direction; and a few serious accidents in this manner have been heard of.

Polo, in fact, is no child's play, but has been compared in its character and incidents to the ancient friendly tournament. It possesses, however, a great fascination for spirited men who can ride well, and are not afraid of an occasional knock; and it may therefore take rank among those pastimes which are believed to strengthen the nerves and harden the courage of Englishmen.

The ponies used in the game are rarely the victims of an unfortunate blow, unless it be from the ball striking their legs; their fore-legs, however, are bandaged, to guard against an accident of this description. The animals at times appear to take a real interest in the game, and to play their part with a zeal which would be incredible to any but an actual spectator. They should be rested whenever an opportunity offers—for instance, when a goal has just been made; and if the game be prolonged, a change of ponies by each rider is necessary. An hour and a half or two hours' play, with brief intervals of rest, is as much as the animals can be expected or are usually called upon to endure.

There is an unwritten code, which exacts from each player as much care and forbearance in the pursuit of the general object as the safety of both himself and his adversaries requires. A reckless player will, in his strokes and indifferent as to the chances of collision with others, would soon be tabooed by his companions. What formal rules there are have already been conveyed in our description, and it will be seen that they are, in the main, very much like those for football and hockey. It is in the horsemanship chiefly that the game presents a peculiarity; and as it is, in this respect, the only one of the kind, it is likely, now that it has become well-established in this country, to last as long here, and with as great favour, as it has endured in the East.

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**PAPER-FLOWER MAKING.**

*By Eliza Chapple.*

Here are many occasions on which we desire to decorate our homes, or it may be some public building, as elaborately as possible—occasions of a jubilant nature, when we wish to exhibit our spirit of gaiety, and by some means to infect those around us with a like festive feeling. It is Christmas-time, and the heavy wreaths of holly and laurel which hang round our walls, according to a time-honoured custom, look too sombre for the mirthful season; it is New Year's Day, and our parish school-room needs enlivening for the annual "tea-feast;" it is "Twelfth Night," and our ball-room must be made to look like a fairy palace. Now, there are no decorations so effective as those of a floral character. But, unhappily, Nature is particularly chary of her gifts at this season of the year, and her few treasures are much too rare and costly for us to think of such an indulgence. We must turn to our paper-flowers, and there we shall find excellent help.

In this hour of emergency, however, the descriptions of flowers which have been given heretofore will be of little or no avail, for the making of such flowers as we have been learning to construct would entail far too much time and toil for the lavish and profuse style of our present decorations; and were that not the case, the delicacy and excellence of their forms would be totally lost beneath the broad leaves of the laurel or amid the bushy box and berberis.

What we now stand in need of are colossal cabbage-roses, monster poppies, saucer-like hellebores, gigantic dahlias and cacti, monstruities of hyacinths—in fact, flowers made on an Egyptian scale of size; flowers which will boldly show themselves, and undeniably flaunt their bright colours before the public eye. One other essential is requisite, and that is rapidity of construction; for it is fairly amazing what a quantity of buds and blossoms it takes to deck even one wreath of ever-
Flowers for these ornaments must be made by the score, for if only a straggler is seen here and there, if solitary heads emerge far apart out of the mass of dark foliage, why then the effect will be quite the contrary to what you intended. For my part, I think it is better not to introduce any flowers at all, unless you can make them of the proper kind, and also stud the wreaths or other designs pretty thickly with them.

The common tissue-paper—red, white, yellow, pink, and light green—will serve your purpose for the majority of your productions, but such flowers as the dahlias and cacti will look better if made of a thicker kind of paper. In this wholesale business fine wire tubes, the plate of gum, and the paper-knife, will prove more deft than the scissors.

As in these cases distance is expected to “lend enchantment to the view,” we need not be very particular in strictly following Nature. If we imitate her in a general way, the effect will satisfy us, when seen under the circumstances to which we have before alluded. But we do see now and again fine large poppies flouting abroad, and so I recommend you to make some of these showy flowers.

Take Fig. 1 as your pattern. The tracing on the diagrams indicates only one-eighth of the size. Cut nine squares of paper, fold them in four, and, having rounded the edges, glup them, thread them on to a piece of stout wire, and then fasten the whole bunch of petals by twisting fine wire several times round their base; and behold! in less time than I can describe its formation, out of your hands comes a gorgeous poppy. Let me hint to you that in making this class of flower there is no necessity to cut the petals separately or even to thread them separately. You really have not the time to devote to all these little niceties of construction; but you must, after the flower is made, just give it a few touches, pull the petals from one another, and give it an air of expansion, and an appearance of being “full blown.”

If you make “single poppies” you will have to deviate from the above instructions, for this kind have hearts. The best way of representing these possessions is to take two or three black feathers (a duck will supply you), tie them together, and then cut off their points, so as to leave a stunted bushy tuft. Fix these on to a stem of wire, and then place one round of petals, cut after the manner of Fig. 1, only in this instance do not glup the edge.

Poppies look most in their element when intermixed with corn. Of course we know that in the natural order of things poppies and ears of corn should only appear in autumn, but on those occasions we do not pay any heed to the seasons and their decrees.

We propose hyacinths as another decorative flower. No special pattern is needful; all you have to do is to fold the paper into many strips, about two inches wide. Before you separate the strips, vandyke one edge, and then curl the tips back with the paper knife, wind the strip one or more times round the top of a piece of wire, according as to whether you wish the flower to be single or double, and then twist the other end of the wire round the main stem. A number of hyacinths must then be affixed to this stalk, and, as from its pyramidal nature the stalk most probably will be visible to the public eye, it must needs be covered. The winding on of paper is to some people a tedious and lengthy process, but you will quickly hide the bareness if you take green wool as a substitute.

Fig. 2 in the diagram shows the half of a flower, whose botanical name I had rather not be asked to give, suffice it that in floral decorations it looks really effective, is quickly made, and adds variety to the somewhat small collection.

A piece of thick white paper folded in two and cut in this shape, forms one flower. Touch the tips with colour, and its beauty will be enhanced. Two or three stamens should appear in its centre, and for this, and others of the class, old artificial flowers will provide what you want.

Dahlias and poinsettias in real life are fine-looking flowers; exaggerate them a little, and their appearance becomes truly magnificent. But they consume too much time, unless the fingers which form them are very nimble in the folding and placing of the single petals. To avoid this, cut out, on an exaggerated scale, a great many of them at once, by folding the paper into several thicknesses, and slip them on to the wire by twos and threes at a time, remembering, however, to turn the wire while doing so, or the flower will be too misshapen even for an out-of-the-way place.

A nondescript flower may be made by following these directions. Cut three inches of orange tissue paper, an inch and a half in width, fringe it to half its depth and roll it round the end of a wire, then take a strip of white paper twice as long, and, having fringed it, roll it round the orange centre, and fasten the whole with fine wire.

Should a flower of this description be likely to come within reach of unfriendly criticism, you had better a little more trouble on it. Make the centre the same, but instead of hastily fringing the white strip, cut broad pointed vandyks an inch in depth, and, placing them in the palm of your hand, pass the bowl of a small tea-spoon firmly down each petal; the effect will be a crumpled and crimped appearance, and a decided turning back of the petals.

In making all the flowers which are formed of strips in this summary way you will find the use of one or two hints. If you but just turn the paper round the wire, why then the flower will emerge out of your hands a miserably thin specimen, however long a strip you have had, but if you crimp and puckers the edge at the base with your fingers as you press it round the wire, you will see the outer edge of the petals gradually expanding.

Roses are our great helpmeets. These favourite flowers always look in season and in place. Pink or white, yellow or red, they are sure to smile forth and to brighten the dusky leaves amongst which they are ensconced. Roses for these purposes may be made in two ways. Some people find one method to be the readiest, and others prefer the second plan. Fig. 3 is the pattern for the first mentioned. Squares of paper are folded into four divisions, and while thus folded are shaped as in the diagram. Two of these make a flower. The centres should be squeezed together when mounting, and then their lack of heart is not noticeable; and also, if this is done, the flower will come into full blow in the proper manner. The second plan which may be followed is to fold the sheet of paper lengthways into strips about an inch and a half in width, and then to scallop one side like the pattern (Fig. 4). You then wind it round, in the manner lately described, and fasten it on to the stem. For the buds, cut the strips into half, or quarter, of the original length, according to their size. Dried moss is a great improvement to the buds, if they are placed in any conspicuous position.

A very full “rosace” rose can be made by cutting eight or nine rounds differing but slightly as to size. The edges of the petals of these roses are not scalloped at all. You will be more expeditions if you take the old lid of a small round box, such a one as you get when you buy the ready-made petals of your more delicately-constructed paper flowers. Divest it of its rim, and, holding it on to paper folded the required number of thicknesses, the rose will be cut out in the twinkling of an eye. The great knack of forming this rose is to give each round a plait here and there at the base, and further to make these
folds at different points in each successive row, and also to let each row be a wee bit below the former one, and, lastly, to squeeze the centres very tightly together while forming the flower, hence will come forth a rich and handsome rose.

It may happen that you will require for some part of your ornamentation a lighter style of decoration than that of wreaths of evergreens. In this dilemma the hop will come to your relief, strings of which are considered to be particularly graceful. This is the manner of their construction:—Green tissue paper of a light shade, folded the whole length of the sheet in strips about an inch wide. Scallop one edge not quite so deeply as that for the rose, and now form the flower by winding one strip round some green-covered wire. Look at Fig. 5 in the diagram; that is the proper shape that the flower should present when completed. The natural flower does not expand its petals, but keeps them closely folded one over the other, and yet you will observe one petal is not laid exactly over the other. The tendril, which accompany the hop are made by twisting green wire round and round a pencil, and then withdrawing the support. The flowers and tendrils are placed at short intervals on a long length of green-covered wire. As you will have long ago perceived, we are not attempting to be natural in many of our efforts to decorate our bowers; therefore, when we suggest such anomalies as gold and silver flowers for that purpose, the idea will not be considered too absurd to be carried out. As a rule these decorations are required for rooms to be seen only by artificial light, and when this is the case the gold glitter and the silver glitters. Flowers of this description should be large and star-shaped, after the pattern of Fig. 6. Gold paper is somewhat expensive, and so is silver, but as a substitute for the latter find some pieces of lead paper, such as that in which tea is usually enclosed when sold in packets, and your requirements will be met without any special outlay.

![Figures 1-6](image_url)

One more piece of advice, and I shall then have said my say; and that is, that when you are making floral decorations for evening entertainments, the preponderance of the flowers should be white and pink, as the darker shades do not show in contrast to the sombre green which surrounds them. And now adieu; and may success attend your labours!

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**FIREWORK-MAKING.**

*By C. T. Brock.*

**SNAKES—GOLD-RAINS—STARLIGHTS—BLUE-CANDLES—CRACKERS—WHEELS.**

There are several little fireworks bearing different names, though they are really the same. “Garibaldi Squibs,” “Blue Devils,” and many other attractive titles are given to fireworks which only differ from squibs in their outside covers. It is therefore unnecessary to make further remarks upon them. “A squib by any other name will hang as loud.”

**SNAKES.**

Snakes resemble squibs, minus the bang. These are sometimes called ladies' squibs, and by other fanciful names. The cases are made from the same roller and in precisely the same way as those for halfpenny squibs. Red paper is used by pyrotechnists for the outside cover of snakes, in place of white. The composition is precisely the same as for squibs, and the filling is done in the same way; but when you have filled to within one inch of the end, then, instead of finishing off with powder, you pour in dry powdered clay, and treat it exactly as the powder was served in the case of the squib. The object of the clay is to make a clean finish to the “snake.”

**GOLD-RAINS.**

The cases for those will be made with a steel roller one foot long, No. 3 gauge. The brown paper is cut as in the case of the squib, until you get to the sixth of the sheet, which you will cut into five instead of into four. The reason of this is that the composition is less fierce, and it is only requisite to make the case strong enough for ramming. The cases are made in the same way as those for squibs, but they are not choked. Gold-
rains are usually covered with yellow paper, which will be cut as you cut the white squib papers. The touchpaper will also be cut as for squibs.

To save the trouble of capping afterwards, as we did with the squibs, the piece of touchpaper is inserted immediately on taking in the yellow covering paper. The touchpaper must, as in the case of the squib, project beyond the mouth, to enable you to twist it. It must be cut (and this applies generally), so as to go twice round the case.

The recipe for gold-rains is—Mole powder, sixteen parts; fine charcoal, three and a half parts; coarser charcoal, one-half part; saltpetre, one part; sulphur, one-half part. Unless you get exactly the sort of charcoal necessary, you will have to lessen or increase its quantity. As there is no choke to these cases, you will not fill them on a nipple, but on the flat surface of your bench, simply bending the touchpaper down. By this means the composition will get in close neighbourhood to the touchpaper, and hence it will not be necessary to prime the gold-rains. These latter remarks also apply to

For blue-candles use 13lb. white demy paper, and cut it exactly as for starlights.

The same roller that you used for rain cases will be used for both star and blue lights. Proceed in the same manner. Neither will require choking or tying off.

The touchpaper will be rolled in with the case.

The composition for starlights is—Saltpetre, ten and a half parts; sulphur, three parts; lamp-black, one and three-quarter parts. You will be fortunate if you succeed in making a good starlight upon your first attempt. Everything depends upon the quality of the lamp-black. The sparks should be large, flower-like, and numerous. If you do not get this result, you
must vary the recipe; experiment alone will decide the exact proportion. A little more or less sulphur, or more intimate mixing, will most likely put it right.

Instead of using your squib funnel, which has served you until now, you will require one rather wider and shorter (see sketch on page 281).

Blue-candle composition is—Prunella, six parts; sulphur, two parts; regalx antimony, one and a half parts.

If you close in the ends by the machine, bear in mind that you are now dealing with more delicate cases, and chop lightly.

We will leave Prince of Wales’s feathers until we get to pinwheels, the making of which they somewhat resemble, and proceed with

**CRACKERS.**

I recommend you to make those of the size known in London as penny crackers, with 14 bangs.

Unlike any other firework, crackers require that both the paper and the powder shall not be too good. If the paper be too strong, and the powder too good, the smart crack of the report is likely to be a little too smart and to break the continuous fire by coming to grief at a bend. The explosion would be too forcible.

You must not suppose that the very best powder gives the loudest report; it is not so. The best gunpowder used by artillerymen is not so loud in its explosion as inferior powders. The inferior quality burns more slowly, and thus helps to secure the continuity of the fire. To make a surance doubly sure, you want a paper which does not make too much resistance, so that a loose kind of sugar or carrick paper will best answer your purpose. It does not make a very nice-looking cracker, but it is certainly the best. The paper should, however, be of such a character as will allow of its burning without breaking.

The paper I find to answer these conditions is 34th, royal hand. Cut down the fold, and then cut each half-sheets the long way of the paper into three strips, so that each sheet will yield six cracker papers.

**Cutting.**—Lay out the paper in the same way as you did when you prepared the squib papers for pasting, but let the edges be wider apart—at least the eighth of an inch instead of a sixteenth. Let the paste be well rubbed into the paper with the brush, and be careful at the same time not to leave a lot of paste on, but, after saturating the edges, brush off the superfluous paste. Unless you do this you will find it a great nuisance in rolling.

For your roller get a piece of steel wire No. 6 gauge, two feet three inches in length.

**Rolling.**—Roll your cases on a half quire of clean brown paper; it will be found much better than the bare table; the elasticity of the paper will help you.

There is a decided knack in rolling cracker cases. You should fold the near edge of the paper over the wire until within three-quarters of an inch of the pasted edge. Feel with the tips of the fingers that the roller is well within the fold of the paper. Now, first with one hand, then with the other, cross the paper under the roller with the nails of the fingers of the right hand of the left hand from the centre of the roller to the outside. As one hand imitates the other quickly, they will both reach the sides at about the same time. When nearing the edges of the paper, press both the thumbs on the top of the roller, and gently move it forwards. Then, with a brisk bold stroke, roll the pipe. This should be done skilfully as only to require one or two rolls with one hand, while with the other you hold the end of the roller and move it backwards and forwards on the bench, in a convenient way for the other hand to finish the rolling.

**Flattening pipes.**—When your pipes are dry, take an ivory paper cutter, or an ordinary knife, and flatten each pipe singly on your smooth bench (not on the paper pad), in the following manner. Mind that the joint of the paper is upwards. With one stroke of your paper knife flatten the pipe to within half an inch of one end, leaving that half-inch of perfect pipe. After flattening one side, turn the pipe over, and give the other side one stroke of the knife. You require to make the pipe quite flat—except the one inch, as explained above—and to do this more than a slight pressure will be required, but you must be careful not to scrape the paper in doing it.

**Filling.**—Bend up three-quarters of an inch of the bottom end of each case, and make a bundle of your pipes by tying them round with paper, which must extend well above the mouth of the pipes, taking care not to bend the tubes. Now pour in grain powder, that known as H F E. Be sure you do not use sporting powder. Besides being much too strong, it is at least four times as expensive. Tap the pipes so that the powder will run into them, some falling on to a piece of paper which you have previously placed there to catch it. Although you have flattened the pipes so thoroughly, a sufficient opening will have been caused by the elasticity of the paper. Take up the powder which has run through, and pour in repeatedly, about a dozen times. Unite your parcel, take each cracker by the tube end with one hand, while with the other you pass the thumb and forefinger down the case, to ascertain if properly filled. Put those which are perfectly filled on one side, and let the others go through the operation again. If you are only making a small number of crackers, take a small funnel, such as I shall describe when I come to pinwheels, and insert it in the tube end of the pipe, and pour in the powder until the case is full. The parcel plan is much the quicker, however.

Now that the cracker is filled, pinch the tube end between the thumb and finger, empty out the powder in that part, and bend it over tightly. Your case is now ready for the next process.

**Milling.**—You require now to keep the powder in the position it is at present occupies, as in the event of its shifting, the fire will not be continuous, and your cracker will be a failure. To do this you must cake the grain powder. The ordinary way is to run it through a mill, the cheapest and best is the common small straw-plaiting mill. In the absence of the mill, get a piece of hard wood with the corners rounded off. Press it along to the pipe from one end to the other, but some force will be necessary to attain your end. The success will not be so certain or so easily ensured as by the mill.

The plaiting mill simply consists of two wooden rollers, between which the tube passes. The upper roller is moved by a handle, the lower one is moved by the passing of the cracker itself.

Bear in mind that it is not necessary to crush the cracker flat; yet only want to cake the powder. If the cracker is pressed excessively you will break the paper.

**Pressing.**—The next thing to be done is the bending of the crackers, and to accomplish this it is necessary to damp the pipes. An hour before you bend them, take a piece of calico, wet it, and then wring it as dry as you possibly can. Lay the crackers in the calico, so that they lay singly, and roll them up. After an hour’s expiration, you will proceed to bend the crackers, for which purpose you require a bending machine, which is made in this way.

**Bending.**—Get two pieces of iron-plate one-eighth of an inch thick, four-fifths of an inch wide, and eight inches long. Have three screw-holes made in each of the iron plates, extending over half the length of each, and screw the iron plates on to
a piece of wood about three feet long, one inch wide, and four-fifths of an inch thick, so that the width of the plates comes against and agrees with the thickness of the wood. You will thus have a sort of fork. Screw it on to the front of your bench in an upright position, so that you look through the prongs (see sketch on p. 231).

Obtain twenty steel wires four inches long, knitting-needles cut into three will do well. The most convenient receptacle for them is a saucer; they can be easily picked up one by one. Now take one or two crackers out of the cloth, and place a wire in the quarter of an inch bend already made. Three crackers are usually bent together by the professional cracker maker. The bent end then (supposing you to be at work on a single cracker) will be upwards, and the cracker pipe stretching away from you through the fork of the apparatus. Press the short bent end in between the prongs, at the same time keep the wire firmly against the fork. Hold the cracker in that position with the thumb of one hand, while with the other hand you take a second wire and place it over the cracker pipe at the further side of the fork, at the same time keeping it firmly against the fork, and bend the pipe over towards you between the prongs again. Keep the pipe flat between the finger and thumb, and continue to place wires, and to bend, until you get to the end of the pipe. There must be an inch and a half of pipe beyond the last bend. Now, with a piece of wood about one foot long and one inch square, press with some force on the top of the cracker, in between the prongs, with both hands. Take out the cracker, and let the wires drop into the saucer, and place the cracker on one side.

After all the pipes are bent they are ready for Capping.—Take hold of the last bend of the cracker between the thumb and forefinger, and with a pair of scissors cut off the end by two cuts to form a point instead of a straight end. This mode of cutting is the best to ensure lighting. Directly you have cut the ends, you should put the touchpaper on to prevent the possibility of the powder escaping.

Cut your touchpapers so that they go twice round in such a way as to leave sufficient beyond the case to twist. This applies generally. The touchpaper should go on beyond the middle of the cracker, in order that the thread about to be used will hold it on firmly.

Tying.—Obtain some fine thread, or hemp as used by shoe-makers. Hold the cracker by the thumb and forefinger, so that the whole length of the cracker is pressed between them. The thumb and forefinger should grip the cracker by less than half of its width, so as to give room for tying round the middle.

Insert one end of the thread in the middle of the first fold (i.e., midway between the first two bends). Pass the thread round the middle of the length of the cracker three times. Draw it tight, so as to make the cracker firm, but not so tightly as to pinch the middle. When you have got the string to the point you started from, hold it at the first bend with the thumb, and then slip the string between the first and the second bends, and draw it tightly to the string running up the middle of the cracker. Then slip the thread in the opening above where you now are, on the opposite side to your last insertion; draw it to the middle, and proceed spirally up the cracker; when you have reached the top continue upon the same plan in descending. On arriving at the last bend, cut the thread closely. You put the cracker in shape, and it is complete.

Wheels.

In catherine-wheels or pin-wheels you have a source of almost unlimited amusement. Of all small fireworks they are undoubtedly the most beautiful, and the varieties which it is in your power to make are very numerous. I will explain to you the mode of making the ordinary wheel; but a few hints are all I shall give you respecting the more ambitious pin-wheels. The most enjoyable part of the work you will find to be the experimenting with a view to attain what I assure you is well within your reach with perseverance. I have succeeded in producing really grand effects in catherine-wheels, but owing to the impossibility of keeping some of them, and the slight danger in manufacturing others, they are unsuited for trade purposes. I recommend you particularly to devote time and attention to this branch of the art, in the belief that from my few hints you will find scope for achieving surprising results. I have spoken of danger in making some of them, but it exists for me rather than for you. With proper care, by experimenting with very small quantities, by taking care to have no other combustible material in your work-room, and by following my instructions strictly, the danger will be almost non-existent. If a wheel you are filling should fire, there need be no personal harm done, and if your work-room be clear of combustible material, no serious damage can result.

I will, however, first teach you how to make the ordinary pin-wheel.

The size I recommend you to make is that known as the fourpenny pin-wheel. I consider the halfpenny, penny, and twopenny sizes too small, and the sizes beyond unnecessarily long-lasting. The usual fourpenny wheel is, however, made in two pipes, which, after filling, have to be joined together. Inasmuch as there is much difficulty in rolling the cases perfectly and in joining them afterwards, I think the increased length of time the wheel will burn will not compensate for the trouble. Therefore I strongly advise that you should confine your wheel-making to single pipe-wheels, but that they should be of the fourpenny size.

Paper.—The paper you will require is 17th. white double-crown, which you will cut down the fold, and then cut each half sheet the long way of the paper into four strips.

Rolling.—Your roller will be a steel wire two feet three inches long, No. 7 gauge. Wheel-pipes require to be “bell-mouthed,” that is to say, that at the mouth the bore should become slightly larger. The process of filling would be very difficult if the cases were not so made, and, in the event of requiring to join the pipes it becomes necessary, in order that the smaller ends fit into the larger ones.

To make your roller give this bell-mouth you will have to thicken the wire at one end. You must make the one end half as thick again at the extremity of the roller and portion of the wire as the wire itself. One way is to wind cotton round, beginning four inches from the end, increasing the thickness of the cotton gradually for two inches towards the end, until you have the requisite addition; then cover the cotton with sealing-wax. Another way is, after patting cotton on as by the last plan, to pass a piece of quill over it, and to fix it by sealing-wax.

Lay out your papers for pasting the same way as for crackers, though scarcely so wide apart, as the white paper used for pin-wheels takes the paste easily. It is very necessary—forgive the reiteration—that you should not use more paste than is absolutely requisite to hold the pipe together. One of the great difficulties of all case-rolling is caused when one gets a lot of unnecessary paste about. It gets on one’s hands, and on the bench, and rolling becomes twice as troublesome.

If you have practised cracker-case making thoroughly you will be all the better prepared to roll wheel-pipes. But much more care is now required. The paper is much more delicate,
and the bell-mouthed end will render your task at first more
difficult. But persevere, and you will soon find it easy work.
My instructions in rolling the cracker-cases apply here, and I
can only add, to help you to roll successfully, these hints:—After
failing with one sheet of paper, do not go on in the hope of
perfecting that one. Throw it aside, and take a fresh one.
Don't practise on the paper you have creased or crumpled; it
would puzzle an expert hand to roll such a paper into a perfect
case, and it is worse than useless for an amateur to attempt it.

Do not think the task insurmountable; a little patience will
triumph. I could teach a boy or girl in an hour or so.

Funnel.—You must now get your tinman or smith to make
you a funnel. It has to be very carefully and nicely made. A
sketch of it is given on page 281. The nozzle is the important
part; it should be so soldered on to the funnel itself, and the
joint so filed inside, that in raising and lowering the rammer
no obstruction is met. The inside should be perfectly smooth,
with no sign of a ridge, however small. This is all-important. The
funnel should be of copper, the nozzle of brass. The outside
of the nozzle should be exactly the same shape as the bell end
of the pipe, but a little thicker towards the funnel, so that as
the pipe has to be fitted on to this nozzle for filling, even if it
has been loosely rolled, it will still wedge firmly on to it. If
the pipe is properly made, it will go on the nozzle of the
funnel about five-eighths of an inch, which five-eighths of an
inch is afterwards twisted up to finish the wheel.

Too much care cannot be taken in strictly following out
these few details.

Your rammer will be a brass rod five or six inches longer
than the pipe itself, and of No. 8 gauge, and with a small
wooden handle. The bottom should be perfectly flat, and
notches should be cut in the wire, as described for aubins.

One other little preparation is necessary before starting to
fill. The bell end of the pipe has to be fitted and wedged on
to the nozzle of the funnel, and the funnel has to be fixed
firmly while the composition is rammed. A very primitive
looking little machine is used in the trade, but it is so simple
and so perfect in answering the requirements of the work,
that you can have nothing better. Get a flat piece of oak
wood about one and a quarter inches wide, five or six inches
long, and a quarter of an inch thick, and screw it down to the
bench in front of you. Get two pieces of brass one-eighth of
an inch thick, one and three-quarter inches long, one inch
wide, and get them screwed WWII to the piece of wood
(one above and one below) at its extreme left, reaching towards
you. The near end should be rounded off. Get another piece
of wood, say half an inch wide, three and a half inches long,
and a quarter of an inch thick, rounded off at one end, which is
to be inserted between the brass plates, and so fixed by a brass
pin that it works freely to enclose between it and the fixed
wood the nozzle of the funnel at a certain place where you
have to a rounded opening made to suit it. A piece of steel
wire (No. 6 gauge) will extend to the right hand, say two and
a half inches. By means of this wire, and one with a crook to
it, coming from the oaken piece on the table, the two pieces of
wood are held together, and they will hold the funnel's
nozzle, and release it, as you desire. A drawing of this will be
found on page 281. An upright piece of wood should be fixed
to the middle of the table, to help to keep the funnel firm,
otherwise the composition would jump out of the funnel during
the ramming.

The ordinary pin-wheel composition is:—Meal powder, thirteen
parts; saltpetre, seven parts; sulphur, five parts. If you
make a wheel with a second pipe joined on, the composition for
that second pipe must have an extra part of meal-powder. If
a third pipe be used, the meal-powder must be 15 parts. If
four pipes be used, there must be 16 parts of meal-powder in
the composition for the last pipe. And so on.

Filling.—The bell-mouthed end of your pipe then is fixed on
the nozzle of the funnel, and the funnel is fixed in position in the
funnel-holder. Before commencing to fill turn up about a
quarter of an inch of the pipe at the bottom, and keep it bent
with your left hand, until a quarter of an inch of the pipe is
filled, when you may remove the hand.

In filling you must not lift your hand high. Give short
quick strokes. The hand should never be more than say six
inches above the top of the funnel. Every time you push the
rammer down it slips through the fingers a very little. As the
pipe fills you will gradually be holding the rammer lower, but
the hand will retain its old position.

Give occasional glances at the top of the rammer. If it rises
and falls perpendicularly, you are working well. Don't attempt
to hurry this filling; work gently, steadily, and carefully. If
you lift the hand too high, the composition will get jammed, and
there will be a void. This cannot be remedied afterwards, so the
wheel is spoilt, and your labour lost. Knowing as I do that
every workman will hurry the work of filling, I desire to caution
you, as an amateur especially, against it.

Listen carefully, and you will, after filling a few, be able to
distinguish the different sounds made by the rammer at different
parts of the case. You know that in pouring out a glass of beer
the sound changes as the glass is filled. Well, the same vari-
ation is noticeable in filling these cases. You will also very soon
be able to feel at what point you are working. Unless you listen
carefully you will go on ramming after the case is full, and fill the
nozzle of the funnel. If this happens—and it will until you are
acustomed to the work—simply take the wheel off and expel the
composition, by forcing your rammer up the nozzle. It is a
common thing for a workman, when he finds the nozzle stopped
up, to attempt to force the composition out by sending the
rammer down through the funnel, so that, as the nozzle tapers
off towards the bottom, the composition gets still more tightly
wedged in. If he succeeds in his object he most likely spoils
his funnel.

To finish off the wheel, just twist up the part of the pipe
which has been fitted on to the nozzle.

Now damp your wheel-pipes for one hour, exactly as you did
the cracker pipes. Be careful, as before, to wring the cloth as
dry as possible before you use it. If the wheel-pipes have been
made over-damp, you will have great difficulty in blocking
them. The pipe is now ready for blocking.

There should not be a spot of dirt on the pipe.

Blocking.—Get from a turner some discs of wood rather
thinner than the pipe itself, and one inch in diameter; also a
smooth Dutch tile or a piece of plate-glass about six inches
square and three-sixteenths of an inch thick.

Warm a stick of good sealing-wax at a candle or gas-light,
and pull it out until you get a length of round wax rather less
than a quarter of an inch thick. Let your lighted candle stand
on the table beyond the tile, as you will require it again shortly.

Neither the candle nor the candlestick should be tall; the
flame should be within easy reach of the hand. Place the tile
or piece of plate-glass on the table before you, over a piece of
cloth or two or three folds of calico. This will prevent it
sliding about while you are at work.

Take from the damp cloth one of the pipes. Lay it in
front of you, so that the small end is in the middle of the
tile and the bell-mouthed end to your right. Now, with
your fingers, gently roll the small end, for a distance of
two inches, backwards and forwards, so as to loosen the composition a little. Flatten these two inches of pipe by pressing the thumb-nail from right to left, so that you make the end wedge-shaped.

Place a single block (one of the wooden discs) nearly in the middle of the tile, between the pipe and yourself (see sketch on page 281). The small end of the pipe should extend three inches beyond the block to your left. Hold the pipe and block in that position firmly on the tile by the right hand. With the left hand gently bend the three inches of pipe towards you, and round the block, and tuck the wedge-like end between the long length of pipe and the block. Keep the finger tips of the left hand on the top of the block, and turn the bent part of the pipe, while the left thumb holds the pipe round towards you, and presses it for a second turn round the block. The off thumb is resting on the side of the pipe next to you. Now, with the right-hand fingers and thumb, proceed to bend the pipe round the block, say one inch; then take off the pressure of the left hand, hold the wheel firmly by the right hand, and turn it back that inch. Then put on the pressure of the left hand again, and bend another inch, and so on, until the wheel is completely formed.

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HOME PETS.

By W. A. Blaiston.

Canaries.

Perhaps the most complete apparatus in the shape of a breeding-cage which can be bought ready-made is the ordinary murium in parbo cage, usually kept in stock by most wire-workers and cage-makers. It is not worth while supplying two sets of seed-holes. Whatever be the size of the cage the hoppers then hang one under the other, and the same with the drinking vessels, presenting a uniform appearance.

In the case of a stack three compartments wide, a water-tin occupying space with an illustration, as I find I must be more brief in my remarks than was at first intended; but I furnish a sketch of the breeding-cage generally used by those who mean business and not show. It will also give any who have profited by the instruction in joinery an opportunity of being their own architects. Those, however, who do not care to be at the trouble to practise amateur cabinet-making, will find the ready-made cage a very neat thing, and no eyesore to the breakfast-room or library. It consists of two compartments, and is adapted for two pairs of birds, with nest-boxes at the end and nursery cage underneath; is mahogany-fronted, neatly got up, and may be purchased for a few shillings.

The breeding-cage, of which a sketch is annexed, and which is technically termed a two-couple cage, may be made either as a single cage, or in stacks of two, four, eight, or more, bearing in mind that it is desirable to make a stack always an even number of compartments in width, to allow of one seed-hopper must either hang contiguous to a seed-hopper, or the water-hole must be made in the door. Either is undesirable, and the latter very dangerous, as the chances are that once in a year after shutting the door, the replacing of the water-tin will be forgotten, and that once may cost the lives of a cage of young birds.

A good useful size for each compartment is eighteen inches wide, fourteen high, and ten from back to front. The front may be made to take off, and in some respects this is desirable, as it affords facility for thorough cleaning, an operation absolutely necessary each spring and autumn. But whether this be done or not, that is, whether the front be made part and parcel of the box or made to ship and unship, there must be no cracks or crevices between it and the edge, but all must be made close and tight, for reasons to be hereafter explained.

The cage is best made of common deal, and half-inch stuff planed up to three-eighths will make solid work. Lighter stuff will make no better work, if there be the ability to manipulate.
The partition must come from back to front, and finish with the edge flush with the front of the box. The hole in the middle can be closed at pleasure by a little door revolving on a screw. An inch and a half deep will do for the top piece of the front, and the same for the bottom, with a turn-rail an inch deep beneath that. The turn-rail revolves on a stout wire, which is indicated by a dotted line, and obviates the necessity of false bottoms, which are at once cumbersome and heavy, and affords every facility for cleaning out the cage by means of a little iron scraper, without disturbing the birds by inserting the hand and lifting the sand and refuse matter out by the door.

These dimensions leave a frontage of ten inches in height for wiring, and if there be a wire cross-bar with a sliding door, the space may be equally divided, or, at any rate, sufficient room allowed above the door to allow of its sliding up without obstruction. A fair-sized door is indispensable, especially when the front is a fixture, as the aperture is required for other purposes than simply a mode of ingress or egress for the birds.

The wires should be No. 16 size galvanised wire, and inserted half an inch apart, centre to centre; and in order that the holes in the top, bottom, and cross-bar, may exactly correspond, the three should be clamped together, pricked off with a pair of compasses, marked across with a square, and carefully pricked, taking special care to hold the pricker in an upright position when pricking the cross-bar. This is of importance.

It is a good plan to have a strip of tin with holes pierced at proper distances. By placing this on the wood, and pricking through the holes, all clamping and marking-off is avoided, and exactness easily obtained. Nothing looks worse than a cage badly wired. The wooden-framed door swings on one of the wires, and the best possible fastening is a piece of stout wire passed through the bottom of the door frame, and bent down at right angles on either side. This fastening is self-acting, and will fall of itself if properly adjusted.

The seed and water holes must be large enough to allow the bird to have free access to its food, but not large enough to admit of its escaping—a misadventure more frequent than might be supposed. The interior of the cage must be thoroughly whitewashed with a composition of whiting and thin flour-and-water paste. This mixture, if applied warm, works very smoothly from the brush (a short-handled paint-brush should be kept for the purpose), and when dry will not rub off. Great care must be taken to work the stuff well into the minutest cracks. The smaller the cracks the more necessary it should be filled up to prevent its ultimately becoming the home of a legion of minute parasites, which, under certain conditions, attack the canary. A loose flake of whitewash will afford a hiding-place for hundreds, and hence the necessity of having all joints and crevices well cemented with the composition. My own cages, from constant whitewashing and consequent gathering up of sand in the brush, are almost concreted.

Before finding tenants for the cage, it may be well to describe the furniture, and give an inventory.

The perches should not be round, and scarcely thicker than a butcher's skewer, but oval-shaped, half an inch in the widest diameter, and about a quarter or perhaps a trifle more the other way. Let them be sufficiently long to project an inch or more beyond the cross-bar, on which they must rest on the flat side, while a sharp-pointed brad inserted at the other end will serve to fix them against the cage back. This additional length admits of their being easily withdrawn, either for being scraped and cleaned, or for fixing in fresh positions as occasion may demand. Two perches is the usual complement for each compartment, and they must be placed sufficiently wide apart to admit of the nest box being suspended between them (at the back of the cage) so as to afford the old birds a good standing-place when they are feeding the young ones.

A little experience soon suggests the best arrangement for these various little matters, about which a volume might be written; and in sundry little contrivances which necessity or the exigencies of the breeding-cage may require, there is ample scope for the exercise of ingenuity.

The old-fashioned seed-glasses are never seen in company with a modern breeding-cage.

It is not necessary to give any dimensions, as the size must be regulated by the number of holes it is intended to cover. Two seed-holes are sufficient for any ordinary cage, and in wiring from that end of the compartment it is usual to run in two wires, then a seed-hole wire, then two more wires, and then the second seed-hole. The insertion of the next wire will be in the seventh hole, a distance of three and a half inches from the centre of the cage, and allowing another half-inch for the thickness of the partition, and repeating the same method of wiring on the other side a hopper nine inches long will cover the whole.

It is well to have the hole which is next the partition the space of two wires from it, as it is quite a common thing for the cock in one cage to put his head through the hole and whistle operatic selections to his neighbour's wife, the consequence of which is, as might be expected, a fight, and the two cocks will peg away at each other through the seed-holes as often as they get the opportunity.

The best remedy for this is to make a partition from top to bottom of the hopper. In the sketch the interior is seen, and the readiest way of inserting a temporary division easily suggests itself. The front should be covered with a piece of glass or perforated zinc, which serves the double purpose of confining the bird a prisoner, if by any chance he should squeeze through the seed-hole, and also prevents the seed being wasted, for birds have a knack of scattering it wholesale by a quick movement of the head. This waste is considerable in a room where there are forty or fifty pairs put up, and not a little nuisance on a parlour or library carpet.

The egg-box is a necessary item of bird-room furniture. It may be made of any size, to suit the requirements of the stock, say from six or eight inches to a foot square. It is only a bottomless box about a couple of inches in depth, having a top of stout perforated zinc firmly nailed on. Through this zinc cover the hard-boiled egg used as food is squeezed with a table-knife, an instantaneous process, doing the work more thoroughly and in less time than by chopping, though the result is always spoken of as "chopped" egg.

The bath is a most necessary adjunct. It may be made of zinc with the wire covering soldered to it, or of wood with a zinc or earthenware basin. Where access can be had to a pottery, there are many articles in use in the bird-room which can be made to pattern. In a large establishment several of these baths are necessary, and if hung at the open door the birds will make free use of them to such an extent indeed, as will astonish those who have not seen the performance.

To counterbalance the leverage caused by the great weight of water, a hooked wire may be attached to the top of the cover, and hitched on to the wires of the cage.

The old style of drinking-fountain—that conical affair with a projecting lip at the base—though most expensive, is the best water vessel to hang on the exterior of the cage. The great disadvantage of all drinking vessels at present in use is that they are so many receptacles for fragments of food,
SKATING.

BY A MEMBER OF THE "LONDON SKATING CLUB."

ELEMENTARY FIGURES—THE EIGHT—THE THREE—DOUBLE THREES—THE ROSE.

Who has fairly mastered the outside edge forwards is introduced at once to the study of the "figures," properly so called, and of those the first that invite his attention are the "eight" and the "three." The former is something more than a mere continuation of the lesson he has just learned. It is at once the simplest and most beautiful of the skating figures, and yet one that is now seldom learned to perfection.

To accomplish it, start on the right foot with a strong bold stroke, leaving the body rather far out of the perpendicular, so as to ensure a rapid curve, and continuing that curve firmly and steadily until a circle is almost entirely completed.

By this time your impetuosity will be pretty well exhausted; but before you come quite to a standstill, bring the left foot (which, of course, has been hitherto held just behind the other) to the front; cross it quickly over the right toe, and as the latter completes its stroke, put the left down at an angle pointing well to the right; throw the whole weight of the body at the same time steadily to the right, so as to rest it entirely on the foot just put down, and thus commence another stroke of precisely the same sort, describing another circle on the left.

These successive circles, all returning nearly to the same spot, constitute each the half of a very handsome figure (Fig. 1), resembling accurately the Arabic symbol 8. Of course, it is not to be supposed that the beginner will succeed at once in making the ends of the circles fit with one another. Many of the strokes will come far short of the proper distance. Sometimes the impetuosity will fail long before the circle is completed; at other times the line of march, animated by some spirit of eccentricity, will fly off provokingly in a wrong direction, and leave the beginner helplessly wandering far away from the point at which he expected to arrive.

All these disasters must not discourage him. Practice will give confidence; and the two together will triumph surely in the end. Above all, do not look down upon the ice to watch whether the feet are going in the right direction. Get a friend, if you like, or if you can, to stand at the place whence you started, and shape your course by looking towards him. But do not on any account, as some do, put an orange on the ice and steer to that. The head must always be kept upright, and the eyes raised. Once let them down, and it is all up with your hopes of skating properly.

The other grand rule is to keep the circles large; eight feet should be the minimum diameter of any circle, and this is much too small. The little cramped circles, favoured by the Canadians, are utterly scoffed by English skaters, and they are fatal to proficiency in that grand masterpiece of our national club, the art of combined figure skating.

We have begun by describing the eight as properly skated, with the feet crossed; but it is possible to execute a very capital eight without crossing the feet at all, as appears in Fig. 2.

When it is desired to practise one foot especially, or to give the other foot a rest, it is a capital plan to interpose between the two circles of the common eight a half-stroke, as is shown in Fig. 3, thus describing the full circles, say on the right foot only, while the easier semicircles remain for the less practised or weaker left. Here, too, is a capital opportunity for executing a simple concerted figure. The other skater performs one of the semicircles while you are doing your own, each on the left foot; then you skate each your full circle at the end on the right foot, passing one another once more as you each return upon the left.

Of course any amount of half-circles may be interposed, leaving the entire circles for the ends. Or there may be a central circle from which four or any other number of others diverge, as in Fig. 4. Or finally, the circles may be made to interlace one another in an infinite variety of series, on the plan shown in Fig. 5.

The second of the elementary figures is the "3," most useful and convenient of all manoeuvres to the skater—in fact, the very basis and foundation of all the Club figures. A very easy one, moreover, to learn, and to do—badly—as beginners usually find. It consists of a half-stroke on the outside forward, followed without any stop by a second half-stroke on the inside backwards of the same foot (Figs. 6, 7, 8, 9, 10).

Of the peculiar jerk or rather shift whereby the motion forwards is suddenly reversed at the point where the turn is made, it is quite impossible to give a good explanation. "Solutur ambulando," the problem is only to be solved by trying it, and a very short trial will make it easy.

At first it will no doubt be necessary, as the twist is made, and the motion backwards commences, to put down the other foot upon the ice, just to steady the balance and avoid the strange and formidable feeling which such a shifting of balance must inspire. At first the forward stroke should be made long, as in Fig. 8, and the turn not made till the impetuosity is dying away. What is called the "tail" of the three, that is, its second half, will at first be a very feeble and straggly stroke.
Soon it will become stronger and bolder; the turn may then be made earlier; and at last the forward stroke becomes merely a tiny introductory step, leading up to the long rounded sweep of Fig. 9.

So much for the thing to be done. Next for the manner of doing it.

Again, the attitude in skating is half the battle. *Imprimis,* a straight knee throughout—terribly difficult this one requisite. *Secundo,* the absence of jerks and whirlings of the arms. *Tertio,* a perfectly clean-cut edge to the angle where the turn is made; no scraping of the ice with the flat of the blade, as in Fig. 11; no loops, as in Fig. 12.

As to the comparative length of the tail compared with the first half of the three, that is rather a moot point; many skaters make their threes almost all tail. Others hold that the two halves should be almost equal in length. There is no doubt of edges practicable by the double and "half-double" threes are endless. And the skater must so manage his balance as at any time to be able to shift from either edge forwards or backwards to the reverse edge in the other direction.

The annexed Figures show a double three, a half-double, the most difficult, and a triple three on the right foot. By multiplying the terms, and making each forward and backward stroke equal in size, a figure is achieved which goes by the name of the "rose."
JOINERY AS A RECREATION.

By Ellis A. Davidson, Author of "Drawing for Carpenters and Joiners," "Drawing for Cabinet-Makers," "Happy Nursery," etc.

MODELS FOR THE MANTELPIECE OR TABLE—HOW TO MAKE A MODEL LODGE OR TOLL-HOUSE.

HAVING now given instructions for the manufacture of several articles of absolute utility, we now proceed to show how a pretty object for the mantelpiece or drawing-room table may be made, and in this occupation we hope to interest our fair readers as well as their brothers, the work being light and refined, and calling into action their natural taste and neatness. Some of these models, too, may be made very handsome, and are well adapted for fancy fairs and bazaars, to which ladies are so often asked to contribute.

We give in the present article a model lodge or toll-house; and the wood of which this is to be constructed should be of best not to press too heavily, but to repeat the cuts again and again. Do not force or break the parts asunder, but continue cutting until the wood is penetrated; otherwise your cut edge will not be smooth.

The front, then, is to be six inches square, and the two sides, made of the quarter-inch wood, must be six inches high, and five and three-quarter inches wide, so that when the back and front, which are one-eighth inch, are nailed against them, the side may be six inches square.

In joining the back and front with the sides, bore small holes at one-eighth of an inch from the two edges of them with your two thicknesses,—viz., quarter-inch and one-eighth of an inch. It should be good dry pine, as free from knots as possible, and planed on both sides. This can be cut with a penknife, and the work may thus be carried on in the usual sitting-room, where a board to cut on, and a newspaper spread on the floor, to catch the few chips made, will protect the table-cloth and carpet from injury; and, after all, the cuttings are "clean dirt," and can easily be picked up.

The first part of the model which should be made is the body of the lodge; this should measure six inches every way; the front and back are to be made of the one-eighth inch wood, and the sides of the quarter-inch.

Mark the two pieces for back and front in pencil; place a straight rule against the lines, and cut down them two or three times with your penknife, until you have penetrated about half the thickness; then near the top and bottom of the line you are cutting, press a pin or needle quite through, and in this way you will get two little holes on the other side. Place your rule against these and cut the line from the back, when the whole thickness will soon be cut through. The quarter-inch wood for the sides can be cut through in the same way.

In cutting, keep your knife as upright as you can. It is fine bradawl, place them quite square with the side, and attach them by means of the small nails called "sprigs." The size of these should be three-eighths of an inch.

We have given the method of uniting the parts at this stage because it is more convenient, when describing the body of the house as a block, to speak of the method of putting it together. But we must now explain that when the four pieces are prepared, the apertures for the windows and doors are to be cut, and when this is done the principal dividing bars should be gimied across. By this we do not mean the sash-bars dividing the separate panes, but in the two upper windows, one horizontal in the middle of each, and in the lower window two uprights dividing the whole into three parts.

The doorway having been cut out, a piece of stuff is to be glued at the back for the door, the divisions for the separate boards of which the door is supposed to be composed having been previously deeply indented with the point of a bradawl.

Pieces of glass are to be glued at the back of the windows, and on these the small sash-bars may be painted with a fine brush, and some of the paint which is to be used for the whole building; or very thin strips of wood may be glued on to the glass.
Small ledges of wood should be glued inside, a little way from the window apertures, to serve for the support of the glass, as, of course, you must not depend on the glue holding it against the wood. The glass should not be put in its place until all nailing is finished, as the knocking will displace it.

When the glass can be obtained at any glazier's, and if the size required be chipped on the edge with a file, these can be easily broken to the required lengths.

Before nailing the four walls together it is advisable to nail on the front and back of the other part of the lodge, supposed to contain the kitchen and scullery. These walls are to be three and a half inches high and seven inches long.

The width at the end is to be four inches, so that the end piece must be three and three-quarter inches across, which will be made up to four inches by the thickness (one-eighth of an inch each) of the back and front.

Draw a line, aided by your square, at one inch from each edge of the side to which this part is to be attached, which will guide you in placing it. Bore fine holes very closely within these lines, through which you will pass your nails from the other side. As these sides are only one-eighth of an inch thick, you must be very careful in nailing so that the wood does not split, or that the points of the nails may not protrude.

You can obtain at some ironmongers some very thin and smooth nails; they are called "French nails," and do not split the wood. Or you can use good-sized common pins, which you can cut in halves and file the end of the upper portion to a point. And now you can nail the whole carcasse together.

The chimney-stack is made by a piece of quarter-inch board, a short piece opposite to it, and back and front made of one-eighth inch wood; it should be about ten inches high, but the square part need only go about four inches down. The remaining part, which is only the quarter-inch board, is then to be nailed or glued on to the outer side of the wall. The chimney-pots may be made of wood rounded, or of part of a quill.

The roof is a pyramid made of four triangular pieces; the base of the triangle is eight inches, and the slanting sides are seven inches. When four of these have been cut, the inner edges of the slanting sides must be shaved down, or "bevelled," as it is called, so that when the sides are brought together a clean sharp edge may be formed. In one of these a hole must be cut for the chimney to pass through.

Before the sides are fastened, lines should be made on them to represent the overlapping of the slates. The roof of the kitchen is to be made similarly; the end piece is triangular, and the other two pieces are slanted off, as seen in the design.

The chimney is to be constructed in precisely the same way as the other. The shutter is to be made of the thin wood, and may, with a very little ingenuity, be made to open and shut, each hinge being formed of two loops made of pins, one loop inserted into the edge of the shutter and the other into the bottom of the window, just above the window-sill. The door-posts, window-sills, etc., are to be made of very thin pieces of wood glued on at the proper places.

The paling is made of separate strips of wood glued or pinned against two cross-pieces; they may be fixed at a distance apart, and thus a view will be given of the garden, which may be laid out with moss and everlasting flowers, to be obtained at any florist or seedsman's shop.

The whole should now be painted, and as there should not be any gloss on it, as is usual in painted work, the best plan is to buy a little ready-mixed white lead at a cobourman's, at a few pence per pound, and, placing a small quantity in an old cup or preserve pot, thin it with turpentine. This will do very well for the whole house, and some of the same paint, with which a little indigo, bought in powder, has been finely ground up, will do for the slates; and the same, with a small quantity of yellow ochre, also bought in powder or lump, will be used for the window-sills. The paling, shutter, and door should be painted green, and the chimney's light red, both of which colours may be bought ready mixed.

The brushes used should be those sold for artists' use, made of hog's-hair fixed in tin; they may be washed out in turpentine, and when not in use should be kept in water.

**FIREWORK-MAKING.**

**BY C. T. BUCK.**

**WHEEL-BLOCKING—QUICKMATCH-MAKING—ROCKET CASES.**

The fault usually made by beginners in blocking wheels is that of attempting to wind up too much of the pipe at a time. You should guard against this, because you will strain the pipe too abruptly, and break it. Be satisfied by the gain of an inch each time. Some little practice at this work will be found necessary, but you should not pass on without devoting the requisite time to master the difficulty. If you break, say one inch off, empty out a little composition, flatten out, and make another attempt. If you break the pipe in the middle, you may, by bending the opposite way with much care, close up the wound, and succeed in blocking the wheel completely.

**Waxing.**—Now that the wheel is blocked, take it up by its circumference with the tips of the left fingers and thumb. You will find that about the last half inch of the pipe. This has to be fixed by sealing-wax to the previous turn of the wheel. You are now holding the wheel between the left forefinger and thumb—the forefinger above the last turn of the pipe. Take the wax in the right hand. Do not over-heat the wax, so as to destroy its adhesiveness, but still make it so hot that a quick dab under the straight half-inch end will be sufficient to hold it firmly. Press down the end with the left forefinger, and lay down the wheel. Proceed in this way until all are blocked, when they will simply require "banding."

**Banding.**—Cut some strips of paper (blue double-crown is generally used) into lengths sufficient to fold over the diameter of the wheel, front and back, and of the same width as the thickness of the pipe. After pasting these strips, take one, and, beginning in the centre of the block, extend to the circumference, and carry it across the diameter of the other side to the starting-point.

If you wish to make long-burning wheels, with two or three lengths of pipes, you must roll the cases very carefully. When you have rolled one or two, see that the tails will fit about three-quarters of an inch into the bell mouths, before proceeding to make a number. In filling pipes which have to be joined on to first pipes, you will not bend up the tail, but will gently fill the first quarter of an inch on some flat hard substance, so as not to break or burst the pipe. In filling pin-wheels you will frequently find that you have neglected to fill precisely to the top of the case (or to the bottom of the nozzle of the funnel).
Perhaps you have filled to within the sixtieth of an inch; but for these long-burning wheels you must exactly fill the pipes, otherwise the fire will not be continuous. The best plan will be to cut one-eighth of an inch off the mouth end of the pipe, after filling, as the joint will thus be cleaner.

*Extraordinary Pin-Wheels.*—Meal powder, four parts; saltpetre, one part; sulphur, one part; oxalate of soda, half part. A very pretty yellow wheel is to be made from this recipe.

Now, you can make pin-wheels with sparks of magnesium, iron, steel, lamp-black, and charcoal. You can make them with decided blue, red, green, and other tints.

These do not come in the category of ordinary fireworks, and I do not care to make my recipes known, but I should like you to be able to make all these, and you will be able to do so if you try. Besides, as I said before, the chief enjoyment is in experimenting. The effects to be obtained are really so grand, that I hope those who have sufficient love for the art will try their hands at it.

I may say generally that the steel and iron sparks are not to be got by what is known as saltpetre and gunpowder compositions. Chlorate of potash, charcoal, and nitrate of lead, will have to be used, but you must avoid sulphur and all sulphides. The possible danger would arise from the gritty steel or iron running down the funnel, and the friction of the rammer igniting the chlorate of potash.

When mixing these compositions, be careful to mix a very small quantity at a time; only enough for a single experiment, and to have all other fireworks and combustible material removed from your work-room. If a wheel ignites in such circumstances the worst results will be a slight shock to your nerves.

All compositions for pin-wheels must be very fierce, and must have this characteristic—that they shall burn an inch before the pipe begins to give way. If the composition should burn the pipe away immediately, it would also burn through the next turn of the wheel, and so cause failure. With coloured pin-wheels, therefore, you will have to use an excess of charcoal.

I do not expect you will succeed in getting deep tints, but you will obtain colours quite fine enough to answer your end. The colour will probably be intermittent, but your wheel will not be less pretty if it change from colours to sparks, or show a bright ring of colour with crenellations and a bright circular flame. In the rapid turning you will find charms in its defects.

**PRINCE OF WALES’ FEATHERS.**

The cases for these are precisely the same as pin-wheel pipes, but yellow paper is generally used. They are filled in the same way.

*Composition.*—Saltpetre, eight parts; sulphur, two and three quarter parts; meal-powder, three parts; lamp-black, one and a quarter parts; orpiment, half part.

Now that I have disposed of all the varieties of small fireworks, I will take the opportunity to explain how to make

**QUICKMATCH,**

which you will very frequently require in making the fireworks I shall next deal with. I will describe the way it is made at Nunhead, and you will see at once how to adapt the plan to your smaller requirements.

Like several other portions of your work, match should be made in sufficient quantity to last you a considerable time.

Two sorts of match, then, are made, viz., “thick” and “thin.” The former is made from lamp-cotton of six threads; the latter, of four threads. This four and six-thread lamp-cotton is made expressly. As usually sold it has two threads.

It is necessary to have the very best quality of cotton; inferior sorts are rotten, knotty, and dirty, and they cause much trouble.

The contents of a “quarter barrel” (twenty-five pounds) of the strongest T. P. C. (tow-proof cannon) gunpowder are turned into a clean glazed earthenware pan, and just sufficient water is added to form a hard paste. This is allowed to remain about an hour, by which time the powder grains will have dissolved, and the paste formed; now six ounces of starch is mixed with three quarts of water, and made as a laudness makes it; this is turned into the powder paste, and thoroughly mixed with it, until a very thick smooth paste is obtained. Care is taken not to add too much water. When a pasty is made, it is invariably completely used the same day; if it were left until the following day it would spoil, the saltpetre would crystallise.

A second clean glazed pan is now required, on the bottom of which a cupful of the paste is poured. Now, a third pan is used and occupied by the ball of cotton which is to be converted into match. Glazed pans are used because they give no opportunity for the cotton to catch or entangle, but enable the match-maker to work freely.

About twenty yards of cotton are laid in the bottom of the second pan, a little more paste is spread over it, and the cup is dabbed on the thread until all the white has disappeared. More cotton is laid in the pan, and paste added, until the latter is exhausted. No more paste is used than is actually necessary.

Now the end of the cotton is taken in, say the left hand, and passed into the clean (No. 3) pan. The right hand is kept in the match pan, and as the match is drawn out by the left hand, it is made to pass between the tips of the thumb and first and second fingers of the right hand. It is not held so tightly as to take off too much of the paste, the object being simply to prevent superfluous paste passing, and the cotton is effectually coated.

Now is used a winding frame six feet long by four feet wide. This is made of wood two inches by one inch, and when the frame is stood up on end, a spindle is driven in the middle of each side. Two wooden uprights are necessary, with holes cut to receive the spindles, at such a height as will allow the frame to revolve without touching the ground. The spindles are at least two inches further apart than the width of the frame.

The spindles should each have a chuck one inch long. You may be interested in learning that fifty or sixty such frames of match are made for each Crystal Palace display.

A cloth is laid underneath the frame, so that the splashes caused by turning the frame do not make the floor dirty. The match is now wound upon the frame from side to side, keeping the turns perfectly regular—say a quarter of an inch apart. Care has to be taken not to wind too quickly. The match has to be held somewhat less loosely than before, but still not by any means tightly.

Good match should be of the same thickness throughout, and should be round. It gets flattened in pressing through the hand, unless the fingers are properly placed.

Now I will take it that you have adopted a modification of this plan, and that you have just wound your match on the frame. You will therefore want a box a little larger than your frame, and, say, six inches deep, with a little block at each corner to support the frame when laid in.

When the frame is placed in the box, take a fine lawn sieve, and sift meal-powder over both sides of the match, until it is completely covered, and you can see no wet match. Knock the frame to remove any loose powder dust, and place it where the wind will dry the match. When dry, cut it into lengths (the length of your frame), and carefully store it in bundles. Two turns of paper should be passed round each bundle in three parts of its length, and then tied. At Nunhead we make bundles of 100 lengths each, and pack them away in boxes of the proper length.
The match described above is raw or naked match, as distinguished from quickmatch, which is made by enclosing the match you have already made in paper pipes, made in the same way—with similar bell mouths—as you made your pin-wheel tubes. For thin match-pipes you will use a steel roller (No. 7 gauge); the thick pipes will require one of No. 6 gauge. Each roller should be twenty-six inches long. Make the bell-mouths as you did in the case of pin-wheels.

Now pass a length of match through the pipe; fix the thin end of the pipe into the bell-mouth of another, and paste over the join a piece of paper about two inches square.

I know by experience that the pipes should not be over-small, but that they should rather be roomy, and that the paper should not be strong or a “size paper.” If a sized paper has been used, the size in it will—say on a summer evening, when the match is most frequently required—take the damp, and so render the match wet, and cause the fire to travel slowly. If the paper be too strong, it is objectionable on the same grounds as over-tough cracker paper; there will be sharp reports, pauses, and even breaks. If the rods are made small, there is the same result. I have seen in books on pyrotechny statements exactly contrary to these, but you will find, if you follow my teaching, you will have quickmatch burning continuously.

**ROCKET AND OTHER CASES.**

You know all about dry-case rolling, but we now come to cases sheets of which have to be saturated with paste. A rolling-board now becomes necessary. The handle should allow sufficient room for you to get the fingers well underneath without rubbing your knuckles against it (see sketch on page 281).

A slate is the best substance to roll these cases on. You should get one three feet by eighteen inches, and an inch and a quarter thick. Your bench should be about three feet three inches high.

In order to roll well and easily, you must cut the paper carefully. Never attempt to cut too much at a time. Fold with exactness, and flatten the fold with a paper-knife. The best knife to cut paper is the ordinary “cobbler’s” knife, which you should sharpen on a cobbler’s sandstone. By the way, do not sharpen your knife in close neighbourhood to composition, for a spark is easily created, and in the daytime is almost imperceptible. If an accident were to happen you would perhaps be puzzled to ascertain the cause.

When you have folded your paper, and cut through the bend, always turn the top half upside-down, and lay it upon the lower half, so that the new edges of the upper sheets lay above the now edges of the lower ones. Pick up the papers, stand them on their new edges, and shake them together before cutting again.

Most cases will require two or more strips of paper. Paste the edges of a few sheets, which are to form the last turn, some time before you want to use them. Paste each sheet (including the last) all over one side just before using it.

My former remarks about excessive pasting will apply here with equal or greater force. It is impossible to roll a case tightly and perfectly if an excess of paste is used. I have had a great deal of experience in case-rolling, and I do not exaggerate the necessity of enforcing this point. During the Franco-German war I had to make two millions of cases in ten weeks, and I found that the best workers were the new hands whom I taught. Those who had never rolled a case before became most proficient; because, having nothing to unlearn, they learned more rapidly than old firework hands, who had a way of their own, and that the wrong way. A few hours generally sufficed to make an ordinarily intelligent new-comer an expert case roller. I had one man whom I taught to become so expert that he rolled thirty gross of cases in one day. I should tell you it was a long day, and the case only consisted of one sheet of paper, but it was a great feat of skill. A few years ago, five or six gross of such cases would have been considered a great result to achieve in the same time.

This is the proper way to roll a case:—Lay your paper lengthwise on the slate, about two inches from the near side of the slate. Place the roller on the paper; double the paper over the roller, so that it overlaps it by at least six inches. Be careful that the side edges of the upper portion of the paper correspond exactly with those of the lower part. Feel that the roller is properly within the fold, press your hand on the top of the paper over the roller, draw back the roller (the paper with it), and tack the edge underneath the roller—you must not double or fold in the paper. Now roll your case up, keeping your hand firmly on the roller. With a little practice you will be able to do this straightly, without wavering to the right or left, and without making the finish of the case uneven at the sides.

The old style of rolling cases was to roll, say five inches, then to unroll three inches, to roll up five more, and then to unroll three, and so on to the end. The intention was to ensure a tight case and even sides, but the plan was seen to be absurd. The proper way is to practise to roll the case perfectly at first, and then all the unrolling is unnecessary. If you devote a little time to this case-rolling, you will save yourself much trouble hereafter.

In rolling, look to one side only, and see that you are keeping that edge perfectly even.

If you use more than one sheet of paper in rolling your case—which will most frequently be the way—you will roll your first sheet within three inches of the end of it; then you will pick up the partly-made case with the roller in it. Lay down your second sheet in the position on the slate which the first sheet occupied at starting. Lay the case with the roller in it about three inches from the bottom of the second sheet, and see that the sides of the three inches which remain unrolled are perfectly even with the sides of the second sheet. Bring the bottom edge of the new sheet over the roller, and tack it in under the roller. Roll up as before. After you have done this, take your rolling-board. Draw the roller to you, so that the handle-end is close up to the thigh. With the rolling-board in the hand nearest to the bench, place the top edge on the roller, rest the other hand on the top of the board immediately over the roller, and with a gentle pressure roll on till you get to the end of the board. Practise this a few times, until you can roll straightly, and without striking the slate with the board. Workmen who roll in a slovenly way—knocking the slate about in a noisy fashion—find it most difficult to break the habit.

Unless the paper has been started evenly, and properly rolled by the hand, without any unrolling and re-rolling, no amount of board rolling will make the case perfect.

For small cases—up to and including what I have called the quarter-pound size—two or three rolls of the board will be sufficient.

There is no paper so suitable for case-making as the Arboufield brown, which I recommended for squib cases. That made seventy pounds or eighty pounds to the ream is usually used. For larger cases I am in the habit of adding a very much thicker paper, which has to be specially made; but that known as two sheet board, which can be purchased at any good stationer’s shop, will answer your purpose. When this board has to be used, you will insert it in the case after at least two turns have been made with the Arbourfield paper, which latter should also finish the case off by two or three turns.
DRAUGHTS.

By George Frederick Pardon.

Critical Situations—Problems.

Sturges, the great authority on draughts, gives a "hundred and fifty critical positions to be won or drawn by scientific play." Many of these are simple enough to masters of the game, though very puzzling to tyros; for in draught, as in chess problems, all depends on the initial move. It is not to Sturges alone, however, that we owe the best and most intricate situations. Later players have discovered or invented some very ingenious problems, well worthy the study of the amateur. Here, for instance—

### White to Play and Win

<table>
<thead>
<tr>
<th>White</th>
<th>Black</th>
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<tbody>
<tr>
<td>1. 23 to 27</td>
<td>1. 5 to 9</td>
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<tr>
<td>2. 12 to 8</td>
<td>2. 9 to 13</td>
</tr>
<tr>
<td>3. 8 to 3 K</td>
<td>3. 13 to 17</td>
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<tr>
<td>4. 3 to 7</td>
<td>4. 17 to 21</td>
</tr>
<tr>
<td>5. 7 to 10</td>
<td>5. 25 to 29 K</td>
</tr>
<tr>
<td>6. 18 to 22</td>
<td>6. 21 to 25</td>
</tr>
</tbody>
</table>

By which it will be seen that the black king and black man are both fixed in the course of a few moves.

In the next example we have the men in an apparently favourable position for the white.

### Black

### White to Move and Draw

<table>
<thead>
<tr>
<th>White</th>
<th>Black</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 29 to 25</td>
<td>1. 1 to 6</td>
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<tr>
<td>2. 25 to 22</td>
<td>2. 6 to 9</td>
</tr>
<tr>
<td>3. 22 to 17</td>
<td>3. 9 to 6</td>
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<tr>
<td>4. 17 to 14</td>
<td>4. 6 to 1</td>
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<tr>
<td>5. 14 to 9</td>
<td>5. 1 to 5</td>
</tr>
<tr>
<td>6. 9 to 6</td>
<td>6. 5 to 1</td>
</tr>
<tr>
<td>7. 6 to 2 K</td>
<td>7. 1 to 5</td>
</tr>
<tr>
<td>8. 2 to 6</td>
<td>8. 5 to 1</td>
</tr>
<tr>
<td>9. 6 to 9</td>
<td>9. 1 to 5</td>
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<tr>
<td>10. 9 to 14</td>
<td>10. 5 to 1</td>
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The solution is as follows:

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<tr>
<th>White</th>
<th>Black</th>
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<tbody>
<tr>
<td>1. 15 to 11</td>
<td>1. 8 to 15</td>
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<tr>
<td>2. 19 to 16</td>
<td>2. 12 to 17</td>
</tr>
<tr>
<td>3. 21 to 7</td>
<td>3. 30 to 21</td>
</tr>
<tr>
<td>4. 28 to 1</td>
<td>4. 28 to 1</td>
</tr>
</tbody>
</table>

and the game will be seen to be drawn, for White, though he appears to command the position, cannot prevent Black from gaining the double corner. The next, from Sturges, is ingenious:

### Black

### White to Move and Draw

<table>
<thead>
<tr>
<th>White</th>
<th>Black</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. 29 to 25</td>
<td>1. 1 to 6</td>
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<tr>
<td>2. 25 to 22</td>
<td>2. 6 to 9</td>
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<tr>
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<td>3. 9 to 6</td>
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<td>4. 17 to 14</td>
<td>4. 6 to 1</td>
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<td>5. 14 to 9</td>
<td>5. 1 to 5</td>
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<tr>
<td>6. 9 to 6</td>
<td>6. 5 to 1</td>
</tr>
<tr>
<td>7. 6 to 2 K</td>
<td>7. 1 to 5</td>
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<td>8. 2 to 6</td>
<td>8. 5 to 1</td>
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<tr>
<td>9. 6 to 9</td>
<td>9. 1 to 5</td>
</tr>
<tr>
<td>10. 9 to 14</td>
<td>10. 5 to 1</td>
</tr>
</tbody>
</table>

Here again we have an exceedingly well-designed position—

### Black

### White to Move and Draw
and White draws.

In the following position the least error will defeat the purpose of the player.

**BLACK.**

**WHITE TO MOVE AND WIN.**

Here is the solution:

**WHITE.**

1. 29 to 25
2. 31 to 26
3. 22 to 18
4. 15 to 10
5. 2 to 27

**BLACK.**

1. 21 to 30 K
2. 30 to 23
3. 23 to 14
4. 14 to 7

and White fixes the man on square 5, and checks the advance of the man on square 16.

Thus we see that the initial move in most cases determines the problem. A curious instance of this is seen in the following:

**BLACK.**

**WHITE.**

**BLACK TO MOVE AND WHITE TO WIN.**

Black, it will be seen, has the advantage of a piece, but he loses, nevertheless.

**WHITE.**

1. 20 to 22
2. 9 to 6
3. 19 to 16
4. 1 to 5

**BLACK.**

1. 25 to 18
2. 2 to 9
3. 12 to 19
4. 3 to 12

Black must take from 3 to 12, when White moves from 5 to 21, taking six pieces. A most ingenious situation.

In like manner the next problem is determined:

**BLACK.**

**WHITE.**

**BLACK TO MOVE AND WHITE TO WIN.**

The Black has a choice of several moves—1 to 5, 8 to 11, and 8 to 12. We will try the last first.
DIAPHANIE.

Imitation stained glass.

The art upon which I now propose to discourse may be said to be a kind of offshoot of the last one which I brought before your notice, namely, Polychromie. If you remember, that showed us how to transform clear glass into chinoiserie; diaphanie will initiate us how to give glass the appearance of being richly stained and coloured in various designs.

In the winter months one feels the want of indoor occupations, and not only so, but one also feels the desire of what the employment should be of a stimulating and entertaining nature; for on a wet, cheerless day, when the sky is dull and grey, how glad and grumbling we are inclined to become if we have not any interesting work to draw our thoughts away from the gloomy prospect outside our windows, one on which our minds can concentrate themselves without effort, and in which they become unconsciously absorbed. Such an employment I believe you will find in Diaphanie.

And then, as to my next bringing forward another art, and then expecting you to be ready for the instructions thereon, I would tender these as my reasons—that now-a-days people are so exceedingly fond of change and variety in every way—change of scene and mode of life, variety of ideas and occupations; and added to this they imbibe knowledge, and learn the mysteries of the various arts and sciences with great rapidity, with a surprising quickness, which would fairly take away the breath of our stalwart grandfathers and grandmothers, who were considerably slower in thoughts, words, and deeds, than we who live in these days of lightning speed and ever-changing events.

But in order to be quite fair in our criticisms of those who preceded us, we must take into consideration the great advantages that we hold over them, and one is, that everything is prepared ready to our hands; whereas, in the olden days, these said predecessors had much to do for themselves before they could begin any work of art. They had to make inquiries for and collect from their friends and neighbours various recipes, if they did not find them contained in their own voluminous manuscript books, in which they carefully inscribed valuable notes of this description. They donned large aprons and deep holland sleeves, and, thus protected, they concocted and mixed and prepared all kinds of useful recipes, it might be "fire and water proof cement," excellent eye-water, good blacking, or the particular varnish, gum, size, or whatever was required for the decorative work they purposed to undertake. We, on the contrary, have nothing to do but to buy a few little bottles already filled with the necessary preparations; we have not the slightest occasion to puzzle our brains or occupy our time by works of this sort; consequently we can the sooner take up another branch of art, and pursue it in a fresh direction. Now I do not suppose that our ancestors knew anything about diaphanie, as it is comparatively a newly-discovered process, but they had divers arts which they did thus pursue under difficulties.

Diaphanie is another of the inventions made by those artistic neighbours of ours the French. They conceived the idea of imitating stained glass, but the first thought was in this instance not the best, for the original plan adopted was to print the designs on paper, and then to fix them permanently on the glass; but unfortunately, although the picture was plainly seen, the light of day was very much shut out, and the blank sheet of paper visible on the other side of the window was decidedly not ornamental, and detracted greatly from the effect. This method did not of course give universal satisfaction; and by-and-by the process was improved, which resulted in what known by the name of diaphanie. This was a decided step in advance of the former and in a few moves White gains a man and wins the game.

Now let us take the VARIATION.

<table>
<thead>
<tr>
<th>BLACK</th>
<th>WHITE</th>
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<tbody>
<tr>
<td>20. 11 to 15</td>
<td>20. 14 to 10</td>
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<tr>
<td>21. 15 to 11</td>
<td>21. 8 to 9</td>
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<td>22. 5 to 14</td>
<td>22. 10 to 17</td>
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<td>23. 12 to 16</td>
<td>23. 17 to 22</td>
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<td>24. 16 to 19</td>
<td>24. 22 to 18</td>
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<tr>
<td>25. 11 to 7</td>
<td>25. 18 to 15</td>
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<tr>
<td>26. 19 to 23</td>
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</table>

and from this point White in a few moves again wins a man. This problem has the advantage of also showing the variations of a capital game.
invention; for now the pictures were put on the glass, as heretofore, but afterwards the process went on to take away the objectionable background of paper, therefore the light was only tempered, and not obscured. The fact that 250,000 sheets of designs have been sold in England alone shows the high estimation in which this art is held. Nor can we wonder; for who does not admire stained glass windows? and where is there a house that has not in it at any rate one window which would look all the better if its panes were of coloured glass? Town houses have many windows which must be screened in some way or other, in order either that the occupants of that particular room may have the desired privacy, and not be subjected to the scrutiny of their opposite neighbours, or else that some unpleasing view may be completely shut out of sight. Ground or frosted glass looks cold and cheerless; muslin blinds soon become limp and untidy, for the smoke-laden atmosphere and the numerous smuts which are always hovering about, soon destroy the purity of white muslin; wire blinds have a most dismal and prison-like aspect. No, depend upon it there is nothing to compare to coloured glass for these panes.

Then, in country houses, it very often happens that too much light streams in through some of the windows. A hall or staircase casement admits the sun's rays too freely; the glare is excessive, and requires to be softened. How can it be done so effectively as by coloured glass? But stained glass is very expensive, and for this reason is not within the reach of everybody. Happily, it can be closely imitated by following this process of diaphanie.

I do not know whether it is necessary for me to tell you the derivation of this name; for in these days of advanced learning every man, woman, and child is of course well acquainted with the dead as well as with the living languages; but in case there should be an "old-fashioned girl," among my readers, I will tell her that the word diaphanie is Greek in derivation and French in form (Διαφανής, transparent.)

And now to turn to the mysteries of the art. We had better mention the materials before we do anything else. You will not find the expenditure very great, especially if you consider what great results are accomplished by the comparatively small outlay. A bottle of clearing liquid and one of washable varnish you must have, the two will cost half-a-crown. One of vitreous cement or transferring varnish is by some artists considered indispensable, but the shilling that that will cost may be kept in your pocket if you use starch cement instead. Mix starch with cold water, and then boil it, and you will find that the picture will adhere to the glass very well indeed. Of course you will require brushes, one for each liquid, and these three will be all the better if encased in a tin ferrule.

The price of a roller is half-a-crown; this I think you can very well manage to do without, unless you are decorating some large panes of glass, and even then you can find an excellent substitute if you happen to have by you one of those old-fashioned round rulers.

The designs are the most expensive item; the cost of them is from one to four shillings per sheet. Each sheet measures twenty inches by sixteen inches, and the price is regulated by the design being elaborate or simple.

These patterns are a kind of chromo-lithograph, and are coloured in bright transparent colours; but even then, to look at them, one would not suppose that they would produce the charming effects which they do when fixed on the glass.

There have been about 300 different designs prepared for diaphanie, so that there is something to suit all tastes and requirements. There are patterns of mosaics, arabesque work, geometrical figures; copies of pictures by old masters and those of a more modern date; landscapes and figures; foliage, flowers, and fruits; subjects sacred or profane.

If your house is old, you can decorate its windows with designs suitable to its age and style of architecture; if it is new, you will have no difficulty in finding something which will accord with its appearance, be the window square or arched, broad or lancet in shape.

I suppose I need hardly say that the pane of glass which you are about to ornament must not be in the window-frame, but quite at liberty for you on the table.
the process, for any spot or speck left on it will be transfigured for ever.

You must also previously decide upon the whole design of your window.

If you intend to put one simple pattern all over the pane, you can at once begin the operation, but if your wish is to have a picture and a background and a border, then it is necessary to make a sketch of your plan.

You can cut out the medallion, or whatever the centre-piece is to be, measure how much of the smaller pattern will be required for the background, and then how much of the plain colour for the border. These measurements should be very exact, and the portions cut from the sheets should be tidily manipulated.

The positions that these will occupy should be sketched on a sheet of paper the size of the pane, or the designs laid on the glass and the outline traced by rubbing on to your finger a little black-lead. This latter is a more expeditious plan, but I think the former the best; the reason for tracing the lines you will see when I tell you that you have to put strips of lead-foil whenever the designs meet one another. I dare say you have noticed how the pattern is marked out by lead-work on all stained-glass windows, and we do the same in order to closely imitate the originals.

The strips of lead-foil are one-eighth of an inch in width.

Supposing that you have adopted the first plan, and traced out the general design on paper, you put the pane of glass over the paper, and then you will see distinctly the lines, and these are the guide for you to put the foil on the glass. Use gum for the purpose, and as you put the foil on, press it down with your thumb (Figs. 1 and 2), never mind if you do have a few creases—as you must have them when you come to corners and the like obstacles—for all unevenesses will be easily flattened down if you smooth them over with a moist paper-knife afterwards. All the outline of the designs being thus marked out on the glass by the strips of lead-foil, we can now turn to the designs themselves, and here the instructions which you have received before, with respect to decalcomanie and potichomanie will be of use, if you can call them to mind. The first thing to do is to sponge the un-coloured side of the paper with cold water, and then to brush over the coloured surface with cement. The more quickly this is done the better will be the after effect; and without any loss of time the picture should at once be placed, coloured side downwards, in its assigned position on the glass.

The roller or its substitute now comes into use; and if you use it with discretion, you will begin to roll from the centre of the design; for then, do you not perceive, the liquid will ooze out from underneath, but if you were to press down the edges it would be sent to the middle, and, not finding any outlet, it would form small mounds, the picture would not be perfectly flat on the glass, and all kinds of vexatious things would happen. Nevertheless, I do not mean you to be too sparing in using the cement; you had better use too much than too little, for it is very essential that every part of the design should adhere tenaciously to the glass, otherwise when you came to take away the white paper the coloured design would not be left behind perfect.

But I must not omit to say that all the time that you are rolling and pressing, the back of the design should be kept quite damp, and the best way of doing this is to previously put over one or two sheets of wet paper, as this also prevents the roller from coming into contact with any stray drops of cement. Inspect your work thoroughly, and if all of it so far looks correct and neat, put it away for two or three days.
I am sorry to disappoint you, because we are all of us naturally impatient to see how a thing looks when finished, more especially if it is a novelty; but I can tell you it would look very bad indeed if you meddled with it before the cement was quite hard and dry.

When you find that you may with safety begin to take away the paper, moisten it with your finger, and then gently rub it. Do not be too energetic, for this process is a very delicate one, and needs great nicety and carelessness. When you have removed all the white paper, let the glass get quite dry, and then put over it a coating of the clearing liquid, which will destroy the opacity of the paper. You must not be too profuse in your use of this. Allow this time to become quite dry, and afterwards put on strips of lead-foil in the same way that you did before and over the same lines. Finally the washable varnish comes into use. One or two applications of this must be applied, as it will act as a preservative, and enable you to clean the glass.

This last operation will, however, always require care. In this respect stained glass possesses a great advantage, for of course it can be washed and rubbed with impunity; but our windowpanes require to be dusted with a soft cloth, and when washed, must only have a damp sponge passed carefully over them.

BAGATELLE.

BY A. G. PAYNS, E.A.

THE CANNON GAME.

The cannon game differs considerably from the ordinary game of bagatelle, and is far more scientific. When played on a large table, twelve or more feet long, and without any holes in it, it somewhat resembles billiards, there being but little chance in the game, the best player being sure to win. The cannon game can, however, be played on the ordinary table containing the nine holes. Only three balls are required, viz., two white and one red. As in billiards, one of the two white balls should bear a distinguishing spot. At starting, the red ball is placed on the spot where, in the ordinary game, the black ball is placed (b), and the opponent’s ball on a small spot between the fire hole and the nine hole (a, Fig. 1).

The player can place his ball anywhere in baulk he likes, but he must not stand at the side of the table, as, should he wish to play from the edge of the baulk, he must keep both his feet within a line with the side of the table.

The player must hit the red ball first, and a cannon is made by striking the other white ball with his own, after having first struck the red.

There are so many varieties of this game, which depend very often on the construction and size of the table, that we will not attempt to give any code of rules, which, like the old rules that used to be observed in the game of pool, very often vary with the room. For instance, where the table has small pockets, the rule with regard to the scoring must of course be different to those where there are none. Should, however, the cannon game be played on an ordinary table, such as is usually found in private houses, which folds up, and which contain the usual nine cups or holes, it will be found best to allow these holes to count as in the ordinary game. For instance, should the player at starting strike the red ball and then the white, he scores two for the cannon. Should the red ball run into a hole, he scores in addition double the number of the hole, on account of its being the red ball, just as if it had been the black ball in the ordinary game. Should either or both of the white balls go into a hole, they score the number of those holes. From this it will be seen that the greatest number that can be made in one stroke is thirty-five, viz.: by the red ball going into the nine, which counts eighteen, the two white balls going into the eight, and the other into the seven, and two for the cannon. Of course, the game played this way must necessarily contain a far greater element of chance than if only the cannons are counted. Should, therefore, two fairly good and equal players wish to test their skill, we would recommend them to ignore the holes altogether. It is for this reason that the large tables, on which the great matches are played at the cannon game, are made without any holes at all. After making a cannon, the player takes his ball up off the table, and replaces it anywhere he likes in baulk. For the benefit of novices, we will define the baulk to mean that part of the table nearest to the player, as far as a line drawn across the table, through the spot on which the ball is placed to start from, in the ordinary game.

It is evident that when there is no easy cannon that can be made directly, there may be often one possible by striking a cushion first. For instance, it may not be easy to cause the ball to rebound from the red directly on to the white, but it may be, just as in billiards, easy to cause the ball to rebound from the red on to the cushion, and thence on to the white. Now, the secret of being a good bagatelle player is to have a thorough knowledge of the angles of the table, and in this respect bagatelle is somewhat more difficult than billiards, as in the latter game the cushions are all straight, but in the former part of the cushion is circular, and it is evidently far more difficult to judge of the direction of the ball, after striking a curved cushion than after striking a straight one.

Now all billiard players know that practically, when the stroke is played gently, the angle of incidence is equal to the angle of reflection. In Fig. 2 this is shown; \( \alpha = \chi \) is the angle of incidence, and \( \beta = \chi \) the angle of reflection. This, then, is the great guide for the direction of the ball in every instance where the ball will strike the cushion as far as it is straight, but what will be the direction of the ball after striking the round part of the cushion? The same law holds true; but the angle must be calculated with an imaginary line drawn through the point of the cushion struck by the ball; this imaginary line must be a tangent to the circle. By bearing this simple rule in mind, the player will be able to calculate the exact direction of the ball from any point. It will be seen from this, that if a ball played from about the centre of baulk strikes the cushion about the place where it begins to curve, or a little higher up the table, that the ball will rebound very nearly in the direction of the cushion itself, and that, after again striking the cushion, will rebound still more in the direction of the cushion; consequently, it will be found that the ball what is called ‘hugs the cushion.’ This is sometimes very useful to recollect. Suppose, for instance, the white ball is touching the cushion somewhere about the 8 hole; by cannoning off the red, should it be low down on the right-hand side of the table on to a spot on the circular cushion near the seven hole, the white ball will be certain to run round the cushion, and cannon on to the other white ball. This stroke, which looks very
difficult, and is very effective, is in reality a very easy one. Of course, in all these strokes, we suppose the ball to be struck in the centre, as, should there be any side on the ball, the ball will rebound from the cushion at an entirely different angle to what it would were no side to exist. Side may be defined as a rotary motion of the ball, on an axis perpendicular to the table, causing it to rebound from the cushion at an angle different to that at which it would rebound had no rotary motion existed. Side can be put on to a ball at will, by striking it on either side of the centre of the ball in a horizontal line with that centre.

Players on small bagatelle boards, where the balls are also necessarily small, would do well to avoid ever putting on side, as in all probability the only effect would be that they either miss the ball altogether, or cause it to run in some eccentric line. Where the balls, however, are large, and the cue tipped with a good leather tip, side will be often found exceedingly useful; but it should never be forgotten, when you intend to put on side or screw, always to chalk your cue first.

Many a game would have been saved had this maxim been always followed.

Cannon players should also be careful with regard to putting on screw, especially on a table containing the usual cups.

Screw may be defined as a rotary motion of the ball on a horizontal axis, in a direction contrary to that in which the ball is travelling, and is caused by striking the ball on a point below its centre, in a line perpendicular to the table, that passes

that centre. But ordinary players will have to strike the ball rather hard, in order to screw effectively, and too often the effect of striking the balls hard at bagatelle is to knock them off the table, the penalty for which is that the stroke does not count; the opponent goes on playing.

We would, therefore, recommend, whenever it is possible, to avoid screwing, and trust to slow strokes, which will be found the most certain; and should the player fully understand the "angles," which he can easily do by recollecting what we have said on the subject, it is wonderful what long breaks can be made at this cannon game of bagatelle.
BOATS AND BOAT-SAILING.

By J. C. WILCOX.

The most simple application of the gaff is seen in the sloop, which has one gaff-sail only, and a single triangular sail in front of the mast, which sail is termed a jib. They are rarely met with at the present day in British waters, but are very frequent in those of North America, where a much more lofty mast is used, and a considerable rake or backward inclination is given to it. The term sloop is now applied to a rig which is in fact a cutter, having two triangular sails before the mast, and the difference between the two rigs is held to consist in the sloop having a fixed, and the cutter a running bowsprit. The rig is a very useful one for a pleasure-boat, and the canvas, as here disposed, is very effective. A boat thus rigged should have good beam, to enable her to carry her canvas well.

The proposed dimensions for the boat in the illustration are twenty-one feet length from the forepart of the stem to the afterpart of the sternpost, twenty-three feet eight inches over all, or, including the counter, twenty feet on the line of flotation, draught aft three feet six inches, and forward two feet three inches. Her breadth of beam is seven feet ten inches.

She might have either one or two cabins, at the pleasure of the owner. The forecastle or forecastle, supposing it extended to six inches behind or abaft the mast, would measure seven feet of length, and a height of four feet six inches might be obtained in it. She would require side decks and water-ways of sixteen inches width, and coamings or ledges on the inner edge four inches high.

This boat is represented with a pole mast, by which arrangement a topmast is dispensed with, and when a topsail is desired it is laced to a pole and hoisted by a halyard passing through a sheave hole marked in the mast at four feet above the top block. The pole being on the opposite side of the mast, cannot of course be seen, but it is supposed to reach down to the third hoop counting from the gaff, where the lower end or heel of it is to be secured by a lashing. The advantage of the pole over the ordinary topmast is, that when there is no topsail set, there is no spar aloft; the disadvantage, that you have to carry the spar on deck. The mast in the sloop rig being placed somewhat more forward than in a cutter, there is a considerable length left between the mast and the stern, and in the present instance we find by the scale that it measures thirteen and a half feet. Here there is ample
BOATS AND BOAT-SAILING.

room for a large party, if she is intended for a day sailing boat, or a comfortable main cabin might be built into her if desired. A main cabin of eight feet length would still leave five and a half feet to the sternpost, and with a good stern locker a storage of four feet would still remain.

A boat of this size could be fitted with a temporary main cabin, by the addition of a movable booby hatch, or coach-roof, as it is sometimes termed. This should be made to drop down over the coamings like the lid of a box, and can be easily secured by four copper bolts with nuts, passing through the coamings of the cabin head, and the fixed coamings near the corners.

A boat of this size and rig cannot have less than two jibs, one for fine and another for stormy weather, the smaller four cloths by the afterpart less than the larger. A better outfit, however, would be three jibs of different sizes, the second two cloths, and the third five cloths smaller than the first. Thus, the boat would be well prepared for fine, fresh, and stormy weather.

In case of the canvas being a different width from that here represented, the dimensions can be ascertained by measuring the cloths in the woodcut by the scale accompanying that of the sloop. Thus, the second jib would measure on the foot 9 feet 9 inches, on the luff 19 feet 8 inches, and on the leech 17 feet 6 inches; the small jib 13 feet 8 inches on the luff, 6 feet 9 inches on the foot, and 12 feet 3 inches on the leech.

THE ITCHEN RIG.

This rig has obtained its appellation from the river Itchen, which falls into Southampton Water near the docks of that seaport. Many fishing-boats have always had their moorings near the mouth of this river, and they were formerly chiefly of this rig. The name still remains, but the boats are now mostly rigged as cutters.

On reference to the accompanying woodcut it will be seen that the Itchen boat is nothing more than a sloop without a boom to the mainsail, and a somewhat shorter bowsprit, and that having no boom; the mainsheet traverses on a horse. As the mainsail is somewhat more narrow on the foot than that of the sloop, a rather longer mast is requisite to enable a sufficiently large mainsail to be set, and by measuring it will be found that the luff, or that part of the mainsail of the sloop which runs up and down the mast, is seventeen feet in length, whilst that of the Itchen rigged boat is nineteen feet eight inches. The boats are supposed to be precisely similar, and are drawn on the same scale to facilitate comparison. The topsails are different, the one being a pole, the other a diamond topsail, which differences, however, have nothing to do with the name of the rig.

This rig may be used in boats from sixteen feet length, and six feet beam, either half-decked or open, but it is not thought advisable for smaller craft, which are generally used for both rowing and sailing, in which it is always desirable to be able instantly to disconnect the masts and sails from each other, and this can easily be done in the case of the lug, which, taken altogether, is the most handy sail for a combined rowing and sailing boat.

The Itchen boat's mainsail is a much handier sail to manage than that of a cutter, as there is no boom in the way, and less rigging is requisite. Thus, when the mainsail is furled, which, if desired, it can be on the mast, the whole space abaft is clear of any gear, which is a great convenience if you have friends on board, or are fishing, and consequently require all the room you can possibly obtain for comfort and accommodation.

The price of such a boat as that here represented, half-decked, with water-ways but with no after cabin, would be about a hundred pounds, built to order, but if four or five years old, they are sometimes to be purchased for from thirty to forty pounds.
ORNAMENTAL

By Rosa Fennell.

SINCE writing my last article I have been trying what different uses the plaited paper could be put to.

In the first place, if made with very narrow paper, it answers admirably for covering books instead of the unsightly brown paper at present used to protect the dainty binding so generally employed for drawing-room and ladies’ literature; it is strong, and well adapted for the purpose. A margin should be left all round, after measuring the size of the book, so that the plaiting only just comes to the edge; the margin, when turned over inside the book, should be carefully gummed at the corners. Very pretty night-dress and handkerchief cases can also be made, lined with some delicate coloured silk in harmony with the tints of the paper employed for the outside; also mats for the dressing-table, to prevent the toilet-cover being soiled by the brushes. These last are better made with paper than any other material, as it is inexpensive, and can be renewed with so little trouble.

I will now give another design for this work (Fig. 1), and also one for a border (Fig. 2), which should be worked all round your mats or cases. No. 1 is thus managed:

1st row. Under two, over two, under three, over two, under two, under one, over two, under one, over three, under two, over one.
2nd row. Under two, over two, under one, over two, under two, over three, under two, over one, over three, under two, over one.
3rd row. Under two, over two, under three, over two, under two, under one, over two, under two, over three, under two, over two.
4th row. Under two, over two, under one, over two, under three, over two, under two, over one.
5th row. Under two, over two, under three, over two, under one, over two, under one, and so on, beginning at first again.

A very handsome border may be made by following the next directions (see Fig. 2).

1st line. Commence under the fifth cut, over two, under four, over two, under three, over two, under three; continue from * and finish reverse corner under four, over two, under five.
2nd line. Under four, over five, under one, over four, under one, reverse corner, over five, over four.
3rd line. Under three, over three, under two, over three; reverse corner, under three, over two, under two.
4th line. Under two, over two, under two, over one, under one, over two, over one, under one, under one, over two, repeat from * reverse corner, under two, over two, under two.
5th line. Same as fourth.
6th line. Under one, over two, under one, over five, over one, over one, over one, over two; repeat from * reverse corner, under five, over one, over one, under one.
7th line. Under one, over two, under one, over five, under one, over two; repeat from * reverse corner, over five, over one, under one, over one.
8th line. Under two, over two, under three, over two, under two, over two; under three, over two, under two; over three, over two, under two; repeat from * reverse corner, over two, under two, over two, over three, over two, under two. This completes the line of border, which should be worked in two shades of colour, or a pretty contrast, as blue and silver, or scarlet and gold.

9th line. With the blue paper with which you have been plaiting your work continue under three, over four; cut off the blue paper, and gum to the end left a strip of silver, with which work one over, one under for the centre, and at the reverse side cut off again and gum on your blue; again work over four, under three.

10th line. With the blue paper, under two, over two, under three, over one, cut off; proceed for middle as in ninth row, only taking under where it was over in that, and, vice versa, reverse side over one, under three, over two, under two.
11th and 12th rows. Under one, over two, under one, over three, under one, over one, reverse side over one, under one, over three, under one, over two, under one.
13th line. Same as tenth.

Commence again at ninth row.

I think I have now shown my readers plainly how to accomplish this sort of work. The ingenious may make many patterns for themselves from any uncoloured Berlin patterns, taking care that the unders and overs are near enough to give stability to the work. There should never be more than six pieces passed over or under, or it will render the work sloppy and difficult to make up.

I generally here and there, from the under part of the work, give a slight touch with a piece of paper dipped in gum. Do not use a brush, as it will loosen your work to pass it under. The point of a penknife or paper-knife would do.

Being an invalid, and unable to join in out-door recreations, I amuse myself in trying all sorts of fancy work, and some years back took it into my head to make a hat of plaited paper for a friend.

Many were the attempts I made. Some were very pretty as plaited paper, but did not answer for hats; others were too intricate, and I was about to give up in despair, when a friend told me I should find excellent directions given in the Queen. My friends tried to procure the paper for me, but alas! it was out of print; so I had to be contented until fortune, in the shape of a second-hand bookseller, could procure one for me. At last a promise came of one; I cut my paper ready, in the best shape I could get being some sheets of foolscap, for in those days you could not procure your paper ready cut for you; but waited in patience.

It came, and to my surprise I found it was written by a gentleman. How is it that so many gentlemen reach a perfection in many kinds of ladies’ work which ladies themselves do not?

Some years ago I visited an exhibition of ladies’ needlework, both plain and fancy. It was supposed, of course, to be entirely performed by ladies; but being struck with the near state of perfection as wool-work can arrive at of a piece of work for an ottoman, I turned to the catalogue and found it was by an invalid gentleman, who had worked it entirely without a pattern, merely taking a bunch of wild flowers for his model.

Many people call a boy a milkboy who tries any sort of ladies’ work; but if they had seen, as I have, poor boys lying upon a bed of sickness amusing themselves with their paper roses, wool-work, and other light employments, instead of restless enforced idleness, they would not deter them when in health from learning these; besides which, men travel, and cannot carry their mender with them.
But I have digressed a long way from my promised directions for paper-plaiting. "Un Girotondo" says, "The paper, cut into the required width, may be obtained from any stationer's who has a paper-cutting machine. It may be used coarse or fine, but the finest looks best. I have seen bonnets made of paper cut only three strips to the inch, but the best width is about one-sixth of an inch. The paper-makers of the present day produce papers of every colour and almost every degree of brightness, so that ladies may procure what colour suits them best. I have seen all colours tried, and like none so well as the white, next to white, primrose.

"The paper should not be very stout, as it is apt to crack in the folds, and has several other objectionable qualities. The higher the glue, and the brighter the paper is, the better it will show when plaited and worn."

Having procured the paper cut to the width decided upon, let us proceed to examine the course to follow.

First of all, study the two diagrams here given, one showing the upper and the other the under part of the work. Of course, all the cones should be of an exact equality, both as to space between and height. A little practice and patience will soon secure this.

There are two ways of beginning; I shall describe both. The first is to take a single strip and double it at a right angle in the middle, the twist being made from underneath, so that the fold is on the top, and that half which points downwards is the highest. Having folded the strip thus, turn it partially round, so that instead of its presenting the two sides of a quadrangle, it more nearly presents the two sides of a triangle.

Then take hold of the strips close to the top. The forefinger of the right hand will be at the top, and the thumb on the under side of the strip on the right side (Fig. 3). The left hand strip will be similarly held, but the position of the thumb and forefinger will be reversed, the finger being under and the thumb over. Fold the strip over from the right hand to the left, the left hand strip at the same time passing underneath it, so that when the cross is completed, the two strips still form the two sides of a triangle.

This forms a sharp cone, rising perpendicularly at the extreme end of the paper, where it is doubled across in the first instance. The commencement in this way is necessary for forming the point which, when the paper comes to be sewn on the bonnet-frame, goes in the centre of the crown. It is very simple, and will need further illustration than the above.

The other way of commencing is scarcely so good, but may be useful. In the former only one strip is taken and doubled over in the middle; in this two strips are taken, and the ends laid over each other at nearly right angles, each one having a piece nearly as long as it is broad projecting over the side of the other. The end held by the left hand thumb and forefinger is laid over the one held by the right hand, and the piece which projects is doubled down underneath, the projecting piece of the other being similarly doubled down on the other side.

Thus, the two hang together, and on folding the strips across, as in the former case, the first cone is formed; but instead of rising perpendicularly at the back, the square of paper doubled down forms a slope, so that it is alike on each side. This will not do for the central point of the crown.

The beginning having been made in either of these ways, the rest follows very naturally. The strip from the right hand is always the one which is folded on the top, but as the two strips pass from right to left of each fold, they are, of course, alternately uppermost. Each strip requires to be held firmly.

The plait begins with the first fold after the commencement described before, when the position of the hands and paper will be as that shown in Fig. 4. The left strip must be held tightly while the paper between the right hand forefinger and thumb is raised, that will be the point of the next cone, being the junction of the two strips.

As the right-hand strip is raised, the nail of the forefinger will bear the last point rather backwards, and make it sharp. The thumb of the left hand and the finger of the right are the active agents in making the next point, the thumb pressing up the point and passing the left-hand strip to the right side, while the forefinger is lifting the paper into the pyramidal shape required.

When it has reached the top, it is doubled down, and the forefinger (the thumb having been released) of the right hand presses it down, as shown below.

That completes the plait, and then the process begins again, the right hand always doubling the paper over and the left passing it under. It is done with great rapidity, and having been once started, scarcely requires the use of the eyes, the fingers being able to regulate and keep the plait alike all the way along. The best plait is that which is most regular, and on which the cones are sharpest. It is, however, quite possible to make them so close that they will look cramped and spoil the effect. The pressure of the left thumb at the termination of each fold determines this.

In Fig. 5 it will be seen that the hands hold a paper roll on which to wind the plait as it is made. This is very important, as the plait naturally folds the paper up, and if it gets twisted at all it breaks, and the whole piece is spoiled. By keeping the roll between the fingers, and turning it round as required, this is avoided, and each roll being laid away as it is completed, the plait is kept in perfect condition.

As with every fresh roll a new beginning will have to be made, it is desirable to have them as long as possible, and to put as many layers of the plait as they will hold upon each. I shall presently describe the method of joining fresh pieces of paper as the other gets used up. By the aid of these junctions it is quite possible to have the whole amount of plait for a hat or in one piece; for the crown it is necessary it should be so. It is always the best to have as few breaks as possible; so that the wisest plan is to wrap fold upon fold on a single roll.

In the beginning it is as well not to have the two strips after the first fold has been made of equal length, because in that case they both come together at the end, which makes the junction of new pieces a matter of difficulty.

Let us say the strip to the right is shorter than the other, but that it is just long enough for the formation of one cone more. It is very necessary that it should be exactly the required length, otherwise it would interfere with the symmetry of the next cone, or the ragged end would be discernible, and require cutting off.

Taking, then, a new strip, push it between the two—that is, over the short strip to the right hand, and under the one to the left. Leave a piece coming above the side of the cone (this will afterwards, with a sharp pair of scissors, have to be cut off level with the edge of the side to which it is joined; it is best done while sewing the plait on the shape); turn the new piece so that it is exactly parallel with the old bit, and with them both, the shorter piece being underneath, form the next cone.

Very much of the effect of paper bonnets depends upon the sewing on. I speak of the effect of those I have seen worn by my fair friends. It is, I am assured, anything but generally
known what pretty bonnets may be made in this way of paper; and, though it is some years since they were first introduced, there are even now but few people who know how to do it. Perhaps my informants may be mistaken, and it is not quite such a secret I am divulging as they suppose. An ordinary white shape ("shape" is, I believe, the correct word) of the prevailing fashion is used, and the first stitch has to be set in the centre of the crown. If the paper of which the plait for the first two or three rounds is made is narrower—a gradual taper is best of all—than the rest, the effect will be much improved; it should, at any rate, be narrower for the first round, so that the spot at which it begins will not be easily discernible. "Having brought the reader thus far," says all. After this the plaits go naturally in strips, cut to the required length, from side to side; the most particular thing to be observed being the fastening off of each end. At the middle, five or six gores will be required, these must be skilfully managed, and then they will not be more observable than in an ordinary fancy bonnet. I always make some plaits especially for the purpose, being tapered at the ends; others have to be made narrow all the way along, just to meet the requirements of the shape to which they are to be sewn. The narrow ends are in every case fastened under the preceding plait. Making these fit nicely and uniformly is the most interesting and difficult part of the entire work. After it has been done, the remainder of the plait—though considerable skill is required in making them fit nicely at the points—will be attached with ease."

"Un Giovonetto," "I will take a lady into my counsel, and let her tell the rest.

"For the first round or two it is necessary to put one stitch to about every two or three points, the needle passing in the first instance from inside the crown. It should strike into the paper at the edge and nearly at the top of the cone, and then be passed to the bottom of the same cone, where it will be returned to the inside again. By this means no stitch is visible to the eye. Care must, of course, be taken to keep the plaits quite close together. The edge of the crown presents—if it is a flat crown with a sharp edge—some difficulty. I have generally found it best to contrive to have the middle of a row just on the edge. This preserves the shape, and the rows on each side keep down the edges well. I have generally made sufficient plait in one piece for the crown, and as much of the shape as permitted; the materials to be sewn on without being cut at
BUTTERFLY AND MOTH COLLECTING.

BY THE AUTHOR OF "THE LEPIDOPTERIST'S GUIDE."

THE MARBLED WHITE—BLACK-VEINED WHITE—MEADOW BROWN—GRAYLING—RINGLET—CLOUDED YELLOW.

UR illustration represents the natural history of the Marbled White butterfly (Arge galatea), a local, but by no means an uncommon species in the South of England; indeed, in some seasons it may be observed in great profusion—over its food plant, the Timothy grass (Phleum pratense), upon which the caterpillar may be observed busy at work. The caterpillar is green, with two yellowish lines on the sides, and has the tail split into two little reddish points.

Although most partial to our coasts this butterfly is not unfrequently to be met with in inland situations, such as, for instance, Epping and Kingsbury. It is on the wing from the middle of July to the middle of August; its flight is graceful, but not nearly so powerful as that of many other butterflies, and it is therefore not very difficult to capture.

VOL. II.
Another local black and white butterfly, the Black-veined White (Aporia crataegi), makes its appearance in its special haunts in the month of June. Its size is a little larger than that of the common large white, but its black-veined white wings, especially those of the female, are semi-transparent, a peculiarity which readily distinguishes it from any other British butterfly. It has been taken, sometimes in abundance, in Monmouthshire, Devonshire, Wiltshire, Hampshire, Sussex, the Isle of Thanet, and a few other places. The caterpillar of this species feeds upon whitethorn and blackthorn bushes, and occasionally upon the leaves of other poisonous plants, such as apple, pear, greengage, and plum trees, but on account of its comparative scarcity the damage done by it passes unnoticed.

The Meadow Brown (Hipparchia janira) is perhaps the very commonest of all the British butterflies; throughout the summer months, from the end of June to the end of August, we can hardly walk abroad without observing many hundreds of it fluttering here and there in the flower-bespangled fields, or along the banks and ditches which border our woods and copses, or at the water's edge of our picturesque country lanes. It is not a handsome insect—merely dull brown with a single spot near the tip of the fore wing; this spot has a white centre, and is encircled in the male by a fulvous ring, which, in the female, assumes the dimensions of a patch. It has three congeners, the Large Heath (H. Tithonus), the Ringlet (H. hyperanthus), and the Grayling (H. senegal).

The large heath differs from it, firstly, in size, the latter measuring a third more or less than an inch and a half, whereas Janira frequently attains two inches; then, the fulvous patch is much more extensive, and occupies a large portion of the wings; added to which the tip of the fore-wings has two white dots instead of one. The large heath is common throughout the southern and midland counties, but has not yet been detected in Scotland; it flies over heaths and commons, and, indeed, in most open parts of the country, in July and August. The ringlet, on the contrary, prefers the shady parts of woods and copses, though it may also be found in the open country regaling itself upon the blossoms of the bramble, from the end of June to the end of July. It is a smoky brown insect, with about six or seven white-centred black spots, each surrounded by a pale tawny ring, distributed over the fore and hind wings; these halos of pale tawny are more distinct in the female than in the male. The under side is similar, but the ground colour is tawny brown, and the spots are more distinctly marked though very variable, and it is very interesting to observe how curiously these spots differ in different specimens. We once captured a considerable number of ringlets with the view of obtaining varieties, and were astonished at the result; a we secured with the tawny rings absent, leaving only the white-centred black spots, others with the white centres alone remaining, and a few without any trace at all of the spots, rings, or centres.

The Grayling (H. senegal) is a comparatively large butterfly, measuring from two to two and three-quarter inches across the wings. It is of a dull brown colour, with an ochreous or tawny patch towards the hind margin of the wings, those on the fore wings each containing two white-centred black spots, and those on the hind wings one. It is a local species, chiefly confined to dry chalky or rocky districts, especially where vegetation is scanty. It is a lover of warmth, making its appearance in the hottest months of the year, namely, from the middle of July to the beginning of September, and taking advantage of the nature of the ground to settle on the bare chalk or rocks in preference to flowers, and thus to procure an additional amount of heat. Its flight is peculiarly sharp and jerking, and usually close to the ground. It is not very easy to follow its movements with the eye, for, though it flies but a short distance before alighting, its actions are very quick, and it has a knack of closing up its wings over its back, and lowering the fore wings under cover of the hind, so that it displays little more than the surface of a single hind wing, especially if the wind be blowing at the time that it touches the ground, for it then leans to one side, and the colour of the under surface of the hind wing so closely assimilates to the tints of the objects surrounding the surface upon which it is resting, that it is with difficulty observed, and sometimes, if a passing cloud be floating overhead, it will not move its wings or stir an inch, even though we may tread within a foot of it.

This brings us to two other members of the family Satyrinae, both comprised in one genus Erebia. They are called the Scotch Ringlet (E. blanda), and the Mountain Ringlet (E. Cassiope). Both are of a rich brown black, with reddish patches on each of the four wings, in which are situated black spots, those of Blanetia being white-centred. Both are peculiar to the northern counties and to Scotland; the mountain ringlet occurring only at a high elevation above the level of the sea, and frequenting marshy places on the sides of mountains; it occurs, too, in June, whereas the Scotch ringlet does not make its appearance till the middle of July, and a further distinguishing point is their respective size, that of Cassiope not exceeding an inch and a half, while Blanetia frequently reaches two inches in expanse. These must be sought for in their northern haunts.

Some sixteen years ago, in the blooming autumn of 1837, we first made the acquaintance of the Clouded Yellows (Colias clytia and C. nyale), and the sport we met with is not likely to be forgotten. Both species were then commoner by far than we have ever seen them since, though in 1808, after we had ceased to collect butterflies, they were taken by thousands in various parts of the country, but chiefly on the south coast. In fact they are both very uncertain in their appearance, and many theories have been started to account for their disappearance and occasional re-occurrence, one of the most absurd of which is that the species are not true Britons, but that their eggs are imported in clover seeds. At any rate hot autumnal seasons are favourable to their occurrence.

It was on the downs by Buckland, a village on the road from Dover to a charming little place called River, that we first fell in with the Pale Clouded Yellows (C. nyale), and many a hard run we had in pursuit of them. We do not mean to say that we actually chased them, for to hunt them thus would be about as difficult a procedure as to run down the proverbial wild goose, but on sighting them in the distance we frequently had to make a rush of two or three hundred yards over tell ground, in order to intercept them in the line of their route. At other times they would come tearing straight up towards us, when, of course, a quick, swift, and steady stroke was necessary to secure them. If we missed, we kept them in sight as long as we could, until we observed them show signs of loitering at some or other attractive object, and then endeavoured, by making a detour, to get in front of them and await their arrival. If the sun went in, even for a few moments,
we were sometimes able to creep cautiously within striking
distance, and net them.

Quite as vigorous, if not even more so, in its flight is the
"Clouded Yellow" (C. edusa), which, in general points, re-
sembles its congener, though its colour is rich deep yellow,
approaching to orange, and the broad black border of the male
is faintly veined, but never spotted as in C. nymelis. There is,
however, a constant pale variety of the more richly coloured
species, which is very apt to puzzle beginners, but, however
closely it may resemble the pale clouded yellow in the tint of
its ground colour, the breadth of the lower part of the black
border will always distinguish it.

Canoes and Canoeing.

By Lampton Young.

Convenient Contrivances for the Canoehist.

If some canoes centre-boards and lee-boards are used, but
they are not recommended for general purposes, as the gain
is not sufficient to warrant their adoption. The centre-board
is a manner cuts the canoe in half with its case, and keeps
the paddler in a very confined and constrained position, and the
lee-boards do not aid the weather progress enough to induce
their general adoption. Wheels are of far more use, and are
made in various ways. One is simply a small sleeve, or wheel,
about five or six inches in diameter, with a chuck above to take
the stern of the boat, and from this a strong cord with a loop
at the end, to go over the stern, is led, so that when to be used
the loop is put on the point of the stem, and the, heel, or stem,
is rested in the chuck, and when the canoe is pushed in front of
the traveller the strain keeps the line tight, and the wheel
revolves over the ground. This is a very slow mode of pro-
gress, and only fit for short distances. A better plan is to
have a steel skid in place of the sleeve or wheel, so that it
slides over the ground.

The best for long journeys, when the canoe may have to be
moved over long distances of ground, is to have wheels a foot
in diameter, which take off from a centre axle-tree of wood
with iron axles at the ends, and the wheels should have boxes
of brass to run on the irons, simply fixing on with a washer
and split-pin.

The centre of the wooden axle-tree has a trough about
a foot long bolted firmly to it, to take the keel of the canoe
when about to be used, and the way to fasten her is to secure
a line to the axle, then led it to a cleat, and draw round the
axle again, finally fastening it to the cleat. This is done on
both sides, so that the canoe sits firmly on her keel, and then
can be driven away like a coxswain's row. The axle is of
sufficient length to enable the canoe to rest between the wheels
without touching, and when not in use is taken to pieces
and stored away under the deck.

These wheels can be very easily constructed by a canoeist.
The writer made his own, and has travelled great distances
with them, finding them specially useful when stopping for a
night at a village where the inn was at a distance from the
water side, as, instead of leaving the canoe to the tender
mercy of the rough-handed so-called care-takers of boats, she
has been safely driven into the coach-house at the inn and
locked up for the night. The weight is not much, and is quite
counterbalanced by the great advantages of having the wheels
with you on a journey.

Last year the writer was bringing his
canoes from Southampton to Winchester by the river Itchen,
and when some three miles from the Southampton Water he
found the river quite dry, the water having been turned over
the meadows; the wheels were immediately called into requi-
sition, and the canoe driven along the towing-path some
four miles, wheels and all being lifted over rails and gates,
until water was again reached, when the journey was com-
plicated, which it would never have been if the wheels had
not been at hand. In passing locks a canoe can be run round
very quickly, by dragging her out of the water, and then
lifting up the stern and running away with her; she slides
on her stem over the grass, or soil, to the point where she is
to be again launched, thus saving at least ten minutes at a look,
which is of consequence in a day's journey where many locks
have to be passed. Some canoes which are intended for sailing
require ballast; the most convenient kind is water, contained
in tins of such shape as may be found to suit the particular
canoe best. One member of the Canoe Club has invented a
very ingenious plan by which he fills and empties his tin ballast-
boxes; merely by blowing through tubes of india-rubber, one
for each operation, and this is done whilst the canoe is being
paddled, and without any undue strain on the lungs. Other
kinds of ballast are stones, gravel in canvas bags, lead, shot
in bags, iron bars, or any weighty substance.

Pumps can be fitted to canoes, but are rarely used, as a
good sponge is found to rid the craft of water fast enough for
anything usually met with, and a tube can be so fitted with a
mouth-piece, that when laid at the back part of the bottom
of the canoe, any water accumulating there can be blown out
with great ease, not requiring the use of a pump, but a sponge
should always be carried, as it is useful to clean the outside of
the canoe, especially if followed with a rub from a chamois
leather.

Clots are necessary in the outfit of a canoe, as the various
haulings are fastened to them. There are several kinds, but
the best is the patent recently come out, in which the clout
itself works on a central pin in the cheeks of the frame, which
is screwed to the deck, and from the slightest rocking motion allowed
the clout, one turn of the line to be fastened securely jams it.
Another good clout is one invented by “Rob Roy.” It is
merely a piece of thick leather, of oblong shape, and screwed
to the deck with two screws. It is very useful for small
lines, but not for the main haulings. It merely requires one
turn of the line round it to make all secure. The old-fashioned
iron or brass clout is very good, but not so efficient as the
patent one just alluded to.

The writer has just had a travelling-canoe built of the fol-
lowing dimensions: 13 feet 6 inches long, 2½ inches wide,
and 14 inches deep amidships. She is constructed of cedar,
and intended for sleeping on board; there are two mast
holes, in which short stumps, about three feet high, are put,
and over this goes a tent of unbleached cotton, fitted to the
sides of the canoe, and tied with tapes to the cleats along the
deck.

Its ends are kept open by two wooden spreaders of the
same width as the deck, and when these are fixed tightly down
at each end there is a capital tent, in which the traveller can
cook, read, work, or do anything he wishes; a lamp is fixed
to the after stump at his back; and, with an inflated waterproof bed, he can sleep comfortably, no rain getting inside; and from the width and capacity of the canoe there is ample room for any required amount of stores, luggage, etc. When done with, the tent can be taken down and stowed away beneath the deck in two minutes. For sleeping, the canoe can be hauled on land and carefully bedded in turfs, grass, bushes, or anything that will prevent any undue strain on the timbers and planks; or she may be secured to the bank under some bushes, and from her beam, and will be quite safe when the occupant turns round, and all the better for being water-borne. There are shelves in the after part, on which various stores can be placed, so as to be raised above any wet that may get on board, and there is plenty of room forward for luggage and other bulky things.

The stores carried in a canoe are various, and must in a great measure be governed by the country or district to be journeyed through—paddle, straight-bladed, nine feet long, and to divide in the middle, so that when a plug with a smooth round end is placed in the socket of one half it makes a neat single paddle that will not hurt or rub the hand when it is used; a painter of tanned rocket line, ten fathoms in length, this being very convenient when the stream is so rapid as to require tracking or towing; and enables one to stretch the legs after being hours in one position; a silk union-jack, if the voyage is to be abroad, one foot by ten inches, fastened to a cane staff about three feet long; spare lines, cords, blocks, sail twine, and needles; a tin or other metal box to contain wax matches; a lamp, either oil or candle; a tin can with methylated spirits for cooking; a glass bottle covered with wickerwork to carry wine, beer, or other beverage for daily consumption; the cooking apparatus, drinking-cups, plates, etc.; a flask for spirits; a couple of good large pocket knives; a small box with medicines, such as quinine, rhubarb, and antiseptic pills, also sticking-plaster in case of cuts or other injuries; a housewife with plenty of needles, pins, thread, buttons, and a piece of beeswax; a book for journals or logs and sketches, with two pencils; guide-books of the country to be passed through; and, for smokers, pipe, tobacco, and matches, in a waterproof metal box. For clothing, one complete change in addition to the suit in wear is quite enough, as any extra article of clothing required can be bought at towns passed through.

Clothing should be carried in an indiarubber postman’s bag, as these are so hermetically sealed when tied up, that no water can find its way into them. Brush, comb, tooth-brush, piece of yellow soap, and one towel, should be taken, as sometimes there is difficulty in obtaining soap, etc., in some foreign towns. It is a good plan to wear round the loins a belt of some kind, as it is a safeguard against chills, a Spanish woolen one is the best, as they are made for the purpose, and wear so well. For a cover from the rain when paddling nothing is better than a policeman’s old cape cut down to the size that suits when sitting down in the canoe; an old one is best, as the painted canvas of which they are made has quite hardened, and will not crack like a new one; these old capes can generally be bought for half-a-crown.

In addition to these stores a sou’wester should be taken, as it is a great protection in case of heavy rain. A charcoal pocket-filter is a requisite article for a voyage, as one has sometimes to drink from the river on which the voyage is being made, and if large, it is sure to contain the impurities of the various towns it has passed.

For the navigating of canoes compasses are quite as necessary as for ships, as, in many cases, arms of the sea have to be crossed, or lakes, or wide rivers, where, when caught in a fog without a compass, the canoeist can easily get into a scrape that could have been avoided if a compass had been taken as a part of the stores. A small inch-and-a-half Singer’s patent night compass is found to be the best, and, as it is made of mother-of-pearl, with the northern half painted black and the point left bright, it can easily be read in obscurity, the eye readily finding the centre and various points without any other light than that, on even a dark night. This compass can be very strongly recommended from actual experience. A piece of mahogany should be fastened to the hatch, and into this the compass must be sunk so that nothing can hurt it. A sufficient knowledge of navigation for a canoe voyage can be gained by a man if he will read a work on the subject; and by a previous study of maps and charts, and marking the proposed routes on them, a man may find his way through most lakes, rivers, and arms of the sea; if there is any difficulty in procuring charts, it is easy to obtain permission to trace the portions of country to be passed through on tracing paper. In many cases books of the size suited for the pocket are published, containing sailing directions, and with squares of maps and charts, giving the soundings and currents on them, these are very useful when they can be obtained. If desires of fixing the position of the canoe, the best way is to take the cross-bearings of any two fixed objects, draw the line of these bearings on the chart, and where they intersect will be the true position of the canoe, and a fresh course can be steered from this point. The compass is known to vary from the true north, for which the proper allowance must be made according to the works on navigation, which should be consulted.

Allowances for currents must be made in steering, if they are shown on the charts; and in case of wanting to sound, a bullet on a cord is as good as anything else in a canoe.

A sufficient quantity of carpenter’s stores can be taken in a small biscuit tin, and may consist of a boxwood handle containing a set of small tools, a hammer, copper and other nails of various sizes, brass screws, wire of various gauges, small bottle of varnish, a piece of putty, a piece of cobbler’s wax, and any other notion that may be thought necessary.

In a voyage likely to be out of the usual way of towns, the food to be carried may be according to each man’s fancy, but a tin of biscuits and tins, a tin of soups and Liebig’s extract, also some skins of sausages and solidified soup, tea, coffee, bottles of “café au lait”—a capital preparation, which only requires a good teaspoonful to be stirred in a cup of boiling water to make a delicious cup of coffee with milk and sugar in it—chocolate, sugar, salt, pepper; these, with eggs, to be bought on the road, and any chance of fresh bread, should suffice for the traveller’s wants, be, of course, taking enough money in the small coin of the country to enable him to pay his way, as it is difficult in many places to change notes or gold. A large tin can is very useful, as in it fresh water for drinking or cooking can be carried, and at the same time serve as ballast.

All clothing, from head to foot, should be flannel, and enough should be worn to prevent chills—nothing is worse than to go half-undressed, in the belief that one’s constitution will bear any amount of exposure and chills, as many have found to their cost.

A Scotch plaid is always a useful companion. Whenever an opportunity offers, cook with a wood fire, and save your spirit for a future day. If these and other points are attended to, a long journey may be made at a very small cost, and the canoeist will return filled with pleasure at the interesting scenes he has passed through in such a novel manner, sound health, and a log full of sketches and notes.
that will always be a source of pleasure to look over at some future day.

Therefore, our readers cannot do better than build themselves a canoe according to the foregoing description, and when on

**CHESS.**

**BY JOHN WISKER, THE ENGLISH CHAMPION.**

**ENDINGS OF GAMES WITH PAWNS—WITH PIECES AND PAWNS.**

In a previous article I cautioned the beginner against too eagerly grasping after small advantages, and in particular against losing time in winning pawns, whilst his adversary may, perhaps, be setting up a destructive attack upon him.

On the other hand, however, the learner must be careful not to neglect his pawns, nor to sacrifice them without good reason. An attack may often fail, but a pawn is a substantial advantage which mostly proves decisive. Between players of great force, after the attack on either side has become exhausted, and the pieces have been exchanged, the position of the pawns generally decides the contest. And not only are the pawns of great importance towards the end of the game; they are also extremely difficult to manipulate with accuracy. The combinations of the pawns are among the subtleties of chess, and merit special attention. Here I can only lay down general principles; for a full knowledge of this branch of the game you must rely upon practice and upon a study of the examples given in current chess literature, and in works specially devoted to the subject—as, for example, Messrs. Kling and Horwitz’s "Chess Studies."

**KING AND PAWN AGAINST KING.**

This is mostly a won game for the superior force, that is, the player having the pawn can force it to the eighth square and make a queen. This result, however, depends entirely upon the power of performing a manœuvre which is technically known as "gaining the opposition." By this is meant the playing of the king in such a manner as to force the hostile king to abandon certain important squares. In chess it is generally advantageous to gain a move; but in end-games a move gained often involves the loss of the game.

An example will better illustrate the nature of "the opposition."
In Fig. 1 White, having the move, gains the opposition, and
wins easily:—

1. K to Q 6
2. K to Q B 7
3. P to Q 5
1. K to K sq.
2. K to K 7
2. K to K 2
And White obviously forces the pawn to the eighth square. If,
instead of 1., K to K sq., he had moved 1. K to Q B sq., the
reply is K to K 7 , the position being precisely similar. Here
the white king is able to drive his black rival from the im-
portant squares, and so win the day. But if Black had the first
move he would be able to draw:—
2. K to K 5
2. K to K 3
1. K to Q 2
If White goes Q B 5, Black moves to the other side, opposite
the white king.

3. P to Q 5
4. P to Q 6
5. K to K 6
6. P to Q 7 ch.
3. K to Q 2
4. K to Q sq.
5. K to K sq.
6. K to Q sq.
And White must either abandon the pawn or give stale-
mate if he support it. Had Black, at his fourth move, played
K to K sq., instead of to Q sq., White would have won:—
5. K to K 6
6. P to K 7
7. K to K 7, and queens the pawn.
4. K to K sq.
5. K to K sq.
6. K to Q B 2

From this analysis is deduced the important general rule
that if the player with the pawn advances it to the seventh
square not giving check, he wins; if he checks he draws only.

When the pawn is on the rook's file, it can never reach
the eighth square if the black king can get in front in time. In
Fig. 2 White can only draw whether he have the move or
not.

1. K to Kt 6
2. P moves
And if the pawn advances it is stale-mate. If White con-

3. K to B 5
4. K to Kt 5
5. K to Kt 6
3. K to B 2
4. K to Kt sq.
5. K to Kt sq.

Do what White will he can never advance the pawn without
giving stale-mate. Even with the assistance of a bishop, unless
it command the eighth square, the superior force cannot win.
In nearly all other cases the king and pawn, with the help of a
piece, win easily.

KING AND PAWNS AGAINST KING AND PAWNS.

King and two pawns, unless doubled on the rook's file, always
win against the king alone. King and two pawns generally
win against king and one; but the result in this case depends
largely upon position, of which the variations are infinite. I
give two examples. In one the single black pawn is posted
apart from the two white pawns; in the other the single pawn
opposes the two.

In situations like that given in Fig. 3 White always wins with
or without the move. He has only to march up his king and
attack the black pawn. The black king, on the other hand,
cannot leave the two white pawns, neither can he take the
blockading pawn, for the other would advance to queen. It is
important to observe that in such situations two pawns are
self-supporting against the king.

Fig. 4 may be called a test position of this kind of ending.
It is from the classic work of Philidor ("Analyse du Jeu des
Echecs, 1749 "). This is an example of the value of sometimes
leaving a move in an end-game. With the move Black loses;
without it he draws.

Suppose, in the first place, that Black moves
1. K to Q 3
He cannot make a better commencement, for if he retreat his
king, you follow it up, gaining the opposition.
2. P to K B 5
2. K to K 2
If Black take the pawn, White wins at once by retaking, after-
wards moving K to Kt 6 and R 7 .
3. P to K B 6 ch.

Much better than 3. P takes P, which leads only to a draw, for
Black moves his king to B sq. and Kt 2, winning the advanced
pawn and drawing against the other, as in Fig. 1.
4. K to Q 4
4. K to Q 3
5. P to B 7

This sacrifice of the pawn is necessary to enable White to win
with the other.

6. K to K 5
7. K to Q 6
8. K to K 6
9. K to Kt 7
10. K to B 6
11. K to B 7
12. K takes P
13. K to B 6
14. K to B 7
15. K to Kt 6
16. K to K 6
17. P to Kt 6
18. P to Kt 7
5. K to K 2
6. K takes P
7. K to B sq.
8. K to Kt 2
9. K to Kt sq.
10. K to K 2
11. K to K sq.
12. K to Kt sq.
13. K to K 2
15. K to Kt sq.
17. K to Kt sq.

And White wins.

On the other hand, if White move first, Black draws by facing
the white king wherever it is played.

This ending is very instructive, and deserves careful study.
By sacrificing one of his pawns, White gains the opposition and
wins the black one. Observe that at move 15 White cannot
advance his pawn, for he would thereby give stale-mate. He
must, therefore, cross over to the other side.

The varieties of pawn-ends are endless. They are also
almost always interesting, and may be the means of passing
many a pleasant hour, when the learner happens to have no
opponent. In this place I have no space to give more than one
more example. It is a curious example of the force of position
in determining the result of a game.

In the position Fig. 5, White with the move wins.

1. P to Q Kt 7
2. P takes Q
3. Q to K 8 sq.
4. P takes Q
5. P to K 6
6. P to K 7
7. P queens ch.
1. P to Q R 7
2. P queens ch.
3. Q takes Q ch.
4. P to Q Kt 5
5. P to Kt 6
6. P to Kt 7
7. P queens ch.

And wins.

QUEEN AGAINST ONE OR MORE PIECES.
The queen wins against any single piece, the knight, bishop,
or rook being soon forced to take up a position where it can be
won by a check of the queen. The queen also mostly wins
against a single piece and a pawn, the exceptions being when
the pawn is very far advanced and cannot be stopped.
The queen in most cases wins against two knights, knight
and bishop, or two bishops; but can only draw against rook
and minor piece, two rooks, or three minor pieces. Indeed,
aided by a pawn, these forces will often win.

Of course, the queen generally wins with ease against one
pawn, or more; but it is important for the learner to observe
the mode of winning when the pawn is at the seventh square
supported by the king, and the other king at some distance
(consider Fig. 6).
And White proceeds in this way, forcing the black king in front of the pawn, and bringing up his own king on each occasion, until the pawn is reached, when it is taken by the queen. Again, beware of stalemate.

**Fig. 5.**

**Fig. 6.**

**Fig. 7.**

**Fig. 8.**

**VARIOUS ENDINGS.**

A bishop or knight generally draws against a rook, though occasionally positions occur where the more powerful piece can win the weaker one.

A rook and knight or rook and bishop draw in most cases against the rook.

Three minor pieces win against the rook, except in cases where two of the three are knights, and the rook can be exchanged for the bishop. In such positions the result is a draw, for two knights cannot give check-mate.

A single pawn will often draw against a rook if the adverse king cannot come up in time, since the rook must be exchanged for the pawn in order to prevent it queening. But if the king can come to the assistance of the rook, the pawn easily falls. So do two pawns; but if the king cannot get up, two united pawns will win, since the rook can only be exchanged for one of them. Three united pawns often win against the rook, even if the hostile king can get in front of them. In all these cases it is presumed that the pawns are supported by their king.

Queen against queen and pawn generally result in a drawn game, for the single queen may give perpetual check.

Rook and pawn against rook win or draw according to the position of the kings. As this ending very frequently occurs in actual play, I give a specimen of a won and a drawn game.

In the position Fig. 7 Black can draw with proper care, for he has succeeded in getting his king in front of the pawn.

And draws ultimately.

In Fig. 8 Black, not being able to place his king in front of the pawn, will be defeated.

And the pawn is speedily advanced to the eighth square, for if—

And Black has no resource.
LEGERDEMAIN.
BY A PROFESSIONAL.
THE INEXHAUSTIBLE BOTTLE.

Perhaps one of the most popular tricks ever exhibited was that of the inexhaustible bottle.

As we have said before, when speaking of the hat trick, though a bad trick, it was still popular, owing to the fact that the audience got something, either in the shape of small toys or sugar plums, but the inexhaustible bottle, unlike the hat, we consider a first-rate trick. Its popularity, therefore, can be imagined better than expressed, when we state that, in addition, the audience get something to drink out of it.

Few sights were more characteristic of the British nation than the pit of Covent Garden Theatre when Professor Anderson used to perform this trick, which consists of bringing at will almost anything out of one bottle—port, sherry, brandy, rum, gin, whisky, cloves, peppermint, green chartreuse, appeared from out the magic bottle at command, and when the finale, in the shape of a small glass of castor-oil, called forth rounds of applause, the feelings of mingled bewilderment and admiration of the audience were only excelled by their still intense feeling of burning desire for "something more to drink."

One great advantage this trick possesses over many others is the variety of different ways in which it is performed, as one part of the trick is done in one way and another part in a different way.

We will first however describe the trick, which is somewhat long and elaborate, in full, as we saw it performed many years ago at Covent Garden Theatre, by Professor Anderson. The conjurer first borrowed a few pocket-handkerchiefs, which he had previously used in other tricks, and stating that he feared they were somewhat soiled, by passing through so many boxes, etc., said he would, with their owners permission, wash them. Placing a large tub on the table, he threw in the handkerchiefs, and poured a good-sized can of water over them. Then he lifted up the handkerchiefs, dripping wet, and wringing them out, placed them in a small box, which had a drawer in it. He next borrowed a ring from some lady, which he wrapped up in a piece of paper, and placed it on a much larger sheet of paper on his centre table. He then took a live dove, which he proceeded to wrap up with the ring in this sheet, and having made it into a parcel, in advancing, fell on it, which of course generally gives rise to some loud screams from some of the more tender-hearted persons present. By this means the small paper parcel is crushed quite flat; but in order to make sure, he stamps upon it in a pretended angry manner, and rolling up the paper into a small ball, places it in the same drawer with the wet pocket-handkerchiefs.

We now come to the inexhaustible bottle; but a short description of the stage and theatre is necessary first. The stage in question, which it is well known was very large, had a good-sized table, covered with a cloth, in the centre, and on either side, near the front, two small slabs against the wall.

Down the centre of the pit was a small platform raised a little above the people's heads, which branched off right and left round the first tier of boxes, along which platform the conjurer was able to run up and down, and fetch or return the different articles borrowed.

First, standing near his large centre table, he invites a few strangers from among the audience to come on to the stage, and places chairs for them on either side, so that they sit sideways to the audience. He then, taking the bottle from the table, proceeds to pour out for them into some tumblers three or four glasses of ale, which an attendant hands, and asks them to taste.

It may here be mentioned that these tumblers are good-sized genuine half-pint glasses, and that the persons asked on to the stage are really some of the audience, whom the conjurer has never before seen. Asking them, with a smile, what they think of it, he asks his attendant for a few more tumblers, and then pours from the same bottle, which has not for one instant disappeared from the sight of the audience, three or four more glasses of stout, which is also handed round to some others present, who, as a rule, first taste, then drink, and then express unqualified approval. Still calling for more glasses, he proceeds to pour out the same quantity of milk, after which some water, and to finish with a dozen glasses full of champagne. All this time the bottle is unchanged, being in sight the whole time, and only leaves the conjurer's hands when he places it down on the table, or side slabs, while he assists in handing the glasses round.

He now requests the persons who are on the stage to retake their seats, and still keeping the bottle in his hand walks behind the large table in the centre of the stage, where he again pours out a fresh quantity of some new liquid.

He then asks his attendant to bring a tray of liqueur glasses, and to precede him down the platform. He follows, bottle in
hand; and now comes the most effective part of the trick. Port, sherry, brandy, rum, gin, whisky, follow one another—every imaginable liquor in existence seems to be there—and on some one being supplied with a glass of castor-oil, a well-merited round of applause ensues. Retreating now along the platform, still holding the bottle in his hand, and though the audience have noticed that any change of the bottle was absolutely impossible since stepping off the little raised platform, he calls for a large cloth and a hammer. Taking the bottle in his left hand, and holding it near the bottom, he gives it a smart blow with the hammer, and knocks off the top, when, lo! out flies the dove, with the lady’s ring fastened with a small piece of silk to its neck, and in drawer, on an attendant removing the tab, of course the handkerchiefs passed into the hands of those who had ample time to iron and scent them before they were again wanted.

Next we come to the disappearance of the ring and dove. This part of the trick is done exactly as some time back described the way in which the handkerchiefs were folded in some paper, and were then made to reappear in some paper cylinders with some sugar-plums.

The conjurer, in folding over the paper to wrap up the dove and ring, hides them for a moment, but during that moment a small trap is opened in the table, and the dove and ring swiftly descend through it in the grasp of a third but unseen hand, which the bottle itself, or fallen on to the cloth with the broken glass, are the previously-borrowed pocket-handkerchiefs, neatly ironed, folded, and scented, which the conjurer, after, of course, seeing that no broken glass is on them, returns to their astonished owners.

How, then, can this trick be done? Better in a theatre than in a private room; but still it can be done, and done well in the latter. But we must commence at the commencement, with borrowing and washing the handkerchiefs. First, in the tub was placed an ordinary empty small round jar, rather heavy, &c., sufficiently so not to swim and upset. On placing the handkerchiefs in the tub, they were placed in this jar, and, when the water was poured in, care was taken to avoid the same jar, consequently the handkerchiefs that were borrowed did not get wet, but some ordinary white ones placed in the tub previously did, and when the conjurer drew these, as we said, dripping wet out of the tub, and, wringing them, placed them in the box with the proceeds at leisure to tie the ring round the bird’s throat and place it with the by this time smooth and scented handkerchiefs.

And now for the bottle. This part of the trick may be divided into two parts, viz., the quantity and the quality. First, the quantity. It is evident that a quart bottle cannot hold a gallon, and, therefore, that three or four half-pint glasses of ale—the glasses being about three-parts filled—the same quantity of stout, milk, water, champagne, etc., cannot all proceed from one bottle, unless, first, the bottle is constantly being changed, or, second, the bottle is constantly being replenished.

Now, with regard to the first, those who witness conjuring tricks for the purpose of discovering the methods by which they are performed, may take it for granted that if for one single instant they lose sight of an object, that object may possibly be changed. But in the present instance we stated the bottle did not disappear for one moment, therefore, it must by some means have
been replenished. Now this is only possible in two ways, either by means of the conjurer's hand and arm, or by means of the table. That the former method is possible we have no doubt; a tube might be passed down the sleeve, the end of which might be flesh-coloured, and a large quantity of fluid of various kinds might be by this means made to appear to proceed from the bottle, but we have never seen this trick performed, nor have we over heard of any conjurer who by this method did the trick known by the name of the Inexhaustible Bottle.

The bottle, in the way in which we have performed this trick, was manufactured as follows:--There is no bottom to it at all, but inside there fits tightly a tin case exactly the same size as the inside of the bottle, and when the latter is placed on a table or side slab immediately above a round trap-door, the emptied tin case can be taken out, and a full one replaced.

The inside of the bottle is covered with a thick kind of felt, in order to avoid any rattling sound from being heard.

It will at once be seen that there is no limit to the quantity that can be produced from the bottle, but the method by which the tin cases are pushed up through the trap-doors requires a little more explanation. It is evident, that as the tin cases fit tight, that unless some pressure is brought to bear upon the bottle from above it would be very likely to move by itself, apparently while the tin case was being pushed up. The method of doing this part of the trick is therefore as follows:--

The performer places the bottle on the exact spot by means of two small fine needles, which are placed upright outside the table.

Suppose, for instance, the diameter of the bottom of the bottle is three and half inches. Place the bottle over the trap-door exactly, and then run the two upright needles into the table, touching the bottle, and with a small hammer knock them in till only about half an inch remains above. These must be about two and half inches apart; then, on placing the bottle on the table as near as possible in the right place, a gentle push, which can be given to the bottle almost imperceptibly, will ensure its going exactly into the right place. The moment this is done the trap is opened, the empty case taken out, and a full one replaced, but not pushed up, otherwise the bottle would move. The confederate who works the trap has one hand holding the tin case by the small knot underneath, and the other ready to close the trap in an instant.

The moment the conjurer takes up the bottle is what may be called in this trick the critical moment, or at any rate one of them, for in taking up the bottle he leans on it for an instant, and during that instant the confederate pushes the tin upwards, causing it thereby to stick tight in the bottle, and then instantly closes the trap-door. The conjurer can now safely lift the bottle, and as a precaution holding it underneath, in case the tin might slip, he proceeds as before to pour out its contents.

There is one little circumstance that might and does occur in this trick—especially if, as is usually the case with amateurs, their tricks, or rather their machinery, is apt to get damp, or sticky, or rusty, as the case may be—which we think worthy of notice. Suppose the tin case sticks so tight in the bottle that the confederate cannot pull it out, what is to be done? We have known this happen. A little presence of mind on the part of the conjurer will immediately get him out of this difficulty. He has, of course, or he could not be a conjurer, a sharp eye. If, then, he sees that, after placing the bottle over the trap-door, the rim of the tin case, which is nearly level with the top of the bottle, does not disappear, he must with his handkerchief just simply wipe the top of the bottle, which can be done very naturally, but in doing so must push with his forefinger the tin case down. However much it may stick it will be sure to give under such direct pressure as this, and of course, in another instant, if the confederate be worth anything, the full tin will take its place, and the trap-door be closed.

The next point is—how are the different wines, spirits, and liqueurs brought out of the same bottle, while the conjurer walks about among the audience?

GAMES OF THE PLAYGROUND.

BY C. W. ALCOCK.

BASE BALL.

I HAVE already told you in a previous article that instead of eleven, as at cricket, the base-ball field consists of nine players, their posts clearly defined in the diagram at page 117. There is first the catcher, in much the same position as long-stop at cricket, and the pitcher, precisely similar to the feeder in our English game of rounders. Then there are the first, second, and third base-men, each covering one of the three bases; the short-stop, a species of mid-off; and lastly, left, centre, and right fielders, practically synonymous with long-off, long-field behind the bowler, and long-on, as they are placed in England to a slow bowler.

THE PITCHER.

You cannot estimate sufficiently without a practical knowledge of the game the responsibility that attaches to the occupation of this post, for on the pitcher and his efficiency to a great degree depends the success of the nine that he represents. His movements are not unrestricted, for he is not allowed to roam beyond a space of six feet square, as now defined, though at first six feet by four feet. He must not move outside this boundary, even to the extent of having one foot beyond the limits, but must deliver the ball with both feet inside, at the risk of incurring the penalty of a "ball," which gives each base-runner the privilege of another base, without the usual danger of being run out. Much depends on the art of pitching, so that the pitcher has, or ought to have, much the same talents as are required to make a good bowler. His main aim is to deceive the striker and deceive him by varying devices. It is necessary, above all things, that he have complete control over the ball, besides judgment to weigh the specialty of each striker, or he will never achieve eminence. The striker has to be allured by cunning contrivances in just the same way as the batsman, and the skill of the pitcher is shown chiefly by the manner in which he varies the speed of the ball, as well as the height of its delivery. If he fail to deliver the striker "fair balls," as balls that are not within the reach of the batsman from any cause or for any reason are termed, the umpire is empowered, after a preliminary warning, to call "one ball," "two balls," "three balls," according as the offence is committed one, twice, or thrice. After the third transgression, he has no choice, for the striker may walk to, and occupy the first base, without fear or risk, and every one of the base runners are entitled to the privilege of advancing one base under similar immunity. The ball, too, must be pitched, and not jerked to or thrown from the bat, and should the pitcher make any of his usual motions in delivering the ball without actual delivery, he in each case comes under the category of "balking."
with the penalty above named. There is still another provi-
sion in the rules applicable to the pitcher, that if the ball be
pitched so that it strike the ground before it reach the bat, or
so high that it is out of reach of the batsman, or on the opposite
side to that on which he usually strikes, each comes under the
designation of unfair balls, and is so registered on the catalogue
of the umpire.

THE CATCHER.
The catcher must be quick of foot, but not quick of
temper, or he will ruin everything. He must be a sure catch,
a sure shot, full of resolution and dash, and with these
essentials he will be sure to command success. He is unlike
the pitcher, for his limits are boundless, and his position is
subject to material alterations, guided by the different actions
and movements of the pitcher. His situation is near to or far
from the home base, according as the delivery of the pitcher is
slow or fast. If the pitching be slow, it is obvious that he should
not be far removed from the base, but if it be fast, it is equally
apparent that he is practically useless unless he be at some
distance, to adapt himself to the different speed of the ball.
His privileges are, that he can put the batsman out either by
catching the ball from the bat on the fly—that is, before it touches
the ground, either fair or foul—or by catching it when hit foul
on the first rebound from the ground. He has another chance,
too, in the failure of the striker to hit the ball once in three
times, for in this event he can also secure the dismissal of the
batsman, if he hold the ball either on the fly or on the first
bound. Therefore, moreover, he will find one of the chief oppor-
tunities for his skill, for in case of his not catching the ball on this
extremity, he has still a last hope in being able to throw
the ball to first base before the striker can reach it, the rule pro-
viding that in the event of three misses the batsman is obliged
to make hot haste to secure safe occupation of the first base.

THE FIRST BASE-MAN.
Of all the three base-men, the first has the least active fielding
to perform. Do not be misled by this, and assume that his posi-
tion is a sinecure, for his duties are arduous enough, though
they do not require so much rough exercise. The first base-man
acts as the lieutenant of the pitcher, for his very post makes him
invincible as an ally to the pitcher when the bases are being
quickly secured by the in-side. It is necessary that he be a good
field at all points able to catch the ball, high or low, skilled in
stopping it, however erratically or forcibly it is thrown, and always
on the alert to receive the ball from the pitcher when circum-
stances demand.

THE SECOND BASE-MAN.
You had better choose one of the most active of all your
fieldsmen to occupy this position, for he will have plenty of
ercise, and he will need plenty of speed as well as endurance.

THE THIRD BASE-MAN.
The responsibility of third base-man will give more cause for
anxiety than that of any other of the three bases, for the
penalties or losses in the event of any mistake on his part are
sometimes serious. You can readily understand the duties and
merits of his situation, by a glance at the diagram on page
117. If a mistake be made either by first or second base-men, the
penalty involved, does not, as a rule, exceed the loss of one base,
but with the third base-man matters are not so easily arranged,
for the base-runner that evades his vigilance has merely to reach
the home base, and the cost of a run will often turn the scales
in favour of a side. You will see that he is the most removed
from the first base, so that he has not only the longest distance
to throw if he attempt to achieve the run of a striker before he
reach the first base, but the shortest time given to return the ball.

SHORT-STOP.
Short-stop is par excellence the player to be regarded as the
"general utility" of the in-fielders. You may term him, if you
like, man-of-all-work, for his duties are universal and his
responsibility unlimited. If any mistake has been made, you
will look forward confidently to short-stop to rectify the error,
or any wild play on the part of any of the fielders, and short-
stop is bound, by virtue of his high office, in common honour to
set matters right. His eye must be one of the rare description
that never sleeps, and his frame must be insensible to any such
degrading influences as dulness or fatigue. He has not only
plenty of good work to do on his own account, but to undo much
that was done badly by the rest of his associates. His duties are
multitudinous, and his work, as you can guess, more than
onerous. If the catcher throws to any of the bases, he does
so in the blind belief that short-stop is there in readiness to
back up. If the pitcher requires assistance, he appeals mutely
to short-stop for relief, and, in fact, short-stop acts generally as
a relieving officer on behalf of the entire union. He should
also be able to throw to the bases from various distances with
equal accuracy.

THE OUT-FIELDERS.
You will have to choose your out-fielders, right, centre and
left, just as you would choose your long-fields at cricket if you
were a slow order. You will want them good throwers and
sure catchers, as well as safe judges of a catch, and you will
select them rather for these essentials than for especial smart-
ness; though obviously there should not be wanting among
their talents any speed of foot. They are, to some extent, the
heavy guards of base-ball, kept as a reserve in case of need, to
be hurled at the enemy on the first sign of weakness, and they
are subject to the orders and signals of the pitcher. Of course
they have to deploy and manoeuvre according to the different
phases of the game, moving noiselessly at the bidding of the
pitcher, or as their judgment directs in accordance with the
play of each separate batsman. The centre-field has an addi-
tional responsibility in having to back up the second base-man,
in case either the catcher or the pitcher throws in that
direction, so that his attention should be more strictly directed
to the movement of the batsman, as well as on the varying
dispositions of the field.

So far, you have learned the duties incidental to your posts,
each of you who have the misfortune to have had your lot cast
with a out or fielding side. Put yourself now for a time
in the place of the striker, and see what dispositions have been
made for your exclusive benefit. In the first place, you are
compelled to occupy a certain position in the act of striking,
being by law reduced to stand astride the line of the home base,
distant not less than one foot from that base, with only one
foot forward or backward of the line of the home base. If you
infringe this rule by any chance, the umpire is instructed to
call " foul strike," and when three such " strikes" have
been made, you are out without appeal. If, on the other
hand, you make but one of these strikes and are caught, either
fair or foul, you are out; and if you think of running even, it is
provided that no base shall be run on any such strike, although
if any of your side have attempted to make another base under
cover of such strike they can return to the base they left
without being put out. You can require the pitcher to give
you a ball either high—pitched between the height of the waist
and shoulder of the striker, or low, between the height of the
waist and one foot from the ground—but the pitcher is not
compelled to give you just the ball that you want, and in case
you make no request, all balls within a foot of ground and the
shoulder of the striker shall be considered fair.
CROQUET.

By Charles Black, Ex-Champion.

Six-Hoop Setting—The Break.

It must be remembered that with the six-hoop setting the first hoop is to the left of the winning peg, half way to the left-hand boundary.

To begin, the ball is placed only a foot from the hoop, so that the anxiety usually attending the first stroke is lessened; but if a ball should miss the first hoop, it must not be replaced at the starting-point, but left where it lies, as the instant it is struck it is in play. The first thing, then, that occurs to the beginner, is what must be done with the ball which has entitled the player to a second stroke by passing through the first hoop.

In this thought there is the germ of a great idea, in fact the idea of an "opening." Chess, draughts, whist, and many other games, equally set before the tyro who would learn their mysteries this puzzling question, "How am I to begin?" "You know people say that a good start is half the battle; and if I make a mess of the beginning I am sure to be beaten."

In its opening, as in all its phases, croquet presents the charm of versatility. You may strike your ball right or left straight ahead or straight-back, and there is a great deal to be said in favour of each of these courses.

Let us now analyse the reasons for and against these strokes with the aid of the following diagram. First, why should a player strike his ball to A? because it is very likely that he will be able to hit it with his second ball, and if he does, he has got his balls together in a corner very convenient for beginning play. Against this there is the danger of attempting such a stroke when your opponent is a very good shot; for if he is at all safe at eight yards, he will have the prior chance of hitting your ball, and will be able, after hitting it, to carry it away to some position more favourable to himself. If your adversary is at all nervous, he will be pretty sure not to try the shot; so before adopting the opening to A, know something about your adversary's eye. How about sending your ball to B? well, even if you do not hit with your second ball, you have your two balls together in a good place; for your adversary will probably reply by going to A, and if he hits with his second ball, it is a difficult take-off from A to B, and so his getting the break depends on a whole chain of contingencies.

If your two balls are at B and his two balls at A (his second having missed), the game is for you to take off to A;
send the dead ball to the second hoop, leave the live one at A, and return to your partner at B, who in the next turn will send the ball near him to the third hoop, and proceed to make the second hoop by the aid of the ball you have provided for him.

Next, how about C? C partakes of the nature of a compromise between A and B. It is less cautious than B, and not quite so risky as A, and consequently rather a favourite with that large number of players who try to adopt the safe game. The objection to it is that if your adversary replies by going to A, and you with your second ball miss his or your own ball, he has, in the case of hitting with his second, a good opening, for the balls are so close together that they are easy to arrange.

Next as to D? This is not a safe opening, except with very narrow hoops, for its efficacy depends on the difficulty of going clean through the first hoop with great force, which would be a certainty with five-inch hoops, while, with three and three-quarter hoops the odds are against it, even at the distance of a foot. With narrow hoops, it is a very good opening to play if your adversary is not good at taking off, as even in case of his hitting his first ball, he will have come the whole length of the lawn to separate you. Of course you run the risk of the adversary going clean through the first hoop, and coming up right alongside you; but even then there is the chance of his hitting against the wire of the second hoop, and having only an eight yards' shot. E is a favourite of mine, and is commonly called a "tye." It has this merit, that if you try to hit your first ball at E with your second, and miss, and your adversary then hits his ball, your two balls are not together to help him, as the dead ball is close to the boundary, while its live comrade is cut in the open. Thus, you hamper his play, which is quite as much an object as to further your own; besides, going to E gives a very feasible shot to your second ball, if your adversary refuses to take the chance.

The value of these openings depends to a great extent on the calibre of your antagonist; for instance, it would be rather rash to attempt A, C, or E with a confident dashing shot; such a foe must be met by B, if he judges strength well; by D, if he does not.

It has been supposed throughout that the opening is made by the first ball in play; but if you have to play second, you have only to adopt the tactics assigned above to the adversary.

Apropos of openings, there is a puzzling problem sometimes presents itself. Supposing my adversary to have played first, and to have gone to A; I play next, and hit him. What am I to do with the two balls? For there are not enough balls in play to attempt to lay a break. The best play, I believe, is to send your adversary's ball rather past the centre point of the lawn, and then go yourself into the corner down by B. These are the reasons: your adversary follows, and if he hits his ball, has no good game open to him; and if he misses it, which is more probable, at ten yards, he plays into your game. Your second ball follows into the corner at B, and, if it hits, has a good game open; if it misses, your two balls are together. Your adversary is then compelled to shoot from the centre of the lawn at his other ball in your game, and if he misses, he leaves two balls together in your game, which is just what you want.

Croquet tactics depend for their success on several conditions—power of arrangement, capability of executing what has been arranged, sharpness in estimating the hitting capacity of your foe, quickness in testing his nerve, and, above all, exemplary patience.

How often has a player, after arranging the balls for a break by a series of well-executed strokes, broken down through some slight slip, without scoring a point, and handed the result of his own skill to his antagonist. That is the moment to try patience and temper; and at no period of the game are these slips more likely to occur than at the outset, before the players have warmed to their work. Let not the reader be discouraged by them, nor by seeing his adversary gallop right away from him at first. In my own experience of matches, I have seen a good score of games won by players who had scarcely made a point when their adversary had made a score.

One of the most remarkable instances of this occurred this summer in the matches for the championship. One gentleman had won the first game of a rubber of three, and in the
second was a rover, with one ball, and had only one hoop to make with the other, when his opponent, who had barely started, came in with a long shot, pulled the second game out of the fire, and finally won the third, thus winning the rubber after a crisis, when a hundred to one would have been laid against him.

Well, it has been shown how to begin the game; the coin has been tossed, the first strokes made, the early qualms of nervousness has passed away, and stern play is in full swing. What is to be the aim of all our endeavours? What principle is to guide our efforts? The execution of shots? Well and good, but that is not all.

Scoring points? Well, but not as separate points. Continuous points is the goal of our hopes; or in other words, a break.

Play for the break; and you will soon find a system pervading your game. But how? Deign, puzzled readers, not only to read the following explanations, but to test them on your own lawn, and I think it will be seen what is meant by the break.

A writer on croquet has already explained the break by a series of eight diagrams. Thinking that the beginner may be puzzled by following the intricacies of so many positions, I shall make the attempt of delineating it by the help of only three.

This is done in the full consciousness that no mere perusal of pen and ink instructions, however clear they may be, can lead a player to the achievement of a break; and these remarks are only offered as suggestions to guide practice, without which it may be safely asserted no one will ever come near a good break.

THE BREAK.

The different strokes required have been described elsewhere, and so they will be merely referred to by their names, thus avoiding the tedious repetition of the manner in which they are worked to effect the actual passing of the hoops. The value of each kind of stroke for this kind of work was shown at the time that they were defined.

Only the difficult strokes, necessary to place the balls for continuous scoring, will be discussed.

The break will be applied here to the match or six-hoop setting.

With this the two main difficulties of a break consist in completing successively the two outer squares of hoops, viz., the first, second, third, and fourth points, and the eighth, ninth, tenth, eleventh.

In order to make the points of the first square in one break, one long and difficult stop stroke is required, while to make those of the second square in one break, two similar strokes are needed.

The stroke required in these three cases is as follows: the ball which has just been used in making a corner hoop is sent flying along the diagonal of the lawn across to the corresponding corner, while the player’s own ball is “stopped” by the side of a ball placed near the centre of the ground from which croquet is taken to the next point, for instance:-

There are four balls in play, Nos. 1, 2, 3, 4. No. 2 has just passed hoop a by the help of No. 1; No. 1 is then sent right across to b, the next point but one, while No. 2 is, by a stop stroke, brought up alongside No. 3, which had been before judiciously placed somewhere near the point c. Croquet is then taken by No. 2 off No. 3 to No. 4, which has been placed near d; and No. 2 having made n by the help of No. 4, sends No. 4 up to c to help him through the centre hoops, and proceeds to make the hoop at b by the help of No. 1.

It would be well for the beginner, or even any player, to practise this combination very often, as it ought to be made a certainty, to ensure success. Having now dwelt on the most difficult feat in the break, inasmuch as it involves very careful judgment of strength, so as to regulate properly the pace of the two balls, we will proceed to the all-round break itself.

For the first outer square the first point is made, as a matter of course. How then are the balls to be placed so as to make a break from the second hoop. It is very good practice to try and place these balls by long splitting and driving strokes before beginning your practice break, as it greatly improves judgment of strength.

We must have a ball at the second hoop, to assist us there, another somewhere about c, and another at a, our next point after the second. Having made the second hoop, the ball which we have used there is sent across to b (vide. Fig. 2) and our own ball brought up near that at c. Then the hoop at a is made as before. After making this hoop, the ball used there is sent to d by a roll, and taking croquet from the ball at c, so as to send it near to the sixth hoop, we go down to n, and make the hoop by the aid of the ball already placed there. We have now completed the first square, and the first question is what to do with the ball which has helped us at b. If the ball at d be well placed to help us through the fifth hoop, the best plan is to send this ball from c straight across to the first hoop, to wait for us there, when we shall have to pass that hoop the reverse way as our ninth point. This is especially the best play when the ball at b is the live ball, as we thus get it well out of the play in case of a breakdown.

If, however, the ball in d is not well enough placed to justify this course, send the ball from b towards c, and get the rush on d to the fifth hoop.

The two centre hoops will now be easily made, and we must make preparations for continuing our break round the second outer square.

Looking at the diagram, balls will be seen to be needed at n and a besides one to help us at the turning peg.

We must remember that we are now supposing that no ball has been yet sent to n; and so, just before we make the sixth hoop, we shall have all three balls to work upon.

Now go through the sixth hoop, and rush one of the balls somewhere towards d, thus leaving two near the sixth hoop. Drive the ball from d to b, and stop yourself near the two. Send one of these two to a, stopping yourself so as to be sure of hitting the other.

Now you have what you want, viz., a ball at n and a, and one to help you to hit the peg. It is a very simple matter to roll up to the peg and hit it. Et puis? Why, split the helping ball to c and yourself to a. Make the hoop at a, and then send the ball at a flying across to b, stopping yourself near the ball you have placed at c. Take croquet from that ball to the one already placed at b, and make that hoop. Then send the ball from b flying across to f, stopping yourself again near the useful “curn” at c. Again, take croquet from it to the ball positioned at e, and make that hoop by his aid.

Now that ball which has helped you at n must not be left down there. No, roll him up to c, visiting again our friend at c. Take a last croquet from this faithful minion, moving him towards h, and go to the ball already placed at f. Make the hoop at f by his help. Now you may drop that friend, especially if he is the live ball.

You have now only two hoops to make, and a ball at each one viz., at a and h. If our friend at f is the live ball, give him a quietus by rolling him against the wire, while you “pass”
THE DACE.

Although we are told to angle for dace much after the fashion of roach, the dace differs in its habits in frequenting rapid and swift currents in warm weather, and leaping out of the water after a fly, much in the same way as may be ascribed to trout.

We find dace in most of the more rapid streams of England, and in a few ponds that are supplied by streamlets, but stagnant water is its abhorrence, and it soon succeeds in canals where the flow is but intermittent.

It is not, however, known in Ireland or Scotland, and only in a branch of the Thames in Cornwall.

Very fine dace may be found in the Kentish Darenth, some weighing a pound or more having been taken there, as also in the New River, the Trent, and other persistently running streams.

Yet a dace of half a pound is considered a fine fish, and is rarely taken in the Thames of that weight.

Dace fishing with the fly is the very best possible practice for the tyro, and from their numbers the sport and practice can be followed for several months in the year until proficiency is attained. The learner, however, must not be dispirited if, in whipping with the artificial black grat or a gentle, he take but one fish in six that may rise to his fly, for even the most able hands and quickest eyes can very seldom boast of taking more than three of these nimble fish out of five.

The reason of this is that the dace does not take the fly like a trout well in its mouth, in which there are, in the trout, teeth to retain the hook, but it mostly seizes the fly mindingly with the extremity of its lips, and if it finds the slightest obstruction it leaves it.

Dace are said to spawn in some rivers twice a year, firstly, according to the nature of the water from the beginning of March to the middle of May, when they may be seen in great numbers, and secondly, in the current of the water of the soil, and in the new river, the Trent, and other persistently running streams. It has been denied by many that fish spawn more than once a year, but that close observer, Mr. Henry Lee the naturalist, has proved this recently to be the case with the white trout in the Brighton Aquarium.

During these periods they are very capricious as to their food, seldom rising at a fly, and refusing even to take their especial some booke, the red-worm, but as they are then not wanted as a bait for pike, and the bleak is preferable for trout spinning, it is as well to leave them alone until they have fully recovered.

When this is the case the natural fly appears to be most acceptable to the dace, and will be found a very killing method, but not so useful a practice as an introduction to trout and grayling fishing as the artificial fly. It is, however, more in reach of the bottom fisher, and will prove a delightful change in the practice of both.

The blue-bottle is a most tempting morsel to the dace; indeed, it appears to be resistless, particularly in the morning and evening.

The fly should be placed carefully on a No. 10 hook, and a single hair line alone used; but everything depends upon its being cast lightly on the water, or the fly will be whipped off the hook.

Many persons have several drop flies, but we would urge the beginner to keep to one only, until he is thoroughly master of that. The natural ant-flies are also greatly appreciated by dace, either on the surface or beneath, as in float fishing.

It is, however, difficult to lay down rules for dace fishing, the appetite of which fish is more subject to caprice than almost any other we know, although the accepted worthlessness of the capture leaves too small a sense of disappointment behind to render the thought of misadventure more than a transient one with the angler.

To give a practical illustration of the separate habits of the roach and dace, it may be stated that two very expert anglers fished at Richmond for roach during four hours, and caught but three fish and not one dace, when they commenced raking the bottom above the punt to attract the dace, and killed ten dozen of these fish in three hours without taking a single roach.

The principal baits for dace besides those already named are caddis, meal-worms, wasp grubs, and paste. This practice of raking for dace is a comparatively modern one, and differs in some degree from the method commonly pursued in gudgeon fishing, inasmuch as the punt in the former is not always stationary, and the raking is effected at the back of the punt as far as the rake will reach up stream, and not in the front of it, as in the latter style of angling.

To rake with the best results, a swim as long as possible with an even bottom should be selected, from three to six feet in depth, in which the stream is neither too rapid nor too slow, but will permit of a good-sized quill float (cork floats should never be used for dace), which, to properly balance, will require five or six double B shot. Have a heavy stone or hundred weight attached to a cord, and the latter made fast to the punt at the stern.

When you arrive at the head of the swim you purpose to fish, plumb the depth with some accuracy as far as the rod...
will reach, then, taking off the plumb, let the float travel down the swim, and should any impediment stay the float, do not alter the depth, but up anchor and examine the obstacle; remove it, if weed, etc., and back to your old spot. This preparation for a clean swim is never time wasted.

Now begin to rake above the punt, and you will see the disturbed and coloured water making its way under the punt, and coursing down the stream.

Do not as yet throw in any ground bait, but trust to this agitation of the animal life which generates and nestles between the gravel for a sufficient attraction.

Bait with the tail of a well scoured lob-worm, as one of the toughest baits the angler can resort to, and with one only of which we have often killed six and eight dace without its being much lacerated or injured.

Should the dace not come on the feed, chop up into fine pieces four or five worms, and cast them well up the stream; but as we have said, do not overfeed your fish, as dace are soon satiated, and the quantity of bread, bran, greaves, etc., thrown in to attract them to the hooks by many anglers, has naturally the very opposite effect.

William Bailey, of Nottingham, tells us in fishing for dace from the bank:

"When there is a rise of water, and it is coloured, your only chance is to fish in shallows. If it is coloured so much that you cannot see more than, say, six inches down, then select a slow swim from two to three feet deep, on a gravelly bottom. In this state of the water the fish are close to the side, and will bite them if you stand well back, and keep quiet, for you must know that the least shake on the bank sends all the fish off in a moment. You cannot be too still when fishing a place of this sort."

In this case a three-shot float will be sufficient, and but very little ground bait is required.

The Lea and Trent anglers are very well aware of the fact that during summer and autumn floods the dace, particularly, go, as they term it, "to grass," and the angler, stepping quietly along the meadow, looks out for small lagoons or Ho-byes, which shelve gradually down to the bed of the river, and there, throwing his worm-baited hook into the deeper part, draws it gradually towards the shallower portion, until it rests on the bottom, from where it is often picked up by the heaviest dace, chub, and roach.

A previous knowledge of the anatomy of a river, its holes, shoals, scours, and under-surface eddies, only to be gained in perfection during a dry season, is of most essential use to the angler when partial freshets or heavy floods visit the stream. Indeed, there is no time of the year—always bearing in mind, of course, the months—when an observant angler need despair of making a fair bag, when others either hopelessly abandon the river altogether or return from its banks lighter in material than they went.

We have devoted more space to the dace than its importance may apparently warrant, but as we consider it the most initiatory style of fishing, either for the trout, and thus for the salmon with the fly, or for any other kind of angling, excepting, perhaps, the pike and perch, the subject would fully warrant yet greater dilation in the opinion of those most experienced in the grammar of the art.

Indeed, Bailey insists truthfully upon this when he says:

"If any one is desirous to become a good bottom fisher, let him practice fishing for dace. He can learn the art of angling sooner and better by fishing for dace with the worm than by any other.

"The first four years of my angling experience was devoted almost entirely to dace fishing, and I can assure you, had I not done so, I should not have known how to kill the finer tribe half so well as I do at present. I have caught almost every description of fresh-water fish in one day's dace fishing with the cockspur" (a local name for the common red-worm with a white tail). "I once caught a ruffe, and in the very next cast a chub six pounds weight with the same bait, and it is the uncertainty of telling what fish may bite next that makes dace fishing so amusing and exciting."

On the Trent, and with the Nottingham tackle, "the rod for dace is about twelve feet in length, as light as possible, and ought to strike sharp from the top. A three-inch common reel, varnished, to keep the rain from swelling the wood, is most suitable. One hundred yards of line for this style of fishing should weigh three drachms, not a fraction more, else it will be too thick. Your tackle should be fine gut, one yard long, and your hook No. 8. Let the bottom shot be one foot from the hook."

The size of the float should be regulated by the stream and depth of water which you are going to fish, but it should be always as small as possible. The Nottingham floats are only composed of a swan, turkey, goose, or other quill cut at the feathered end, on which a wire loop is whipped, and if caps are not used, two half hitches reversed are all that is needed to secure it to the line.
THE various sizes are distinguished as 1 oz., 2 oz., ½ lb., and so on. There is no reason why they should be so named. The origin of the distinction is generally misunderstood.

A “quartar” or quarter pound, but which is much larger than that usually so known. There is no reason why you should not determine your own sizes, quite irrespective of artillerists' measurements or of pyrotechnists' practice.

The nominal size of the rocket is that of the weight of a spherical shot fitting the tube from which the rocket is fired. Thus, a 12 lb. rocket would be fired from a tube of the same bore as a twelve-pounder gun. Some persons erroneously suppose that it is the weight of a shot fitting the bore.

I doubt very much whether any rocket now made in the firework trade would be found to fulfill these conditions. In determining what sized rockets you will make, you will perhaps adopt my suggestion to make them chiefly of a size which I call

The length of the rocket should be about eight and a half times the diameter of the bore. The spindle should be one-third the diameter of the bore at the choke end, diminishing to half that thickness at the top, which will be within about two diameters (of the bore) from the end of the case. This distance of two diameters will vary slightly; it will have to be rather less for the larger-sized rockets, and more for the smaller ones.

If you decide, as I should advise, in favour of a rocket going to a moderate height, carrying many stars, and show-
ing a perfect tail, you will increase the bore and lessen the length. A good rocket should have a very nearly complete tail from its starting point until its stars show, and this great effect cannot be combined with that of great height. It should also attain its full height and begin to turn over before the head bursts, showing the stars. It is wrong for a rocket to continue ascending after its stars have been scattered.

I will now proceed to explain how to make a rocket of the size which I recommend you to adopt, if not to confine yourself to, and which you may call, if you please, as I do, a

**QUARTER-POUND ROCKET.**

You will use 30lb. air-dried imperial paper, and cut each sheet into five strips, the short way of the paper. Roll in with it, in the manner described under the head of "case rolling," a piece of board of the same width and half the length.

The best roller you can possibly have is a piece of brass tube fifteen inches long and three-quarters of an inch in diameter.

You have already had full instructions to make rocket-cases on page 292, so I will pass on to the next stage, simply mentioning that a good rule for rocket-cases will be to make them in thickness one-fifth the diameter of the bore.

**Choking.—** The cases should be rolled at least an hour before choking. Use a thick strong string, known as laid cord, which it will be well to rub with a little soap occasionally. Instead of tying round your waist, as you have previously done, tie it to a piece of broom-handle, and pass it through your legs, by which means you will get more purchase. The choke should invariably be made near to the end, never more than a quarter of an inch from it. Unless you keep it near the end you waste paper and space, and, besides, make the case ugly.

Immediately after choking each case put three half hitches in the choke. When you become expert at choking you can leave the tying until three or four are ready, but at first they must be tied as soon as choked.

After so tying a string of them, say a yard of cases, stretch the cord tightly, and leave them to dry. When dry, cut the string close to the chokes, and tie two or three more half hitches round, so as to completely fill up the choke. If this was not done in choking, the form of the choke would get altered.

**Composition.—** Saltpetre, eight parts; sulphur, two parts; charcoal, three and three-quarter parts. The quality of these is all-important. The charcoal should be light in character.

I usually use the best charcoal I can buy ordinarily, which is of a heavy description, mixed in equal proportions with a lighter sort, which comes from powder mills. The latter is much more expensive, but is good.

Gunpowder consists, as nearly as possible, of six parts of saltpetre to one part of sulphur and one of charcoal, so that you will see your rocket composition has a preponderance of charcoal as compared with it, and it will be obvious how you can strengthen or weaken your composition. You should never in any circumstances use meal powder in rocket making.

For charging you will want a wooden block, to rest on the earth, or at all events on a good solid foundation.

The mouth of the case should, when in position on the block, be as nearly as possible level with your bench, so that you can conveniently reach composition, etc.

**Tools, etc.**—A steel spindle, fitted on a gun-metal base; a "setting-down" tool; three hollow drifts or rammers of different lengths; a solid drift; a mallet; and a copper scoop (see sketches of these tools on page 321).

To make this rocket you want to use your scoop fourteen times, so that, if the scoop be too large, you must cut it down.

**Clay.**—A few words on the powdered clay you will continually want. You should get good blue London clay. It will be found to have no grit whatever; such clay as is used for bricks will not do. I have seen it stated that bricks dried, but unbaked, are suitable, but the presence of grit in them, from the cinders, etc., mixed with the clay, unfit them for our purpose.

Broken unbaked flower-pots are tolerably sure to be free from grit, and will do very well. But whatever description of clay you get you will dry it perfectly in the air, pound it, and pass it through a coarse sieve.

"Setting-down."—Take your setting-down tool, place it in the case, and the case on the spindle, keep case and tool perfectly perpendicular, and, with your mallet, strike a few blows on the middle of the top of the tool until the case is firmly set on the spindle. Remove this tool, lay it aside, and take your first or longest drift in the left hand.

**Charging.**—In the right hand take a scoopful of composition, level it with your drift, and pour into the case. Insert the drift, and strike with the mallet eighteen blows. Each blow should be of the same strength. It is a common mistake with amateurs, and a bad habit with workmen, to give a particularly hard blow "for the last" of each series.

Take your second drift when you feel that you can do so, but before doing so be careful to give the head of the discarded drift a few smart taps, holding the tail of the tool over the composition. The object is to loosen and eject any composition which may have got jammed into the drift. Do this in every case, as, if you neglect the precaution, you will find, on next using that particular drift, it will not go its proper depth on the spindle, and an unlucky blow while in its improper position will split the tool. Besides this, there is some danger connected with neglect of this rule. Invariably, on taking a fresh drift, feel that the bottom of it rests on the composition.

In charging, you should continually move and twist the drift on the spindle while the blows are being given.

After charging with your third hollow drift to the top of the spindle, take your solid drift, and insert it in the case, so that it rests on the top of the spindle.

Rest your thumb on the top of the case, withdraw the tool with the thumb in the same position against it, and make a mark outside the case at a depth equaling that to the composition, and level with the top of the spindle. Make another mark outside the case one diameter and a half of your drift above the mark already made.

The necessary amount of this solid charging or heading depends entirely upon the composition. A diameter and a half is generally the quantity. Larger rockets require rather less, and smaller ones more.

Proceed to charge with the solid drift until you have got to a point equal to your second mark outside. Take powdered clay, and put in say half a scoopful, to give a thickness of three-sixteenths of an inch. This finishes your rocket off cleanly, and keeps the composition in its place. You now have your rocket complete, and you will have to decide what effects you will display. For stars you will require "rocket caps," which is a matter of paper and paste again.

**Rocket-caps.**—The rocket-cap is a very important part of your rocket, and you must not run away with the idea that anything will do to carry your stars, now that you have completed the rocket proper. The object of a rocket is to display stars.

My aim is always to make a rocket carry as many stars as
it can. What is the use of making a powerful rocket, and then giving it only half the weight which it is capable of carrying?

The cap I recommend has what I may call a bulged head, and has to be made on a former of these dimensions:—Length, seven inches, diameter at thick end, two and a half inches, diameter at small end, one inch. It should have a handle at the thick end.

Paste some strips of stout brown paper—80lb. double imperial—and make a case on this former, so that there are four turns of paper in every part of the case. When dry, cut the small end down, until you find it will fit on the end of your rocket. Five inches from there cut off the other margin. The caps are now ready for "coming."

For this you must get a cone of wood made. The height from the centre of the base to the apex should be equal to the diameter of the base.

Cut some pieces of paper, say four inches square. With scissors, cut from the middle of one side to the centre. Paste the papers all over. Take up one piece, lay it on the cone, so that the centre is on the point of the cone, and lap it round. When dry, cut off the rough margin, so that the base of the cone just fits the top or large end of the cap.

Now, with some slips of blue double-crown paper, paste the cones on to the caps by a couple of turns. Where this join comes is a weak place, which is intentionally so.

Priming is the next operation.

The priming may be made of any powder you have at hand. Moistens sufficient to form a very thick paste. The priming must invariably be used as dry as possible. If too much water be used it will soak into the chokes of the case and affect the composition, and it might be the cause of the rocket failing.

Now take a piece of raw match, about three inches long, rub an inch of it at one end so as to bend and break it. Press the abent end into the mouth of the rocket, and fix the match to the inside of the choke by means of as little wet priming as you can possibly make sufficient.

Do this cleanly; don't smear it over the outside of the case and the choke.

Capping.—Cut some discs of blue touchpaper half an inch more in diameter than the rocket case itself, and, after pasting, fix two over the mouth of each rocket.

Boring.—Bore through the clay at the upper end of your rocket with a quarter-inch chisel, and press a piece of raw match one inch long into the hole.

Opening charge.—Pill the rocket head with your stars. If coloured stars are used you must pour into the head half a rocket-scoopful of fuse composition. For bright stars, or any other stars but coloured ones, use half this quantity of meal-powder.

Join the head to the body of the rocket by means of glue. It will be well to paste a strip of blue paper round this join.

ROCKET STARS, ETC.

The composition for bright stars is Saltpetre, eight parts; sulphur, four parts; bright antimony, two parts; meal-powder, one part. For tall stars—Meal-powder, twelve parts; sulphur, eight parts; saltpetre, five parts; fine charcoal, three parts. For comet stars—Meal-powder, eight parts; lamp-black, three parts; black antimony, one part.

These stars are usually made in this way:—A little starch is made—as laundresses make it, with boiling water—and the composition is wetted with it until a thick paste is formed. The paste is then flattened out on a board, and cut into small circles with a knife. When sufficiently set, these stars are broken apart, and allowed to dry; but as this is rather a wasteful process, I recommend you to "pump" them.

Blister Pump.—This so-called pump is made of a piece of brass tube about two inches long. For the sized rocket we are dealing with the diameter of the tube should be three-eighths of an inch. File a slit in the tube three-quarters of an inch down from one end. Get a boxwood former to fit the tube easily. The part of the former which goes into the tube must not be longer than the tube itself, and the handle of the former must be short, not more than one inch and a half high. Insert the former in the tube until it reaches a point at a distance from the bottom equal to the inside diameter. Fix a little brass peg into the side of the former level with the top of the tube.

Now, with the peg resting on the top of the tube, press the pump into the star composition. Three or four firm pressures with the handle against the palm of the hand will be necessary. Flatten off the bottom on the smooth surface of the paper on the table. With thumb and forefinger, twist the tube so that the peg slips into the slit, press it down, and expel the star on to a plate or tray. This can be done very rapidly; only one hand is required.

The stars will have to be exposed in dry air or wind for a couple of days before they are ready for use.

Golden-rains are very pretty effects for rockets. The cases are made of three turns of 70lb. imperial brown paper, pasted all over. Roll with your halfpenny-ribbin roller, and cut the cases into two-inch lengths. Punch out of cardboard some discs, to form a bottom like that of a pill-box.

In the absence of bottoms, you must ram powdered clay for the depth of a quarter of an inch.

Filling.—Now, using a rammer and funnel, fill to within a quarter of an inch of the top with rain composition (see page 281).

After filling a number in this way, fill up, as nearly as possible to the top, with fuse composition. Prime with wet priming, and while the prime is still moist, dip the rain again into fuse composition. In filling your cap with these, put in say half a dozen pieces of raw match, four or five inches long, as well as the meal-powder.

Peacock's Plumes are made by putting the rain case on a nipple half an inch long, then inserting clay on the top of the nipple, charging as for rains, filling the space at the nipple end with coloured fire, and pressing a piece of raw match in at the end. The coloured fire in this instance will be the same as that used for Roman-candle stars.

Snakes.—Make the cases of four turns of the same paper as you used for crackers. Paste throughout, and roll on the halfpenny-ribbin roller. The cases should be three inches long. Choke them, and fill with equib composition.

Draw in and glue the ends. Prime the choke end with two primings, and press a little in with a nipple rather smaller than that used to charge them on.

Squibs for rockets are made just as described under halfpenny squibs, but the cases should be much shorter (say only three or four inches long), and they should be primed as snakes.

For squibs, rains, peacock's plumes, snakes, etc., a straight cap is better than one with a bulged head. These you will make with three turns of 70lb. ordinary brown paper, not very strong. Use a former (which should be rounded at the end) a quarter of an inch more in diameter than the rocket itself. Before the case is dry draw in one end, and tie with three half hitches. Now cut off the ragged paper beyond the string, and glue the closed-in end. In order to join the cap to the rocket you will have to add to the latter some strips of paper a quarter of an inch wide, until the cap fits on precisely and firmly.
Another and simpler way for amateurs to do this will be to wind three turns of paper round the top of the rocket, and tie it in that position. Then insert the equis or rains in the cap, carefully packing them, so as to ensure their lighting readily. There is no reason why you should not use the same kind of caps for stars also. After putting them all in, tie up the other end.

The usual fault in making rocket-caps is in making them too strong, so that when the charge bursts, the head is either blown off with the stars in it, or the stars are forcibly scattered until. These straight caps must be made weak throughout.

The bulged head caps are made stronger, but they are provided, as already explained, with a weak place, which facilitates the liberation of the stars.

Rocket-sticks.—Your sticks will have to be made of light wood, and for this sized rocket I recommend you to have them four feet long and three-eighths of an inch thick.

See that the stick balances the rocket, making the fulcrum two inches below the mouth of the rocket.

Tying on.—I advise you now to wire the rocket to the stick at the choke end. If you do not do so tie with three half hitches of string, not in the choke, but a quarter of an inch above. The reason is this: a rocket occasionally burns through its choke, and, unless it be tied to the stick in another place, the string may get burned, and the rocket lose its position on the stick, and ascend spirally instead of straightly, or it may even descend.

By tying round the choke with thin wire you effectually prevent the possibility of failure in this way.

Testing rockets.—In making trials with your rockets you will best test their power by filling the cap with bright stars; indeed, it will not be a fair trial unless you do so. Of course, if you are satisfied with caps of smaller proportions, you can easily reduce the size.

You should endeavour to find the fallen stick and case, to ascertain if the choke is burnt through. If you find it is you will have to regulate your composition.

If your rocket is weak, you will find that about the eighth part of a scoopful of powdered clay put into the case (after it has been set down on the spindle), and rammed with the setting-down tool, will strengthen the case, and keep the mouth of the rocket intact. Do not do this if you can avoid it, as it will damage the tail, and may cause the rocket to be burned through just above the clay.

Firing.—Have a stout stick one inch and a half square, and four feet and a half long, pointed at one end for driving into the ground. Drive in a staple at about two inches from the top, and another two feet and a half lower. The staples should be sufficiently large to allow the rocket stick to pass freely through. See that the rocket is perfectly straight on the stick. Break the blue paper, and light with a port-fire.

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**INDIAN BADMINTON, OR LAWN RACQUETS.**

The origin of most games is lost in obscurity, and forms a pleasant puzzle to those who interest themselves in such matters. But it is not so with the game of Badminton; its origin has been explained, and its history narrated in a most matter-of-fact way. The story runs, that one of the Dukes of Beaufort once chanced to have for a guest a friend who neither rode, shot, fishèd, nor danced, and who probably was, in consequence, quite a burden to the rest of the company. The Duke—a worthy descendant of that famous Marquis of Worcester who wrote the "Century of Inventions"—contrived a penance for this unfortunate individual, and condemned him to invent some new game for the general amusement. Remembering that great works are only to be produced in solitude, the guest retired to his room, locked himself in, and, after severe thought, designed the game which we have now to lay before our readers. It was called Badminton, from the Duke of Beaufort's Gloucestershire residence, in which the incident occurred.

But, if invented thus in England, how, you may ask, does the game get its title of "Indian Badminton?" Well, that is the curious part of the affair. The game appears not to have taken root in England at first, but to have migrated to India, where in course of time it spread, and was played in different forms in different districts. After it had been naturalised, as one might say, in the East, it occurred to two English gentlemen to devote themselves to the labour of collecting what was good in the various methods, and embodying the results in a set of rules, which are now generally used throughout India. These rules have now found their way to this country, and fallen into the hands of the well-known Mr. James Lillywhite, of Cheltenham, by whom we have been kindly favoured with much information regarding the game.

That now, on its return to the land of its birth, Badminton will attain to considerable popularity seems likely. It has many features to recommend it. To begin with, it is very amusing; then it is simple in theory, and not encumbered with many rules; it can be united in by both ladies and gentlemen; it affords good and healthy exercise; and, last of all, it is an exceedingly graceful amusement.

We come now to a description of the game. It is played with
GOLF.

By Robert Howie Smith.

THE RULES.

In approaching the practical treatment of the subject, it is necessary to premise that throughout the common there is a succession of circular holes four inches in diameter, situated at arbitrary distances, ranging from 80 to 500 yards. They are generally cut on a table land of smooth turf, to facilitate "putting"—the gentle tapping of the ball as it gets near the hole. Whenever the ball is struck from the "tee" (a snuff of sand or a tuft of grass to give the requisite elevation for a full drive), it is sacred from the touch of aught but a club until it lies at the bottom of its destination. My first injunction to the beginner is to persevere studiously the rules prescribed by the Royal and Ancient Club of St. Andrews, which are here reproduced after their most recent revision. They are universally recognised as the standard golfing code, and, subject to slight local modifications, they can be easily adapted to any green.

1. Mode and Order of Playing the Game.—The game of golf is played by two persons, or by four (two of a side), playing alternately; it may also be played by three or more persons, each playing his own ball. The game commences by each party playing off a ball from a place called the tee, near the first hole. In a match of four, those who are opposed to each other, and to play off, shall be named at starting, and shall continue so during the match. The person entitled to play off first shall be named by the parties themselves; and although the courtesy of starting is generally granted to old captains of the club, or members, it may be settled by lot or toss of a coin. The hole is won by the party holing at fewest strokes, and the reckoning of the game is made by the terms odds and like, one more, two more, etc. The party gaining the hole is to lead, unless his opponent has won the previous match, in which case the latter leads off, and is entitled to claim his privilege, and to recall his opponent's stroke should he play out of order. One round of the links, or eighteen holes, is reckoned a match, unless otherwise stipulated. If in a double match one person shall play twice in succession, he loses the hole.

2. Place of Teeing.—The ball must be teed not nearer the hole (either in front or side of the hole) than six club lengths, and not farther from it than eight; and after the balls are struck off, the ball furthest from the hole to which the parties are playing must be played first. When two parties meet on the putting green, the party first there may claim the privilege of holing out; and any party coming up must wait till the other party has played out the hole, and on no account play their balls up, lest they should annoy the parties who are putting.
No player may play his teed ball till the party in front have played their second strokes.

3. Changing the Balls.—The balls struck off from the tee must not be changed, touched, or moved, before the hole is played out (except in striking, and the cases provided for by Rules 9, 19, and 20); and if the parties are at a loss to know the one ball from the other, neither shall be lifted till both parties agree.

4. Lifting of Break Clubs, etc.—All loose impediments within a club length of the ball may be removed on or off the course, when the ball lies on grass (see Rules 6 and 13). When a ball lies in a bunker, sand, or any other hazard, there shall be no impression made, nor sand or other obstacles removed by the club, or otherwise, either on or off the green, before striking at the ball. When a ball lies within a club length of a water-tub, the tub may be removed; and when on clothes, the ball may be lifted and dropped behind them.

5. Entitled to See the Ball.—When a ball is completely covered with fog, bent, whins, etc., so much thereof shall be set aside so that the player shall merely have a view of his ball before he plays, whether in a line with the hole or otherwise. If any such ball is stuck fast in wet ground or sand, it may be taken out and replaced in the hole it had made.

6. Clearing the Putting Green.—All loose impediments, of whatever kind, may be lifted on the putting green or table land on which the hole is placed (excepting as declared in Rule 4), which is considered not to exceed twenty yards from the hole. Nothing can be lifted either on the course or putting green if it is to move the ball out of its position.

7. Rabbit-scrapes, Burrows, Holes, etc.—If a ball lies in a rabbit-scrape, the player shall not be at liberty to take it out, but must play it (see Rule 14) as from any common hazard; if, however, it lies in a rabbit-burrow, or any of the holes made for golfing, he may lift it, drop it behind the hazard, and play with an iron without losing a stroke. In all cases where a ball is to be dropped, the party dropping so shall front the hole to which he is playing, standing close on the hazard, and drop the ball behind him from his head.

8. Lifting Balls.—When, on any part of the course, or off it, or in a bunker, the balls lie within six inches of each other, the ball nearest the hole must be lifted till the other is played, and then placed as nearly as possible in its original position—the six inches to be measured from the surface of the balls. In a three-ball match, the ball in any degree interposing between the player and the hole on the green, must be played out.

9. Ball in Water, and Place of Ret-teeing.—If the ball is in water, the player may take it out, change the ball if he pleases, tee it, and play from behind the hazard, losing a stroke.

10. Rubs of the Green.—Whatever happens to a ball by accident, such as striking any person, or being touched with the foot by a third party, or by the fore-caddy, must be reckoned a rub of the green, and submitted to. If, however, the player's ball strike his adversary, or his adversary's caddy or clubs, the adversary loses the hole; or if it strikes himself or his partner, or their caddies or clubs, or if he strikes the ball a second time while in the act of playing, the player loses the hole. If the player touch the ball with his foot, or any part of his body, or with anything except his club, or if he with his club moves the ball in preparing to strike, he loses the stroke; and if one party strike his adversary's ball with his club, foot, or otherwise, that party loses the hole. But if he plays it inadvertently, thinking it his own, and the adversary also plays the wrong ball, it is then too late to claim the penalty, and the hole must be played out with the balls thus changed. If, however, the mistake occurs from wrong information given by one party to the other, the penalty cannot be claimed; and the mistake, if discovered before the other party has played, must be rectified by replacing the ball as nearly as possible where it lay. If the player's ball be played away by mistake, or lifted by a third party, then the player must drop a ball as near the spot as possible, without any penalty. Whatever happens to a ball on a medal-day—such as a player striking his caddy, or himself, or his clubs, or moving the ball with his foot or club, or his caddy doing so, or the player striking it twice before it stops motion—the player in such case, shall lose one stroke only as the penalty.

11. Ball Lost.—If a ball is lost, the player (or his partner, in a double match) returns to the spot, as near as possible, where the ball was struck, tees another ball, and loses both the distance and a stroke. If the original ball is found before the party has struck the other ball, the first shall continue the one to be played, without any penalty.

12. Club-breaking.—If, in striking, the club breaks, it is, nevertheless, to be counted a stroke, if the part of the club remaining in the player's hand either strike the ground or pass the ball.

13. Holing out the Ball.—In holing, no mark shall be placed or line drawn to direct the ball to the hole; the ball must be played fairly and honestly for the hole, and not on your adversary's ball, not being in the way to the hole; nor, although lying in the way to the hole, is the player entitled to play with any strength upon it that might injure his adversary's position, or greater than is necessary honestly to send your own ball the distance of the hole. Either party may smooth sand lying around the hole; but this must be done lightly and without pressure, or beating down with the feet, club, or otherwise. If, in holing out, the ball rests upon the flag-stick in the hole, the player shall be entitled to have the stick removed, and if the ball falls in, it shall be considered as holing out; but either party is entitled to have the flag-stick removed when approaching the hole.

14. Unplayable Balls.—In match playing, every ball must be played, wherever it lies, or the hole be given up, excepting when it lies on clothes, in water, or in any of the holes, or short holes, made for golfing; in which latter case it may be lifted, dropped behind the hazard, and played without losing a stroke. In medal playing, a ball may, under a penalty of two strokes, be lifted out of a difficulty of any description, and teed behind the hazard; and if in any of the golfing-holes, it may be lifted, dropped, and played, without a penalty. In all cases where a ball is to be dropped, the party doing so shall front the hole to which he is playing, standing close on the hazard, and drop the ball behind him from his head.

15. Medal Days.—New holes shall always be made on the day the medals are played for, and no competitor shall play at these holes before he starts for the prize, under the penalty of being disqualified for playing for the medal. On medal days, a party starting off from the tee must allow the party in front to cross the burn before they strike off. All balls must be held out on medal days, and no stannes allowed.

16. Asking Advice.—A player must not ask advice about the game, by word, look, or gesture, from any one except his own caddy, his partner's caddy, or his partner.

17. Disputes.—Any dispute respecting the play shall be determined by the captain, or senior member present; or, if none of the members are present, it shall be settled by a committee appointed by the parties interested, or by the captain and his annual council for the time, at their first meeting.

18. Parties Passing Each Other.—Any party having lost a ball, and incurring delay by seeking for it, shall be passed by
any other party coming up; and on all occasions a two-ball match—whether by two or four players—may pass parties playing three or more balls. Also, parties having caddies may pass those carrying their own clubs.

20. Breach of Rules.—Where no penalty for the infringement of a rule is specially mentioned, the loss of the hole shall be understood to be the penalty.

21. Repairing the Links.—The person appointed to take charge of keeping the links shall make new holes when required, and in such places as to preserve the putting green in proper order.

In reducing these laws to practice, it must be explained that when both parties hole the ball in the same number of strokes, the hole is halved, and counts to neither. Obviously, whoever gains the majority of holes wins the match, which may be finished, however, without completing the round if one of the sides has placed more holes to its credit than what remain to be played. You are said to be "dormy" when it is impossible for you to lose, as, for instance, if you are two holes ahead and there are only two to play, because, even should your adversary win the last two, the match would be drawn. Disparity between the competitors is balanced by "odds," which serve the same purpose as points in billiards—the loss skillful getting a stroke to every hole, or every second or third hole, as the case may be. The advantage lies here, that if the ball is held by each in six strokes, the player receiving the odds gains that hole by deducting his allowance; or if he takes seven to his opponent's six, it is halved.

Nothing, perhaps, has done more to popularise golf than the introduction of gutta-percha balls about the year 1868. Formerly the price of leather ones stuffed hard with feathers, which were generally ruined with the first gash, was half-a-crown; now it is a shilling or fifteen-pence, and, unlike the old oval ones, those at present in use can be easily made up by re-hammering and re-painting, thus doing double duty at a very moderate rate per dozen. They are manufactured in three sizes, weighing twenty-seven, twenty-eight, and twenty-nine drachmas respectively; the heavier being selected for playing in high winds, but the medium may be recommended as the most serviceable.

The tools which constitute the golfer's paraphernalia are numerous and varied, consisting of the play-club, the grassed-driver, the long, middle, short, and haffing spoons, the heavy and light irons, the clock, the niblick, and the driving and green-putters. This is a portentous catalogue; yet the tyro need not be disheartened. Armed with a play-club, a niblick, and a putter, he may acquire such proficiency as will afford him many a good day's sport; and as he advances in skill he may complete his set. The three implements named may be had for thirteen or fourteen shillings.

The play-club, varying in length from forty-one inches downwards, should be selected inclining rather to stiffness than to springiness in the shaft, with a medium-weighted flaxish head, neither too deep in the face nor too broad in the back. Its primary purpose is to drive long raking shots from the tee; but it is also useful in playing through the green, when the ball lies in a tolerably good position. It should be grasped firmly with the left hand at the extreme end, the right being held loosely to act as a guide, both hands being kept close to each other, the wrists easy, and the thumbs over, not along, the shaft, while the knees should be a little bent. Then the club should be drawn slowly back over the right shoulder, but without touching it, and brought smartly down to the ball—the swing describing three-fourths of a circle. The ascent can scarcely be too deliberate, or the descent too rapid. But during the operation the eye must remain steadily fixed upon the ball, else it will either be missed altogether or struck on the top. No attempt must be made to press the shot, which is always fatal, as success of aim and fairness of flight are more the result of art than strength. These conditions lie at the foundation of style, and patience and attention will soon carry them into successful practice. But of no less importance is the manner in which the ball is addressed. This depends on the stand. The feet should be from thirty to thirty-six inches apart, the left toe being turned in slightly in front of, and nearly opposite to, the ball. A careful study of the proper position will prevent the ball being sent off the course to the right, by standing too near it, or to the left, by standing too far from it.

The cleek is a stiff-shafted club, with a straight-faced iron head, sloped backwards. It occasionally acts as substitute for the more unwieldy sand-iron, in extricating the ball from gravel-pits, furze, bushes, and similar hazards; but its chief glory is that, being the handiest tool of the lot, it can be made to do duty for them all. Many beginners rely upon it exclusively in their early efforts, as they can strike with it more confidently than with a wooden club, while it gives them a comparative immunity from breakages. Yet in its legitimate sphere it requires rather delicate handling, for the niceties of which no printed instructions can be rendered available.

The putter is rightly regarded as the deadliest weapon in the golfer's armoury, as it has decided many a hard-fought contest. Thirty-six inches long, it should possess an absolutely stiff, slender, upright shaft, slightly curved, with a medium head, broad-faced, and weighted with plenty of lead to ensure steadiness. This club comes into play as the hole is approached, and necessitates dexterous manipulation; as not only has distance to be judged, but the undulations of the ground and the impeding force of the grass have also to be calculated. At this crucial stage in the game, the position of the player is the reverse of that prescribed in driving. Having viewed his line, he should lean on his right foot, which should be immediately opposite the ball, the left toes being turned outwards. The arms should never be brought into requisition at all, the wrists being the prime motors, and the stroke should be delivered with combined celerity and decision. To hesitate here is to be lost. No timidity should mar the chances of a "pot." It cannot be too strongly impressed upon the novice that he commits a greater mistake in stopping short of the goal than in going beyond it. There is no sounder saw of the links than "Never up, never in."

The costume of the golfer is simple enough. A cap, a jacket, or short-sleeved roomy shooting-coat, loosely-fitting trousers, woollen socks, and strong boots, are the staples of his wardrobe. Cricketing-shoes are a nuisance; and as a safeguard against slipping, too many rough nails in the soles are worse than having none at all. A good waist-belt is preferable to braces, which do not give the muscles of the shoulders sufficient freedom. Discarded white kid gloves will prevent blisters arising from the friction of the clubs; but the left hand only stands in need of such protection, and the fingers of the glove may be cut off below the second joint with advantage.

In conclusion, my parting advice to the aspirant for golfing delights and distinction is to postpone his début on the green until he be accompanied by some one who is familiar with the game—not necessarily a professional. With such assistance his progress will be more satisfactory, and he may also be spared the chagrin of plunging into vices of style, which once acquired become hopelessly incurable.
THE MAGIC LANTERN.

BY SAMUEL HAYKET, F.G.S., Etc.

The Magic Lantern may be considered, as to constructive details, arrangement of accessories and manipulation, according to the source of light selected as that best suited for the purpose its exhibitor has in view. Thus, if a lantern is required for the amusement of the family circle, or as an instrument of class instruction in ordinary schools, the Argand Lantern, with its contingent system of appliances, best meets the case; but if a large assembly is to be instructed or entertained, then the Lime-light Lantern is the most suitable arrangement, either in its simple form, for the mere exhibition of views, or the demonstration of physical experiments, which I shall describe under the head of The Demonstrating Lantern System, or in its more complex form, for the production of what are known as "effects," which I shall describe under the head of The Diromatic Lantern System.

This system embraces the lantern, the source of light, the protective slide tray, the slide frame, and the screen, which are arranged for exhibition as shown in Fig. 1.

The Argand Lantern is constructed of tin, for the reason that as the chimney of the lamp employed as the source of light, concentrates heat, metal is best suited for what is technically termed the "body" of this lantern. This concentration of the heat necessitates good ventilation, or the metal body would get as hot as a furnace soon after the lighting of the lamp, with the attendant risk of burnt fingers for those who had the handling of it.

In the ordinary magic lanterns of the shops it will be found this is effected by means of a long tapering pointed chimney, or else by a straight cylinder terminated by a gauffered cowl, but as both of these forms contract the original diameter of the chimney, I regard them as objectionable, for they cannot do otherwise than impede free ventilation.

The chimney I have found to answer best is one of equal diameter throughout its entire length, with the upper aperture nearly as large as that which fits upon the "dome" or roof of the lantern, and, instead of being cylindrical, made square, as shown in Fig. 2, so that its interior may be utilised for the package of the slides in a manner hereafter described, and thus economise space.

In connection with an arrangement for throwing a much greater body of air into the base of the lantern than is usually adopted, I find the ventilation thus obtained so perfect, that the fingers may be placed on the domes with impunity, even after the powerful lamp employed has been burning for some hours or two. Access to the body is obtained by two folding-doors placed at the back of the lantern. The L shape of the body is arranged with the view of economising space, for it will be seen on looking at Fig. 2 that the space beneath the "stage" is of proportions to admit of the stowage of the chimney when unshipped and filled with slides.

The optical system comprises (1) the Condenser; (2) the Flange that carries it; (3) the Stage for the slide frame, with its tube, that carries (4) the Lens Mount that carries (5) the Power.

The stage and power, it should be observed, are, in this instrument, separable from the lantern, with the view of being employed as a photographic camera, for I hold that we should have the power of utilising this portion of our apparatus for taking views as well as showing them, an idea palpably practicable to every photographer, and thus making our lantern apparatus serviceable in the summer, as well as amusing and instructive in the winter. Moreover, this lantern can be employed for making "photographic enlargement" from negatives thus obtained, as well as for showing pictures on the screen. Thus we truly have multum in parvo, for in the remarkably small space of 13 x 12 x 9 inches can be packed not only a photographic and educational lantern with its source of light, but also a series of from fifty to seventy-five slides.

The floor of this lantern is fitted with a sliding board that carries the source of light and admits of its focal adjustment, as shown in Fig. 4. The construction of the condenser involves several important questions pro and con. Its office being that of a light collector, we have to consider how we can pick up and evenly distribute over a given surface the greatest number of rays emitted from the source of light, in a manner practically attainable.

First let us consider what is the extent of surface we have to illuminate, and that in other words means, what is the size of our "standard slide" or glass picture?

In former times, when the designs had to be painted entirely by hand, wherever detail was required, a commensurate amount of surface had to be given to the artist to enable him to accomplish his task, and it was no uncommon thing for the glass slide to measure 8 x 6 inches, which consequently entailed cumbersome and costly apparatus for its exhibition. Since the application of photography to the production of the design or picture, an enormous amount of detail can be concentrated into a disc three inches in diameter, which might be regarded as the standard size for the slide at the present day, were it not for the extensive use of the halves of transparent stereographs, which, though only 2 inches square, nevertheless measures 3½ inches across the diagonals of the picture. As it is an established rule that the diameter of the condenser should be at least half an inch longer than the diameter of the picture, it will be seen, that if all slides did not exceed three inches at their greatest diameter, then there would be no question but that a condenser of 3½ inches diameter would be universally recognised as the standard size; but these stereographs make it questionable with many persons as to whether four inches ought not to be the standard diameter for the condenser.

For the reasons presently given, and all things considered, I regard the 3½ condenser as the best "standard" size for general adoption. If we take two condensers of equal focal length, say of 2 inches, but of unequal diameter, say of 4 and 3½ inches respectively, we shall find that while the 4-inch condenser picks up 80° of light emitted at the focal point, the 3½-inch condenser only collects 75° of the emitted rays; but, on the other hand, the entire bundle of rays collected by the 3½ condenser are conveyed through a 3-inch disc, with the exception of those marginal rays that would produce colouring fringes on the
screen if not stopped back by the usual black border of the slide that acts as a diaphragm, which marginal rays amount to one-seventh part of the condenser’s diameter, while, with the four-inch condenser, a quarter of its diameter is “stopped out” when a three-inch disc is used, and nearly three-eighths of its diameter, as far as the square portion is concerned, when stereographs are employed, and this for the sake of “covering” or illuminating the four corners of such photographs.

The condenser of a first-class lantern should be comprised of at least two lenses, which may be a pair of double convex, or a meniscus and double convex, such as should be known as Herschel’s condenser, or a meniscus and crossed lens, known as Gravett’s form, or, what I find to give the flattest field on the screen, a pair of plano-convex lenses of equal focal, which, moreover, possess the advantage of being most readily replaceable in the “cell” in which the condensers are mounted, should either lens be damaged or fractured. This is a point of importance to travelling lecturers, etc., or those who live in localities far removed from opticians or mechanics’ workshops, as such an arrangement makes them independent of extraneous aid.

Next we have to consider the question of the best focal length for a condenser. In old forms they may be found as long as four inches back focus, that is to say, the distance at which parallel rays (as those coming from the sun, or a source of light at least twenty feet distant) are conveyed to a point of light behind the condenser, this being known as the “principal” or “solar focus” of a lens or combination of lenses. More frequently the focus was three inches, and those of recent manufacture about 2 inches back focus. Now it will be found, if we take three condensers of equal diameter, say 4 inches—of the respective focal lengths of 4, 3, and 2½-inch focus, that, while the first will only pick up 50°, and the second 60°, the third will collect 80° of the rays emitted from the source of light placed at the focal point.

Now, as the office of the condenser is to collect the greatest amount of light practically attainable, and it is evident that the shorter the focus the more efficient it becomes; let us go a step further, and make the combined forms of one pair of plano-convex lenses as short as 2½ inches, and we shall find that if four inches in diameter this condenser will pick up 85° of light. As, however, I have selected 3½ inches as the standard diameter, we shall only be able to pick up 80° of light, nevertheless as great an amount as we can attain to with the condenser of four inches diameter and 2½ inches focus. Beyond this point we cannot go without losing the desired “flatness of field,” and having to employ an objectionable thickness of glass, for while one pair of lenses of 2½ combined focus only measures 1½ inches across their line of greatest thickness, a pair of lenses of two inches combined focus (3½ diameter) would be 2½ thick, and extreme thickness of glass means a proportional loss of light through retardation and absorption.

The importance of employing short-focus condensers where we have to deal with weak sources of light (such as the most powerful Argand burner must be considered in relation to the intensity of the lime or electric light) is therefore fully demonstrated.

There is one drawback to the employment of very short-focus condensers, which is, that through being brought so
close to the light they are more liable to crack, especially when used in frosty weather.

This troublesome defect may be easily remedied by placing a disc of thin plate-glass between the source of light and the back lens of the condenser in such manner as to allow a current of air to pass between the two surfaces of glass, so that if a breakage should occur, the comparatively valueless plate-glass disc would bear the brunt.

Finally, we have to consider the nature of the material best suited for short-focussed condensers, and I have simply to state my experience that a very bright white flint-glass with a refractive index of about 1·6 (crown glass being 1·5), to compensate for the extra thickness of the lenses, answers best, as the green tint of crown-glass obscures and stops back an appreciable portion of light, if lenses of that material are of great thickness.

To sum up, my "standard condenser" is 3½ inches in diameter, is composed of two plano-convex lenses having a combined focus of 2½ inches formed out of brilliantly transparent white glass, with a guard of plate-glass mounted in a brass cell, so that either glass can be immediately replaced in case of damage, without having to send to the opthalmician; and it also admits of a current of air passing freely between the guard glass and back lens in the manner shown in section in Fig. 3.

The condenser fits from the inside of the lantern into "the flange," or carrier tube attached to a circular plate, by which it is fixed to the tin body of the lantern.

The "stage" is formed of a pair of brass plates with three-inch circular apertures, framed together so as not only to carry the slide frame, but also double-backed photographic plate-holders or "camera frames," either lantern or photographic frame being kept central by means of a spring stop. To the front of the square stage is attached the large tube, into which screws a cloth-lined "jacket" with its focussing tube that forms the "mount" for the "power."

This portion, called the "camera" of the present arrangement, is attached to the front limb of the lantern (as shown in Fig. 2) by a clamp screw, that also admits of its attachment to a camera-stand, when photographic negatives are to be produced.

The "power" is of a single achromatic flint and crown combination of the periscopic meniscus form, of four-inch focus, suitable alike for lantern or photographic purposes, which, in combination with the short-focussed condenser, gives a well-defined, flat, and brilliant picture up to ten feet in diameter, when a photographic transparency is illuminated by my hydrocarbon lamp.

The "source of light" is a hydro-carbon Argand lamp, specially constructed to meet the requirements of those who desire a powerful light without resorting to the employment of oxygen.

It consists of a fountain reservoir, for securing a constant level, fitted with a carefully-constructed Argand burner and oxygenising cone, with the air-shaft and chimney adjusted for the perfect combustion of refined petroleum having a specific gravity of 0·895 and a boiling point of 340° Fahrenheit, a liquid (notwithstanding the prejudice existing in the minds of those who are ignorant of the distinction that must be drawn between hydro-carbon oils of low and high boiling points) that is perfectly free from danger, also from unpleasant smell during its perfect combustion, and from that greasy exhalation peculiar to paraffin oil.

In this lamp the oil becomes volatilised and burnt in a gaseous form, while, by an arrangement passing into the body of the flame which I call "the intensifier," a light is produced that makes the nearest approach to the so-called oxy-calium light I have yet seen any Argand burner attain to. The external arrangement of this lamp is shown in Fig. 4, and it will be seen that provision is made for the adjustment of the flame with the axis of the optical system of the lantern. The reflector is a concave mirror of silvered glass—having a focus corresponding to that of the condenser.

The usual glass chimney may, for the sake of saving breakage, be replaced with one of metal, fitted with a nozzle to give egress to the rays emanating from the most brilliant part of the flame.

The flame of this lamp is not only intense, but dense, which characterises it from those produced by paraffin or the most perfect gas-burners.

The Slide Tray next claims our attention. All who have had any experience with magic-lantern exhibitions, must be aware of the annoyance one is subject to through people handling the pictures at the conclusion of an entertainment, and the risk run in the ordinary mode of packing slides. To obviate this, I have arranged a protective tray, that not only provides for the methodical arrangement of the slides in the intended order of exhibition, but against their being laid about on the table that supports the lantern, according to ordinary custom. This contrivance is shown in Fig. 5, and it will be seen that it is an oblong tray divided into three compartments, each being 3½ square (the photographed slide being 3½ square), and deep enough to take twenty-five double-glass slides, the sides being open to allow of each slide being seized by finger and thumb.

One compartment is left vacant, to allow of the arrangement being worked in the following manner:

The Slide Frame, also shown in Fig. 5, is tunnelled, and long enough to hold three (3½ inches square) slides in a row. In the centre of this frame there is a three-inch circular aperture, which corresponds with the axis of the optical system, when pushed into the stage and fixed by the spring stop, previously described.

A slide is taken from the top of the central compartment of the tray, and is pushed into the frame; then the second, to bring No. 1 to the centre of the frame; and when the image of this has been shown on the screen, a third is inserted, which brings No. 1 to the end of the frame, and No. 2 central. No. 1 is now removed, and placed in the empty compartment of the tray; and so the exhibition goes on till the central compartment is empty, and the one at the end of the tray filled up.

The second pile is now manipulated in the same manner, till the central compartment is again filled up, and the last one emptied, when a cover is dropped over the tray to protect the set of slides from meddling hands, and the whole packed inside the square chimney of the lantern (see Fig. 5), which again is packed inside the lantern, as previously described. It will be observed that this system obviates the employment of a separate wood frame for each slide—a matter of importance where portability and compactness of apparatus have to be considered.

The Screen best suited for school-room use is one made of seamless cotton, six feet square, prepared with a flexible opaque white surface, mounted in a protecting case, after the manner of a wall-map, as shown in Fig. 1, so that it can be pulled down for use or rolled up without loss of time. If a larger screen is desired, the drawing-room screen, eight feet square, or the lecturer's ten-feet screen, hereafter described, may be employed.
WINDOW GARDENING.

By J. C. Leake.

PLANTS FOR THE PURPOSE.

In concluding this short series of articles it must not be expected that we can give minutes and particular directions for the cultivation of plants, the names of which alone would fill a volume. To a great extent each flower gardener must consult his own taste as to the plants he wishes to cultivate, his only aim being to keep up a goodly display of foliage and blossom, so that his window garden be really what it is intended to be—one of the great features of household decoration.

To commence with that portion of the work which is intended for external decoration. The first care should be the edges of the window. A flower-box, such as we have described, is very charming when filled with a well-assorted collection of flowering plants; but much beauty is added thereto when, in addition to the horizontal line of blossom, we have a curved one of vegetation passing along the sides and over the top of the window. This is easily produced. Even if we have nothing else, there is the hardy and evergreen ivy, which will require little or no attention beyond an occasional training of its branches in the required direction. Better still will be the climbing rose, of which there are many varieties. Most of these are exceedingly hardy, very free in growth, and bear an abundance of flowers.

More charming yet, we have the common sweet-brier with its delicate blossoms and fragrant foliage, which will run to an immense distance if properly trained. Either or all of these may be employed for the purpose indicated, and if to these we add, for growth in the flower-box, one or two of the best known drooping plants, which may overran and fall below the lower edge of the window opening, we shall have all we can require for this purpose.

For the boxes themselves we may employ either the ordinary flowering annuals, or some of the hardier of herbaceous plants. The geranium alone will suffice to keep a window-box gay during a great part of the year. "Count the sands of the sea," says a well-known writer, "and then count the varieties of the geranium." And he must be hard to please who cannot be contented with the countless varieties of scarlet, white, and blended colours produced by this plant alone. Most persons in town will probably purchase their plants; but they may be propagated by wholesale almost anywhere. A common frame, with a few inches of good manure, and four or five inches of light sandy earth, will answer perfectly. The cuttings should not be exposed to direct sunlight at first, and should be kept from cold, but they will, from their hardiness, rarely fail to strike. During winter they should, of course, be housed, and kept from the frost. The same remarks will apply to many other plants which we cannot here enumerate. One suggestion will be found worthy of attention before we leave this part of our subject, namely, the advantage of keeping our plants for outside cases in pots or boxes easily removed. By adopting this course we can always keep up a good show, and replace a defective plant readily, while, in case of a sudden change of weather which we fear might prove destructive, we can remove a rare or choice specimen to a safe place without disturbance of the whole. The outside window-cases which are placed externally may be employed for the cultivation of more delicate and rarer plants. If not too much exposed to the sun, many of the hardier ferns may be grown with success in these, as well as geraniums of the rarer sorts, verbena, the smaller roses, fuchsias, heaths, if very carefully tended, camellias, and scores of other plants, which we cannot find space to mention.

Here also we may make a splendid display of the ever-favourite hyacinth, and, with a little care, keep it up for a considerable time. It is to be regretted that these beautiful flowers should be so frequently grown in glasses instead of pots. There can surely be no satisfaction in displaying the roots of these ill-treated bulbs, which, as soon as they begin to assume a beautiful form and to develop their bloom, must be supported by wires, or fall.

The best plan of cultivation is to make a compost of one part each of light loam, river-sand, leaf-mould, and well-rotted dung, and place the bulb in it in pots of ten or eleven inches deep. The bulbs should be covered for about three parts of its depth. They should be watered, and kept in a dark cool place for a few days. When the central bud has started about half an inch they may be exposed to light and warmth. By careful arrangement of planting a succession of blooms may be kept up for a considerable period.

The enclosed cases in rooms, best known as the "Wardian fern-cases," are, as their name implies, best suited for the cultivation of ferns. The principal conditions for the successful growth of these are shade, warmth, and a moist atmosphere, consequently the fern-case should not be exposed to the direct rays of the sun, but if placed in a sunny window, a blind should be provided, which may be drawn down as required. Most ferns require a considerable quantity of moisture, but they should be well drained, as anything like stagnation in the water would most probably destroy some of the more rare varieties. The best soil for the cultivation of ferns is that in which they are found in their wild or natural state, and this can frequently be procured in sufficient quantities for small cases; if not, however, a mixture of equal portions of peat or bog-earth with sandy loam and fine sand will be found to answer perfectly. No manure is required, but on no account must a steady equal supply of water be neglected. There should also be a free circulation of air, especially during the night; and in no case should this be too strictly excluded. When it is remembered that it is in the humid atmosphere of tropical forests that the fern tribe acquire their greatest perfection and most gigantic dimensions, we can easily realise the fact that the conditions required are those before-named, warm air, and plenty of moisture. The direct enemy to ferns in this country is frost, which only a few of the very hardiest can withstand. When the nights are very cold, a thick cloth or blanket thrown over the case will often save the contents, and this precaution should not be neglected.

It is impossible in this place to give any specific directions for the cultivation of ferns. There will really be no difficulty in propagating any of the more hardy varieties, and we may almost say the most beautiful. As each plant is introduced to the case, and arrives at maturity, the spores or seeds fall, and, if left undisturbed, germinate freely. We have seen the side of a fernery completely covered with young plants self sown in this way; so that there is no danger of the stock falling off. All the attention required is to keep up the supply of water, and let the plants grow at their own sweet will.
THE AQUARIUM.
By W. A. Lloyd.

A FEW WORDS ON SEA-WEEDS.

And now, as I have poked fun at these antediluvian aquarium sea-weed gatherers, I should like to say something which is not fun. I have already mentioned that the collecting, transmission, and introduction of them was a very obvious application of the balancing arrangement of plants and animals, and there would have been nothing to say against it on the score of being lumbering, or costly, or anything else, if these sea-weeds would only live in captivity as well and as easily as the animals which these plants were supposed to keep in health. But they would not live, they will not live now. And then, to add to the provocation of the matter, they will sometimes live and thrive, perhaps one time in a hundred, or one time in a thousand, when one takes no pains at all with them, and die outright and immediately when they are made the subject of good weather, and how much solicitude.

I must now say something about sea-weed and one marine flowering plant, and about fresh-water alge and other plants, premising, however, even if I make the confession to my own detriment, that I am so much of a thorough cockney naturalist, that I know little or nothing of marine botany as it exists in the sea, and just as little of aquatic botany as it is met with in rivers, brooks, lakes, or ponds.

I am an inland aquarium naturalist, and nothing else. This stated, I have to explain that the word "weed" is veritably applied to plants having no commercial value, and usually to such as grow unbidden on land or in water, whether salt or fresh, without their being cultivated, and sometimes to the detriment of other and desirable plants.

Used in this sense, there is no restriction as to any kind or natural division of plants, according to the practice of scientific botanists. But when the term is applied to what are known as sea-weeds, it is restricted invariably (with the exception of one common error in the case of a flowering marine plant, Zostera marina) to certain forms of vegetation forming a large natural group or class, the one great leading distinction of which is that all its members are flowerless. They are composed of thousands of species and many hundreds of orders, families, and genera; but the whole of them all over the world are divided broadly into three great colour sub-classes—the chloro-sperms, which are green; the Rhodospersms, which are red; and the Melanosperms, which are olive.

It does not come within the province of a series of popular papers on aquaria to enter into minute natural-history details respecting plants or animals, as that information can be found abundantly in many able books specially written for the purpose; and it is a part of my duty to point out as I go along the best and most suitable works on the subject. Thus, the best one volume on British sea-weeds is the "Manual" of the late Professor Harvey, of which the second and best edition is that of 1849, with twenty-seven plates containing one figure of every genus, and representing the typical species of each. When, as in this instance, the coloring of natural objects is well done, and is not mere dashing, it is best to buy a coloured copy, as colour is then a valuable means of instruction.

But though my business is to teach people, as far as may be, how to keep things in aquaria, it is allowable that I may give as much description of them as will define their place in the scale of being, and furnish such short accounts of them as will create interest for the further pursuit of a knowledge of them. Beginning at the lowest and simplest form, therefore, which is always the right way, the Chlorosperms are the most widely diffused of any, they being found everywhere, in all climates, in sea-water and fresh-water, and in admixtures of the two in equal proportion. Harvey, at pages 189-190 of his "Manual," has described their universality and purifying usefulness; and I (at page 375, col. 1, Part 9, Recreator) have alluded to their wonderful persistence, and the essential service they perform.

Some of them, as the Diatoms (marine) and the Desmidieae (fresh-water), are mere microscopic single cells, which are locomotive during their whole period of existence. Some are branched and non-locomotive; others, as the Oscillatoria (marine and fresh-water), are minute locomotive filaments, or strings of cells all their lives.

But all have locomotive spores or seeds, even if these spores settle down into non-locomotive plants; and respecting these locomotive seeds I shall later on have much to say in reference to their being a source of serious aquarium trouble. Some of the members of this sub-class are prettily branched and plumed, as Bryophis; others, as Conerva, are filamentous, but structurally differing from Oscillatoria. Their forms and variations are indeed infinite, but special mention must be made of one very distinct order, the Ulvaceae, where the cells unite so as to make broad thin membranes of considerable extent (sometimes several inches long and wide), usually much puckered at their edges, as Ulva and Porphyra, or as in Enteromorpha, where the froun (the whole plant) forms thin flat tubes of great length and breadth.

I specially allude to these three plants, because, in the early days of aquaria (1858-1853) and indeed for long after, and even up to 1859, all aquarium authors and workers, myself included, recommended them as almost the only good forms of vegetation for the evolution of oxygen in marine aquaria, but it is curious that they were never intentionally used for fresh-water aquaria, though some members of these three genera are not marine.

The Rhodospersms come next in position in the scale, and being by far the most beautiful of any, they have received more attention in the desire to cultivate them in aquaria than any others. One very curious thing about them is that their red colour is the most pure, deep, and rosy when they grow in much shade, and it is just the contrary when they are found in the sea (they are almost exclusively marine) growing in light situations. This is exactly the contrary of the rule which obtains among land and fresh-water plants, which grow white in darkness, as when, e.g., potatoes grow in a cellar.

The third and highest sub-class, the Melanosperms, to which belongs the common bladder-rack or fucus, or any which fringe all coasts, and which, in the form of "Gulf Weed," floats on the surface of the ocean in enormous masses in the Atlantic, has but very little aquarium interest, as I know of only one instance where one species was grown in a tank, and that was a froun of Alaria, which in the summer of 1866 made its appearance, from no visible source, in tank No. 6 of the Aquarium of the Zoological Gardens of Hamburg, and as it came and went away unbidden, its growth was not owing to any skill of mine. Once, in 1869, it was said that a small froun of fucus grew up in an aquarium at Wandsworth, but the report was not authenticated.

Like the Rhodospersms, there are but one or two fresh-water
TOY-MAKING AND TOY-GAMES.

DIBS OR KNUCKLE-BONES—PEBBLE GAME—DUCK-AND-DRAKE—BIRD-WHISTLES—COMMON WHISTLE—SQUEAKER—SQUIRT—
WHALINGONE CROSS-BOAT.

The game of Dibs or Knuckle-bones is played with five small bones from the hind leg of a sheep. It is a very pastime, and, amongst girls especially, is a very great favourite. The performance consists in throwing up the bones, sometimes one at a time, and sometimes all together, and catching them, either in the palm or on the back of the hand. The order of the "tricks" into which the game is divided appears to vary in different parts of the country. It seems to be the general practice, however, for the game to begin by one player taking the knuckle-bones in hand; he commences the series of tricks, and whenever he fails to perform one of them, the bones are taken possession of by the next player. This second player also commences the series of tricks, and, when he fails, the bones are handed over to the third player, and so on. When, in course of time, they come back to the first player, he once more attempts the manoeuvre which he failed to accomplish. Should he succeed, he tries to perform the rest of the series of tricks; should he fail, the bones are passed on as before. Whoever arrives first at the end of the series is the winner of the game.

The Pebble Game is very like the pastime of Dibs. It is played with small, round, smooth pebbles, and is called "Jack's," or "Jackstones," in England, and "Chucks," or "Fives," in the northern country. The tricks, which are numerous and slightly different in different places, are, as a rule, much the same as in Dibs, and a description of the more important of them will answer for both games.

You begin by throwing up the five stones, and catching them, first on the back and then, by a rapid turn, in the palm of your hand. One seldom, however, succeeds in catching all five; but should you only catch one you may continue to play, and the first thing you have to do is to throw up, one by one, the stones you have dropped, throwing them up and catching them in the way described for the next stage of the game. Should you catch none, you must hand over the pebbles to another player.

For the next stage, scatter the pebbles on the floor, or whatever you are playing upon (the best place for the players to be seated on is the carpet), lift one, throw it a little way up, and, before it falls, pick up another of those lying on the ground, and, with that stone in your hand, catch the one just then thrown up. Lay the first pebble aside; then throw up the one retained in your hand, pick up a third, and catch the second as it falls, and so on, till you have gone over all five pebbles. This stage is known as the "ones."

The second part of the game now begins. Its different movements are known as the "twos," the "threes," and the "fours." Scatter the pebbles as before. Throw up one, pick up two, and catch the one as it falls. Lay the two aside, throw up the one retained, pick up the other two, and catch the one as it falls. That finishes the "twos." For the "threes," scatter the pebbles, throw up one, and pick up three; then lay these three aside, throw up one, pick up the remaining pebble, and catch the one thrown up. The "fours" consists, you will readily understand, in throwing up one and picking up four.

Now you arrive at the third part, that known as the "castles." It is played thus:—Take four pebbles in your hand, and one between the finger and thumb; throw up the single pebble, and put the four quickly down. Immediately after having done so, catch the one thrown up, fling it into the air again, lift the four, and catch the single one in its fall. Repeat this trick four times, leaving out one pebble each time.

Begin the fourth part by putting down one pebble; then fling the remaining four into the air; lift the one, and catch the four as they fall. Put down two pebbles, and fling up the remaining three, and carry on so till you put down four, and fling up one.

In the fifth stage, keep all the pebbles in your hand but one, which you must hold between the finger and thumb. Throw that one up, and drop one of the four out of your hand. Next, throw the same one up, and drop another, and continue doing this till you have dropped all four, when you must fling up the single pebble, and catch up the four together.

The last trick is now to be performed. Lay your left arm along the ground, and place a pebble at the point touched by your elbow, and another at the point touched by the tip of your fingers. When that is done, raise your arm, throw up a pebble, and, whilst it is in the air, catch up the two upon the ground. As they are far apart, you will likely have many a failure before you succeed. And so ends the game.

Duck-and-Drake, or water-skimming, is a pastime of great antiquity. It is mentioned by Julius Pollux, and also by Eustathius in his commentary upon Homer. The ancient Greeks used to play at it, we are given to understand, with flat shells. As prac-
tised now-a-days, it is an amusement of the simplest possible description. A number of boys in turn throw a stone, a flat piece of slate or tile, or an oyster-shell, along the surface of the water. He whose stone rebounds oftener in a given number of throws is held to be the winner. If the thing thrown rebounds only once, it is called, in some places, a “Dick”; if twice, a “Drake”; if three times, a “Drake.” By a little practice, the stone can be made to dip eight or nine times, or even oftener. It has been remarked that Duck-and-Drake produces, even on a small scale, the effect seen when a cannon-ball strikes the water in a slanting direction. When a shot hits the water in this way, it goes bounding and rebounding over the surface for half a mile before it sinks.

Our game has given rise, I may remark, to a well-known proverb applied to a spendthrift, “He is making ducks-and-drakes with his money;” that is to say, he is casting it on the waters as carelessly as if it were bits of slate or oyster shells.

I have already in a former article (p. 172, Vol. I.) described a toy for imitating the cries of birds. Two or three different forms of whistles answering the same end are now to have our attention.

The first of the Bird-Whistles you can make out of a little toy-teapot. First of all, remove the spout; then make a whistle at the lower end of a quill, and fit that end to the hole where the spout was broken off; then fill the teapot rather more than half-full of water, blow the whistle, and you will obtain clear liquid notes, as like as possible to those of the feathered race. The agitation of the water, by the sound-waves passing through it, gives a fine bird-like effect, and by jerking the breath, the most wonderful imitation can be produced, of larks, blackbirds, canaries, etc.

Or you may make a whistle of a slightly different sort. Get a piece of elder or willow, or some such wood, about six inches long, and make a whistle in the middle of it. Dip the end that is farthest from your lips under the surface of a glassful of water. You will obtain as bird-like tones as with the quill and the tea-pot.

The small bird-whistles sold in the streets of London and elsewhere are of the same sort as those last described, only they are much smaller, being usually about three inches long. They are made sometimes of metal, and sometimes of wood, and occasionally of glass. One of these street articles is represented in Fig. 1. The material used to obstruct the air-passage is only a little bit of putty.

On the subject of the Common Whistle I do not think anything need be said. With its form and peculiarities every schoolboy is familiar. It is a noisy toy, but—to its credit be it stated—it can establish a real claim to usefulness. The only thing that occurs to me to say about it is, that the pea which is often inserted in the whistle is introduced for the purpose of agitating and breaking the currents of air, and so producing a succession of quick vibrations, upon which the acuteness of sound depends.

Having touched upon the bird-whistles sold in the streets, I may as well make mention of a squeaking toy which also finds a market there. This Squeaker is the instrument with which it is generally supposed that the peculiar squeak of Punch, in Punch and Judy, is produced. You may make it for yourself. Get two little pieces of tin, each about an inch long, and half an inch broad, and bend them slightly inwards. Now wind a piece of tape round, and tie the whole together with thread. Blow through the instrument, and by the vibration of the central piece of tape, the peculiar sound will be produced. This squeaker is allied to a very noisy amusement that boys follow in some country districts. They place their two thumbs together, and in the hollow between them lay a piece of grass, which is made as tight as possible. Then they blow upon the grass, and produce a most horrible and unceasing noise. The piece of grass takes the place of the tape in the manufactured toy.

It is difficult, if not impossible, to utter distinct words with the squeaker; but one may, by its means, disturb a whole neighborhood, and drive one’s immediate friends well-nigh distracted. It makes a startling contrast to the clear musical tones of the bird-whistle.

The Squirt is a popular toy, but is not one which you would find it profitable to attempt making for yourself. The price at the toy-shops is so moderate, and the difficulty of making it air-tight so great, that to buy a squirt is the best plan if you want one.

It consists of a tube, into which a piston or plug is fitted so nicely that no air can pass by its sides. To the piston a handle is attached, and at the far end of the tube from the handle there is a small opening. When you play with the squirt, you first of all push the piston down to the bottom of the tube, then you immerse the nose of the tube in a bason of water, and draw up the piston. This leaves a vacuum in the lower part of the cylinder; the water rushes in and fills it, and may be squirted out to a considerable distance by forcing the piston down again towards the nose of the tube.

The manufacture of a handsome Whalebone Cross-bow is what will put to the test your taste and neat-handedness. To make one not handsome is, of course, what anybody can do.

You begin by getting a piece of wood, out of which to form the stock, which, in shape, is to be very much like that of a gun (see Fig. 3). In cutting out the stock, leave a piece projecting at a, and in it cut a square hole, in which to fasten the bow, and chisel an aperture in the stock, at b, for fixing the trigger in. Next cut a groove along the top of the stock, and, at c, fasten two small pegs of some sort of hard wood; these are to prevent the string being cut and injured by repeated contact with the metal barrel. This metal barrel is a plain brass tube, purchasable at the brazier’s; you see it at d. d. Have it of such a diameter that it will slide readily into the groove, d; fasten it securely by means of waxed string or fine brass wire, allowing one half of it to project beyond the stock.

Cut now a small piece of wood for a trigger, and fasten it in the aperture at b, fixing it so that it may move on a pin for a pivot. Now make a catch for the string of the bow in the upper part of the stock, by cutting away a small piece of the
stock, and a smaller piece of the upper part of the trigger (as shown in the enlarged Fig. 3). And you must take care to round off the corners where you have just cut the wood, so that the string, on being drawn back to the catch, may not be cut or damaged.

Make the bow of two pieces of whalebone, the under one rather thicker and shorter than that on the top. Fasten them together by binding string or fine wire round them in several places. Then wedge the bow into the square hole, at a; attach the string to it, and all is complete. You see the finished article in Fig. 4. In shooting, carry the string over the catch at b, and place a shot or an arrow in the groove; pull the trigger, and the string will be lifted over the catch, and will send off the missile with great force.

There is another form of cross-bow without a barrel, and of much larger dimensions (shown in Fig. 5). It has a semicircular groove, for placing the arrow or bullet in, on the top of the stock, just as in the bow already described.

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**CARD GAMES.**

**BY GEO. TINDALL.**

**LOO—POTE JOAN.**

Loo, or Looe, as it is sometimes called, is a game suitable for any number of players. A complete pack of cards is used, the values of which are the same as at whist, that is, ace is highest, then king, queen, knave, and the rest in rotation down to the two, or deuces, as it is commonly called. Counters are to be used for stakes, and it will be necessary before commencing play to decide what shall be the amount of the loo, and what shall be paid by parties who are looed, that is, who do not obtain a trick during the playing of a hand. It will be quite sufficient to make the loo three counters, and the fine for persons looed six counters; but these amounts may be regulated by a majority of the players.

The game may be played with three or five cards, but as the method of playing is very different in each case, we will first describe simple three-card loo, because it is more suitable for a large number of players than the game played with five cards, and will afterwards point out the variations in the latter game.

The players being seated round the table, the cards are cut for deal, the party cutting the lowest card having the preference; the dealer then places in the pool three times the amount decided on for loo, that is, if the loo is fixed at three counters the price of the deal is nine counters, which must be contributed by the dealer.

The cards are then shuffled, the dealer having the privilege of repeating that operation if he chooses, and are cut by the player on his right; he then deals to each player, commencing on his left, three cards each all round, including himself, one card at a time, and places the rest of the cards on the table.

The first card is played for force, as it is termed; each person takes up his cards, and the oldest hand plays, exposed on the table before him, a card of any suit that will best help his hand. Each player does the same in rotation, and must follow suit if he can; if all the cards played are of the same suit, then the player of the highest card wins the trick, becoming eldest hand, and he leads for the next trick. But if cards of different suits are played, then, and not before, the dealer turns the uppermost card of the pack on the table for trumps, and if any trumps have been played they take the precedence of the suit led, the highest trump winning the trick. The next player must lead his highest trump, if he has more, and each player following must head the trick by playing a superior card if he is able. After the three tricks are played out, the pool is divided amongst the winners, one-third for each trick, and the other players being looed, forfeit to the next pool six counters each, if that is the limited amount to be forfeited previously agreed upon.

The game now proceeds in a totally different manner. The cards being again shuffled and cut, and the deal paid for by the player who won eldest hand in the last round, whom it passes in rotation, he deals as before three cards to each player, and, in addition, another set of three cards to an imaginary hand, styled "miss," and he then turns up at once the next card for trumps. The players now take up their hands, and examine them, and if they are not satisfied, have the option, in rotation, of either giving them up and not playing, or of exchanging the cards dealt to them for those dealt to "miss," but each player must wait until asked by the dealer whether he plays or not, or takes miss, before giving up his cards, and this must be done in strict order, from the player on the left of the dealer, under the penalty of paying a fine of a loo to the pool. Any player taking miss must play that hand, even if it is a worse one than he previously held, and no player must look at the cards before taking it under penalty of one loo to the pool, and being compelled to play it.

The dealer having asked all the other players whether they stand or not, may then take up his own cards, and if not satisfied he may also decline to play, or may take miss if no other player has previously done so.

The eldest hand of those who have decided to play must now lead his highest trump, and each player must head the trick if possible, and after the three hands are played out the pool is shared amongst the winners in the same way as before, and those who are looed must pay their forfeits of six counters each. The next player in rotation then deals, and the play proceeds in the same manner until the pool happens to be empty, when a fresh game is commenced with a "force" hand as first described.

When any player obtains a flush of trumps in hand he wins the entire pool, and in addition "loos the board," that is, he is entitled to recover the amount of a loo from each player or from each person who has decided to play his hand, as may be arranged beforehand; if the former is agreed upon, the person holding the flush must show it when asked by the dealer if he will stand, in the latter case he must wait until the whole of the players have decided to play or not. If another player holds a flush of trumps at the same time, he is exempted from being looed.

The dealer being the last person to decide upon his cards, has the advantage of knowing how many persons intend to stand the game, and can arrange his play accordingly; if every other player decline the dealer wins the game at once and takes the whole pool.

Loo is pre-eminently a game of chance, so that very little skill is required of the player, the only question he is called upon to decide is whether he shall stand his game or throw up his cards to prevent his being looed. If the player hold one
very good trump, or two of any value, it is usually safe to stand, but this also depends in a great measure upon the number of players and the quantity of cards left in the pack; if the bulk of the cards are dealt the odds are against a single card except of the highest value.

It is quite possible for a person to hold both king and knave of trumps and still be loosed, if the queen and ace be dealt, and the person who holds the queen have another trump; for instance, if the eldest hand have the two cards mentioned he must lead the king, which will, of course, fall to the ace, while the person holding queen, not being able to head the trick, will play the small one, and in the next trick the knave must fall to the queen.

This is, of course, an extreme case, and a player holding king alone would usually consider it safe unless very nearly the whole pack was dealt.

By the term "eldest hand" is meant the person who plays the first card or leads for any trick; this in loo, as in almost every other card game, is first the player nearest the dealer on his left, and afterwards the winner of the previous trick; the youngest hand is the person who plays the last card of any trick.

In unlimited loo each person pays into the next pool as much as is contained in the pool at the time he is loosed.

In playing loo with five cards the method of procedure is somewhat different; in the first place the knave of clubs, or, if agreed to beforehand, the knave of the trump suit, is the highest card in the pack, and is called "Pam," then follows the ace of trumps, and the rest of the cards in the usual order. The first hand is not played for force, nor are any cards dealt for "miss."

The preliminaries are the same as in the simple game, but five cards are dealt to each player, and the next card turned up for trumps; then the eldest hand, and after him each player in rotation, is at liberty to return to the dealer any of the cards dealt to him, and these cards are placed by the dealer at the bottom of the pack, and the same number are returned to the player from the top. Each player is also at liberty to throw up his hand if he chooses. When all have decided, play is commenced by the eldest hand, and carried out as in three-card loo, but when any player lays down the ace of trumps he may say "Pam be civil," when the holder of that card is expected to pass the trick by playing a lower card, but he is not compelled to do so. Those players who do not take a trick are loosed in the amount agreed upon, and the pool is divided amongst the winners of the tricks in the manner before described.

A flush may be composed of five trumps in hand, or four trumps and Pam; the holder of a flush wins the game and looses the board, except those parties who hold either an inferior flush or Pam in hand.

POPE JOAN.

This game is said by some to be very similar to Matrimony, but in play it will be found to be entirely different, the only points of resemblance being the two combinations—Matrimony and Intrigue—which are introduced into both games.

A pack of cards is required, from which the eight of diamonds must be discarded, and also a proper pool or board divided into eight compartments for the different points (of which we give an illustration), with the names or figures of the points in the margin. This may be procured at most toy-shops or bazaars.

The points above mentioned are ace, king, queen, and knave, the stakes on each of which are taken by the person who plays the corresponding cards in the trump suit; game, which is taken by the person who first plays all the cards out of his hand; matrimony, or king and queen in the same hand; intrigue, queen and knave in the same hand; and pope, the nine of diamonds.

The deal and other preliminaries are decided in this game in the usual way, and the dealer commences by "dressing the board," as it is termed, that is, by placing thereon one counter to each ace, king, queen, and knave, and two each to matrimony and intrigue, and six to pope. For this purpose he draws two counters from each player, and makes up the required number from his own store.

The dealer then commences dealing the cards singly all round in the usual way, commencing with the eldest hand, and continuing until the pack is nearly exhausted, but a small quantity of cards, six or eight, must be retained to form "stops," as they are termed; these must be placed on the table, and the uppermost card must be turned up for trumps.

If the card turned up happens to be pope, the game is prematurely brought to an end, the fortunate dealer claiming the game, taking the pool, and also a forfeit of one counter for each card dealt to the players. If, however, ace, king, queen, or knave be turned up, the dealer only takes the stakes placed opposite those cards, and in this case, or if any other card be turned up, the game proceeds.

The eldest hand commences by playing a card, and whoever can play the following card in sequence of the same suit follows, and this is done until a "stop" occurs, that is, until the sequence is broken by one of the cards being missing from the hands, or by the sequence having run to the highest card, the king. The object of the play being to exhaust the hand as quickly as possible, the person who leads will, of course, play out such cards as are stops first, such as the kings, for they are always fixed stops, and all sequences in his hand ending in king, then pope, and sequence up to pope, for whoever plays the last card in a sequence, that is a stop card, leads for the next. He will then play the lowest card of his longest suit, for by that means he has the chance of getting rid of most cards, and whoever in play makes any of the points of the game, takes the counters staked on such points; those which remain unplayed belong to the game.

Whoever first parts with all his cards wins the game, and takes the counters left in the pool, besides a forfeit of one counter for every card held in hand by each player, except any one hold pope, which exempts him from paying a forfeit.

This game is easily learned, the only requirement being attention to the cards played, so as to remember what are stops, for whenever any person leads a card from a sequence, the one next below the card led becomes a stop whenever that suit is again led from a lower card, and a person holding any such card may play it or any sequence ending with it, and retain the lead.
THE MAGIC LANTERN.

By Samuel Higley, F.G.S., etc.

THE DEMONSTRATING LANTERN SYSTEM.

THIS system of apparatus embraces the lantern, the protective slide cabinet, and the screen, which should be arranged as shown in Fig. 1.

The Lime-Light Demonstrating Lantern, represented by Fig. 1, page 337, Vol. I., is made of well-seasoned mahogany, in fact, of the oldest material obtainable, preferably old dining table-tops, showy pattern in the wood being rather objectionable than otherwise, for as the source of light diffuses the heat given out from the incandescent lime cylinder, the tin lining inserted in old-fashioned lanterns is really unnecessary if sound wood,
properly framed together, be employed for the body, and a free current of air be allowed to pass through its interior.

The simplest method of ventilating the body is by admitting air through narrow oblong slots cut on each side, and just above the floor of the lantern, and giving egress by raising the back of a flat dome, which in this arrangement is devoid of chimney, for as there is no smoke to carry off, no up-draught is required, so I regard this part as a useless incumbrance to a light-lantern.

If required for physical demonstrations, the body of this lantern can be fitted to a gallery mounted on four brass pillars, which carries a wooden stage for the support of apparatus, as shown at pages 237, 3, Vol. I., Figs. 1, 3, 6, 8, and 10, that can be removed at will, being fitted to the gallery by a pair of dowels and a clamp screw.

The Optical System consists of the short-focussed condenser, c, Fig. 2 (previously described at page 330), that fits into a round flange, \( y \), Fig. 2, on the front of which the stage, \( x \), Fig. 2, fits by a bayonet-joint, to admit of the “front” being readily removed when the spectroscope or other physical appliances are to be used, or replaced by other accessories, such as the microscope or polariscope.

The stage is formed of two brass plates framed together by four short rods and eight screws, so as to leave the top and bottom as well as the sides open, to allow of slide frames being inserted vertically as well as horizontally, and a quick action clamp screw is inserted in the top of the front stage plate to provide for mechanical slides being fixed in the stage when necessary, the spring stage plate of the ordinary lanterns being objectionable, as not admitting of that facile insertion and removal of a frame which adds so much to the perfection of lantern manipulation.

The centreing of the slide with the axis of the optical system is secured by means of an angular stop screwed to the back stage plate, \( a \), Fig. 2, against which the slide frame rests, which stop can be rotated out of the way when a longer frame than the standard size has to be inserted.

The tube \( r \) attached to the front of the stage is telescopic, not only to facilitate the adjustment of additional lenses, but to admit of parallel rays being brought to bear on objects, as shown at page 238, Vol. I., Fig. 10. Into the inner of these tubes a “telescopic lengthener,” \( t \), Fig. 2, may be screwed when the long-focussed power is to be employed, or the “lens mount,” \( x \), Fig. 2, when the ordinary short-focussed power is used. The lens mount consists of an external “jacket,” within which the focussing tube is adjusted by means of a rack-and-pinion motion.

The Power, \( p \), Fig. 2, is a double achromatic combination of 4\( \frac{1}{2} \) inches combined focus, from which the back combination can be removed to provide a long power of nine inches focus, when circumstances necessitate the exhibitor working at long range, over the heads of his audience.

The Source of Light may be the “oxy-spirit jet,” or the “oxy-house-gas jet,” according as the exhibitor is placed as to facilities for obtaining the ordinary carburetted hydrogen supplied to houses, and with sufficiency of pressure from the main, or the “oxy-hydrogen jet,” where both gases are used in bags under pressure, or the “lime clock jet,” when both gases are burnt under the greatest pressure attainable.

To meet the requirements and difficulties of the travelling exhibitor I have contrived a lime-light burner which I call my “convertible jet,” for the reason that it can be arranged for the consumption of both gases under extreme or moderate pressure, or at the pressure of the main, or for oxygen in connection with a spirit-lamp flame. The basis of this useful piece of apparatus is a pair of tubes fitted with lever stop-cocks for the conveyance of oxygen or hydrogen to the nozzle, so mounted on a tube that slides up and down, or rotates on a supporting rod, so as to admit of every adjustment required in centering a jet with the axis of the optical system, and then clamping it in position without the possibility of such adjustments being disturbed while the lantern is in action. This part I call “the jet.”

Between the pair of tubes a boiler-shaped spirit lamp can be clamped for the production of the oxy-spirit lamp arrangement shown on Fig. 2. The reservoir is fitted with a large flat double wick, for the production of a more powerful flame than is provided in the ordinary oxy-calcium jet, through the centre of which oxygen is projected from the nozzle on to the lime cylinder, which is supported on an adjustable pinion fixed behind the wick-holder. To keep the reservoir cool, a semi-cylindrical shield is fixed above it, so as to allow a current of air to pass between the two surfaces, while air likewise passes freely through the reservoir itself.

The wick-holder is placed high above the reservoir, and through the well-known cooling effect of the process of spirit evaporation, this part may be fingered while the jet is in full action. Moreover, the entire arrangement is kept so cool by the appliances thus provided, that the spirit reservoir is placed within the body of the lantern with perfect safety.

This portion of the convertible jet I call the “oxy-spirit lamp lime stage.” When this is used, one tap is closed, and the other connected with an oxygen holder.

The adjustment for distance between nozzle and lime cylinder, for securing the most intense light, is made by sliding the clamp piece of the spirit reservoir to and fro between the tubes of the jet.

This arrangement gives a much more powerful light than the ordinary oxy-calculator jet, and I regard it as the lime-light burner for “foreign service,” or localities where house-gas is not obtainable. When arranged as shown in Fig. 3, I call this the “oxy-spirit jet.”

Where house-gas is obtainable, we may replace the oxy-spirit-lamp lime stage with what I call the “rotatable lime stage,” which is likewise adjustable between the tubes of the jet, by means of a clamp piece.

Thus arranged, as shown in Fig. 4, one stop-cock may be connected by a length of red rubber tubing to a special “key tap,” fitted against a wall, or to the tap of a gas-engine (from which the burner has been removed), connected in the ordinary way with the service-pipe of the house-gas supply or “main,” and the other with an oxygen holder.

Thus disposed, I call this, for the convenience of distinction, the “oxy-house-gas jet,” though the same disposition of parts is employed when the taps are connected with oxygen and hydrogen, each gas in a separate holder, and even when house-gas (or carburetted hydrogen) is run off into a bag, as is the ordinary custom, for the sake of saving the trouble of making hydrogen gas. In this case both gases are conveyed to the nozzle of the jet under greater pressure than can be obtained from the main, and I then call it the “oxy-hydrogen jet.”

When either the oxy-spirit or oxy-house-gas jets are employed, “soft limes” are fixed upon the lime stage, and, as a rule, it is not necessary to alter their position when once adjusted, for the small amount of gas pressure brought to bear on them from the nozzle seldom “pits” them, but when both gases are worked with a hundred weight on each bag, or under equivalent pressure, then holes are burnt into the “hard limes,” fixed on the lime stage of the oxy-hydrogen jet, and it becomes necessary to provide some arrangement for turning the lime cylinder, for as the holes become deep, the light gets out of focus with the condenser, and if very deep, the jet
of ignited gases oftentimes get reflected backwards, and then cracks the back lens of the condenser.

 Usually the provision made for turning the spindle that supports the lime cylinder is worked from inside the lantern, which involves the opening and shutting of the side door; each time the lime has to be partially rotated on its axis with an upward spiral motion, this motion, however, I obtain by a simple arrangement worked from outside the body, in the manner shown in Fig. 4. This consists of a pair of drums, one being attached to the lime stage, the other screwing up or down on the adjustment tube of the jet, and both are connected by cut-out. On commencing work, the cut-out is wound upon the lime stage drum, which brings that and the drum upon the adjustment tube close down to the oxygen and hydrogen tubes of the jet. After each view or two has been shown, a square head on the back drum is seized between finger and thumb, and turned so that what was the back edge of this square now stands to the left side of the jet, this winds a small portion of the cut-out off the front drum, and works the lime stage upwards on its supporting screw, and so brings a fresh surface of the lime cylinder opposite the gas nozzle, and thus prevents the impinging jet of ignited gases having time to pit it.

 Where, however, we have to use the two gases under extreme pressure, especially when condensed gas-bottles are employed as gas-holders, it then becomes absolutely essential that the rotation of the lime cylinder shall be continuous, and, therefore, automatic, in which case the lime stage above described must be replaced with a "lime clock stage," as shown in Fig. 5, which arrangement in its entirety I call the "oxy-hydrogen lime clock jet." The lime cylinder should always be warmed before it is brought under the full action of the oxy-hydrogen jet; and as some lime is apt to crack during use, much to the danger of the condensers, and with inevitable delay to the lecture, it is always well to keep a second lime warm and in reserve. This is simply provided for by making the lime pin longer than usual, so that the reserve may be kept above the incandescent lime cylinder, as shown in Fig. 5. It is well to be provided with a pair of lime tongs, with which to grasp the entire lime cylinder whenever it becomes necessary to remove it from its stage pin.

 Gas-bottles may be gas-bags, pneumatic gasometers, or condensed gas-bottles. The first are in general use, the second are cumbersome, but being made entirely of metal, are well adapted for use in foreign climates; while the third, though by far the most convenient and portable contrivance, are only employed to a limited extent, through it being a matter of necessity that they must be sent to the gas-engineer for filling.

 The best size for gas bags is 36 x 24 x 24 inches in the wedge, of six cubic feet in capacity. If required for the oxy-calciun light, with only a pressure of half a hundredweight, the material may be of thin quality, but for the oxy-hydrogen light, with a pressure of one hundredweight on each bag, then the material must be thick. The oxygen bags should be made in white the hydrogen bag in black material, so that they may be recognised in a dimly-lighted room; and it may here be mentioned that each tap of the jet is lacquered bright and black, to correspond to the colour of the respective bags.

 If hydrogen is used instead of house-gas, then two black bags will be required for a long entertainment, as hydrogen and oxygen burn in the proportion of two volumes of the former to one volume of the latter, whereas house-gas and oxygen burn in equal volumes.

 Each bag, when fitted and ready for use, is placed between a pair of pressure boards, also measuring 36 x 24 x 24 inches, on the top of which the weights are placed in a manner hereafter represented.

 Condensed gas-bottles are made of wrought-iron cylinders, closed with most carefully-constructed valves, which are regulated by key levered taps. Oxygen bottles are of 7½ cubic feet capacity; hydrogen bottles of fifteen cubic feet capacity—all being tested up to sixty atmospheres or 700 lb. of pressure on the square inch, while the working pressure never exceeds one half. One or a pair of bottles can be packed in a travelling case.

 The advantages of condensed gas-bottles are that they give perfect immunity from danger, are extremely portable—a 7½ cubic feet vessel only measuring when packed in case, six inches square by two feet six inches high, while a six cubic feet gas-bag measures, when filled, as stated above, 36 x 24 x 24 inches—and are capable of giving, without the encumbrance of weight, the greatest amount of pressure attainable, consequently the greatest amount of light, in fact, make the nearest approach to the electric light yet attained; that the gases will keep in these bottles for any length of time, consequently be ever ready for use at a moment's notice, while gas stored in gas-bags deteriorates in a day or two, consequently must be made fresh at the time wanted; that in comparison with gas-bags and their accessories, both as to the first expense and wear and tear, gas-bottles are the most economical for adoption.

 The drawback of re-filling, previously referred to, may be reduced to a minimum by making a point of sending a bottle to be re-filled as soon as empty, so as to be ready for the next occasion, or by having a relay of one or more extra bottles, according to the requirements of the exhibitor.

 Where amateurs have to make their own gases, it is advisable to arrange the apparatus so that provision be made against accident, to which end I devised the safety oxygen generating system of apparatus (Fig. 6), which Professor Peppar has employed since its introduction for his travelling lectures. It consists of a conical iron "retort," fitted with a gun-metal head, into which screws a large delivery tube, to provide, as far as possible, against its being blocked, by any of the "oxygen mixture" being blown over, and in the event of such accident, with a safety valve, through which the gas can find a vent. This retort is enclosed in a "furnace jacket," heated by gas (or, on emergency, charcoal), which gives the manipulator the power of regulating the flow of oxygen by turning the burner up or down, so as to increase or decrease the action while the conical part of the jacket has
the effect of keeping the upper surface of the mixture melted as well as the bottom part of the mass. The oxygen, as it comes over, passes into a zinc "wash-bottle," which, however, is so arranged that there is not the usual direct communication with the washing water, so that in the event of a "suck back," on all the oxygen being liberated from the mass of mixture, and a vacuum being formed in the retort, no water can pass back into that red-hot vessel, and steam explosions are thus provided against.

The safety-valve likewise provides against the water in the wash bottles being forced into the gas-bag through the tube that connects the two, should the gas by oversight be allowed to come over with a rush.

It is customary to use powdered oxide of manganese for mixing with the chlorate of potash, but this has a tendency to be carried over with the gas and vapour, and choke the delivery tubes, this is avoided by employing coarse-grained manganese. It is also better to use the chlorate of potash in crystals, and not in a powdered condition. The best proportion for the mixture is one and a half pounds of chlorate of potash to half a pound of black oxide of manganese, and these ingredients should be well mixed and dried before a fire, before placing them in the retort, at the same time taking every care that neither coals, root, or other combustible matter fall into the mixture, as it would cause hydrogen to be generated in the retort, and a more or less dangerous explosion would ensue.

The gas may be freed from any contaminating chlorine by dissolving half an ounce of salt of tartar in the washing water. As I have previously stated, house-gas may be used instead of hydrogen, the bags being filled (after being completely freed from air, by rolling up tight and then shutting the stop-cock) by connecting it by a tube with any house-gas supply, but the apparatus for making hydrogen is represented in Fig. 7. It is a large vessel made of lead, having a mouth closed by a gun-metal screw plug. Zinc cuttings are introduced through this month, which is then closed, a mixture of one part of sulphuric acid to seven of water is then introduced through the funnel seen on the left-hand side. Hydrogen is generated, which passes off by the curved pipe into a leader wash-bottle, and after passing through a depth of water, it passes over into the gas-bag, which must have been freed from air, as previously described, or an explosive mixture might be formed therein.

I believe the secret of avoiding gas explosions to depend on making it a rule never to light the jet till both bags have been weighted, and never to allow a weight to be removed from either bag while the jet is alight, or put a greater weight on one bag than on the other, for which reason known weights should be used, and not fenders and such kind of household goods; again, both gas-bags should be of equal size, for if one were longer than the other, unequal pressure would arise through the unequal leverage of the longer bag.

It is better to keep sulphuric acid stored in a capped lead bottle of the capacity of a Winchester quart, as it can be sent to and fro without fear of breakage or damage to goods in carriers' carts or railway vans.

The Demonstrating Lantern Slide Cabinet is an extension of the principle of my slide tray, previously described; it provides not only for the methodical arrangement of a series of framed slides, but against a slide being taken out of proper order while working in a darkened room, and for the whole being put under lock and key the moment an exhibition is over, and thus secure them against the usual risk of damage.

The side view of this protective cabinet is shown in Fig. 1; but the plan and method of working will be best understood by aid of Fig. 8.

The cabinet is divided into three compartments, the several openings to which are closed by two hinged doors, D D, by two sliding panels, S S, and two fixed ends, K K. When opened to commence work, the disposition of doors and panels is, as shown at A, with compartments 2 and 3 filled with framed slides, measuring 7 X 4 inches, and compartment 1 empty.

Compartment 3 is closed by its panel S, but compartment 2 is open, and from the top of the pile the first slide is taken and passed into the stage of the lantern by the exhibitor, who stands on the right-hand side. An assistant withdraws this first slide, and places it in the empty compartment 1. The second slide is served in the same manner; and so on, till all the slides have been taken out of 2, and packed away into No. 1. Then the panel S at the back of No. 2 is slipped along to close up No. 1; and the panel S that closes No. 3 is slipped along not only to give access to the slides in that compartment, but to form a back to compartment 2, which also provides against the accident of the pile of frames being knocked out of their compartment.

The frames in No. 3 are now served in a similar manner till transferred to compartment 2, as shown in Fig. 8, B. When all the slides have been exhibited, both panels S are pushed back into their original position, and the doors D D are shut and locked.

When this slide-cabinet is fixed upon the packing-case (that takes both lantern and cabinet), a stand is formed that brings the optical system central with a screen eight feet square, as shown in Fig. 1.

The slide frames are made of mahogany, and are of the standard size of seven inches long by four and a half inches wide. Three sides are framed and glued together, but the fourth side is removable, to allow of a double glass slide three and a half inches square being inserted and fixed in the frame, so that it shall stand exactly central with the optical system when placed in the stage. To enable the operator, working in the dark, to know that the slide is in the necessary doubly reversed position for the proper aspect of the image on the screen, a bead is formed on one edge of the frame, which, of course, can be felt when handled in the dark, this bead must always be kept next to the exhibitor, and to the top of the stage.

If a screen ten feet square is employed, provision is made for bringing the lantern central by interposing between the packing case and the slide cabinet a shell that fits outside the latter, in a manner shown in the next article.

The Screen best suited for the ordinary requirements of the Demonstrating Lantern is one seven and a half feet square, made of seamless cotton, coated with a flexible opaque white surface, which is by far the best for showing lantern views to the greatest advantage. The packing-case for this measures eight feet long by five inches square, and is arranged so that it shall form a support for the screen, as shown in Fig. 1. Beneath the case, two pieces of wood, that together correspond with its length and breadth, are pivoted so that they can be turned at right angles to the case, and then form a firm base on which to fix in sockets two uprights, upon these the lath tacked to the top of the screen is fixed by a dowel-fitting and clamp hook. The screen is then carefully unrolled downwards, so as to avoid its beautiful white and even surface being damaged, and its roller then hangs just inside the case in a manner that gives it steadiness, and prevents its being blown out of place by any draught of wind. The height just allows of the framework being fitted together when the exhibitor stands upon a chair. This arrangement I call my "Portable Drawing-room Screen." It can be packed and unpacked in a few minutes, and removed out of the way as soon as done with, and obviates the removal of pictures, frames, or furniture.
CHESS.

By John Wisner, the English Champion.

THE OPENINGS.

REGULAR OPENINGS.

After 1. P to K 4 on each side, the first player may proceed with several moves. That which is most favored is 2. Kt to K B 3, forming what is known as the king’s knight’s opening. Black, in reply, has also a choice of moves. Setting aside several that are very inferior, I shall confine myself to three, viz., 2. Kt to K B 3; 3. P to Q 3; and 3. Q Kt to B 3.

The first is called "Petroff’s defence," or the Russian game.

1. P to K 4
2. Kt to K B 3
3. Kt takes K P
4. Kt to K B 3
5. P to Q 4
6. B to Q 3
7. Castles

And each party proceeds to develop his game on the queen’s side, the situation being about even.

The second defence, P to Q 3, is called Philidor’s.

1. P to K 4
2. Kt to K B 3
3. P to Q 4
4. Q takes P
5. B to Q Kt 5
6. B takes Kt
7. Kt to Q B 3

White has a little the freer position.

The third and regular defence, 2. Q Kt to K B 3, is most frequently adopted. Some specimens have already been given in the illustrative games, where each party proceeds:

1. P to K 4
2. Kt to K B 3
3. B to Q B 4

Forming what is termed the giuoco piano, a sound and safe defense, frequently adopted. Each side gets out its pieces, and the game is even.

Instead of 3. B to Q B 4, White may move 3. B to Q Kt 5, and form the Ray Topen game.

3. B to Q Kt 5
4. B to Q B 4
5. P to Q 3
6. P to K R 3
7. B to K 2

The game is even.

Or White may continue 3. P to Q 4, forming the “Scotch gambit,” so called because it was first brought into vogue in the match between London and Edinburgh in 1826. A “gambit,” the beginner may observe, is an opening wherein the first player gives up a pawn in order to obtain a better position. The gambits give rise to great interest, but are hazardous, for if the pawn be retained by Black, a lost game for the first player is almost a certainty. In the “Scotch gambit,” however, the pawn may be regained immediately.

3. P to Q 4
4. Kt takes P
5. B to K R 3
6. P to Q B 3, etc.

White may also move 3. P to Q B 3, forming the queen’s bishop’s pawn’s game:

3. P to Q B 3
4. B to Q Kt 5
5. Kt takes K P

The learner will remember how the giuoco piano game is brought out. If White at his fourth move play 4. P to Q Kt 4, he forms the “Evan’s gambit,” called after its inventor. This is one of the most celebrated of openings. If the pawn be taken

4. P to Q Kt 4
1. P to Q Kt 4

White then castles, and moves P to Q 4, establishing his pawns in the centre. His queen and queen’s bishop can rapidly be brought to the assault of the adverse king, and the attack is so great that in actual play it often compensates for the pawn. But with the best play, the “Evan’s gambit” breaks down, and the defence wins.

So much for the king’s knight’s opening. If White, at his second move, play 2. B to Q B 4, instead of bringing out his K Kt, he forms the king’s bishop’s opening. Black’s best reply is to bring out his K B also, or his K Kt. The opening then soon resolves itself into a giuoco piano, in which the king’s knight is brought out first, and the king’s bishop at the third move.

Amongst the most important varieties of the “regular openings” is the “king’s gambit.” This is formed by placing

P to K B 4 at the second move. This pawn the second player may either take or refuse. If he take it, and White plays

3. K Kt to B 3, the opening becomes the king’s knight’s gambit; if White brings out his K B to Q B 4, the king’s bishop’s gambit is formed. But the second player may decline the gambit, in which case the opening often proceeds thus:

1. P to K 4
2. P to Q B 4

The best mode of declining the gambit.

3. Kt to K B 3
3. P to Q 3

If White take the K P at his third move, Black gives a fatal check at K R 5 with his queen.

4. B to Q B 4
5. Kt to Q B 3
6. P to Q 3

And White obtains a little the freer position.

The king’s gambit requires exceedingly delicate and skilful play, and I would advise the beginner not to attempt it until he has acquired some experience.

IRREGULAR OPENINGS.

The irregular openings are those in which one or both players do not commence by 1. P to K 4. They give rise to solid and substantial games, and differ from the regular openings in this respect, that whilst in the latter the two combatants have a limited choice of sound moves, in the irregular games there is generally an infinite variety of good lines of play at command.

First, with regard to the cases where White plays 1. P to K 4, but Black does not. The second player may answer 1. P to K 4 with 1. P to K 3 (the French game), 1. P to Q B 4 (the Sicilian game), or 1. P to Q K 3 (the Flanchetto), or 1. P to Q 6 (the centre counter gambit). Of these the French game is much the best:

1. P to K 4
2. P to Q 4
3. P takes P
4. Kt to K B 3
5. B to Q B

Each player castles, the positions being even.

The Sicilian defence is less favourable to the second player.
This latter move is almost forced, and as White gets his pieces into play more rapidly he has somewhat the advantage.

In reply to the Fianchetto, White rapidly occupies the centre of the board:

1. P to K 4  2. P to Q 4  3. Kt to K B 3  4. P to Q 4  5. Kt takes P


By adopting the centre counter gambit, the second player gets an inferior game:

1. P to K 4  2. P takes P  3. Kt to O B 3  4. P to Q 4

1. P to K K 3  2. B to Q K 2  3. P to K 3

And White develops his pieces rapidly.

The second class of irregular openings are those wherein neither side moves 1. P to K 4. Of these the principal is the queen's gambit, which may proceed thus:

1. P to Q 4  2. P to Q B 4

1. P to Q 4  2. P to K 3

As a rule, Black does not take the pawn, for White regains it immediately.

3. P to K 3  4. Kt to K B 3  5. P to Q 3

3. Kt to K B 3  4. P to Q K 3  5. P to Q B 4

Even game. It is indispensable for both players to move P to Q R 3 early in this opening.

Other irregular games are 1. P to Q B 4, and 1. P to K B 4, to which Black may reply by the same moves. Or he may answer 1. P to Q B 4 by 1. P to K B 4, and 1. P to K B 4 by 1. P to Q B 4, or 1. P to Q 4, or 1. P to K 3. No precise directions can be given for the conduct of these openings. The general rule is that each player brings out his pieces as rapidly as possible, avoiding premature attacks. I give one specimen:

1. P to Q B 4  2. P to K 3  3. Q Kt to B 3  4. P to Q R 3  5. P to Q K 3


1. P to Q 4  2. P to K 3

ROUND GAMES.

BY JAMES MASON.

DEFINITIONS—THE OLD FAMILY COACH—POST.

The first amusement for this evening is to be the game of Definitions, or the Council of Friends, is it not?”

said Alice.

“‘Yes,” replied David; “but I suppose some of you don’t know it, so let me explain. The game of Definitions was invented several years ago by Mr. Wallbridge Lunn, and was first given to the world by him in a little book called ‘The Council of Four, or Game of Definitions.’”

“What does the fun consist in?” said Tom.

“‘It consists,” David continued, “in giving fanciful definitions of words. Every player has a pencil and a piece of paper: a word—either a common or a proper noun—is given out, and all try to define it, not by the strict dictionary method, but by a poetical or imaginative phrase. You must be pointed and epigrammatic, that is all that is required of you.”

“‘My impression is that that is quite enough,” said Kate; “you speak as if we were all clever here, and fit for any intellectual exercise that may turn up.”

“I am sure some of us will never manage to play your game,” Emily chimed in.

“One may try, at all events,” David answered; and he handed a slip of paper to each one in turn. “Now,” when the words are given out, write them down, and then, on the same line, put the definition. Let every one give a word; I give Night.”

We wrote our definitions of that word.

“We do return the papers to you now?” asked Tom.

“No, no,” said David; “Notes-and-Queries, will you give the next word?”

“Let it be Mind.” We wrote our definitions.

“I give Pen,” said the Laughing Hyena. We wrote again.

The Princess gave Wind; and Arabella gave Parting; and, as for the other words, they were Paper, Love, Sword, Revenge, Gold, and Electricity.

When all the words were given, and all the definitions written, the papers were folded up, and placed in a vase. Then came the reading aloud, which was entrusted to Alice.

As specimens of what we produced, I shall take the first six words, and shall give only five examples of each. These will be amply sufficient, however, to let you see what the game is, and the exact quantity of brains requisite for playing at it.

Night was defined as the betrothed of the day—the friend of the weary—the showman of the stars—the enemy of the sun—and the ladder up which the moon climbs.

Mind was defined as a portable library—a throat which swallows everything—a sea rarely calm enough to reflect the heavens—a magic mirror—and a rushlight with which we would illuminate the universe.

The definitions given of a Pen were “a loss to one goose and no gain to another”—the lever that moves the world—the servant of thought—a magician in black and white—and the best weapon in a quarrel.

Time was set down as a visitor who looks in but will not stay—a chain which binds the ambitions—the foundation on which we build everything—our true golden age—and unfurnished apartments, to be fitted up according to taste.

Wind was defined as the swiftest runner in the world—the taskmaster of the clouds—the fan of Nature—a poker that stirs up great fires—and a capricious giant, sometimes raging and sometimes kind.

Parting was held to be the sunset of friendship—sweet sorrow—a fountain of regrets—a break in the thread of life—and the strengtheners of affection.

“I declare,” said Kate, “we have got quite sentimental on that head. Why, there is Notes-and-Queries looking most woebegone, and Emily making a face like three rainy days at the thought of our parting and bringing all these pleasant games to an end.”

“What nonsense!” said Emily; “Alice, go on.

Alice went on; and soon all the definitions were read, and we began to play at another game.
This other was The Old Family Coach.

"There is a story needed," said David; "who is to invent it?"

"I shall do it, if nobody else will," said Notes-and-Queries.

"Thank you. I have often thought it's a great blessing that during the course of these games no one has ever needed to be coerced and pressed to do his duty. All, like you just now, have cheerfully volunteered to be of use when you could."

"Rise, all of you, if you please," said Notes-and-Queries; "you must not sit round the table, but round the room, to play at the Old Family Coach. I shall give a name to each of you, and, whenever that name is mentioned in the course of my tale, he or she who bears it must rise, turn once round, and sit down again. And, take notice, that whenever I name the Old Family Coach, everybody must rise, turn round, and sit down. Emily, as you are the youngest amongst us, you will represent the Old Lady; Hyanna, you will be the Old Gentleman; Alice will be the Daughter; you, David, will be the Family Coachman; Maggie, you will stand for the Captain of the Brigands; Reporter, you will be the Second Brigand; the Third Brigand will be found, Kate, in you; Arabella, you will be the Countryman; John, you will be the Landlord; Princess, you will be the Landlady; Tom, your duty will be to represent the little Lap-dog belonging to the daughter."

"The story begins," said Notes-and-Queries. "It happened once that an Old Gentleman (the Laughing Hydra got up, turned round, and sat down) and an Old Lady (Emily rose, turned round, and sat down), accompanied by their Daughter (Alice rose, etc.) and her little Lap-dog (Tom rose, etc.), set out on a journey in their Old Family Coach (everybody rose, turned round, and sat down). On the way they passed many an insolent Countryman (Arabella rose, etc.). At last, just as they had promised themselves a kindly reception from the Landlord (John Ferguson rose, etc.) and the Landlady (the Princess rose, etc.), at the next inn, out sprang a party of Brigands upon them. The Captain of the Brigands (Maggie, etc.) popped his head in at the carriage-window; the Second Brigand (the Reporter rose, etc.) held the horses' heads, the Third Brigand (Kate rose, etc.) seized the Family Coachman (David rose, etc.), and the rest began opening the boxes that were upon the roof."

The story went on to tell how the Captain of the Brigands, on demanding the Old Gentleman's purse, found it to contain only a trifling sum, and was for bearing off the daughter to his cave in hopes that a high ransom would be paid by her bereaved friends. Just then a Countryman appeared in the distance driving a flock of sheep. The Brigands being, singularly, all short-sighted, took him for the commander of an army advancing with a great force. So, according to Notes-and-Queries' version of it, they turned and fled, leaving the daughter behind, and the Old Family Coach pursued its way to the nearest town.

"If all tales are true so is that one," said John, when our antiquarian friend had come to a conclusion.

"This is a good game," said the Laughing Hydra. "I have seen two other versions of it played, one substituting a gig and the other a railway train for the old family coach."

"And which do you like best?" the Princess asked.

"The Old Family Coach, certainly; there is something more aristocratic, isn't there, about the mere sound of it? besides there is no romance in a gig or a railway train."

"Now, what is our last game of all to be?" asked David.

"Let it be one suitable to the occasion," said Maggie; "I propose that we play at Post. As we are going to separate it is a very appropriate game."

No one had any better suggestion to offer, so we elected a Postmaster-General—he was John Ferguson—and condemned one of our number to serve as Postman—Notes-and-Queries was that unfortunate individual.

The Postmaster-General then went round the company, and wrote down on a piece of paper the names of the towns the players were supposed to represent. The Princess said she would be Singapore; David said he would be London; Maggie became Dublin; Tom became Timbuctoo; Arabella chose to be Calcutta; Emily, Hong-Kong; Kate, Montreal; the Laughing Hydra, Pekin; the Reporter, Edinburgh; and Alice thought she could not do better than be San Francisco. When he had taken down all the names, John said he would appropriate Buenos Ayres to himself, in case he should grow tired of office, resign, and become a town. Notes-and-Queries also took the name of Melbourne.

We took our seats round the room, and John Ferguson, paper in hand, stationed himself in a corner, where he would be out of the bustle of the game. Notes-and-Queries was blindfolded by Emily, who, from our first meeting has always been ready for such kind offices.

"Are you sure you cannot see?" said Emily.

"Perfectly sure," answered Notes-and-Queries.

"Then stand here in the centre of the room," said she.

"Let me tell you the postal regulations," said John. "When I mention the passage of a letter from one place to another, the two players who represent the towns must rise and change places. Whilst they are changing, it is the blind postman's business to try to catch one of them or to seat himself in either of the vacant chairs."

"And if he does either," asked Tom, "what happens?"

"The player caught, or left without a seat, becomes postman."

There is another regulation—when I say 'General Post' all must change their places. Now, look out. A letter goes from London to Timbuctoo."

David rose, and so did Tom, and, as quickly as possible, changed places. They went so silently that Notes-and-Queries did not hear them, and went on groping after they were seated.

"The post has passed," said the Postmaster-General.

"Singapore, now, to San Francisco.""

The Princess and Alice changed places.

"Singapore to Pekin."

The Princess had to move again, and the Laughing Hydra slipped into her chair.

"Calcutta to Edinburgh."

The exchange was made.

"Dublin to Pekin."

Maggie had not got half way to Pekin, when the Postman caught her, and held her fast, and said, "My dear Arabella, or Kate, or whoever you are, you must become Postman."

"It is neither Arabella, nor Kate, but I," said Maggie, laughing and raising the handkerchief which covered Notes-and-Queries' eyes. "I think," she added, "that, far from calling the blindfolded player the Postman, one should call him the robber who tries to steal the letters."

We had all got thoroughly interested, and, with Maggie as Postman, had an exciting time of it. She showed herself more lively than ever before, and as the mails passed to and fro, they had many narrow escapes from falling into her clutches. At last she cleverly caught the Princess—and the Princess was blindfolded.

"I have been Postmaster-General long enough," said John Ferguson; "David, will you be my successor?"

"Willingly," said David; so he took the list of towns, and John Ferguson became Buenos Ayres, and the game went on.

"Do you hear what that is?" said Arabella.

It was the clock striking midnight.

"We must be up and away," said Maggie.
HE must first change the bottle, and this is done while the people who were invited on the stage are leaving it. In fact, the first part of the trick is so good that there is no occasion to be very particular about changing the other bottle taken out. This of course requires great command of countenance, both on the part of the conjuror and assistant, who must not of course turn his back to the audience. A good excuse for not doing so is for the man to carry out a long seat.

Fig. 3.

Fig. 4.

Fig. 1.

Fig. 5.

Fig. 2.

bottle very skilfully; the conjuror may even walk off the stage, bottle in hand, and return, in a few moments’ time, without doing any harm. Should however, he prefer to change it, one very good method is behind the table.

A bottle, which outwardly is exactly similar, is raised on a small stool to nearly the height of the table, and, by passing bottle in hand behind the table, dropping the one on to a feather bed to avoid noise, and quickly taking up the other, the change can be effected.

Perhaps the most ingenious method of changing a bottle on the stage is behind the back of an attendant, who has strapped behind his shoulders an apparatus as shown in our illustration on page 312.

The bottle is dropped quickly into the empty side, and the walking backwards, whilst another man takes the other end. However, the different ways of changing the bottle are almost infinite, and would naturally very much depend upon the shape of the room or stage where the trick is performed.

The bottle is, as we have said, changed into one apparently the same as far as outward appearances go, but very different indeed as to its interior.

The new bottle is divided into different compartments, each of which is previously filled with the different liquids and liqueurs it is intended to bring out.

As no description of the bottle we fear would enable the amateur to make one for himself, we will not enter into the minutiae of its construction.

These bottles can however be bought at the principal
conjuring trick shops. The best one we ever saw was of French workmanship.

The different fluids can be poured at will by pressing on the outside of the bottle. Many bottles are constructed so that the pressure on the spots on the bottle simply let in the air, which enables the liquid to run out at the end of the tube near the neck; this end being very narrow, no liquid will run out till an opening (by means of the spot being pressed) admits the air into the compartment containing the fluid.

This arrangement is however very liable to get out of order, and cannot be always depended upon, especially when only a little fluid is left in each compartment. The bottle of which we ordinary bottle, as a very little makes a great show. In pouring out these glasses the conjuror has, of course, never once let go of the bottle, and, from his proximity to the audience, it is apparent that the trick is not performed, as is so often thought, by means of a tube down the sleeve.

But how do the dove and handkerchiefs eventually make their appearance?

Here again assistance is required. The best means in a theatre for changing the bottle is a friend in a private box.

After all the contents of the different compartments have been emptied, or nearly so, the conjuror can, on reaching into a box to pour out, perhaps, the last glass, easily hide the bottle.

THE LITTLE BOX TRICK.

The little box from which the bottle was constructed rather differently, as the pressure on the bottle not only admitted the air into the compartment, but opened, by means of a small spring, the mouth of the tube. There are, however, various different arrangements, such as, for instance, a revolving circle with a small round hole in it, which admits of the fluid running out only from the small compartment over which this round hole has stopped.

As the bottle of which we speak is not real glass, but made of thin material, it will contain a far greater amount of fluid than an ordinary bottle.

The number of compartments in which a bottle can be divided is of course entirely at the option of the maker. The French bottle, of which we speak, had twenty-four.

Much however depends upon the wine-glasses, which should be similar in shape to those in the illustration on p. 313. Each glass should be filled not more than half full. With wine-glasses of this description it is wonderful what a quantity can be filled from an
inexhaustible. Beside which, he stops requests for anything
more to drink. The remainder of the trick is obvious:
the bottle is broken, the dove flies out, the handkerchiefs are
claimed, and recognised as the same as those borrowed.

The ring from the dove’s neck is returned, and the box, in
which were placed the wet handkerchiefs and paper parcel,
shown to be empty. This latter part is owing to the box being
similar in its construction to the small box we described in
the watch trick, i.e., it has an outer drawer, though, of course, no
piece cut out of the bottom.

The small one-shilling trick, known as the “Magic Cigar
Case,” is made on this principle.

Should this trick be shown in a private room, we would
recommend the change of bottle from the “Compartment
Bottle” to the “Dove and Handkerchief Bottle” to be made
by means of the attendant’s back, and the previous change to
be done by merely walking with the bottle behind the scenes.

One word of practical warning as to the best method of knocking
out the bottom of the black bottle. Place on one’s lap three
or four thick cloths, as broken glass is dangerous; place the
bottle upside down between the knees, and strike a pretty sharp
blow on the centre of the bottom of the bottle with a hammer.
The effect will be, that that part of the bottle sometimes called
the “kick-up” will fall into the bottle, and very probably break
the same somewhere about the shoulder, at least such was our ex-
perience; therefore, before striking the blow, fill the bottle, by
means of a small stick, about half full of old linen or cotton rags
which will make a soft bed inside the bottle for the broken
glass to fall on. Having knocked sufficient out to admit of
placing a dove and handkerchiefs inside, scrape the edges of
the broken glass round the edge with a glass file, as this will
probably save a cut finger, which is an exceedingly awkward
affair for a conjuror.

The trick shown in the illustration on p. 344 is a very simple,
but at the same time a very good one. It may be called “causing
a marked shilling to pass from a money-box into the interior of a
number of small boxes.” Fig. 1 is a small round brass box, con-
taining a slit in the top of sufficient size to allow of a shilling
being dropped through it. This box may be given to any one
in the audience to examine, and some one is requested to mark
a shilling so that they would know it again. Attention is then
called to another small box (Fig. 3), which is placed somewhere
in view of the audience. The conjuror takes the brass box into
his hand, and asks the person who has marked the shilling to
drop it in. He then immediately places the box on the ground,
and asks the person who placed the shilling in it to watch the
box, so that he does not take the shilling out. The marked
shilling is, however, immediately afterwards found in the
interior of a number of small boxes which fit one into the other,
the outer one being apparently the small box originally placed
in view of the audience.

The diagram explains the trick. The lower part of the brass
box slides up and exposes a slit in the bottom of the box, through
which the shilling slips into the hand (Fig. 2). Of course this
brass is slid down before placing the box on the floor. The
marked shilling is then placed in the small inside box (Fig. 4),
and the covers (Fig. 5) placed over it, by which means all the
boxes are closed together. This box is quickly changed for the
one of which it is, of course, a fac-simile, placed previously in
view of the audience.

Another good trick can be performed by means of rapidly
changing two little boxes. The illustration on p. 345 shows the
conjurer looking apparently through his wand at a little box on
the small table in front of him, and describing its contents. This
little box has previously been sent round among the audience,
who have placed in it small rings, brooches, etc.; but by means
of the box having been changed, the conjuror has been informed
of the contents by a confederate between the scenes. These
are afterwards produced out of the large chest, which appears
hanging by a rope in front. This chest contains a quantity of boxes one inside the other, one of which has a trap-
door in the bottom, which is placed over a trap in the table,
when, both being opened together, a small box containing the
borrowed articles is immediately pushed up, and the two traps
quickly closed. The conjuror, on opening the box, of course
takes out the one inside it, and hands it to one of the audience
to open. This trick is very effective, but properly requires a
stage.

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GAMES OF THE PLAYGROUND.

By C. W. ALCOCK.

BASE-BALL (continued)—THE RULES.

You will have to strike one of three fair balls, or in default
either be declared out, if the last be caught from the fly
or on the first bound, or make for the first base and sub-
ject yourself to the usual risks incidental to running, as if you had
struck a fair ball. Your dangers are numerous, you will find, for
you will be out if a foul ball, i.e., a “ball sent from the bat so as
to hit the ground back of the lines of the bases;” if you strike
a fair ball—a ball sent from the bat and striking the ground
forward of the lines of the bases—and the ball be held before
it touches the ground; if you strike a fair ball, and the ball be
held by an adversary on first base before you touch the base;
if you hit a fair ball so that it is caught from the hands or
person of a player before having touched the ground; if you
strike a foul ball and are similarly caught on the first bound;
or if you fairly strike at the ball either to be put out or to balk
the striker.

Rule 1.—The Materials.

Section 1.—The ball must weigh not less than five nor more
than five and a quarter ounces avoids propos. It must measure
not less than nine inches, nor more than nine and a quarter
inches in circumference. It must be composed of indiarubber
and yarn, and be covered with leather. The quantity of rubber
used in the ball shall be one ounce, and the rubber used shall
be vulcanised and in mould form.

Section 2.—In the first and odd games of a series, the ball
shall be furnished by the challenging club, and in the second
and even games by the challenged club; but when “single”
games are played only, the ball shall be furnished by the challeng-
ing club. In all cases it shall become the property of the win-
ing club as a trophy of victory.

Section 3.—The bat must be round, and must not exceed
two and a half inches in diameter in the thickest part. It
must be made of wood, and shall not exceed forty-two inches
in length.

Section 4.—The bases must be four in number, placed an
equal distances from each other, and securely fastened upon
each corner of a square, whose sides are respectively thirty yards. The bases must be so constructed and placed as to be distinctly seen by the umpire, and must cover a space equal to one square foot of surface. The first, second, and third bases shall be canvas bags, painted white and filled with some soft material; the home base shall consist of white marble or stone, so fixed in the ground as to be even with the surface.

Section 5.—The base from which the ball is struck shall be designated the home base, and must be directly opposite to the second base; the first base must always be that upon the right-hand, and the third base that upon the left-hand side of the striker when occupying his position at the home base. And in all match games a line connecting the home and first base and the third base, as also the lines of the striker’s and pitcher’s positions, shall be marked by the use of chalk or other suitable material so as to be distinctly seen by the umpire. The base bag shall be considered the base, and not the post to which it is or should be fastened. The line of the home base shall extend three feet on each side of the base, and it shall be drawn parallel to a line extending from first to third base.

Rule II.—The Pitching Department.

Section 1.—The pitcher’s position shall be designated by two lines, two yards in length, drawn at right angles to the line from home to the second base, having their centres upon that line at two fixed iron plates placed at points fifteen and seventeen yards distant from the home base. There must also be an iron plate at each end of the front line of the position.

Section 2.—The player who delivers the ball to the bat must do so while within the lines of the pitcher’s position, and he must remain within them until the ball has left his hand; and he shall not make any motion to do deliver the ball while outside the lines of the pitcher’s position.

Section 3.—Whenever the player delivering the ball to the bat shall throw it by an overhand of round-arm throw, the umpire shall declare a foul ball; and should the player delivering such balls to the bat persist in his action, the umpire, after warning him of the penalty, shall declare the game forfeited by a score of 9 to 0.

Also, when the player delivering the ball makes any motion to deliver the ball to the bat, he shall so deliver it, and he must not have either foot outside the lines of his position, either when commencing to deliver the ball or at the time of its delivery; and if he fall in any of these particulars, then it shall be declared a ball, in which case any base-runner occupying a base shall take one base without being put out.

Section 4.—All balls delivered to the bat which are sent in over the striker’s head, or on the ground in front of the home base, or on the side opposite to that which the batsman strikes from, or which hit the striker while he is standing in his proper position, or which are sent in within a foot of his person, shall be considered unfair balls, and every such unfair ball must be called in the order of its delivery, after the first ball has been delivered; the first ball to each striker alone to be excepted.

Section 5.—All balls delivered to the bat which are sent in over the home base, and “high” or “low,” as the batsman calls for, and which are not delivered by an overhand throw, or by a round-arm delivery, as in cricket, shall be considered fair balls.

Section 6.—No player shall be put out on any hit ball on which a “ball” or a “ball” has been called, and neither shall a strike or a foul ball be called or a base be run on such a ball.

Section 7.—Any ball sent to the bat from the pitcher’s position which shall accidentally hit the striker’s bat, shall be declared a “dead foul ball,” and no base shall be run or players put out on such ball.

Section 8.—Should the player who delivers the ball to the bat repeatedly fail to deliver to the striker fair balls, from any cause, the umpire must call one ball; and if the player persists in such action, two or three balls. When three balls have been called, the striker shall take his first base without being put out, but no base-runner shall take a base on third-called balls, unless he is obliged to vacate the base he occupies. No ball shall be called on the first ball delivered, and not until the ball has passed the home base. With this exception, all unfair balls must be called in the order of their delivery.

Rule III.—The Batting Department.

Section 1.—The striker, when in the act of striking at the ball, must stand astride the line of the home base, and distant not less than one foot from that base, and when occupying this position, only one foot must be forward or backward of the line of the home base.

The penalty for an infringement of this rule shall be the calling of “foul strike,” and when three such strikes have been called, the striker shall be declared out.

A ball on which such a strike is called be hit and caught, either fair or foul, the striker shall be declared out. No base shall be run on any such called strike. But any player running the bases shall be allowed to return to the base he has left without being put out. As soon as the striker has struck a ball he shall be considered as “a player running the base.”

Section 2.—Players must strike in regular rotation, and after the first innings is played, the turn commences with the player who stands on the list next to the one who was third player out.

Any player failing to take his turn at the bat after the umpire has called for the striker, unless by reason of illness or injury, or by consent of the captains of the contesting sides, shall be declared out.

Section 3.—The striker shall be privileged to call for either a high or a low ball, in which case the pitcher must deliver the ball to the bat as required. The ball shall be considered a high ball if pitched between the height of the waist and the shoulder of the striker; and it shall be considered a low ball if pitched between the height of the waist and one foot from the ground.

Section 4.—Should the striker fail to call for either a “high” or “low” ball, in such case no ball shall be called which is delivered over the home base, and within the range of shoulder high and of one foot from the ground; provided, also, that the balls so delivered shall not include any balls described in Rule 2nd, Section 4th, as unfair balls.

Section 5.—Should the striker refuse to strike at fair balls pitched over the home base, and within the specified reach of the bat, the umpire shall call “one strike,” and if the striker persists in such action, two and three strikes.

When three strikes are called, and the ball be caught, either before touching the ground or upon the first bound, the striker shall be declared out, provided the balls struck at are not those on which balls or balls have been called. If three balls are struck at and missed, and the last one is not caught, either flying or upon the first bound, the striker (or the player running for him) must attempt to make his run, and in such cases he can be put out on the bases in the same manner as if he had struck a fair ball.

No strike shall be called upon the first ball delivered, except the ball be struck at, and neither shall any strike be called when the ball is struck at for the purpose of wilfully striking out.

Section 6.—The striker is out if a foul ball is caught either before touching the ground or upon the first bound; or if a fair ball is struck and the ball be held before touching the ground; or
if a fair ball is struck, and the ball be held by an adversary on first base before the base-runner touches that base; or if a fair ball be caught from the hands or person of the player before having touched the ground; or if a foul ball be similarly caught after touching the ground but once; or if the striker wilfully strike at the ball either to be put out or to balk the catcher. No fair or foul ball, if caught from any other object than the person of a player, even before touching the ground, shall put a player out.

Section 7.—The striker shall be privileged to use his own private bat exclusively, and no other player of the contesting nines shall have any claim to the use of such bat, except by the consent of its owner.

Section 8.—If the ball from the stroke of the bat first touches the ground, the person of a player, or any other object behind the line of range of the home and first base, or home and third base, it shall be termed foul, and must be so declared by the umpire, unasked. If the ball first touches the ground, the person of a player, or any other object, either upon or in front of the line of range of those bases, it shall be considered fair.

All foul balls must be called whenever the ball, while in the air, is seen to be falling behind the lines of the bases as above described.

**Rule IV. — Running the Bases.**

Section 1.—Players must take their bases in the order of striking, and when a fair ball is struck and not caught flying, the first base must be vacated, as also the second and third bases, if they are occupied at the same time. Players may be put out on any base under these circumstances, in the same manner as when running to the first base, but the moment the ball is caught or the player running to the first base is put out, the other players running bases shall cease to be forced to vacate their bases, and may return to them.

Section 2.—The player running to first base may overrun it without being put out, provided that in so doing he either runs straight forward on the line of the foul ball or to the right of the base; but should he turn to the left, or attempt to make second base, he shall be liable to be put out, as in the case of running to second, third, or home base.

Section 3.—Players running bases must touch them, and, so far as possible, keep upon the direct line between them, and must touch them in the following order: First, second, third, and home; and, if returning, must reverse this order; and should any player run three feet out of this line for the purpose of avoiding the ball in the hands of an adversary, he shall be declared out; or if he fail to touch each base he runs or returns to, he shall be declared out, unless he return to such base before the ball be held on it.

Section 4.—A base-runner shall be forced to vacate a base, unless provided for in Section 1 of this Rule; and when the first and second bases, or the three bases, are occupied, and a fair ball is struck, the moment the player running to a base is put out, the players occupying the bases ahead of him shall cease to be forced to vacate their bases, and shall be privileged to return to the bases they have vacated, but only at the risk of being put out while off a base.

Section 5.—No run or base can be made upon a foul ball. Such a ball shall be considered dead, and not in play until it shall first have been settled in the hands of the pitcher, in any part of the field he may happen to be. In such cases players running bases shall return to them, and may be put out in the same manner as when running to first base. Neither can a run or base be made when a fair ball has been caught without having touched the ground, but such a ball shall be considered alive and in play. In such cases, also, players running bases shall return to them, and may be put out in so returning in the same manner as when running to first base; but players, when balls are so caught, may run their bases immediately after the ball has been momentarily settled in the hands of the player catching it.

Section 6.—When a ball is made by the pitcher, every player running the bases must take one base without being put out, whether it be on a "foul ball" or an ordinary balk.

Section 7.—In the case of a fair hit ball on the fly, the player running the bases shall not be entitled to any base touched after the ball has been hit, and before the catch has been made.

Section 8.—A player running the bases shall, after touching the home base, be entitled to score one run, but if a fair ball be struck when two hands are already out, no player running home at the time the ball is struck can make a run to count in the score of the game if the striker or player running the bases is put out before touching the first base.

Section 9.—If the player running the bases is prevented from making a base by the intentional obstruction of an adversary, he shall be entitled to that base, and shall not be put out. Any obstruction that could readily be avoided shall be considered as intentional.

Section 10.—Any player running the bases is out if at any time he is touched by the ball while in play in the hands of an adversary without some part of his person being on the base, except as provided in Section 2 of Rule IV. And should a fielder, with ball in hand, while in the act of touching a base-runner while off a base, have the ball knocked out of his hand by the base-runner, the latter shall be declared out.

Section 11.—Any player running the bases who shall have a base given him on called balls, shall be privileged to run the risk of making all the bases he can by fielding errors beyond the base given him; but in such case he shall be liable to be put out by being touched while off the base, as described in Section 19 of Rule IV.

Section 12.—No player shall be allowed a substitute in running the bases, except for illness or injury, unless by a special consent of the captain of the opposing nine; and in such case the latter shall select the player to run as substitute.

**Rule V. — The Game. — The Innings.**

Section 1.—The game shall consist of nine innings to each side, when at the close of such number of innings, should the number of runs be equal, the play shall be continued until a majority of runs, upon an equal number of innings, shall be declared, which shall conclude the game. All innings must be concluded at the time the third hand is put out.

Section 2.—Whenever a game of five or more innings on each side is stopped by darkness, rain, or other such causes, and the score at the time is equal on the even innings played, then the game shall be declared drawn; but under no other circumstances shall a drawn game be declared.

Section 3.—Under no circumstances shall a game be considered as played, or a ball be claimed or delivered as the trophy of victory, unless five innings on each side shall have been played to a close. And should darkness or rain intervene before the third hand is put out in the closing part of the fifth innings of a game, the umpire shall declare "no game."

Section 4.—No match shall be commenced when rain is falling, and neither shall play in any such game be continued after rain has fallen over five minutes. Should rain commence to fall during the progress of a match game, the umpire shall promptly note the time it began to rain, and should rain continue for five minutes he shall suspend play directly; and such
suspended game shall not be resumed until, in the opinion of the umpire, the ground is in fit condition for fair fielding.

Rule VII.—Miscellaneous.—Special Ground Rules.

Section 1.—Clubs may adopt such rules respecting balls knocked beyond outside of the bounds of the field as the circumstances of the ground may demand; and these rules shall govern all matches played upon the ground, provided that they are distinctly made known to the umpire previous to the commencement of the game, but not otherwise.

Section 2.—No fence shall be erected within ninety feet back of the home base of a ball field, except such fence marks the boundary line of the grounds on which the field is laid. And in case such fence be located within ninety feet of the home base, then each ball passing the catcher and touching the fence, shall give each base-runner one base without his being put out.

Section 3.—If a fielder stops the ball with his hat or cap, no player can be put out on such ball, and each player running the bases shall be entitled to one base; no player can be put out by any ball so stopped or caught; or if a ball be stopped in any way by a person or persons not engaged in the game, no player can be put out unless the ball should first have been settled in the hands of the pitcher while he stands within the lines of his position.

Section 4.—Any player who shall intentionally prevent an adversary from catching or fielding the ball, or any base-runner who shall in any way prevent a fielder from catching a fly ball from the bat—fair or foul—shall be declared out.

Section 5.—Any player who shall designately let the ball strike him, or kick the ball when at the bat, or when running the bases, and thereby prevent an adversary from holding or fielding such ball, shall be declared out.

ANGLING.

By GREVILLE PENSHEL.

BARBEL—BREAM—GUDGEON—CARP—TENCH.

The BARBEL.—Barbel-fishing boasts a class of anglers wholly devoted to it, as in some few other styles of fishing. They are a very strong and powerful fish; and give great sport, from the length of time they will frustrate the wiles of the angler. They should not, however, be fished for until July, or these qualities, from lack of condition after spawning, will be wanting. They are found in the deepest and most rapid streams, and sometimes are to be seen in incredible numbers contesting with each other for the food brought down through sluice-holes and over weirs into the pools beneath. Herein they will select a spot in which the rapidity of the current is broken by some sudden rise in the bottom, or the set of the stream is diverted by piers or other impediments.

There are two ways generally adopted for capture—the one by ledgering, the bait being stationary, and kept so by a heavy lead, or by float fishing, which is only pursued in a stream in which the float employed can live, as all sinking eddies and "boils" should be avoided.

Always fish with as light tackle as is possible, for in this consists the charm of killing any description of fish; indeed, when barbel are taken upon ordinary reach tackle the sport is intense, the fish often bidding good-bye to the landing-net—when its security was presumed to be certain—some half-dozen or more times, to renew its vigorous attempts to escape, which it occasionally does, after a very lengthened fight for its life.

Ledgering is sometimes practiced with a perforated bullet, but we prefer the flat lead for most pools, as it is less likely to rove about amongst stone-work and other dangerous stuff, and thus get jammed beyond redemption. The hook is baited with a well-secured and lively lob-worm, sometimes two are used, but we do not advocate an overloaded hook, the tail end being mostly sufficient. They will sometimes take a white piece of greaves or a bunch of gentles. A tight hand should be kept on the lead after it is cast forth and has reached the bottom, not, however, so as to cause it to shift its place.

When a nibble is felt, which is easily done if the line passes over the end of the forefinger, the angler should not immediately strike, as the fish is but nipping the bait before taking it. When, however, the indications of this process is followed by two or more decided tugs, the rod should be suddenly raised, when the line, which has been drawn through the lead by the fish, will be thus tightened and the fish be hooked.

Upon the annoyance of nibbling, and the loss of bites therefrom, Mr. Francis, in "A Book of Angling," gives the following admirable suggestion:—

"One of the greatest annoyances the angler experiences in ledgering is the constant occurrence of nibbles, or short bites, at which he is often induced to strike futilely; the consequence of which being that the bait is torn or disarranged and the hook so exposed, that it becomes necessary to draw it up and bait afresh. If the fish are well fed and shy he will get three or four or more nibbles for one bite; and as the bait is a rather long and large one, and the hook likewise, it is useless to strike unless the fish has it in its mouth. Let the angler then adopt the Stewart worm tackle, which consists of three small fly-hooks tied on one above another at intervals of half an inch or so (the hooks should be rather larger and stouter than those used for trout), and let him fix his worm on these and strike at every nibble, and the result will astonish your Thames puntmen considerably."

The best ground-bait for barbel is a quantity of chopped worms thrown in the swim overnight; but if the fish go off the feed while fishing, a few worms broken up should at such times be supplemented.

The clay-ball system, and fishing with a short piece of umbrella rib instead of a rod, by which the nicest bite is felt, the fish, after being struck, being played with the hand and line, however, may be alluded to in passing.

The barbel is generally considered a very capricious fish in its habits of feeding; but experience has taught us that it is not the fish that causes in its season to feed, but that we are not acquainted with what description of food it best likes, and the proper way to satisfy or pamper its appetite. Of one thing we are quite certain; that is, that much more success would attend the barbel-fisher, and less blank days would fall to his share, if he would rake for this fish in the same way in which gudgeon have been brought to hook from time immemorial, and of late dace have been induced to congregate around a given spot. It is not only the food thus exposed, but the clean bed which is offered to them by the removal of the slime and filth from the gravel, which by its slipperiness
does not permit the exercise of that swinish propensit of the barbel to root, grovel, and rub itself, in which they may be seen so manifestly to delight, which thus attracts the fish.

The Bream.—There are two descriptions of this fish; the one, the silver or white bream, the other the carp or golden bream. The first is, in a gastronomic sense, a mouthful of small bones and nastiness, the second, when in full season, a most excellent dish, preferred by many epicures to the John Dory, more particularly for the delicious fatty portions of its belly and fins. There are even connoisseurs who have recommended with equal confidence “a carp’s head, a bream’s middle, and a pike’s tail;” but Badham, making or knowing no distinction between the two kinds of bream, perpetrates the prejudice by his own individual opinion of its worthlessness. If, therefore, these few words may save an estimable fish from its customary fate of the hog-tub, they will be as golden as their subject.

Bream are generally found in deep still waters, with a hard marly, clayey, or sandy bottom; it is a mistake to suppose they prefer mud or thick waters.

From July to October is certainly the best time for bream-fishing, but they will bite in all open waters. Their baits are paste, gentles, greaves, wasp-grub, bullocks’ pith, and worms, but worms have decidedly the advantage, as they will never refuse them if on the feed.

Ground-baiting is most essential for a day’s thorough success in bream-fishing. Bailey says that “at least 1,500 dew worms should be thrown in twenty-four hours before commencing to angle, the swim selected being in a gentle stream of about four or five feet deep, and in deep stagnant pools or lakes.”

Fish with light tackle in clear water, with the wind at your back. Let your bait get as near to the bottom, without touching it, as possible. Throw in a few broken worms, letting them go down stream in as narrow and certain a line as you can. This channel your float and bait should follow. Let your float swim sufficiently free to prevent dragging, but at the same time keep the slightest possible check upon it, that the bait shall precede it. Do not expect to see the float go under at all times, for the float is often thrown up, sometimes slightly, sometimes to be completely flat on the surface of the water, as the bait and shot had got on a shallow. At other times you will perceive a jog or shake of the float, and these latter are generally bites from the heaviest fish, at all of which indications you must strike, or you will lose ten bites out of twelve.

There are many holes in which bream congregate in countless numbers, which, from their extreme depth (say thirty feet and upwards), and the set of the stream, cannot be angled without the sliding or traveller float, with which you can easily fish even greater depths than this. These floats are explained by the illustration on page 165, Vol. I.

To use the Traveller.—“After plumbing the depth (which can be easily accomplished by pushing a small plug of wood into the upper ring of the float, to fasten the line while the operation of plumbing is performed), remove the plug and plummet, and make a slip-knot in the line about two inches above the top of the float, inserting a double piece of stout gut, elastic, or rush, to project half an inch on either side of the knot. Now draw the latter tight, and there will be a sufficient impediment created by the projecting pieces of gut to prevent the float rising on the line higher than required for the depth of water; thus the line and stop can be drawn through the rings of the rod, to enable the fish to be brought within a reachable distance, the float falling down and resting upon the line during the process.

“After the fish is secured, and the hook re-baited, slacken the line, and the float regains its original depth, the weight of the shots carrying the line rapidly through the rings on the float until it reaches the gut stop.”

We give likewise “Otter’s” (Mr. Alfred, jun.) Improved Traveller (page 208, Vol. I), which certainly possesses obvious advantages, as any ordinary cork float can, by a small link of malleable wire, be converted into so desirable a means of overcoming one of the greatest difficulties in getting at bream in their profoundest abodes.

The Gudgeon.—Gudgeon-fishing is especially a lady art, for the greatest proficiency in which Mr. Frank Buckland once facetiously offered the prize of a ring. They are generally fished for in June, July, August, and September, but they are scarcely in condition in most rivers during the first-named month. We have, however, caught them all the year round, and those taken in the winter have far surpassed the gudgeon of any other season for size and table purposes. We have known gudgeon of four ounces in weight, from the river Itchen in Hampshire.

Their baits are worms and gentles, a small portion of the red worm being sufficient. The most captivating bait, however, is the blood-worm, which can be washed out of mud; but this requires the finest possible wire-hook and the tenderest manipulation to bait. This effected, it appears perfectly irresistible.

The hook should be always small—say No. 12, 11, or 10—whatever bait is used, as their mouths lie well under the jaw, and although this gives them, like the barbel, the advantage of taking up anything; however minute, from the bottom, it denies them this power if there be a line or other obstruction attached to it.

Fish on or very near the bottom. Gudgeon will seldom rise even an inch to take a passing bait, but will follow it for long distances when trailing on the bottom.

You must seek for gudgeon on the shallow side of rivers and streams, at the top or bottom of holes made by the whirl or eddy of the current; but as they are far from being a shy fish, you mayrove for them, and when you see them, you may mostly take all that are about.

If you ground-bait at all beyond raking, throw in some sand, a few turfs, or any loose soil, or, as a luxury, a few carrion gentles; but should you have your wading boots on, go into the stream, and, kicking about, send down a cloud of turbid water, and then commence fishing amongst it. In this way we have, when requiring baits for pig-fishing, caught a fish at every swim.

Carp.—Carp are a most shy and crafty fish, and require all the thought and experience of the master-mind to get the better of. He is, however, to be over-reached.

Amongst the hundreds of baits recommended for carp we have found nothing to excel a well-secured red worm. Your tackle must be of the finest and strongest, your bottom shot as far off the hook as possible, say at least twenty inches; your hook a No. 8 or 9, and the smallest quill float consistent with the depth of water.

Ground-bait the day previous in a clean open spot reachable with a long bamboo rod in the deepest part of the pond. Take your depth at the same time, so as not to disturb the fish when you commence angling, and so that either the worm lies two or more inches on the bottom, which we much prefer, or close to it. But you will require all the patience at your command, for we have known days spent in carp-fishing without a bite, and then upon another day a bag of seventy, and once of nearly a hundred pounds weight, being made.

Indeed, their sagacity and cunning has been often compared
to the fox, and even when encircled with nets, we have seen them dive under, dodge through the opening at the side, and leap over the corks with the agility of the greyhound.

Nor is it alone that when hooked skill and perseverance is necessary, for even then you will be willing to admit that he has got you more in command than you have him.

Vain, then, is all your judgment, and even strength, to hold him, for he will have his way, swimming steadily and doggedly to whatever part of the water he is disposed for, despite all your endeavours to the contrary. Nor is it of any use to oppose him, beyond making him work for every inch of line by a severe tension, but only sufficient just to give and take, or he will break you, strong as may be your tackle.

The arts which an old and wily carp uses to get free are worthy the closest observation of the angler. If in a stream, he will make often for the opposite bank, and when you think he is far off, he has caused a slack in your line, and is back beneath your rod. Then he breastas the current; then down stream, always with a steady persistent pull, with seldom any dash or sudden turns, as in most other fish when hooked.

It will be therefore seen that running tackle is essential.

We have known carp take out eighty yards of line, and then, having arrived at the further end of the pond, remain motionless, their presence being only felt by a tremor in the line, which means mischief, and is said to be occasioned by their efforts to cut it with their back-bone, which is tolerably sharp. After a while, this we presume has been effected, for our line has come home minus the hook and about a foot of gut.

This difficulty does not apply to the crucian, and a few other descriptions of carp, which may be caught in numbers in many ponds with almost the coarsest tackle and a piece of bread. Carp are said to bite best when the broad bean is in blossom.

The Tench, although generally associated, like the roach, with the dace, possesses likewise distinct peculiarities, inasmuch as there is not that cunning and coyness observable in the feeding of the tench which we find in the carp, although he is timid in showing himself. So much does the latter fact prevail, that many ponds which have been for years under the observant eye of persons living almost over them, have been supposed to be destitute of fish, until some enthusiastic angler has arrived, and who, taking nothing for granted, has brought from the presumably barren waters a goodly hamper of these numerous blackish-olive inhabitants.

Tench will, moreover, bite almost throughout the winter, and numbers are taken from the Arun, and other Kentish rivers and ponds, by the angler in open weather, even when the snow is on the ground.

They delight in worms, and are very fond of pieces of potatoes boiled, as it is termed, “with the bone in it.”

Their habit is to seek the bait before taking it, and the angler should therefore fish with a triangle of small hooks, placed back to back, to give them plenty of time, and even after the float has disappeared and held under by the fish, he should not be in a hurry to strike until they rise again with your bait, and lay your float fairly on the water. Then strike short and gently, lest the fish has the bait only between his lips. He has, however, generally taken it fairly when he acts thus.

You cannot be too early or late for the tench; and a “muggy” close day, with a fine rain, is most fatal to tench either in river or pond.

Carthusena Weir at Broxbourne is famous for its tench, and seventy to eighty pounds have here fallen to a single rod in a morning; this weight having been caught in two successive years on the Easter Mondays of 1872-3.

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GYMNASICS.

By Wat Bradwood.

EXERCISES ON FIXED PARALLEL BARS.

A pair of parallel bars is about the commonest gymnastic apparatus to be found in any school or private playground, and admits of a great variety of exercises.

They strengthen the extensor muscles of the arms, the shoulders, and pectoral muscles, and engender activity—but not necessarily strength—in the loins and lower limbs.

A pair of fixed parallel bars (Fig. 1) should be about ten feet long. In height they should stand, for a man, about three feet nine inches from the ground, for boys about three or four inches lower. They should be twenty inches apart in either case.

The simpler exercises on the bars consist of plain progression backwards and forwards by means of the hands alone, the weight being supported on them and the feet off the ground. The body should be raised to position of Fig. 2 at first by a spring, the hands grasping and pressing at the same time on the surface of the bars, to aid the elevation, and to retain the body in its position when elevated. Subsequently, as the muscles become strengthened by practice, the elevation should be performed by the arms alone, without the aid of a spring. The thumbs should be outside the bars, as the position indicated. The body should be perfectly upright, chest well thrown out, head held up, and feet close together.

Single progression consists of simply “walking” along the bars with alternate hands, resting as much weight for the instant as is possible on one hand, while the other springs its “step,” which should be about six inches in length, and so on, till the length of the bars has been traversed. The progression having been performed forwards, should then be done backwards.

Double progression is performed by both hands springing simultaneously, lifting the body entirely for the instant, and advancing as far as each hand can evenly along the bar. The arms should be kept rigidly parallel to the side, so that one hand does not take a longer “hop” than the other, and the pressure of each before the spring should be even, the stronger hand not doing more work than its fellow is capable of, else they will advance unequal distances, and throw the body out of its plane. In this form of progression the legs should not hang perpendicularly, as in the former motion, but should be bent backwards at right angles from the knee. This will throw the weight rather more forward upon the palm of the hands, at the base of the fingers, and so will give more elasticity to the pressure of the hands when making its spring. The exercise having been performed forwards, should, like its predecessors, be repeated backwards.

The exercises thus detailed comprise what are generally called the first or primary series of parallel bar exercises.

The secondary exercises consist of various methods of clearing the bars, and descending with the body outside them, from the original position of Fig. 2. To clear the bars forward, the legs must be raised till they are extended at right angles to the
body, with knees straight, then turned sideways, till the feet are over one bar or other; then lower the limbs again, and at the same moment throw the body clear over the bar by a strong pressure of the further hand, that on the side to which the feet have not been turned. This exercise should be practised both ways, to right and left. The elevation of the legs may at first be done with a swing, but as the muscles gain in strength the pupil should be competent to do it without swinging the limbs, and by sheer pressure of the hands.

In clearing the bar backward the motion is not quite analogous, inasmuch as the legs cannot be bent back from the waist in the same way that in the former exercise they were bent forward, so as to bring them in a horizontal position. In clearing the bar, the flexion must come at the elbow joint, so that as the legs pass to the rear, the arms, from wrist to elbow, must remain perpendicular, and the whole of the rest of the body is brought into a horizontal position. The feet are then passed over the bar just to clear it, as in the preceding exercise, and the body then thrown over by a spring from the further hand (see Fig. 3). This exercise also is practised both right and left, and, like its predecessor, can at first be done with a swing, but later on by a steady elevation of the limbs, by sheer pressure of the arms and rigidity of the loins.

These exercises can be varied by sitting on one bar or other to commence with, hands holding the bar in the usual manner. Then raising the limbs, letting them swing back between the bars, and so clearing the bars as in preceding exercises. These variations can be done to front and rear, right and left.

The body also can be supported on the bars in a vertical position, head downwards, and the bars then similarly cleared by first lowering the limbs sideways to give a bias to the descent, and then, as before, springing clear from the further hand. The body is raised to this perpendicular reversed position by first lifting the feet in front till they are as high, or even higher, than the face; then letting them swing to the rear, and with that impetus, and pressure of the hands, raising the body to the required position. Or the same position can be attained by sitting on one bar, or astride of the two, with hands in position in front of the legs, and then letting the head and body fall slowly forward between the arms, the legs being at the same time extended from the hips, and brought into a straight line between the bars. Then the bars can be cleared in the swing as before, or the body can be gradually lowered by letting the legs fall slowly back between the bars, and ascend again with a forward swing on the other side, till they descend, sitting on the bar as before, only with the hands now behind the body. By passing the hands once more in front of the body the exercise can be repeated, and a system of progression along the bar thereby adopted.

The same exercise can be reversed: i.e., the hands first grasping the bar behind the body, sitting. Then elevating the legs with a swing to the rear, then descend, swing under the body and to the front, again swing to the rear to the level of the bars, and either clear them with a swing, or descend sitting. The ingenuity of the pupil will soon discern abundant variations and combinations of the exercises here detailed. One thing he should bear in mind, to practise each exercise, if at all, both right and left, to preserve the balance of activity in the limbs.

The perpendicular to the rear may be attained with arms even, perfectly straight, though it requires far more strength in the extensor muscle of the arm and in the grasp than any of the exercises yet mentioned. This can be done either by raising the body by extension of the arms, or by a swing from the front, the feet having been first elevated in front as high as the face to give impetus to the swing. When thus at the perpendicular, "single progression," by moving one hand at a time along the bars, may be practised, both forward and backwards. In so doing the rigidity of the body must be strictly preserved, by stiffening the back, loins, and knees, so that the weight must fall perpendicularly upon the hands, and the latter must grasp with all their force, far more so than in the ordinary progressions with head uppermost.

One precaution we must add, now that we have thoroughly embarked in gymnastics pure and simple, and have dismissed those which have even an affinity to athletics, and that is, that a broad belt should be worn during the performance of all these exercises which exert the muscles of the loins and abdomen, so as to guard against the possibility of a rupture or strain of the abdomen under a sudden strain or attempted recovery in a failure or fall. With such a belt there will be no danger of any such accident. The belt should be of leather, about four inches wide, fastening with a double strap at top and bottom.

Many of the exercises here described may to some extent tax the nerve of the pupil, till he begins to gain confidence in his own powers, and to feel as much at home with his frame in a reversed as in a perpendicular position. In the absence of a gymnastic tutor, which we almost assume (for book-work would be almost superfluous where practical education could be given), and we suppose these papers to be written for more for instruction in home gymnastics), pupils can assist each other and lend a helping hand to ensure security during earlier attempts.

A friendly hand placed under each shoulder of a timid pupil to assure him of support in case his grasp should fail, will speedily give him confidence. For similar reasons that connote this mutual assistance, practical jokes, while practising exercises, should be carefully avoided. Not only is the nerve of a pupil destroyed by the distraction of his mind, and his practice crippled, but serious accidents may occur from so doing. We give this caution with emphasis, because boys will be boys, and temptation to play a joke when a play-fellow is helpless and in a quasi-ridiculous position is doubtless strong, unless its possible consequences are forewarned.
BUTTERFLY AND MOTH COLLECTING.

VOL. II.

A very favourite group with butterfly collectors is the genus *Thecla*, commonly known as the "hairstreaks." These are classed in the same family (*Lycaenidae*) with the "blues" and "coppers," but differ from them in several respects, the most striking of which is that the hairstreaks are possessed of short tails to their hind wings. This character, however, is not infallible, for the Green Hairstreak (*Th. fabi*) exhibits this appendage in a very rudimentary state, and, on the other side, the Long-tailed Blue (*Lycana batista*), a species which we have not yet thought proper to introduce to our readers as British, sports a hair-like continuation, but then batista, putting colour out of the question, has nothing to do with the true "blues," for it wants the peculiar "battledore scales" so very characteristic of the males of that group of butterflies.

The hairstreaks, of which there are five in number, are respectively called the Brown Hairstreak (*Th. betula*), the Purple Hairstreak (*Th. quercus*), the Green Hairstreak (*Th. rubi*), the Black Hairstreak (*Th. pruni*), and the White-letter Hairstreak (*Th. W-album*). Now the ground colour of all may be described as brown, and we may separate the species in the following way:—*Th. betula* has a large orange patch beyond the middle of its fore wing in the female, detected by its brown spotless upper side, and its green under side; *pruni* and *W-album* are the species most likely to be confounded by the beginner, that is, if he is fortunate enough to fall in with them. Both have their upper sides of a dull, blackish brown, with more or less distinct orange markings towards the hind angle of the fore wing; these may be seen as three or four spots in *pruni*, and only one in *W-album*, but it is on the under side that we have our best guide, for, although the hind wings of both have a marginal orange band, enclosing distinct spots, the inner edge of the band is bordered, in *pruni*, by a row of black spots, but in *W-album* by a black line, and this, as well as the distinctive white letter W line, from which the insect takes its British name, is clearly shown in our illustration, for, though *pruni* has a line of similar extent, its direction partakes of the form of a wave rather than that of a definite shape. In our illustration the green slug-like
caterpillar, with its short slanting streaks of darker hue, is feeding on the elm (*Ulmus campestris*), the leaves of which form its natural food, and the chrysalis is suspended to adjacent twigs, though it probably sometimes undergoes this metamorphosis beneath the surface of the soil.

The great months for the “hairstreaks” are July and August, but our readers must not count upon meeting with them with any degree of certainty in any particular season. *Rubia* and *Quercus* are the most generally distributed, the former being attached to the oaks, upon which the caterpillar feeds, and the perfect insect flying around the saplings in July and August is most readily secured by means of a long-handed net. *Rubia*, as already stated in a former paper, is double-brooded, the first broods occurring as early, in some years, as the end of April, the second in August. The rest are single-brooded, and are summer species, betula being the last to make its appearance. All (excepting perhaps *Quercus*) delight to settle, and frequently, on the blossoms of the bramble, a situation in which the collector, in his endeavour to capture them, is very likely to get into a predicament, unless he is dexterous and properly equipped.

The Skippers come next under our notice. They are small butterflies, measuring from an inch to an inch and a third, when the wings are fully expanded. In general appearance, they differ very considerably from the rest of their tribe. Their build is more robust, and the head is comparatively large, while the horns or antenna are placed widely apart; that is to say, the stalks by which they are attached to the head are quite twice as far apart, proportionately to the width of the head, as in any of the rest of the butterflies. This peculiarity gives them a somewhat bull-headed appearance.

The flight of the Skippers, or *Papilio*, is jerking, and very unlike that of the other butterflies, reminding one of the ass of skipping, hence their familiar English name. This up and down flight is most remarkable in the Chequered Skipper (*Strychius panicus*), but all possess it in some degree. They are very active on the wing, but do not fly far from one spot before they alight on another, generally starting off again just at the very moment that the collector has cautiously managed to get almost within striking distance of them. They love to frequent downs, heaths, undercliffs, country lanes, clearings, and borders of woods, some being partial to dry ground, others to moist places.

The family comprises seven species, of which four, viz., the Grizzled Skipper (*Strychius alcinous*), the Dingy Skipper (*Thymus pallas*), the Large Skipper (*Parnatha sylvarum*), and the Small Skipper (*P. lineata*), are pretty widely distributed, and more or less abundant. The other three, the Chequered Skipper (*Strychius panicus*), the Pearl Skipper (*Parnatha commode*), and the Lilworth Skipper (*P. alcinous*), are each local, though sufficiently common in their respective habitats. *Strychius alcinous*, the grizzled, is the least of the family, measuring about an inch across the wings; it is almost black, with small whitish marks, and the fringes of the wings are chequered alternately with little squares of black and white. It may be met with on heaths and other open spots, but is more partial to moist places in woods.

The dingy is rather larger than the foregoing, and of a mackerel, brought us to the desired spot, “the Burning Cliff,” where we had been told we should find *Parnatha acræna*, and there, sure enough, we saw it in profusion. The spot, close to the sea, is a kind of undercliff, not very level, of no great extent, and covered with thistles and large tufts of a low coarse grass or copses, about which our prey were skipping briskly. So abundant were they that I often had five or six in my net at one stroke, and in about two hours I caught a hundred, filling my box and my hat. . . They were accompanied by a few of the common *P. lineata*, which in their flight they greatly resembled.”

The species seems to be confined to the coast of Dorsetshire and Devonshire; and even in these localities its recurrence is restricted to a few favoured spots. It is particularly partial to the flowers of a small yellow thistle. Its time of flight varies, with the season, from July to August.

The Chequered Skipper (*S. panicus*) is darker than any of the genus *Parnatha*, and its spots are more distinctly defined upon the under wings. It is a very local species, and the beginner must not expect to meet with it during the first summer of his career.

The skippers form a link between the butterflies and moths, since their antennae, or horns, decidedly approach in shape those of the burnets and foresters (*Zygaenidae*), a class of moths exhibiting scales of metallic lustre, adornments which are of exceedingly rare occurrence among the moth tribe. At any rate, the skippers and burnets are related by what a contemporary would, by courtesy, term “marriage,” as we—woe—we had almost said “we for one” —can attest to.
PHOTOGRAPHY.

BY J. C. LEAKE.

LANDSCAPE TAKING—CONCLUDING WORDS.

In the completion of the tent, one of the most important items of the photographer's outfit will have been prepared; but as it will not be possible to take to a distance all the appliances which may be employed in the laboratory at home, we must now consider how we may dispense with all superfluous apparatus and chemicals.

In reality, the chemicals which are absolutely required out of doors are but few; and if some discretion be exercised in their selection and management, they may all be easily carried in a moderate sized travelling-bag.

The camera first claims our attention. In all probability the amateur will at first not be inclined to purchase a special instrument for this purpose, but will prefer to employ that which he already possesses, and which will most likely be of the ordinary rigid form. This will, of course, be more bulky as well as much more weighty than one made especially for landscape purposes, but, if properly managed, these faults may be made to become virtues, and the box may be employed as a packing-case, in which many necessary may be conveniently carried. For instance, there must in all cases be employed a plate-box, in which the plates for work, and the finished negatives may be placed, and this may be made to fit into the camera. This plate-box should be made of pine, about three-eighths of an inch in thickness, and should be well varnished both inside and outside. Inside, on the edges, should be secured two series of grooves of sufficient thickness to allow of the easy insertion of the plates of glass. These grooves should, however, not be made flat at the edges, as is usual in the ordinary form of plate-box, but V-shaped, presenting in section a serrated appearance, like the teeth of a saw. If we suppose that six pictures will suffice to satisfy us for one day's work—and if we really produce fine ones, it should do so—our plate-box should have twelve grooves, and should be divided in the centre by a sheet of tin or zinc. On one side of this partition should be stored six very carefully cleaned plates, and the best or polished sides of those should be placed next to the hinges of the box. The other compartment will be for the finished pictures, and as each plate is covered, it must be replaced in its groove.

It is well to get into the habit of replacing the plates in the same direction, namely, the cleaned or covered side next to the hinges, as this will avert many disasters, through rubbing off the film. It will also be necessary to take with us some appliance in which the required quantity of water may be carried to the tent, and this may be most conveniently effected by having a can or tin box made to fit exactly over the plate-box. This vessel will hold sufficient water to well wash a plate, and must, of course, be re-filled as required.

By this arrangement much space is economised, and the plate-box and water-trough afford mutual protection to each other while travelling. It is very convenient to have inserted in the bottom of this trough a short piece of brass tubing—say one inch in length—and to provide a length of flexible india-rubber pipe with a clip to form a stopper. The flexible tube may then be stretched over the brass pipe, and the box filled with water and placed upon the top of the tent, the india-rubber pipe passing through a hole made for the purpose, when a regular supply of water may be obtained in the tent. This will be found to be an excellent and cleanly method of working. These appliances, then, having been obtained, the metal top of the tripod stand should be screwed to the camera, and the plate-box and trough placed inside. Should there be any space left, it should be filled by packing a clean towel and a large coarse sponge, which will, besides preventing the boxes from damaging the camera, be found useful.

The next requisite is the bath, and this is one of the most tiresome items. If the ordinary bath be employed it will be of course necessary to take the solution in a separate bottle, which involves not only extra bulk and weight, but the risk of breakage, and, of course, the loss of the day's work, as well as of the solution itself. The best plan, therefore, is to employ a bath made for the purpose. The water-tight baths constructed for landscape work are made of obonite, or more often of gutta-percha, and are fitted with a cover of wood lined with india-rubber. This top is secured by means of clamp screws, and, when fastened down, the solution may be carried in it without fear. On the whole, we should advise the use of a bath of this description, as, although somewhat costly, it is certainly the best. The stopper should be of gutta-percha or of silver wire, and be so fitted as to allow of its being placed inside the bath when the top is secured.

The only other piece of apparatus required will be two developing cups, which are best made of gutta-percha, and a dusting-brush for dusting the plates before coating with collodium. This latter should always be carried in a case, as, if it becomes soiled or greasy, the plates will, of course, become dirty instead of cleaned.

Many photographers prefer to confine these out-door operations simply to the preparation of the plate, and its exposure and development, deferring the after processes of intensification and fixing until their arrival at home. This method answers admirably in the hands of one perfectly accustomed to the work, but for the tyro, we should advise that the pictures be finished, ready for varnishing, in the field. In order, however, to reduce the quantity of matériel as far as possible, some precautions are necessary, and these we will now describe.

The bath, in its water-tight vessel, we have already discussed, and the next item is the collodion. Of this important material it is advisable to take two bottles, so that in case of accident to one we should have an ample supply.

The iron developer we take in a somewhat concentrated form, as follows:—Dissolve four hundred grains of sulphate of iron in six ounces of water, to which add of methylated spirit two ounces, and the same quantity of glacial acetic acid, making in all ten ounces. This is the stock solution which we take with us. When about to develop a picture, we add to each ounce of this four ounces of clean water, which forms a good developing solution for ordinary work. If, however, we require a stronger solution, or vice versa, it can, of course, be readily made. This is a far better plan than that of taking a large quantity of developing fluid already diluted, as it at once saves the carriage of some weight, and affords us an opportunity of regulating the strength of our developer, in order to adapt it to the requirements of each picture.

The intensifying solution consists of pyrogallol acid, thirty grains, dissolved in two ounces of methylated spirit, and three ounces of water, in which we must also dissolve thirty to forty grains of citric acid. For this we shall require a five-ounce bottle: and for use we distil it with an equal bulk of water.
The fixing solution should consist of a weak solution of cyanide of potassium, as, when working in the tent, a solution of hyposulphite of soda would in all probability get splashed about, and cause stains and dirt of every description.

This will complete our chemical outfit, and it will now be seen that we have reduced it to two five-ounce bottles of collodion, one of iron developer, one of pyrogallic intensifier, and one of fixing solution. To this we should add, although not absolutely necessary, one empty bottle holding about ten ounces, in which to mix the diluted iron solution for use; in all, we shall have six bottles. These we may carry in a bag, or, better still, a case of wood divided into six compartments.

Before starting, we should make some preliminary trials of our apparatus and chemicals at home.

We therefore commence by very carefully decanting from a large bottle the quantity of collodion required, taking the most extreme precautions to avoid introducing any dust or sediment, for we must remember, that when travelling, our chemicals will be severely shaken, and if there be any dust about we may certainly expect to receive the fullest benefit thereof, in the shape of spots, stains, and pinholes. The bath must be well cleaned, and the solution carefully filtered for the same reason, while, unless it remain quite clear when shaken up, which is seldom the case, the iron developer should be likewise filtered. The other solutions will, if cleanly made up, not require it. The camera and lens should be thoroughly cleaned and dusted, as well as the interior of the tent, while the plate-box must be carefully wiped out with a damp cloth, or our pictures, although they may be taken clean, will receive a coating of dust, which will stick to the wet surface, and defy removal.

We have to provide ourselves with a thick focussing cloth, which is indispensable in out-door work.

A desirable spot being found, we commence by screwing the tent firmly to its stand, and erecting it by means of the slips of wood mentioned before. Then, without hanging on the curtains, we dust the interior, as a final precaution against spots. The bath, and the bottles containing the developers and fixing solutions, as well as our bottle of collodion, are now placed inside ready for use; and brush and plate, too, are got ready at a little distance from the tent. The water supply next claims attention; so we fill our miniature tank, and place it on the top of the tent, passing the tube into the interior. Then, after a final glance to see that we are all prepared, we loosen the screws of the bath, and hang the curtain in its place, tying it so as to exclude the light.

Now comes the selection of the view; and it is here that the photographer will show how much skill and taste he possesses as an artist. Too much care cannot be taken in this particular; and it should be remembered that upon this hinges the question whether we are merely to make a photograph or a picture.

These preliminaries being settled, we take one of our cleaned plates from the box, and, after carefully brushing it back and front, take it to the inside of the tent and coat and excite it, precisely as we have done at home when taking portraits; of course being exceedingly careful to exclude every ray of white light, by wrapping the curtain closely round the opening of the tent. When ready, the plate is removed from the bath, well drained upon a slip of clean blotting-paper, and placed in the slide, a second piece of blotting-paper being placed at the back, so as to absorb any moisture which may remain. The closed slide is now enveloped in a cloth, and taken to the camera, which of course has been before adjusted and focussed. The cloth is loosened, but not removed from the slide—as we must guard against the slightest gleam of light—and the plate inserted in its place in the camera, the cloth being kept thrown over all. Now, all being ready, we draw up the sliding shutter, and take off the cap, thus exposing the plate to the action of light.

As was the case when we were taking portraits, so here we can give no definite directions as to time of exposure. We will suppose that we are working in sunlight, and that we are taking a view which includes some trees, a bit of leafy hedge, and a small patch of water—a rustic pond, in fact, at which the cattle are watered. We are working with a quarter of an inch stop in the lens, and upon a plate seven inches by five. We expose our plate for thirty seconds, and return to the tent to develop it.

Our first proceeding is to dilute our iron solution to fifteen grains to the ounce, and having, as before, rigidly excluded all light, proceed to develop the image, exactly as in the case of our portrait work. In a few seconds our plate shows signs of the higher lights in the sky, and the reflection of it upon the surface of the water, and gradually all the details appear, until at last we can see the leaflage of the trees and hedge, and even the details of the darker parts of the branches and trunks.

The plate is now washed, and if not of sufficient printing density, we proceed to intensify it with the pyrogallic acid and silver. In landscape work the golden rule is not too much intensity, as by pushing this we get a disagreeable snowy-looking effect, which will almost transform our summer landscape into a winter scene.

When well washed, we can take our plate into the open air for examination, and, if satisfactory, we fix and wash it well, for if we leave any trace of cyanide upon it, our picture will be destroyed before we reach home.

The picture should at once be placed in the box, to preserve it from dust or injury, and so we proceed, taking our pictures, and carefully cleansing our slide and lens as each is taken, until we or our plates are exhausted.

BILLIARDS.
BY A. G. PAINE, B.A.

CAUTIONS.

In most works on billiards that all-important point position-play is generally taught by means of diagrams, the best work hitherto published, viz., Bennett's (De La Rue & Co.), containing no less than 196. Our space will not, of course, allow of any such number. We now proceed to point out to our readers the general principles of playing for position, so that they may be able to judge for themselves the best method of playing the various strokes which may occur, and which are, of course, absolutely infinite in number.

Fig. 1 represents a very common position of the balls, in which the striker's ball is supposed to be in hand.

Now, it is obvious to even a beginner that with the balls in this position the easiest stroke to play would be the cannon, but what should be the position which he should try to obtain after making the cannon. Now 'position' may be divided into two kinds, viz., that of bringing the balls together, or that of leaving a ball near a pocket.

Now, in regard to this latter point, it must be evident that
the red ball is the one principally to be considered, for the double reason that the red hazards count three, while white hazards count only two, and that, should the ball stop near the pocket, so that there is only a winning hazard left, the red, on being put in, is replaced on the table, and the white is not.

Of these two reasons the last is far more important than the first. When, therefore, the balls are placed so that the object of the player is not to bring them together for a cannon, but to leave them so that he can get either a winning or losing hazard the next stroke, he should, as a rule, confine his attention almost entirely to the ultimate position of the red ball.

In the position given in our diagram, therefore, the position in which it is desirable to leave the balls depends entirely upon which ball of the two is the red. We will first suppose that the ball marked in the diagram as No. 1 is the red ball. The dotted line across the table shows the direction of the ball after it has been struck by the white. The stroke should be played with just sufficient strength to bring the red across the table within, if possible, an inch of the pocket.

There will be more danger of playing the stroke too hard than of playing it too slowly. The striker's ball, after hitting the white ball (No. 2) will be placed in such a position that there will be almost a certain hazard, either winning or losing, off the red ball into the middle pocket. But suppose, on the other hand, that No. 2 is the red, and No. 1 the white, in this case the player should confine his attention again to the position of the red ball, of course taking care that he does not double the white ball into the middle pocket, of which there is some danger. He should endeavour to hit the red ball No. 2 full, and with sufficient strength to leave it over the right hand top corner pocket: the direction of the ball is shown by the dotted line.

Should be succeed in so doing, there will, of course, be either a winning or a losing hazard left off the red into the pocket named. To continue the idea of playing for position. Suppose the player to have succeeded, it is quite possible that the ball may be so placed that he can take his choice of either putting in the red or going in off it.

Here again we must remind our readers of what we said before, viz., that very often what is the game for one man is not necessarily the game for another. Since the introduction of the spot-stroke, the game of billiards is entirely different to what it was; the game as now played by crack professionals is a series of attempts to get the "spot-stroke," which, when obtained, often means that the game is over. For instance, on Saturday, Nov. 29th, 1873, Cook, in an exhibition match with Bennett, when far behind, got the spot-stroke, and made a break of 390, the greatest number yet attained by any man, past or present.

These few men, therefore, and we write, of course, for amateurs, who can make the spot, i.e., who can depend, at any rate as a rule, on making from six to twelve hazards, and there are some amateurs who can, we should of course say, by all means play whenever you can to put in the red and get the spot; but to those many amateurs whose spot-stroke generally consists in missing the very first hazard they attempt, we say, do not try for it.

Now, when a ball is close to the pocket, and the player near it, it is very often possible to go in off it and leave it almost exactly where it was before.

How often will a beginner be seen to play hard at a ball near a pocket, and in so doing not only knock it away from the pocket, but absolutely risk missing the stroke, when he might, by playing it gently, have made sure of not only obtaining one hazard, but a second one after it. All this arises from a want of thought.

The men who take the longest to learn the game are the impatient excitable people who rush into a billiard-room and instantly want to seize hold of a cue and commence knocking about the balls before they have had time to take off their hats; these men, who are only content when playing themselves, and who never care to watch others, never make players.

One reason of the vast superiority of professionals over amateurs is that, as a rule, in early life they have been forced to look on and see others play more often than they have been able to play themselves. We cannot too much insist on the importance of looking on at good play to those desirous of learning the game.

As an instance in point of position-play, we would call attention to Fig. 2. We believe few beginners would, of their own accord, ever think of playing for position with the balls placed as we have shown. No. 1 is the striker's ball, the opponent's ball is touching the cushion near the right-hand top pocket, but there is no losing hazard off it possible. The shaded ball is the red.
THE POPULAR RECREATOR.

Now, if the stroke be played properly, there is no difficulty in not only making the cannon, but in bringing the balls together afterwards. By hitting the red sufficiently hard to force it round the table, and putting on a little screw, all three balls will be left together near the right-hand top corner pocket, when there will, in all probability, be a choice of several easy strokes left for which to play next time.

It is by thinking before each stroke of where the balls will be likely to go, and altering and moderating the strength accordingly, that the beginner will gradually learn to make breaks.

The worse the player, as a rule the more impatient is he to play, but then too often it is the impatience that is the cause, and the bad play the effect. The impatience of some bad players, who are nevertheless fond of the game, is sometimes so great that more often than not they commence to play before even the balls have done rolling.

We will only add, in conclusion, that the three most important points requisite in order for any one to become a good player are:
1. Never play in a hurry.
2. Think where the balls will go to after the stroke.
3. Keep your temper.

BOATS AND BOAT-SAILING.

By J. C. WILCOX.

THE CUTTER.

This is our national rig for all vessels of moderate size, a rig of which we may be justly proud, on account of its beauty, grace, and effectiveness.

We have a few very large vessels of this class, the appearance of which is truly grand, as they fly along under the influence of a fine breeze.

We have numbers also of cutter-rigged vessels as well, of very small tonnage, and in fact there are more yachts of this rig than of any other. This is owing to the disposition of the canvas, which enables more speed to be obtained from the majority of vessels than any other which can be devised.

The cutter has but one mast, a topmast, a bowsprit or bolt-sprit (for the orthography of the word is doubtful), a boom or main-boom, and a gaff topsail yard. The middle-sized and large cutters are also provided with a yard for a square-sail, which is found very useful when a vessel has to run a long distance before the wind; but it is generally omitted in the smaller vessels, not being considered necessary, involving as it does much additional running rigging, which is looked upon as lumber; and it has on this account been discontinued.

The regular plain sails of a cutter are a jib, foresail, or fores-top-sail, mainsail, and gaff topsail set over the mainmast. This latter sail is in use in two forms, the square-headed or diamond topsail extended by the aid of a yard, and the jib-headed or triangular topsail, which is hoisted on the topmast only, and reaches up to the shrouds at the topmast head, where it terminates in an acute angle.

The diamond or square-headed topsail is sometimes made, especially in racing vessels, so very wide at the foot, that it cannot be spread by the gaff, in which case a small light spar is laced on the outer part of the foot for about a fourth of its length; and by aid of this the foot of the sail is easily extended beyond the end of the gaff, which is thus not required to be of more than the ordinary length. This small spar is termed a "jack-yarl."

There are three other sails sometimes used in cutters, either in racing or during light winds. They are the jib-top-sail, the square top-sail, and the spinnaker. The single top-sail is not a frequent sail amongst cutters, and is chiefly in use in revenue vessels, or such large yachts as make long voyages, when it is set over the squaresail, and has been found very useful in light weather, when running off the wind. The jib-top-sail is hoisted in the triangular space between the bowsprit end, the topmast, and the jib, and runs on the rope, stretching from the bowsprit end to the topmast head, by the aid of hanks or small rings.

This rope is termed the topmast stay. In small yachts its use is quite an exception, but in those of the middle and larger sizes it is frequently seen.

It is considered quite a fine-weather sail, and together with the square top-sail and spinnaker, is classed by yacht sailors amongst the "flying kites," a term applied by seamen to all the lighter sails brought into use in very fine weather.

Lastly, we have the spinnaker, a sail much used in racing, which, as far as I can gather, was introduced from ten to fifteen years since, and has now become very general; it is intended to set in running before the wind as a counterpoise to the mainsail and gaff topsail.

This sail is made of light material, hoists up to the topmast head, and is extended from the side of the vessel at right angles by a boom, so arranged that it can be shifted from one side to the other of the vessel, as may be required.

Sometimes this sail is run out to the end of the bowsprit, where it renders good service as a huge jib, with the wind at right angles to the course of the vessel, or "abeam," as sailors term it, when it would not be effective in its usual position. It has been japoesly termed a "topmast breaker," from the number it has carried away since its introduction.

The spinnaker has sometimes been made square-headed, but it is more often pointed at the top like a jib, which allows of its being hauled forward to the bowsprit-end, as I have just mentioned, where it does duty as a jib of extra large size.

Large cutters have as many as four or five jibs, their use being regulated by the strength of the wind; middle-sized cutters should not have less than three, and none but the very smallest cutters as few as two.

To make the best, however, of a small cutter's sailing, two jibs are not sufficient, for a large jib of light material is required for light weather, which is known as the balloon jib, one of substantial canvas, of fair size for an average breeze, known as the working jib, and a small one of still stouter substance for strong winds, which is termed the "storm jib."

Racing vessels use very large gaff topsails and foresails, to which, when speaking of them, the term "balloon" is always prefixed, in common with all extra-sized sails. The boom of a cutter is, for the size of the vessel, a large and heavy spar, and in very strong weather and a high sea, causes her to plunge and labour exceedingly.

When a cutter is caught in a gale of wind, she should not be subjected to the violent action consequent on the use of the boom, but the mainsail should be furled, and the boom be securely lashed down in the crutch provided for it. A small mainsail is provided for such occasions, having a very short
gaff, which sail is termed a "trysail;" and as it is so much narrower on its foot, no boom is required to extend it, but it is hauled aft by tackle-sheets, attached to stout eyebolts on either side of the vessel's quarter, just inside the bulwarks, one sheet for each side.

When a cutter is relieved from the sway of the boom, her action in troubled water is quite different, as she labours very little, and rides over the heavy seas as if a new life had been acquired by the change from the mainsail to the trysail. It is the custom to keep the trysail gaff lashed upon the boom, being a convenient place to stow it, and where it is always ready at hand when required.

The cutter shown in the illustration is twenty-seven feet long from the fore side of the stem to the after side of the stern-post, and thirty-one feet six inches over all, there being a length of four feet six inches from the after part of the stern-post to the taffrail, or extreme end of the stern. Her beam we set down at nine feet six inches, and her draught of water at five feet six inches aft, and two feet six inches forward. That part of a boat or vessel extending aft from the stern-post to the taffrail is termed the counter.

The standing rigging consists of a pair of shrouds, each side to stay the mast vertically, the tension on each side being equalised for that purpose. Small cutters sometimes have only one shroud each side. To steady it forward is the work of the forestay, which, being formed into a bow or collar at its upper end, embraces the trestle-tree, which has a hole through it for the topmast to work through, and is often, although not always, brought up over the bolt used to support the upper throat halliard blocks, shown in the illustration close to it. It is thence brought down to the stem-head, through which a hole has been bored for its reception, and led aft to the bits close to the heel or inner end of the bowsprit, where, having been set up as tant as required, by aid of a tackle, it is firmly secured by a lanyard. A certain amount of strain is necessary to stay the mast in a backward direction, which is effected by the pennants, one of which is seen behind the shrouds.

The forestay, the shrouds, and the pennants, are now almost always galvanised wire rope, which has a very neat appearance, from its small size, and is very durable, besides offering but little opposition to the wind.

The pennants are fitted each with a block at their ends, through which a stout rope is passed, termed a "runner;" one end of the runner has a hook, which is attached to a metal plate, bolted firmly to the side of the boat or vessel; the other end has another block, and frequently a tackle consisting of two, by aid of which a strong forward strain can be brought on the mast in opposition to the forestay, and this suffices to support the mast in combination with the others, except an extreme pressure be brought to bear on it, which should be prevented by shortening sail in time. The arrangement for setting up the shrouds is as follows:

At their ends circular pieces of hemp, termed "dead-eyes," are spiked into them, of flattened form, pierced with three holes. Just below the level of the deck, a piece of strong tough wood—elm being commonly used—is bolted to the side of the boat or vessel, through both the plank and timbers, and against these steps, which are known as chainwales (vulgo, "channels"), a plate is bolted for each shroud; these plates receive each another dead-eye, strapped round with iron at the edge by a hinged joint, and a rope of small size being put through them, knotted at one end, and well greased, the other can be drawn very tight, or as sailors say, "set up," by attaching it to the hook of the runner tackle, and hauling thereon as much as may be requisite to obtain sufficient strain.

The remaining portions of the standing rigging of a cutter are the boobystay and bowsprit shrouds for the bowsprit, and the topping-lift for the boom.

The use of the boobystay is to keep the end of the bowsprit from rising when the jib is being set up, and of the shrouds, to support the bowsprit laterally, so that it may not be deflected to starboard or port when the jib is filled.

The boobystay is often of wire-rope or fine chain, and is fitted with a tackle consisting of a single and a double block. The double block is next the bowsprit end; both blocks are iron-stropped, and that close to the bowsprit has the strap drawn out into a hook, six or eight inches long. A flattened band or hoop is provided for the bowsprit end, which has four eyes, and is put on square in its position. The hook of the double block enters the lowest eye, those at the sides receive the hooks of the bowsprit shrouds, whilst that at the top has a dead-eye for the topmast stay.

The single block of the boobystay is provided with a ring and thimble at one end, and the stop is left open at the other; the rope, or "fall," as it is termed, is spliced into the thimble, led through the double block, then through the single block, again through the double one, when it is brought on board, through a hole in the bulwarks, and made fast to a cleat provided for it, screwed fast to the bulwarks. The opened stop of the single block receives the end of the boobystay, which is fitted with a larger link than the others, so that it may take a screw-bolt after this link has been placed between its jaws.

The topping-lift is a rope for lifting the boom, and has a pair of sister or clip hooks, and it takes the weight when the main-sail is to be hoisted or reefed, so that the gaff can be with facility raised to its required angle, which gives the mainsail its proper peak, or allows the reef to be hauled down upon the boom, when shortening sail. It is right here to mention the reef pennants, two of which are ordinarily kept in place, as shown in the illustration.

The boom is provided with cheeks on each side, and holes abreast of each other, a pair for each reef pennant. In every hole on one side is a sheave. A knot being made on one end of the pennant, the other is passed through the hole up from the under side, seized through the cringle or the leash of the sail, and then down through the other hole on the boom, with the sheave in it.

The pennants should be sereed over with yarn for a quarter of their length, about a foot leathed, and that portion which goes through the holes, cringle, and boom, well greased, which will enable it to be hauled down snugly on the boom. Sufficient strain is brought to bear on it by aid of a tackle consisting of two blocks, one single, the other double; one block has a hook, the other an eye; an eye-bolt in the boom receives the hook, and the end of the pennant being bent on to the eye, a heavy strain can be brought on it, until the cringle comes down on the boom, when the end of the fall is delayed for the time to a cleat on the boom provided for it. The pennant is then lashed down to the boom with a piece of small lute, which will bite closely, when the blocks and fall, which we term a "reef-tackle," can be removed.

The running rigging should consist of Manila cordage, as it never becomes hard and stubborn, like hemp rope. When laid up with care, it has the handsomest appearance of any, and is consequently generally preferred by yachtsmen to other kinds of cordage.

The various ropes comprising the running rigging have the following appellations, derived from the spars, sails, or standing rigging, with which they are connected. Beginning forwards we have the jib-out haul, a rope spliced into the traveller, by aid
of which this sail is extended on the bowsprit, the jib-halliards, and jib-sheets, by which it is hoisted and trimmed, and a jib-purchase, being an arrangement of blocks, to enable this sail to be set well up. In large craft there is also a jib-down haul, which is requisite to effect the act its name implies.

The bobstay fall, and falls of the bowsprit shrouds, have been previously alluded to, as required to support the bowsprit against the vertical and lateral strains of the jib.

has also its tack-tricing line, which by raising the tack or inner lower corner of the sail enables canvas to be shortened instantly on an emergency, or when waiting for any purpose under sail.

The topping-lift fall is connected with the topping lift by blocks, by which power is obtained to raise the outer end of the boom, when setting or reefing the mainsail.

The peak-down haul is a small rope, led through a neat block.

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The forestay sail has its halliards, sheets, and downhaul, and by the aid of thimbles, or eyed hanks, as they are termed, slides up or down on the forestay.

The downhaul is spliced into the head of the sail, and being led through a small block on the stem-head, is brought aft, so that in a small cutter, where there is so little space forward, no necessity exists to go the extremity of the bow to haul the sail down by clutching hold of it, which would not unfrequently be found a dangerous proceeding.

The mainsail has its throat and peak halliards, and the latter a purchase; if the craft is of considerable size, the throat halliards are brought to a winch if necessary. The mainsail secured to an eye-bolt driven into the gaff end, by aid of which the peak is brought down, and hauled in board, when the peak halliards are let go. The ensign is also hoisted on this rope, which is delayed on the boom when set.

The mainsheet passes through its two blocks, one of which, by aid of its strop, embraces the boom, and the other the horse, or a very stout eyebolt, riveted through the timbers of the stern frame.

The gaff topsail has its halliards, its tack and sheet, and, if the yacht be of any tonnage, the sail will require purchases to set it properly. A clew line is often fitted to the topsail, by aid of which this sail is, as it were, temporarily furled.
THE MAGIC LANTERN.

By Samuel Hoagley, F.G.S., etc.

DISSOLVING-VIEW LANTERNS.

With the single lantern it is customary to push one slide in after the other, and change the views before the eyes of the audience. This is certainly a crude method of operation; and, to avoid such a primitive fashion, some exhibitors simply place their hands before the power while the change is made, others place a metal cap over the end of the lens mount; I used to employ an adjustable diaphragm let into the nozzle, worked by a lever action, so that each picture was gradually unfolded to view through a small central opening, which gradually expanded to the full aperture of the diaphragm, and, after showing the picture for a sufficient time, it was as gradually obscured and shut out. The obscuration of the bright white screen, with the consequent rest for the eyes of the observers, is a decided advantage, but the best method of obtaining this result is attained by what I call my "single-lantern dissolver." This consists of a dovetailed frame, within which an oblong piece of mica or thin horn can be worked in and out, by means of a friction roller, over the aperture of the tubular fitting by which it is attached to the nozzle of the lens mount, in the manner shown in Fig. 1.

The front edge of the horn is cut so as to imitate the edge of a mass of clouds, and from this point to its back edge the transparent medium is shaded by graduated tints into opaque blue. When a slide is placed in the stage, the opaque part is worked backwards till the picture gradually emerges from a mass of clouds into full view, when shown, by a reverse action of the roller, it is gradually obscured, the slide is then changed for the next, and the dissolving action repeated.

People buy what are termed "a pair of dissolving-view lanterns" simply for the purpose of accomplishing this end, such as the change from a summer to a winter scene, etc.; but the proper office for a pair of lanterns is to produce dioramaic effects, such as the representation of natural phenomena, as, for instance, the appearance of falling flakes in a snow-storm, lightning flashing, torrents rushing down from mountain heights, the appearance and disappearance of the mirage, or the various forms of the Aurora, etc.; the belching forth of smoke and fire from a volcano, the moon appearing from clouds, and simultaneously producing a moonlit ripple on sea or lake; or such an effect as windows being illuminated at the approach of night, all of which are produced by an image from one lantern being "superimposed" on that projected from the other, the second image being required to produce the desired effect; or when we have to produce such an effect as the appearance of a town before and immediately after an earthquake shock, in which case the change of aspect is made by instantly "flashing" one view into the other. By "flashing" we likewise produce such effects as a tiger springing on its victim, in which case the first view represents the animal about to spring, and by the instant obscuration of that picture and the simultaneous uncovering of the second, representing the tiger on its victim, the idea of action is conveyed to the beholders. Such effects can only be produced by...
means of two optical systems for the superposition of one view on the other, or the flashing of one picture into another.

As I have said, dissolving views and dioramic effects are usually produced by means of a pair of lanterns, thus, we may take two of the hydro-carbon lanterns, and place them side by side, as shown in Fig. 2, with their fronts touching, but their backs just so far apart that the two illuminated discs exactly superimpose upon the screen, that is to say, if the optical system of both lanterns coincide exactly as to height from the ground, and then fix in front of their nozzles a "dissolving flashing-fan," such as is likewise represented in Fig. 2, an arrangement I have contrived to bring the desired motion into the simplest possible form. The "comb" is fixed upon a stiff brass rod, mounted on a double hinge, that admits of its being slowly moved across the apertures of the lantern nozzles, and so adjusted that as soon as the teeth on one side of the comb begin to cover up the exposed nozzle, those on the other side begin to allow the image-laden rays from the obscured nozzle to pass to the screen, and the motion is continued till the first picture has been fully dissolved into the second. If, however, the second view is to be "flushed" upon the screen, this action is made quickly instead of slowly; and if the pair of views in each lantern are to be "superimposed," then, by the second hinge, the fan is turned downwards, so as to fully expose the previously obscured nozzle of the second lantern, in a manner that will be comprehended on inspecting the sectional view shown in Fig. 3.

In using a pair of lanterns side by side, it is obvious that two persons are required for their proper manipulation, and though on account of the tremendous heat concentrated by the lamp-glass, metal lanterns thus arranged are best adapted for Argand burners; where oxy-hydrogen jets are employed, and we have only to deal with the diffused heat from the lime cylinders, it is better to place the pair of bodies one over the other in the form known as the "bi-unial lantern."

**THE DIOGRAMIC LANTERN SYSTEM.**

This system embraces the lantern, the source of light, the gas-dissolver, the flashing-fan, the protective slide cabinet, and the screen, all of which are disposed as shown in Fig. 4, so that the packing-cases form stands for lantern and screen, on the principle previously described.

The Dioramic Lantern consists of a double body, made of well-seasoned mahogany, constructed for perfect ventilation on the plan previously described, a flat dome made of japanned tin, a sliding base-board, and a japanned tin sliding tray, both fitted with clamp rods for the support and adjustment of the pair of jets, the tray being made double, to allow of air passing between the upper and lower surfaces, as it stands immediately over the lower jet, and narrow, to admit of the heated air passing freely from the lower to the upper part of the body and out at the back when the dome is raised.

The optical system comprises a pair of my stage fronts and double achromatic powers, with the short focussed condensers mounted in square flanges, the upper flange being hinged to admit of the axis of the upper optical system being inclined downwards, so as to provide for the two illuminated discs being made to coincide on the screen by the action of a spring and countereacting screw-head adjustment. The base-board projects, to provide against the weight of the brass fronts overbalancing the lantern, and a clamp screw passes through this to prevent any shifting. The dioramic lantern is represented in Fig. 4.

The Source of Light is my convertible jet, arranged according to the general requirements of the exhibitor, or upon local circumstances or accidents of travel—as the "oxy-spirit jet," or the "oxy-house-gas jet," or the "oxy-hydrogen jet," or the "lime clock jet," previously described, with gas-bags and boards, metal gasometers, or condensed gas-bottles for gas-reservoirs, according to the special requirements of the exhibitor.

The Gas-dissolver presents many advantages over the old-fashioned mechanical contrivances, in the form of "dissolving-fans" of various shapes, as it admits of the exhibitor playing with the light, so as to give greater or less intensity to one image or the other, when a pair of views are "superimposed" upon the screen for the production of "an effect" by their judicious blending. If oxy-spirit jets or oxy-house gas jets are employed, then the simple "oxyhydrogen dissolver," or two-way tap is required. This is represented in Fig. 5; the upper portion being the part used if a condensed oxygen bottle is selected as the reservoir, as it is then only necessary to screw this on to the gun-metal valve of the bottle, but if a gas-bag is employed, then both the upper and lower parts shown in Fig. 5 are required. The lower part, or connector, being attached to the back of the slide cabinet, the oxygen dissolver is screwed on to it, and a red rubber tube being forced over the lower nozzle, connection is made with the tap of the gas-bag, and the two upper arms of the dissolver are connected with the oxygen taps of each jet.

If oxy-hydrogen jets with a pair of bags or bottles are employed, then it is necessary to use the "Highley-Malden oxy-hydrogen gas dissolver," represented in Fig. 6, which embodies the simplest form I have been able to give to a most useful oxy-hydrogen lantern appliance, originally invented by Mr. Malden. This, in the first stage of its development, as is usually the case with human creations, took the most complicated form, and then passed, stage by stage, to the simplest, instead of, as with Nature, germinating in the simplest, and then developing into a more complex form. The space at my disposal does not permit me to trace its history, but all that is necessary to state in this place is that it reached the stage represented in Fig. 6 in the year 1866. It consists of a "four-way cock," worked by a single lever tap! At starting, oxygen and hydrogen are distributed equally to both jets of the lantern, and adjustment made by the jet taps, till perfect and equal illumination is produced by both jets. For showing the first view, the lever is turned till the oxygen is completely cut off from the jet that is to illuminate the second picture, but allowing sufficient hydrogen to pass to keep that jet alight. Of course the first view is brilliantly illuminated; by turning the tap the oxygen is quite shut off from the first, and only a sufficiency of hydrogen is allowed to pass to keep the first jet alight, and so the first picture gradually fades and the second as gradually appears. So far for mere "dissolving"; if, however, an effect is to be produced by "superposition" of part of one view upon another, then the lever tap is turned till both pictures are illuminated, equally or unequally, according to requirement of subject. Thus, if we have to represent steam blowing off from a steam-ship that has arrived in port on a moonlight night, the principal slide represents the steamer and seascape, with a deep blue night sky, while, by the "effect slide," the moon, and an accompanying ripple on the water, is first "thrown on," and then the white steam rolling out of the tunnel is made to appear. In this case, by the action of the lever tap, the light is reduced for the seascape and intensified
for the moonlight and steam-effect slide, the proper balance of light being given whilst the exhibitor looks at the image on the screen, and sees when he has secured the most effective result.

By this oxy-hydrogen dissolver not only does the operator, by playing with his lights, secure the greatest amount of control over such dioramic effects as are dependent upon a proper balance of illumination (an advantage unattainable with the mechanical dissolving-fans, etc.), but both gases are economised in a manner that will be fully appreciated by those who have to give a long entertainment with only an amount of oxygen and hydrogen limited to six cubic feet of each gas.

The Flashing Fun consists of a telescopic tube, that fits by a double bayonet-join to a socket fixed on the left-hand side of the lantern, midway between the two nozzles, on the end of which are fixed, by a compass-join hinge, a pair of flat shields, which can be folded over each other when not required, or opened, as shown in Fig. 7, so as to cover one nozzle and leave the other open, and then by a rotatory action, given by moving the projecting lever, the second picture is "flashed on" to the screen, and the first obscured, through the position of the shields being reversed.

The Dioramic Slide Cabinet is constructed exactly on the same principle as that described at page 340, under the head of the "Demonstrating Slide Cabinet," only it is made in four compartments instead of three, to admit of the proper adjustment for height of the lower lantern-nozzle being central with the eight-foot square drawing-room screen, or when raised on its shelf, as shown in Fig. 4, with the ten-foot lecturer's screen, when slide cabinet, shell, and packing-case are clamped together to form a stand for the dioramic lantern.

The Lecturer's Screen is made of seamless cotton, ten feet square, and faced with the opaque white surface previously described. The packing-case and arrangements are on the same principle as that described under the head of the drawing-room screen, only, on account of the extra height, the uprights are made cylindrical to give stiffness, and are surmounted by pulleys to allow of the screen being raised with facility, and the cords being used as "guy-ropes" to give steadiness to the ten-foot frame-work. The cords are fastened, by military snap-hooks, to rings in the top of the lath the screen is lashed to.

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FIREWORK-MAKING.

By C. T. Brock.

LINE ROCKETS—ROMAN CANDLES—TOURBILLONS—CHINESE FISHERS.

LINE ROCKETS are very simply made. Take one of your rockets which has been primed and matched at the chokes, and bored, matched, and primed at the end. Twist a piece of touchpaper round the mouth, and cover the rocket with four turns of paper, so as to let one inch of paper overlap the clay end.

Take a second rocket, which has not been bored, but has been primed and matched at the choke. Cover it also with four turns of paper overlapping each end one inch.

Make a stout case, on a former half inch in diameter, and let it be in thickness say the fourth of the bore, and in length about five inches long.

Lay the two rockets side by side, letting the mouths face in opposite directions.

Place the case upon the top of the two rockets in the middle of their length, and tie the three cases together with three or four ties. Paste paper round the string, then lead a piece of quickmatch from the tail end of the first rocket (the one which has been touchpapered) into the mouth of the other.

Carefully close the paper round the match-pipe, and tie with two half hitches within a quarter of an inch of the end of the paper.

Stretch a line or wire between two posts. Pass this line through the empty case, taking care that the mouth of the first rocket is towards the post from which it starts. Light the touchpaper, and the rocket will travel to the other end of the line, say fifty yards. The rocket will make the return journey.

ROMAN CANDLES.

I recommend you to make these of only one size, and that known as sixpenny will answer your purpose. The bore of the case is half an inch, the length ten inches and a half.

The case (which should be in thickness one-fourth of the diameter of the bore) is made of 70lb. imperial paper, with a piece of board inserted. A common paper answers all requirements, provided you get a smooth inside surface.

To fill Roman candles you require, besides the powder to blow the stars out, what pyrotechnists call "dark fire" and fuse composition. The powder is F.P.P., the dark fire is simply squib composition, and the fuse composition is as follows:—

- Meal-powder, sixteen parts; saltpetre, sixteen parts; charcoal, seven parts; sulphur, eight parts.

The secret of successful Roman-candle making is this, you must have your stars the right size. They are made by means of the pump, as described under the head of rocket-stars, and you must make them fit loosely. They should run up and down the case very easily. Make this your test.

The compositions for Roman-candle stars should always be very fierce, so that they will light readily.

Composition.—Bright stars for Roman candles: Saltpetre, four parts; meal-powder, two parts; sulphur, one part; black antimony, one part. For Italian streamer stars: Meal-powder, eight parts; lampblack, three parts; black antimony, one part.

To fill Roman candles you want a rammer four inches longer than your case. It should be a solid copper rod, fitting the case very loosely, but knocked up at the bottom, in the same way as your squib rammer was served, so that, when nicely filled, the bottom will be perfectly flat, and will more perfectly fit the case, but will not so tightly fit it as to scrape the paper.

Scoops.—You can very easily make your Roman-candle scoops yourself; and I advise you by all means to do so. You will only require a vice, a pair of scissors, and some thin sheets of copper. The actual size of the smallest and largest scoops is given in the drawing on page 364. You must be careful to make all your scoops perfectly smooth by means of file and emery-cloth, so that they will deliver the composition easily.

You will ascertain by experiment which scoops to select, but you must of course use the smallest of your set for blowing the first or bottom star, then take the next larger, and so on.

Filling.—Take your fuse scoop, half fill it with clay, and turn it into the case, which you must hold in an upright position on some
flat hard substance. Four or five blows with the rammer will suffice.

After claying as many cases as you intend to fill, turn out the loose dust, and insert half a scoopful of fuse composition. Set that down by three or four blows of the rammer. A proficient would take seven cases in hand at a time, but you had better, at first, confine your filling to one case.

Insert the contents of your first scoop of powder, then another then a scoop of "dark fire," and then a scoop of fuse.

Now comes one of the principal points of Roman-candle making, where they are invariably spoiled by every body. The composition is simply required to be firmly set, and this will be done by giving three or four gentle blows with the rammer.

Well, the powder, as you know, is to blow out the star. On the powder comes the star, and then you put in dark fire. Of this last it is only necessary to have just sufficient to fill up the space between the star and the case. A very small scoop is required, say your No. 3 powder scoop. This dark fire burns quickly to the powder, and lights the star at the same time, but it should not burn so rapidly as to be explosive. Fuse composition does not burn quickly enough. If you did not use the "dark fire" the fuse composition would occupy the space between the star and the case, and, upon the star lighting, instead of the fire travelling rapidly to the powder, and the powder blowing it out at that moment, the star would simply burn away at the same rate as the fuse composition, and the powder would only light from the star itself as it was expiring.

A Roman candle of the size I am dealing with should contain eight stars. After filling one case you may perhaps find that your fuse scoop is too large, in which case you will cut it down.

The fuse composition should be contained in a square shallow box, with a thin piece of wood, say a quarter of an inch square, jammed in between the sides at the top, so that while taking a scoopful of composition you can level it off at the same time by scraping it under this cross piece.

The dark fire you require but little of, so you can keep it in a saucer. The grain powder and the stars should also be kept in separate saucers.

A Roman candle should burn steadily, and throw its stars up, at regular intervals, to the same altitude.

Stars which light readily require a greater charge of powder than those which light with difficulty. With coloured stars especially more or less dark fire will sometimes contribute to success.

When you have filled your Roman candle your last star should be at least an inch and a half from the top of the case. Fill up with fuse, prime with wet prime, and, while wet, dip it into ordinary fuse composition. Cap, cover, and finish off.

TOURBILLONS.

Make your tourbillon case eight times the diameter of the bore. A good size for ordinary purposes is that requiring a former one inch in diameter. These cases require to be made of very good paper—the same as for rockets—and to be well made.

When the cases are dry, put them upon a flat nipple a quarter of an inch long. Charge with clay to the thickness of a quarter of an inch. Mark outside the case where the clay terminates, using the rammer to ascertain the depth inside the case, and then placing it outside, as explained under "rocket making." Now fill up to within half an inch of the top with this

Composition.—Meal-powder, fourteen parts; sulphur, twelve parts; fine charcoal, six parts; sulphur, three parts.

Mark outside the case, to indicate the point to which you have filled, and complete the case, as you began, with clay.

Procure a hollow punch to make a hole a quarter of an inch in diameter. It should be fixed into a short round handle, to fit the hand comfortably. Make it sharp, and in boring, dip the punch into tallow repeatedly. Have a V groove cut in a piece of wood to receive your tourbillon. Lay one in the groove, and bore a hole with the punch straight through the paper to the composition at a point close to the clay. Turn the tourbillon completely over, and at the other end in a corresponding position, bore another hole in the same way. Now your tourbillon has two holes bored into the composition at opposite ends and contrary sides.

Turn the tourbillon over so that the holes are at the sides, and at a quarter of an inch from the clay at each end bore down to the composition. At one-third of the distance between these last two holes bore a third hole, and at a corresponding position on the other half of the case bore a fourth. Now, between these last two holes—in the middle of the case—make a small hole with a bradawl.

With the bradawl, press a piece of raw match into one of the end holes of the five last made, and carry the other end of the match to the second hole, and insert it in the same way. Go to the other end of the case, and connect the first and second holes similarly.

Now connect the two holes first made, carrying the match along the reverse side to that having the line of holes.

Fill up all the holes with raw match.

Paste some strips of cartridge-paper over all the match and the holes. Do this cleanly and perfectly, so that there are no air spaces between the tourbillon and the slips of paper. After this has been done paste a piece of blue double-crown paper completely over the whole of the tourbillon.

At the middle of the long piece of match cut away the paper down to the raw match, and paste a small piece of touchpaper over the place. This is where the tourbillon is to be lighted.

Now take a piece of hooping, such as is used for making toy wheels. It should not be more than one-eighth of an inch thick and three quarters of an inch wide. Bend it slightly, and bore a hole in the middle with a bradawl.

Place on your block a cloth folded four or five times, so as to form a pad, and lay the tourbillon upon it with the touchpaper downwards.

Lay the piece of hooping over the tourbillon crosswise, with the convex side upwards, and gently drive a stout one-inch clout nail through the hole in the middle of the hoop down into the tourbillon through the hole made by the bradawl. The middle of the stick where it comes against the tourbillon and
the point of the nail also should be glued. The tourbillon is now complete and ready for firing. It is necessary to have a perfectly flat level surface upon which to place your tourbillon for firing—a stone slab or a sheet of iron will serve.

**CHINESE FLIERS OR SAXONS.**

The manufacture of Chinese fliers somewhat resembles that of tourbillons.

Your cases should be five-eighths of an inch in bore and thirteen inches in length. The thickness of the case should be one-fourth of the inside diameter or bore. Use Arboursfield paper with a piece of board inside.

Place the case on a flat nipple a quarter of an inch long. Charge with clay for a quarter of an inch. Then charge the following composition until within a quarter of an inch of the middle of the case.

**Composition.**—Meal-powder, two parts; sulphur, one part; saltpetre, one part.

Charge with clay for half an inch, and then proceed with the composition until the last half inch, which will be of clay, to correspond with the other end.

Place the case in the V groove, and bore two holes with the same punch and in the same way and in the same positions as you bored the first two holes of the tourbillon. Turn the Chinese flier so that these holes are at the sides, and bore a hole in the centre completely through the clay with great care. This hole is for the spindle. Now turn the flier to its original position, and in a line with the first hole bore another into the composition just beyond the clay in the middle.

Connect these two holes with a piece of raw match in the same way as you matched the tourbillon (filling up the holes with match), and paste a piece of cartridge-paper over it.

Insert a piece of raw match an inch and a half long, into the unoccupied hole. Fix the other end of the match upon the clay at the end, with a piece of wet priming. Put a strip of paper round the end of the case to hold the match. Cap with a piece of touchpaper at the end, and cover the whole with some fancy distinguishing paper.

From that simple hole the composition burns down to the clay, and then the fire is conveyed by the match to the hole at the opposite side of the other end.

To fire the Chinese flier you will require a spindle. On this page is a sketch of a T spindle which will serve you now as well as for other wheels.

If firing fliers or wheels of any description, you should always have a "chuck," to be made of paper cases cut up, say into one-inch lengths. It should fit the spindle easily. Its object is to prevent the wheel getting against the post, and so stopping its turning.

**MAROONS.**

Maroons can of course be made any size, but if you intend to fire them in a garden of ordinary dimensions, you should not make them over large, or they become dangerous as well as annoying. The maroons I recommend you to make are of the size sold at two shillings. The inside diameter of the case will be one inch and three-quarters. The case should be strong and stout, and should be half an inch shorter than its diameter. In making large numbers at Nunhead long cases are made, and cut by a lathe to the requisite lengths.

You will want from your turner some wooden discs the eighth of an inch thick, to fit the cases.

Take one of these discs, and fit it, with gun, into the bottom of a case. Fill the case with TP powder, and fix a second disc in the top in the same way.

Now this filled case has to be covered with cord, which is wound round it on a regular plan, as follows:

Divide the circumference at each end of the case into six, and cut a notch in the paper at each division. Be careful that the notches at case end are exactly opposite those at the other end.

Now take a ball of stout laid cord. Pass the end through a ring attached to a firm post, so that you have something to pull against, and hold the end in your right hand.

Place yourself five feet away from the ring through which the string has been passed. Take the end of the string, and hold it firmly between the thumb and one end of the maroon.

Take a turn of the string which runs to the ball round your left hand, still occupying this position five feet from the post, so that you will have a firm grip of the cord, and yet will be able to let it slip through as it is wanted by the right hand for winding.

Hold the maroon with the right thumb and forefinger by the ends of the case—the end of the string being firmly gripped between the thumb and the maroon—and let the cord lay in a notch. Turn the cylinder over until the cord rests in the corresponding notch at the opposite end. Continue the cord completely round, to overlap the end you started with, and let the turns of the cord lie close together and regularly side by side until you have wound to the next notch and its corresponding one at the opposite end. You have now covered the middle third of the diameter of each end of the maroon.

Now, there are two notches at each end unoccupied by string. Take your string to the notch on the other side of the maroon, and continue it so that it comes to the place you started from for the second series. Continue to wind towards the middle of the case, until you reach the next pair of occupied notches.

Now you have about two-thirds of the maroon covered. Fill up the remaining space in the same way. If you have done this properly, no part of the case will be visible, and the cords will lay lengthwise singly and close all round the maroon.

After filling the last third, hold the string firmly at the point
CRICKET AND CRICKETERS.

By C. W. Alcock.

LAST WORDS ON BOWLING—NEVER DESPAIR—"HEAD BOWLING"—THE ACCURACY OF BOWLERS—ENCOURAGE YOUR FIELD.

If you aim at being an absolute expert in the way of bowling, you will have to cultivate, as I told you in my last article, other faculties than those with which the mere possession of a certain amount of bodily strength has endowed you. The science of batting has improved so much of late, and developed so marvellously with the proportionate improvement in the condition of cricket grounds, that the old order of bowling has changed in a surprising manner, giving place to a new and vastly more intelligent state of things. Indeed, to be a skilful bowler now-a-days, requires a degree of mental acumen that was almost unnecessary in the past, when village commons were rough, and protective armour had not yet been invented to indemnify the batsmen against any serious risks, and make his position at the wickets as pleasant as tenure as possible.

Do not misunderstand me to reflect any want of skill on the heroes of the by-gone, or to impute any lack of brain to men who immortalised themselves by the display of singular aptitude in every requisite. It is merely that the revolution of affairs has caused a different condition of requirement, as the march of events has materially altered the state of cricketdom.

You will have more than one style of batsman to meet, so that you will have to have all your wits about you, to adapt yourself to differing circumstances.

You will have to face sometimes a batsman whom no amount of allure will entice an inch beyond the limits of the popping-crease, and at others members of the "slogging" fraternity, whose eyes are so keen, and shoulders so broad, that even your most cunningly-devised ball will be sent to the next parish. There are some batsmen of this impetuous order who will meet you almost half way between the wickets.

See how often a mighty hitter, such as Mr. C. T. Thornton was, and still is, has upset the nicest calculations of a bowler, and scored his hundreds, when batsmen possibly of a much higher grade in the real art and science of batting have had to be content with their tens or their twenties.

You will find that practice will soon initiate you into the special weakness of every batsman with whom you have to cope, provided that you only take the trouble to learn, and are only gifted with an ordinary amount of discernment.

You will find occasionally times when you are punished severely; for it happens that a batsman has his own peculiar likes and dislikes, and your bowling may unfortunately come under the former category. You may have tried every ruse common to the general run of bowlers, and without success. You have varied your pitch with consummate care, but still the play of the batsman has been varied too. You have altered your tactics then, and made the ball point from off to leg, instead from leg to off, but with the same ill-fortune; and your artifices seem to be inferred by intuition. In the light of a last hope, you have then determined to give a ball that shall be utterly devoid of break or spin, and it has sped straight from your arm into the wicket of your foe.

You have always a material advantage over your adversary, in that he has only at the most a few seconds to deliberate on his movements, whilst you may have in addition a great help in any inequality of ground.

If you are wise, you will not continue to bowl when you have found that the batsman has thoroughly mastered you, but take a spell of rest, and return invigorated to the attack. Such a course will involve some self-sacrifice, for the best bowlers will feel aggrieved at being taken off, even when they are practically ruining their side. It is common enough to hear such a one complain that he has been so treated, on the ground that he was secure to get a wicket in an over or two.

An anecdote on this point is told of Lord F. Beaufort, the greatest name in connection with the cricket of the past, that is not inapplicable. He was bowling to Mr. W. Ward—the Ward of ancient fame—and at last did succeed in securing the mighty batsman. "I knew I should get you," was his remark. "Yes, but I have scored eighty," was the natural reply.

You must be cautious, above all things, to keep your bowling well up to the batsman, or your chances will be very scarce. It may be that now and then you suffer, but on the other hand you are little likely to do any great injury to the batsman, unless you do preserve something more than a short pitch in your bowling. Remember that you have ten men to help you in the field, and that you have to consider them as much as, or even more, than yourself.

The perfect condition of cricket-grounds now-a-days, and the almost painful regularity that marks the course of each ball after the pitch, is very much against your chance of hitting the stump themselves, so that you must utilise your forces as best you can.

A far-pitched ball, or what is technically called a "Yorker," will often secure the fall of an inexperienced batsman, before he has been in long enough to get his eye used to the sight, when thousands of short-pitched balls would be treated with contempt. Indeed, with short-pitched balls, you lose altogether
the great point of vantage that you have over the batsman, in giving him plenty of time to speculate on and determine his movements. I could name scores of fast bowlers, useful enough when the ground is rough, and the ball flies almost perpendicularly from the pitch, who are practically valueless on a good and easy wicket, solely because their pitch is so short that every ball comes up easily to the bat, and is hit without difficulty: so far from the point aimed at it, that it goes an inch or two over the stumps, instead of striking them.

If you are faint-hearted, you will never win the fair lady of cricket. Indeed, unless you are patient as well as determined, you will have to cope with other bowlers on most disadvantageous terms. You will learn that many a ball that would have shattered a wicket on your own village green, will be regarded with disdain at Lords or the Oval.

You will learn, in course of time, that the very best batsman has his vulnerable place, if it only be of the dimensions of Achilles' heel. You will discover that few are without some form of weakness, especially with balls pitched on the leg stump; and this is essentially the blind side, the most favourable for you to attack, if you are able to maintain anything like a continuous fire. Here, though, you must be very careful not to overdo matters, by pitching the ball too near the bat; for it is decidedly easier to get rid of a ball well up on the leg stump, than one of a lesser pitch. A short-pitched ball, straight on the leg stump, is the most difficult of all for the batsman, as it is the most likely to produce a catch.

You will do well to experiment on this ground, for, as a general rule, the tendency to straight play is overcome by a succession of leg balls, and the patience of the batsman is exhausted, until he begins to show, not only signs of a crooked bat, but of a desire to hit, and is inevitably lost. If you find that your opponent has a strong defence, that he plays straight, and is at all stiff or cramped in style, do not maintain a persistent attack at his stumps, but rather tempt him, and encourage him to forsake his prudential tactics. If you have tried him on the off side, and discover that he can hit well in that quarter, or can cut well as most systematic blockers can, give him one on the leg stump, and dispose the field, when you have stationed at short leg, according to the manner in which he meets the new assailant.

You can do much in all probability by this simple rule, for a good field at short leg will still more effectively cramp the movements of the bat; and if he be at all worthy of his onerous post, will be able to adapt himself as well to the requirements of the ball, and help materially the aim of the bowler.

You must remember, too, that you have to rely greatly on the assistance that you derive from the ten players who combine to constitute your field, so you will have to be cautious that you dispose them rightly, and that you work harmoniously with them, or you will be a serious loser yourself. If you are in good accord with them, you will find many a catch made that would otherwise perhaps never have been attempted.

Bowl always with the idea of getting a wicket, not of accomplishing another maiden over. Do not make excuses when you are asked to bowl, that it is not your day, or that the wind is too strong, that the hill is against you, or the ground too heavy for you to stand. Sink all such insignificant devices, and play the game as if it were a noble sport, instead of a mere vehicle for individual aggrandisement.

CARD GAMES.

By Geo. Tindall.

CASSINO AND "ALBERT SMITH."

Cassino is a very pleasant and agreeable game, especially for young people. It is easily learned, and affords scope for the exercise of some ingenuity in play, as well as being an exercise of the memory.

The score in this game is eleven, and if either party or side score out before the opponents are six, the latter are lunched, and the winners score a double game.

The points are thus reckoned:

- Great Cassino, the ten of diamonds: 2 points.
- Little Cassino, the two of spades: 1 point.
- Euchre: 1 point.
- The majority of cards obtained: 2 points.
- Spades: 1 point.

Besides which, if any player clear the board of exposed cards during play, he or his side score one for doing so.

These points are not scored as they are made, but are reckoned at the end of each deal, and the party having made most points scores the amount of the majority only, precisely in the same way that honours are counted at whist, that is, the smaller number is deducted from the larger, and the overplus is scored by the party to whom it belongs. Thus, if you make eight points, and your opponents four, you score four; so that a hard may be played and nothing be scored by either party, if both obtain an equal number of points.

Partners are first chosen by cutting in the usual way, and the person who draws the lowest card has the first deal. The deal afterwards goes round in rotation, as in whist and most other card games.

The cards are then shuffled and cut by the person on the right of the dealer, and the latter commences dealing on his left one card to each player, face downwards, and then one card exposed on the table, until he has dealt four cards to each, and four exposed.

Each player then takes up his cards, and the eldest hand commences play. He looks at the cards on the table, and if he holds any similar card, he places it upon the one exposed, and turns them over to his own side; he can, however, not only take any similar card, but he can also take any other cards which, added together, will make the same value numerically as the one he plays; for instance, if a five and a three are on the table, and the player holds an eight, he can take the two cards with his single one. By this means it is possible to clear the board at once by the first player; for if the exposed cards were a ten, with a five, three, and two, and the eldest hand held a ten, he would sweep every card from the table, and score one for doing so.

It will be seen from the above that the count cards can only be matched and take similar cards, they cannot combine to take cards of lower value.

If the player cannot play a card that will take any other card or cards already exposed, he must lay down one of his cards face upwards among the rest, and the next player proceeds in the same way, either taking cards with his own or adding one from his hand to the exposed cards on the table, and so on, round and round, until the four cards dealt to each are exhausted.
The dealer then takes up the remainder of the pack, and again gives to each in rotation four more cards, but this time he does not expose any of the cards, as there is already a stock on the table, unless the last player succeed in sweeping the board.

The game goes on in this way until the entire pack is exhausted, when each party takes up his cards and reckons the points he has made, scoring the number he has obtained over his opponent. The player who obtained the last trick takes all the cards then remaining unmatched on the table.

The cards are again shuffled and cut, and the next person in rotation deals for the next hand, as before, and so on until the game is completed.

When three persons are playing, the two who obtain the least number of points add them together, and the party having the largest number can only score what he has made over the combined points of his antagonists.

The principal objects of the game are to make Great and Little Cassino, and the ace, if you hold them, and if not, to prevent your opponents from doing so. In order to do this, you will avoid playing cards that will match with them as long as you can, although as you never hold more than four cards at a time, it often happens that you do not get a chance of making them, and are obliged to lay them on the table and run the risk of making them when your turn comes round again. Should ace or little cassino be played by your opponent, it would be wise to take them immediately if possible, even if by playing a higher card you could take two or three others; but no opportunity should be lost of making cards, on account of the number of points the majority of cards bring. It is also well to secure spades as early as possible, so that if you have two chances of matching at one time take that first which will make spades.

If you are unable to play a matching card, the court cards are the most eligible to discard, as your opponent can only match them, they cannot be combined; the higher numbers are the next best cards, as they do not enter so readily into combination; at the same time, if you retain them, they may give you a better chance of matching when your turn comes.

When you hold a pair, play one of them, and if one is spades, play that last; but be careful to remember whether any others of the same denomination have been previously played; indeed, remembrance of the cards played is the surest means of success.

Keep in view the state of the score, and play accordingly; if your adversary is very nearly out, prevent him from sweeping the board, even if you risk pairing sometimes yourself; the way to do this is to keep some court cards on the table; but take every opportunity of sweeping yourself, as your opponent must then play without a chance of taking anything. Gain also the final sweep, if possible; you may sometimes almost ensure this with a court card. For instance, if you know that one queen has been paired and the third is on the table, if you have the other queen dealt and retain it until the last, if you are the youngest hand you are certain of matching it, and so obtain the sweep; and if you are not the youngest there is a chance of those following you not being able to play a matching card.

"ALBERT SMITH"

Is a very lively and amusing round game, or rather a medley of card games, very popular in some parts of England, and especially in the northern counties. It is suitable for any number of players, and does not call for any great exercise of the mental powers, as several of the results are purely dependent on chance, which gives the game just sufficient excitement to keep up individual interest, without checking the general conversation, it is thus eminently a social game, and often a very merry and agreeable one.

Counters in rather large quantities are required for this game, and it is well to limit the number to be staked at any one time to three, as the dealer is at liberty at any period of the game to double the amount without option on the part of the players.

The deal being decided in the usual way, the cards are shuffled by the eldest hand and cut by the youngest, and the game commences by one round of vingt-un, played in the manner we have described for that game in a previous paper.

The next round is styled "imaginary ten," and is played exactly like a round at vingt-un, except that each player is supposed to have a ten dealt to him, and stakes accordingly, and only one card is dealt round to each; the players add the ten to this card, and either stand or take more cards, as they choose, to make twenty-one, or as near as possible, and in all other respects proceed as in the first round.

The next round is "Rouge et Noir;" the cards being again shuffled and cut, the players, in rotation, commencing with the eldest hand, may stake any number of counters not exceeding the agreed maximum on the colour of the card to be turned up by the dealer; if the colour staked on be turned up, the dealer pays the amount to the player, but if it be of the opposite colour, the latter pays. Thus, if the eldest hand stakes three red, and either diamonds or hearts be turned up, he receives three counters from the dealer, but if clubs or spades be turned up, he pays the stakes, and the next player speculates in the same way upon the next card.

To this follows "odd or even," which is played in exactly the same way, except that the player stakes upon the chance of the card turned up having an odd or even number of pips. The balance of chances is greatly in favour of even, as the court cards count ten each, and consequently are even.

The dealer next turns up two cards to each, the player having previously staked his counters on "sympathy" or "antipathy." Sympathy wins if both cards are of the same colour, antipathy if they are of opposite colours.

The next round is called "self or company;" the dealer deals two cards on the table before him face downwards, calling one "self" and the other "company." Each player then places the number of counters he is willing to stake on the table before him; the dealer then commences dealing the cards face upwards in one pile, until he deals a card similar to or that will pair one of the original cards; if it pairs with "self," he sweeps the whole of the counters staked; if "company" is first paired, he pays the same to the players.

In the round called "pips" there is no staking, but the dealer gives two cards to each player, and then to himself. The cards reckon as at vingt-un, and each player who has a less number than the dealer pays to him as many counters as will make the difference, whilst those who have a larger number receive the same from him.

The completing round is called the "clock;" each player stakes what he chooses, laying the counters in front of him. The dealer then commences turning up the cards from the pack, counting at the same time one, two, three, etc., up to ten, then knave, queen, king; if he happens to turn up a card that agrees with the number he calls at the time, he takes up all the stakes, but if he counts up to king without turning up a similar card, then he must pay to each person the amount he staked, and this completes the game.

The deal then passes to the person on the left of the last dealer, who again commences with vingt-un, and goes through the various rounds in the same order.
THE STANDARD SLIDE should be three and a half inches square, to allow the requisite margin for the photographer’s and colourer’s requirements, and for the overlapping edges of the frame.

The standard size for the picture being a disc three inches in diameter, the margin of the glass slide around the circle is usually stopped out by black varnish, but it is a better plan to use a stout paper "mat," to prevent the slide coming in contact with the "covering glass." This mat or mount should be printed in black and white from a wood-block design, with two scrolls around the circle and two shields in each corner, the top scroll being provided for the name of the series, the bottom scroll for the name of the subject, the right-hand shield for the number of the series, the left-hand shield for the trade-mark of the producer, as shown in Fig. 1. The covering glass may be imprinted in black and gold, with a garter inscribed with the name of the exhibitor, etc. For some subjects the aperture in this "stop-mount" must be square instead of a circle.
The Standard Frame is seven inches long by four and a half wide, and is made in the method previously described, with one edge beaded, as shown in Fig. 1.

The Diornamic Frame, however, measures 10 by 44 inches to allow of its packing in the diornamic slide cabinet, with other frames of the same size mounted with panoramic or chromatropic, or other effect slides.

The convenience of having ordinary and effect frames of one size, to avoid that higgledy-piggledy all shapes and sizes plan usually followed by exhibitors, will be appreciated by the following example. The simplest moving slide is where a number of figures or objects have to be presented in succession, in which case they are painted on a long slide, as shown in Fig. 2, representing "A nice Scene in the Park," from my magic lantern pantomime of "Harlequin Castle of Otranto," and such a slide is known as a "Panoramic" (P. S.), which in its frame measures fourteen by three and a half inches.

Where the figures or objects have to move across a view, as a train passing over a railway viaduct, affected by means of one long glass passing over a central picture, the slide is called a "Moving Panoramic" (M. P. S.). In most cases M. P. S. are placed in the stage horizontally, but wherever they represent such subjects as a balloon ascent, ascending and descending demons, etc. then they must be inserted into an open stage vertically.

Fig. 3 represents a vertical moving panoramic slide. The proportions between Figs. 2 and 3, and that of Fig. 1, will be observed, and it becomes apparent that if such long frames as the former had to be packed with those of the proportion represented by Fig. 1, the chances of a breakage would be considerable, while it is equally obvious that if ordinary slides and mechanical slides are all put in frames of uniform size, a number of such frames can be packed above the other with neatness and perfect safety.

Single Slipping Slides (S. S. S.) are simple in construction, and afford the means of producing a considerable variety of amusing effects, such as elongation of noses, as shown in Figs. 4 and 5, moving eyes, kicking donkeys, people dancing, fighting, etc., and being very cheap, are great favourites with those who use the lantern for mere amusement. They consist of a central figure with a second glass that slips to and fro, which generally serves the purpose of hiding parts painted on the under glass, which are exposed to view when the slip slide is drawn back, and covering parts previously shown.

Double Slipping Slides (D. S. S.) consist of a central picture painted on an under glass, which is gradually or suddenly exposed to view by drawing back two slipping glasses, as shown in Fig. 6, which represents a fairy appearing from the clouds. Many pretty and amusing effects can be shown by this simple and cheap contrivance.

Lever Slides (L. S.) consist of two glasses, one fixed, the other movable by means of a lever arm attached to a brass ring in which it is imbedded. Objects painted in the centre of the lever glass can have a certain amount of motion imparted to them, and so produce an aspect of natural action, such as the rolling of a ship, as shown in Fig. 7, animals moving their heads and necks to drink or browse, people bowing, etc.

Double Lever Slides (D. L. S.) consist of one fixed glass and two lever-action glasses, by which such action as an arm being raised to a hat on a dandy’s head—the hat being lifted, replaced, and the arm lowered to its first position—can be effected.

Double Lever Rocking Slides (D. L. R. S.) are still more complex, consisting of the fixed glass, two lever-action glasses, and a rocking-glass.

Rocked Slides (R. S.) consist of a fixed glass and a second that rotates over it by means of a circular-toothed wheel affixed to its edge, which is acted on by a pinion worked by a little handle. Such effects as a windmill in motion can be represented by this arrangement.

Double Racked Slides (D. R. S.) consist of a pair of rotating discs worked in opposite directions by one pinion, with or without a fixed sub-glass. By this action such effects as fish swimming through an aquarium, bees flying about their hive, etc., are produced. When the two or all three glasses are painted, with geometrical designs, this arrangement is known as a chromatropo, or the Racked Chromatropo (R. C.).

If motion is imparted by a drum and endless cord working over grooves in the edges of the discs, it is then called a Band Chromatropo (B. C.), the frame in this case being of the same size as the diornamic frame. An endless variety of beautiful ever-changing geometrical patterns, with rolling or flashing action, may be produced by this contrivance, according to the ingenuity of the designer. Sometimes the centres are filled in with mottoes, such as “Welcome!” “Good Night!” and are then called Motto Chromatropes (M. C.), or the centres being painted in black, portraits of the Royal Family and reigning kings, etc., are superimposed upon the black disc from a second lantern.

Rocked Rocking Slides (R. R. S.) consist of a fixed glass on which the principal portion of the subject is painted, a rotating disc, and a rocking-glass fixed to the opposite side of the frame to which it is worked from.

Eccentric Motion Slides (E. M. S.) consist of one fixed glass and two that work over each other with an eccentric motion, so as to produce the effect of rolling waves, birds in motion, etc.

Curtain Effect consists of a slide representing a painted proscenium curtain, in front of which a strip of stiff black calico can be wound or unwound by means of a pair of rollers worked by handles. The screen is first shown dark, and as the black strip is wound back so as to display the picture behind it, a curtain seems to roll down from the ceiling. On commencing with the first scene of an entertainment the action of the rollers is reversed, and the curtain seems to ascend. When a pair of stages are placed one over the other, I have obtained a better curtain effect by arranging a pair of metal shields in such a manner that as the curtain in one stage was gradually covered over, the first scene in the other stage was gradually uncovered, so that as the curtain seemed to be wound up, the lower part of the first scene appeared beneath its edge, as it would do on a real stage. But this leads us to the consideration of

**SUPER-POSITIVE EFFECTS.**

Snow-storm Effect.—The frame for this is made like the curtain effect, only the black calico stretches from the top to the bottom roller, and the only light that passes is through little holes stabbed all over it. When the calico is wound upwards it gives the impression of flakes of snow falling downwards, and when the effect is superimposed upon any snow-clad view, thrown on by another lantern, the imitation of a snow-storm is wonderfully real in aspect.

Fairy Fountain Effect.—This consists of a double-racked slide, each glass being painted and scratched in such a manner that, when rotated, a “cross-hatching” appearance is produced upon the screen, which, when superimposed upon the painted representation of a fountain, gives the impression of falling water.

Torrent Effect.—This is exactly like the last in construction, only the representation of foaming tumbling water superimposed on a scene representing a mountain gorge, has to be put in with bolder character.
Fire and Smoke Effect is produced by painting a representation of volumes of smoke, and ruddy gleams, and flashes of yellow flames upon a single glass, that rotates behind one or more openings made in a blackened fixed glass, which openings correspond exactly to the outlines of the cone of a volcano—burning windows, etc., or rigging, in the pictures of the volcano, building, ship, etc., so that when both images are superimposed upon the screen (every attention having been given to secure the exact centreing of one slide with its fellow), a very faithful representation can be given of the phases of a volcanic eruption, or the destruction of a building or ship by fire.

Rippling Water Effect is produced by similar means.

Mumified heads are produced with a lever motion, by which the moon and the high lights it produces are simultaneously allowed to pass through apertures made in the stepping-out glass, so as to appear upon appropriate parts of the scene on which this effect is superimposed.

Racked Lever Effect (R. L. E.)—In the effect slide used in the scene of the steamer leaving the port of Alexandria, by a lever action, the moon placed in a central band, and the high lights it produces placed in an outer band, are simultaneously un-covered, together with the steam effect painted in the innermost band of the disc. On rotating the racked glass, the water seems to move and ripple when the moonbeams fall upon the waves, and white steam to blow off from the funnel of the steamer.

I conclude this series of articles on the Magic Lantern by referring to the forms of the most useful accessory apparatus employed, when the instrument is used for educational purposes, as the space at my disposal will not permit me to describe them in detail. The Aphiroscope, or arrangement employed for projecting the images of opaque objects, such as cartes de visite, coins, plaster casts, sections of fruit, the works of a watch or of its hands in motion, fossils, etc., is represented in Fig. 8. The Gas Microscope, for showing natural history objects, mounted on three-inch, two-inch, and one-inch discs, is shown in Fig. 9. The Gas Polaroscope, for demonstrating the gorgeous chromatic phenomena of bodies in a state of strain, etc., under polarised light, is represented in Fig. 10; and the Lantern Kaleidoscope, by which the beautiful geometrical designs producible by a pair of mirrors placed at an angle of 45° can be shown on the screen, is shown in Fig. 11.

EGG-COLLECTING.

BUNTINGS—WOODPECKERS—CUCKOO—REDSTAIN—NIGHTINGALE—WARBLERS—SWALLOWS—SHRIKES—SNIPES—WILD-DUCKS.

A Far rarer and more local species is the Cirl Bunting (E. circulus), an inhabitant of the southern counties of England, Surrey, Sussex, Devon, Haunts, and the Isle of Wight are those in which there is perfect certainty of finding it breeding; and on the Continent it is naturally more abundant as we proceed southwards. Chalk-hills with little bushes and with a southern aspect are the favourite haunts of this bird, the male being recognisable by his black throat and grey gorget.

As for the eggs, it is difficult to say how they are to be distinguished with certainty from those of the commoner bird, but to a practised eye there is a boldness about the markings of those of the cirl bunting which will at once enable the collector to judge whether it is worth while to set a snare or to watch for the parents of a nest which he may have found.

The remaining member of the family is the Reed Bunting (E. schoenobaenus), also known as the "reed-sparrow," from its trivial resemblance. It may be found amongst the herbage and rushes of almost any pool or sluggish stream, and the appearance of the male, with his rich black head and white collar, must be familiar to every one who has passed close to the osier-beds and willow-swamps on the Thames.

In such situations, and in the banks of ditches, it makes its nest, and lays four or five eggs, generally of a much darker tint than those of the other species.

The Ortolan Bunting (E. ortulana) has never been known to breed in this country.

Recognition will be easy, from the grey gorget and deep orange-chestnut abdomen of the male, and the yellow buff one of the female; and the eggs, although showing a family likeness, are as a rule very round and blunt, and far less streaked than others of the group; the vinculum is also very prevalent.

An aberrant species, yet one which seems to us more nearly related to the bantings than any other, is the Bearded Reedling (Calamospizias bistriatus), the "bearded tit" of antiquated ornithologists.

The moors of Norfolk and Suffolk are the spots where there is a certainty of finding this species, but until recently it nested in the fenny districts of Essex and Kent. The eggs, very round in form, are of a clay white, finely streaked with short wavy lines of a pale umber brown and minute dots of the same—altogether most delicate and fragile in appearance.

Before undertaking the great family of Warblers which visit us every spring for breeding purposes, let us turn to a group of residents, or only partial migrants—the Woodpeckers.

The most abundant and best known of these is the Green Woodpecker (Picus viridis) in many parts of England, and whose loud ringing mocking laugh may be heard in most places where there is any large and old timber. It breaks out a circular hole with its strong bill, seldom or never availing itself of a root in the decayed limb, as a starting would do, and on the soft spongy rotten wood it deposits five or six somewhat pear-shaped eggs, of a pure glossy white, as are those of the whole family.

The Great Spotted Woodpecker (Picus major) is far less generally distributed throughout the kingdom, and is also a quieter bird in its note. It is partial to decayed horizontal branches as a site for its nest, and where the root is too large to suit the bird's convenience, it is often plastered up, leaving a hole only just large enough for use. The eggs, five or six in number, are a good deal smaller than those of the preceding species.

The Lesser Spotted Woodpecker (Picus minor) is another local and unobtrusive species. The eggs are very like those of the Wryneck, which we shall next have occasion to mention, but they may be distinguished by their firmer and more ivory texture, and by certain furrows and lines, especially clear under a magnifier.

The Wryneck (Jynx torquilla) is otherwise known as the "snake-bird," from the hissing noise which it makes when its nest is threatened, and also as the "cuckoo's mate," from the time of its arrival. Its bill not being adapted for hacking out holes, it chooses a rotten branch, generally in some orchard tree, and there, in the decayed wood, it deposits its eggs, which, as we have said, are very similar to those of the lesser spotted woodpecker, and, indeed, do duty for them in many collections.

A species not far removed from the Woodpecker is the brilliant-plumaged Kingfisher (Alcedo papa), which is indeed a
rather earlier breeder. It deposits its round glossy white eggs in a hole of some bank, either of the stream which it frequents, or of a sand-pit not very far distant. The eggs are originally deposited upon the bare earth, but the fish-bones, which form the bird’s castings, being ejected round them during the time of laying, a sort of nest is frequently formed. In number the eggs are six or seven, but we once knew of a clutch of nine.

The pretty lavender-backed Nuthatch (Sitta caesia) is another species which is partial to holes in trees as sites for its nest; and its habits of plastering up the hole selected, leaving only a tiny orifice, is well known to all observant naturalists. The eggs are white, spotted and blotched with red, being similar to those of the great tit, but, as a rule, a trifle larger, and the blotches of a bolder character.

And now let us take the Cuckoo (Cuculus canorus), which is popularly supposed to prefer the hedge-sparrow’s nest as a place to deposit its egg, but which, as a matter of fact, favours some score of species, by selecting them as foster-parents. The egg varies from a grey to a clay brown, sometimes suffused with vinous colour.

As we walk by a shrubbbery of old yew trees, or near some pollard, we observe a handsome bird, with rich chestnut breast and tail, and black throat, fitting before us, followed by a more sober clad partner. This is the Redstart, or “fire-tail” (Phoenicurus), one of our handsomest spring visitors. In May you will find the nest either in the hole of some tree or old wall; it is a loose and untidy structure of moss, hair, and feathers, and the eggs, five or six in number, are of a delicate blue colour, longer and more pointed than those of the hedge-sparrow.

Every one knows the song of the Nightingale but comparatively speaking few people have seen it, or know it when they see it; for, in spite of the chestnut hue which pervades its body, there is a strong similarity to the colour of the last year’s leaves, and it is, moreover, a bird which is not in the habit of showing itself overmuch. You must go carefully examining the bottoms of the saplings and hazel bushes, and looking into the banks, before you will find the leaf-lined nest containing some four or five olive-brown or olive-green eggs. Sometimes they are zoned with a colour like burnished copper, and, at other times, spotted; but there is no great variation. We have found the nest in a low bush, snugly embedded in the fallen beech leaves, and also on the stump of a tree, in a hedge some five feet high, but generally the nest is either on or quite close to the ground.

A bird but little inferior in song to the nightingale is the Blackcap (Sylvia atricapilla), which is partial to shrubberties and low struggling bushes as sites for its nest, a somewhat slender structure formed of bents and lined with hair, some nests, however, being much more firmly made than others, especially the first ones of the season. The eggs are sometimes very like those of the garden warbler, being of a clay white spotted and blotched with brown.

The Whitethroat (S. cinerea), generally known to country lads as the “nettle-creeper” is a rather earlier breeder than the preceding species, and the nest is placed in any low bush or amongst the thick herbage which skirts the sides of ditches; it is a finicky affair, but comparatively deep, and the eggs are of a greenish ground, more or less blotched with darker colour.

The Lesser Whitethroat (S. curruca) often called the “hay-bird,” makes a still slighter nest, as a rule, in rather higher places, often well up in a hedgerow or bush. The eggs are quite different from those of the preceding species, with which indeed it has no particular affinity; they are of course smaller than those of the blackcap, and the ground colour is of a purer white, but otherwise in their markings there is a good deal of resemblance.

There are three little warblers whose yellowish green forms may frequently be detected amongst the foliage of our larger trees, where they are searching for their food a good deal after the manner of the titmice. The best known is perhaps the Willow Wren (S. trochilus) whose round domed nest may be sought amongst the herbage of banks, or on the ground itself, and will be found to contain some half dozen white eggs marked with red spots, very like those of the smaller titmice. The nest is lined with hair and feathers, and so is that of the Chiffchaff (S. rubra) a rather smaller though very similar bird, which also makes a domed nest in much the same kind of places, and lines it with feathers. The eggs are white, spotted with more purple-red spots than those of the former, and as a rule they are rounder in shape; in fact, we consider them easily recognisable.

The third and largest species is the Wood Wren (S. sibilatrix), whose nest, although domed and placed in similar situations to those of the two preceding, yet is never lined with feathers; the eggs also are so streaked and spotted with dark purple as frequently to appear altogether of that colour.

The Dartford Warbler (S. palustris), is a species restricted to our southern counties, and not unknown so near to London as Hampstead Heath, where it has been known to breed in quite recent times, although, until within the last ten years it was considered quite a rare bird. The eggs are of a greyish colour with darker streaks and blottings.

A very different species, yet one whose nest is only to be found after a still greater amount of perseverance, is the Grasshopper Warbler (Locustella naevia), yet the sibilant note from which the name is derived may be heard in almost any county in England, although it is particularly abundant in the north. The nest is placed in the midst of the very thickest herbage; it is a deep and solid structure for a warbler, and the eggs, of a pinkish grey streaked colour, are often suffused with a lovely pink, which, unfortunately, fades considerably after a time, especially if they are exposed to the light.

A very abundant noisy little visitant is the Sedge Warbler (S. palustris) which may be found wherever there is any water, even by the margin of a moderate-sized ditch. Its nest is generally near the ground in the fork of some alder, willow, or other bush, and the eggs, of a sort of yellowish brown, are often scrawled with a line or two at the blunt end, something like those on the wagtail’s and pipit’s eggs.

The Reed Warbler (S. stagnata) as its name denotes, is partial to the neighbourhood of osiers and rushes, and its deep cup-shaped nest may be found woven on three or four stems, swaying with every blast and yet quite secure from danger. The eggs are of a greyish-green colour mottled with darker patches of the same.

There is a very closely-allied warbler which may easily be confounded with it, and has perhaps occurred many times in this country without being recognised. It is the Marsh Warbler (S. palustris), a species common just across the Channel.

Of the swallow tribe there are three species which visit us in the spring.

The House-martin (Delichon urbica) is the species whose globe-shaped mud nest may be seen under the eaves of houses, and its eggs are of a pure white, whilst the Swallow (Hirundo rustica) with its long pointed tail and ruddy throat, builds a more open nest, either inside a chimney, or under a rustic bridge, or in barns and outhouses, and lays an egg of a white colour spotted with black or dark brown.

The third species, the Sand-martin (Cinclus riparius), is the
first of the family to arrive; it breeds in large colonies in sand
banks, tunneled with holes, at the bottom of which four or
five white eggs are deposited.

The Swift (Cypselus aquis) is the last of our summer migrants
to arrive, and the earliest to leave us, only rearing one brood
during the season. Its dark form, shaped when soaring like a
turk-sitter, its rapid flight, and shrill scream, must be familiar
to every one, particularly so to those who have lived near a
church tower or other lofty building. It makes a slight nest
in holes or under the eaves of houses, and in the wilder districts
it selects cliffs for the purpose; the eggs, two in number, are
elaborated in form and of a dull white.

A widely different bird is another of our latest breeders, the
Night-jar (Caprimulgus europaeus) whose two beautiful marble
eggs may be found on the bare ground in the middle of the fern,
or on the open moorland in the neighbourhood of any cultivated
and wooded district.

The Red-backed Shrike (Lanius collurio) is the only one of
the family of Butcher-birds which breeds habitually in our
country. The latter name is owing to the habit which the
members of the group have of impaling insects, beetles, and
small birds, on thorns and branches. The eggs, five or six in
number, are of a yellowish white spotted and zoned with brown,
but they are frequently suffused with a lovely salmon-pink.

The Spotted Flycatcher or Beam-bird (Muscicapa grisola) is a
species which every one must have seen as it darts from its
post on some bough or raking, secures its insect prey, and,
after slightly hovering for a second, returns to its place, to re-
peat the manoeuvre in a few seconds. It is not hard to please
for a site for its nest, the end of a leaf-covered beam, the
trellis-work against the house-wall, and many other places,
seem equally acceptable, and it deposits some five or six eggs
of a bluish-white spotted with rufous brown.

The Corn-cake or Landrail (Crex crentes), is more often
heard than seen towards evening amongst the grass meadows,
but its eggs are not unfrequently overlooked by the mower’s
scythe. In colour they are somewhat like those of the moorhen,
though smaller in size, and they are sometimes as many as ten
in number.

The increase of cultivation and drainage has done much to
diminish the numbers of the Lapwing, or Plover (Vanellus
cristatus), but there are still some to be found in all our home
counties, and eggs may be taken, by those who know how to
look for them, within ten miles of Hyde Park Corner. Any
depression on the moor or fallows serves for its four pear-
shaped eggs of an olive or ash-brown colour marked with black.

We cannot hold out much hope to our readers of taking a
closet of Woodcocks’ (Scolopax rusticola) eggs the first season,
for besides nesting in March it selects a bed of dry leaves in
the midst of thick covers and in preserved woods, which are
not to be disturbed at that time of year. The eggs are four
in number, of a clay colour, with dark blotches; they are
scarce to be called pear-shaped, and are frequently nearly
round.

The Snipe (Gallinago gallinula) may still be found breeding
in small numbers within their limits wherever there is marshy
ground; its nest is a mere depression in the centre of a tussock
of bog grass, and the complement of eggs is four, pear-shaped,
and of a greenish olive, blotched and zoned with black and
chocolate brown.

The Redshank (Tringa calidris), known in Essex as the
“tack,” is another frequenter of boggy ground. Its eggs are
larger than those of the snipe, and of a warmer clay-brown.

The Wild Duck or Mallard (Anas boschii) may also be found
by the collector not far from the haunts of civilization, but the
nest is placed in far drier situations than those of the preceding
species; a sloping hill-side near a stream or pond is a favourite
site, and the nest, warmly lined with down, often contains as
many as ten eggs of a clay colour, slightly tinged with green.

The Teal (A. crecca) frequents similar sites, but is far rarer.
Its eggs are much smaller than those of the wild duck, and of
a pale cream colour, with just the faintest tinge of green.

Few ponds margined with reeds are without the little Grebe
or Dabchick (Podiceps minor), which, like all its tribe, is an
unrivalled diver, and trusts to that facility far more than to its
wings. The nest is made in April, of piled-up reeds, and the
bird is said to cover them with dry “bag,” when she volun-
tarily leaves her nest, but we cannot vouch for this. The eggs
are of a dirty, often a very dirty white, with a calcareous
surface, but they become so stained by the wet reeds on which
they are deposited as to exhibit most curious and abnormal
markings.

TOY-MAKING AND TOY-GAMES.

BY JAMES MASON.

GAS BALLOON—JAVELIN—HYDRAULIC DANCER—PITH
DANCER—MINIATURE GAS WORK—JACK-IN-THE-BOX.


Toy gas-balloons are now to occupy our attention. Is there
not something peculiarly attractive about toys of this class
—toys by means of which one may, by proxy at least, rival
the birds and explore the sky? Small gas-balloons are made of thin
sheet india-rubber, or gutta-percha, or tussu-paper; larger
ones, are manufactured of oiled silk. To begin—suppose you
wish to make an oiled silk one—cut out several gores in paper,
of the same shape as that indicated in Fig. 3, page 172, Vol. I.,
for the fire-balloon. As many of these should be cut out as
will suffice to form a globe with a pear-shaped end. When you
have accomplished this, cut an equal number of gores out of
oiled silk, using as a pattern one of the paper gores. In doing
this you must allow for the lapping over of the cloth at the
edges. Join the gores together with marling glue or by varnish,
and double lines of sewing; and, if you use varnish, take care
that it is not too thick. At the lower end of the balloon insert
a tube, and tie all the points of the gores firmly round it. Cover
all with varnish (india-rubber dissolved in naphtha and tar-
pentine), and, over the balloon, place a bag of netting.

The gas with which this balloon is to be filled is made in the
following way—Put a pound of granulated zinc or iron filings
into two quarts of water, in a stone jar, and add gradually a pint
of sulphuric acid. Have a tube of glass or metal run through
a bung with which you cork the jar, and fill the balloon by
connecting this tube with the one at its mouth. When it is
full, tie the neck of the balloon very tightly, and it will rise
into the air.

A small car or boat, made of wicker-work, and covered with
leather or painted, may be hung, by means of cords, from the
netting which goes over the balloon. The meshes of the said
netting, it is as well to say, should be small at the top, for there
the gas exercises the greatest force, and gradually increase in size as they approach the mouth of the balloon.

A rather more fragile sort of gas-balloon is easily made thus:—Get a bladder furnished with a stop, fill it with hydrogen gas, adapt a tobacco pipe to it, and dip the bowl of the pipe into soap and water, just in the ordinary way of blowing soap bubbles. Then press the bladder, and bubbles will be formed filled with gas, which will at once rise into the air.

An explosive balloon is rather a curious affair. Put into the balloon a mixture of chlorine and hydrogen gas. Stop up the mouth, and let it rise in the sun. Immediately it will burst with a loud report.

There has recently been invented a very pretty balloon, which may be bought at the philosophical instrument makers. It is made of india-rubber, and is to be had in a variety of sizes and in many odd and laughable shapes. It is extremely light and, when filled with hydrogen gas, readily ascends.

Small balloons are sometimes made of gold-beater’s skin. They are inflated from a bladder or jar, and, when fully blown, have a thread tied round the mouth to prevent the escape of the gas. Then a little fanciful ear of thin coloured paper is attached to it, and it is set free. If this is done within a room it will soon gain the ceiling, and there it will remain; if in the open air, it will quickly ascend out of sight. By placing a few grains of shot into the car, one may experiment on the difference in weight between hydrogen gas and common air.

We come now to a game of rather an athletic character—the game of Javelin. The weapons employed in it are rods of ash or fir about six feet long and an inch and a half in diameter. At one end they have a spike of iron about two inches in length. The targets at which the javelins are thrown may be constructed of any piece of soft wood one can lay hands on—the lid of a packing-box makes as good a target as could be wished. The rings upon the target are to be chalked, and painted, and numbered, the highest numbers being placed lowest. The following has been given by a good authority as the best mode of throwing the javelin. Balance it in the hollow of the right hand, a little below the ears, the thumb lying along the fingers, firmly pressing down upon the shaft. Poise the body on the right leg, and keep the left well advanced. Now hurl the javelin at the mark, throwing the body, at the same time, well forward on the left leg. You may give much greater steadiness of flight to the weapon by bringing the fingers sharply downwards on the shaft at the moment of its leaving the hand, so imparting to it a rotatory motion something like that given to a rifle-ball.

By expert players javelins padded at the ends are sometimes thrown about from one to the other; and boys use them occasionally for the attack and defence of an imaginary fort. But I do not think they are to be recommended for the latter purpose, even when padded with all due care, unless the players are the best-tempered youths in the world, and hardened against all kinds of hard knocks.

The Hydratic Drum is a toy depending on the same principles as those which govern the pea suspended upon air, described on a previous page. Make a little figure of cork, in the shape of a dancing sailor, mountehank, or whoever else you please. Place in this figure a small hollow cone of thin leaf brass. Set the figure now on any jet d’eau, and it will remain suspended on the top of the water, and move about in a very amusing manner. A hollow ball of thin copper placed on a fountain in a similar way, will remain suspended, turning round and spreading the water gracefully about it.

The Pith Dancer forms another sort of dancing toy of a pleasing description. It is a little figure made of cork, or pith if you like. At one end of the piece of cork or pith cut out a head and bust, at the other end stick four hog’s bristles. Paint the face, put a little cap on the head, add a pair of arms and a cloak, which last may be made of tissue-paper. When the dancer is complete, set her on the sounding-board of the piano, and play the briskest tune you know. She will hop with great spirit and originality.

The Miniature Gas-Work will not furnish gas enough to light a whole household, but it will, at any rate, illuminate a fireside. Fill the bowl of a tobacco-pipe—the largest you can procure—with powdered coal. The best for the purpose is cannel coal. Close the top by means of piceclay, or sand and beer: the latter is said to be the preferable article. When the covering is dry, insert the bowl of the pipe in a clear fire. In a little while a dense smoke will issue from the stem; apply a light; the smoke will take fire, and burn steadily so long as any gas continues to be distilled from the coal.

Jack-in-the-Box is a favourite toy with children, and, to the more juvenile, a source of unspeakable wonder. It consists of a box containing a conical figure. Inside the figure a piece of wire is coiled up, cork-screw-wise, like the spring within a carriage lamp. When the box is closed the wire is compressed, on the removal of the pressure from the lid the wire regains its original form, and up Jack springs. Sometimes the figure, instead of being fastened to the bottom of the box, is attached to its side by a long piece of string. Whenever the lid is unfastened, Jack springs out of his hiding-place and goes high into the air.

ELECTROTYPING.
BY CHARLES HICKS.

ELECTRO DEPOSITS FROM NATURAL OBJECTS.

Among other useful adjuncts to this art, we would advise the young electrotyper to provide himself with a jeweller’s blow-pipe and pair of shears. The latter will be useful for nipping off the ends of connecting wires, and clipping the edges of his work into proper form; the former will aid him in backing up the thin copper shell of his deposit with solder, so as to make it more solid for mounting. Suppose a copy of a coin or medal has been obtained, it should be treated in the following way:—Wash over the reverse side with muriatic acid, in which a small portion of zinc has been dissolved; then cut up powder solder into small pieces, and lay them over the hollow surface. Place the medal, face downwards, on a piece of charcoal, and with the blow-pipe direct the flame of a lamp over the solder until it has run evenly into every part. You may now completely fill up the hollow with lead, and it will adhere to the solder.

We shall conclude this series of papers by initiating the reader into a very beautiful and fascinating branch of the art—viz., obtaining electro deposits from natural objects.

Of all the available objects in the animal kingdom, perhaps the easiest to begin with is a fish. Lay him out nicely, and spread out his fins and tail, so as to make him look as natural as possible, then brush him over lightly with oil. Have some
plaster of Paris mixed into the consistency of thick cream, and pour it on to a plate which has been well greased. Let it stand till it just begins to set into a paste, then lay the fish upon it on its side, pressing it gently down till it is half-way embedded. In a few minutes the plaster will have hardened sufficiently to allow you to pick out the fish from his bed, when you should find a perfect print of his profile in the place where he has lain.

The edges of the mould must also be scraped and smoothed with a knife, where requisite, in order to make an even bed for the other half, which has yet to be cast. When this is done, and the plaster is quite firm, bore three or four shallow conical holes in the margin with the point of a knife, or anything, say two above the fish's back, and two underneath him; then lay the fish carefully in his place again, and brush over the top half with oil a second time, to make all sure, and the plaster with thin soapsuds also, using a very soft brush. Have some liquid plaster ready, and pour it quickly over fish and mould together, not all in one place, but thinly and evenly all over, especially taking care that the holes you have made are well filled up. It will require both dexterity and promptitude to do it well, as the plaster soon sets, and if you are not quick in going over the ground the second time, it will become too hard to unite. It will be well to have an assistant standing by with a feather or a soft brush, in case any air-bubbles make their appearance. If they do, he must instantly dissipate them, or they may make ugly tumours on the mould. Get a good body of plaster on, to make a solid mould, then let it rest till it is hard enough to lift up from the lower half, when the fish may be extracted again. Your upper mould will have conical projections upon it, to fit the holes you have bored, and these will ensure its getting into the same position in which you cast it, each time it is put together.

The moulds should be dried well—baked a little oven—before you use them, and then, as before directed, saturated with melted wax, dried, and treated with plumbago, to conduct the deposit. The two halves of the fish should be deposited separately, and the surest way of attaching the conducting wires is as follows:

Drill a dozen or so of small holes round the outline of the fish, on the flat part of the mould which surrounds it, as close as is practicable.

In each of these insert a short piece of copper wire, and gather the ends together in a bunch, so as to tighten the wires in the holes sufficiently to bear the mould up, but not so much as to break the edges down into the print of the fish. These gathered ends may be attached to the main conducting wire, and all black-leaded, at the juncture especially, and round the holes. The main wire may extend into the centre of the fish's body, and a little hole may be drilled in the print to receive it, making, of course, a slight defect, which will afterwards have to be repaired. In addition, pieces of thin wire may be twisted round the main or diverging conductors, and thin disengaged ends made to touch the print in various places, so that the deposit may be attracted all over it, and a good shell be quickly formed. When the two halves of the fish have been thus obtained, the superfluous copper must be sheared off, and the edges neatly filed, so that a good joint may be made, and the always useful blow-pipe must then be called into requisition, to unite them with solder into a complete and apparently solid copy of the original.

For most of the forms in Nature, however, an elastic mould will be the best. If the object can be suspended in a vessel while the elastic composition is run round it, and if it be of such a nature as not to be liable to distortion while doing, that will be the readiest way. It can then be treated in the same way precisely as that previously described for a plaster figure. But most natural substances require dainty handling and careful adjustment, therefore greater precautions are necessary, in order to preserve form.

Suppose you wanted to obtain a copy of a bird with its wings outspread, a group of dead game, etc., it would be difficult to retain them in the position you desire without actually holding them. The writer has found the following device answer very well for such a purpose:—Take an earthenware vessel with a hole in the bottom—a common flower-pot, for instance—and plug up the hole with a cork, a piece of wood, or anything that can be easily removed. Hold the bird or other object with the fingers, as well as you can, in the position you wish to copy it, inside the vessel. Let an assistant pour down from above upon it a rain of very fine dry sand, which will run into all the crevices, and allow you to withdraw the fingers gradually as the lower parts of the figure become supported by the sand. When it is buried all but the head or so, withdraw the fingers altogether, and gently shake the sand down into a more solid mass. If you have done it cleverly, the object will be embedded in the sand in the exact position you require; the problem is to keep it so. Level the sand by shaking or moderately pressing down, and begin to operate upon the small part of the object which is still left exposed. Brush it well over with oil to begin with; then bend a piece of thin sheet-iron, or anything of that sort, into a cylinder, large enough, in your judgment, to surround the object in its widest part, and leave plenty of room to spare. It may be tied round with thread or wire, to keep it in form. Stick this upright in the sand, having first greased the inside thoroughly. Pour into it, upon the head of the specimen, sufficient of the melted elastic composition to cover the head, and a little more. Let it have plenty of time to set, then remove the cylinder (if it will not easily lift off, it must be un tied), and leave the column of composition standing. Now the plug must be withdrawn from the bottom of the vessel, and a little of the sand allowed to run out, so as to leave exposed a little more of the specimen, below the head, which is enclosed in the column of composition. Brush off every particle of sand that has adhered, treat with oil, as before, replace the cylinder, and put all together in an oven till the composition melts again, and runs down to enclose the part you have just left bare. Pour on a little more composition on the top, so as still to keep the head covered, and let it set again. Repeat this process till it will be safe to take the specimen out of the sand entirely, all being enclosed but the lower parts, which no longer require support. Then the whole affair may be turned upside down, the cylinder again placed over the composition, and a last pouring will effectually enclose the whole figure, like a fly in amber.

Getting the specimen out of the mould will often be found as difficult and tedious a process as getting it in. We can give no general directions as to a process which must necessarily vary with almost every article. We can only refer our readers to the previous instruction about removing plaster figures, and advise them to exercise their own ingenuity in the matter. The mould must be opened in several directions to suit some figures. For such purposes as these we would recommend that the lightest coloured and best Russian glue be used, and mixed with the palest treacle that can be procured; the composition will then be transparent enough to give great assistance to the artist in discovering the position of his figure. Complicated figures will require to be deposited in parts, and the mould may be separated with that view. The same instructions will apply here as those given for the copying of plaster figures; you may either deposit in the mould direct, or follow the alternative process described in the last article, according to circumstances.

Beautiful vegetable forms may be copied by a simpler
method than this. For instance, a fern-leaf may be taken, and laid face upwards upon a bed of soft plaster, not liquid enough to immerse it, but just sufficiently so to yield to its pressure, first brushed or dusted the surface with fine black-lead. When this is set, it can be easily lifted off, and you will have a perfect wax mould of the face of the leaf, in which you can deposit in

**BIRD IN ELASTIC MOULD (Section).**

and allow it to become slightly embedded. When the plaster is set, level and smoothen it by scraping with a sharp knife, place a fencing of cardboard or sheet metal round the leaf, and pour upon it the wax composition formerly described, having the ordinary way. The metallic copy can be bent or twisted about in any graceful form, and you may build up a plant or group of leaves with a little taste, and the use of the soldering tools, which will form a very beautiful ornament for a sideboard.

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**TOPS.**

**BY JAMES MASON.**

**WHIP-Top—PEG-Top—HUMMING-Top—WHIZIG—GLOBE Top—FLYING Top—CHAMELEON Top—FRENCH Top.**

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**TOPS are universal favourites, and deservedly so, for there are few toys from which one can obtain more pleasant and healthy recreation.**

In choosing a whip-top, you should take care that it be not too high in proportion to its width, or it will overbalance. It must not be too short either, or you will find it impossible to strike it properly with the whip. The whip may be made of various sorts of material; soft buff leather does very well, or one may use a few leather boot-laces fastened to a handle; or a piece of rope will do, the twisting of
which has been carefully undone, so that the top may be struck by the loosened silky fibre. The best lash, however, is made of an eel's skin.

The top is set spinning by turning it sharply round with both hands, then it is whipped till its motion becomes very rapid.

Next we have to consider Peg-Tops (see Fig. 1), and it is with these that most amusement is to be had. There are various shapes for peg-tops, some being much rounder than others, and each shape has its own particular admirers. The wood of which they are made is sometimes deal, sometimes elm, or yew-tree, or box. "Boxers," without doubt, are the best. The spikes or pegs also differ considerably in shape and size; one may have them either short and thick, or long and tapering.

The method of spinning the peg-top is the first thing to be learned. You take a cord with a button or loop at one end—a button, by the way, is much better than a loop. At about an inch from the other end of the cord there should be a knot, and from the knot to the end the cord should be unravelled. You hold the top in the left hand, slightly wet the unravelled piece of string, and lay it along the top just above the peg. You then proceed to wind the string round the top, beginning at the upper half of the peg. When all the string is wound, you place the button between the last two fingers of the right hand, and, keeping the string tight, place the thumb beneath the peg, and the fore and middle fingers on the top. You now lift the top above your head, and smartly throw it to the ground in a curved line, giving the string, when it leaves the top, a peculiar jerk, which you must learn by practice.

Having now seen how the top is to be spun, let us look at the principal peg-top game, which is Peg-in-the-Ring. The method of playing at it is as follows:—

1. Draw a circle on the ground about a yard in diameter. You next settle who is to cast his top first into the ring. The best way to determine this is to place a small coin or a piece of china or earthenware on the ground for a mark; all the players then should peg their tops at it, and he who pegs farthest from the mark, or whose top fails to spin, is fated to begin.

This player casts his top then within the circle which has just been drawn, and, whilst it continues spinning, the others are at liberty to peg their tops at it. Whenever it rolls or spins out of the ring, it is to be taken up; and the owner, if he be a smart fellow, may contrive to have a peg with it at the tops of his companions that are still spinning within the ring.

Should any player fail to spin his top when he throws it, or fail to cast his top within the ring, or should he take it up before it is "down," or should it, on ceasing to spin, lie in the ring, the top is called "dead," and either is set in the middle of the ring, or left where it falls for the others to peg at. If a dead top should chance to be pegged out of the ring, it becomes alive again, and the owner may resume his play with it. The object of each player has been described as either to split the tops of his companions, and thereby gain their spikes or pegs as trophies, or, by striking them sufficiently hard, to drive them beyond the boundaries of the circle, when the owners may play with them as before.

Ohip-Stone is with some a favourite game. It is played with a peg-top and a spoon; the proper place for it being a piece of hard and smooth ground. Mark two lines on the ground at about six feet apart. Place some small pebbles midway between the lines; they should be smooth, and not larger than a small bean. Buttons may occasionally be used instead of pebbles.

Now let the players—each one of whom has a small wooden spoon—set their tops spinning. Each one must take up his top with his spoon, and throw it down again, endeavouring to make the peg strike his pebble so as to chip it out of bounds. So long as it is alive he can continue this performance, and when the top is dead,
he must set it spinning again. He who first manages to chip his pebble beyond the line is the victor.

Boys occasionally, it is worth noticing, use their hands instead of a spoon for lifting the top; but I do not think the hand answers so well as the spoon, by any means.

Before leaving the peg-top, it may be mentioned that there is a Spanish peg-top, with a rounded knob instead of a pointed peg, as is the case with our tops. The wood of which it is usually made is mahogany. It spins nearly three times as long as our tops do. To set it up is easy, and it does very well for spinning on pavement or flooring.

The Humming-Top—so called from the noise it produces when spun—is a more juvenile toy than either of the two just described. Humming-tops are of various kinds, and are to be obtained in the shops at various prices.

Little skill is required to spin it properly. The string, which must not be too long, is wound firmly and evenly round the upright wooden pin. In one hand the player holds the fork, and in the other the end of the string. He pulls his two hands apart, the string is unwound, and the top set up. The top goes for a long or a short time, in proportion to the strength and quickness with which it is set spinning.

Some humming-tops are made of metal. An ingenious metal one, set in motion by means of a spring, is shown in Fig. 4. The spring is contained in the upper part, which is twisted round when the top is to be set a-going. On the spring being wound up tight enough, the top is allowed to go free, the part which slips off and on being retained in the hand.

A Wristy, which used to be a favourite toy, is recalled to one's recollection by the humming-top. It was a hollow disc of wood, with an opening in its side. By alternately coiling and uncoiling the cord on which it was strung, it received a circular motion, and as it went round, it produced a loud and not unmusical sound.

In conclusion, let us glance at a few of the miscellaneous tops of the present day. First of all comes the Globe Top (shown in Fig. 2). The central wheel of this is movable, and it is set in motion by holding the brass ring in one hand, and giving a strong pull to the string with the other. The globe top is a very ingenious toy, and can be made to spin in a number of eccentric and apparently impossible positions. It will even spin with the axle of the wheel in a horizontal position, the top being suspended in the air by a piece of string looped round the knob, shown in the cut, at the foot of the ring.

The Flying Top is quite as ingenious. It is a toy with wings set at a certain angle. A spinning motion is imparted to it by means of a piece of cord, and the top takes flight, and rises to a considerable elevation. By practice a player can make it return to his hand after its flight is over.

One of the most interesting, however, of the mechanical tops is the Chameleon. It is shown in Fig. 3; and it is set in motion by winding a piece of cord round the upright stem, inserting the point of a little instrument, supplied with the top, into the hole, holding this instrument in the left hand, pressing the top firmly down at the same time, and pulling the string with the right. The disc is marked with various-coloured lines, and when the top is revolving, the central part is touched with a piece of wire or the point of a pencil; this produces remarkable changes of colour on the disc. Small pieces of wire, bent to various shapes, are also fitted, one by one, into the hole; as they go round they assume very curious shapes. A third performance with the chameleon top is to attach small cardboard discs, marked with various colours, to the top, by means of a wire. These discs are touched by the tip of the finger when revolving, and they then exhibit many beautiful effects in colour.

There is a toy known as the French Top. It is a case containing a number of shallow conical tops. This so-called French top is really a Japanese top. The people of Japan, it is commonly said, are the cleverest top-spinners in the world.

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LA CROSSE.

LAWS OF THE GAME.

THE CROSSE. The crosse may be of any length, but the woven network must not be ragged, nor of a greater width than one foot.

2.—The Ball.—The ball shall be of solid india-rubber, not more than nine or less than eight inches in circumference.

3.—The Goals.—The goals shall be upright posts seven feet apart, with a tape or bar across them six feet from the ground. When practicable, they shall be placed at not more than two hundred and fifty nor less than one hundred and fifty yards apart, and the ground shall not be more than one hundred nor less than sixty yards across.

4.—Commencing the Game.—The game shall be started by the ball being placed on the ground opposite the centre flag, between two players on opposite sides, who shall tussle for the ball with their crossetes. This is called facing.

5.—Ball out of Bounds.—When the ball goes out of bounds, it shall be thrown in by the player first touches it with his crosse. When it goes behind goal without passing through goal, it shall be thrown out by one of the players behind whose goal it has passed.

6.—Touching the Ball with the Hand.—The ball must not be caught, thrown, or picked up with the hand, except in the case provided for by Rule 7; but a ball coming in the air may be blocked or patted away with the hand to protect the face or body; otherwise it must not be touched.

7.—Should the ball lodge in any place inaccessible to the crosse, it may be taken out by the hand and immediately placed on the crosse.

8.—Striking and Kicking the Ball.—The ball shall not be hit while on the ground, or kicked.

9.—Spiked Sides.—No player shall wear spiked soles.

10.—Obtaining a Goal.—A goal is obtained when the ball is carried past between the goal-posts and under the bar or tape in any manner whatever by one of the defending side, or in any manner not forbidden by the rules, by one of the attacking side.

11.—Holding and Pushing.—Players shall not hold each other, nor grasp an opponent's crosse, neither shall they deliberately trip, strike, or push each other.

12.—Throwing the Crosse.—No player shall throw his crosse.

13.—Changing Goals.—After each game the players shall change goals unless otherwise agreed.

14.—Deciding a Match.—A match shall be decided by a majority of goals won during the time specified for play.

15.—Number constituting a Full Side.—Twelve players shall constitute a full side.

16.—Change of Players.—No change of players shall be made after a match has commenced without consent of both parties.
FIREWORKS.

By C. T. Brook.

PIGEONS—CHINESE TREES—PARACHUTE ROCKETS.

THE best size for general purposes has a case six and a half inches long, with a bore five-eighths of an inch in diameter, and I advise you to make turning-cases of this one size only.

You must use a strong paper, and the cases should be well made. Choke the cases in the same way as rocket-cases are choked.

The Composition is—Meal powder, four parts; steel filings, one part.

Charge the cases on a nipple to be made of gun-metal set in a wooden base.

PIGEONS.

are made in this way:—You will first get your turner to make a sort of wheel having a nave six inches long and three inches thick, with a hole running through the middle of its length; this hole to be "bushed," so that the wheel will run easily on the string or wire, and so that there is no more resistance by way of friction than can be helped. On four sides of the nave it must be hollowed out to receive four rockets, and in between the rockets must be four spokes about three inches long, hollowed out at the ends to take turning-cases, and having small holes bored through them near to the ends for passing the string which will tie the turning-cases in position.

Cover four turning-cases with four turns of white double-crown paper, so that the paper overlaps each end one inch.

Now fix the turning-cases into the hollows at the ends of the spokes.

Your rockets for pigeons do not require to be bored, and are of course headless. Cover the rockets in the same way as you have covered the turning-cases, and turn in the paper at the clay ends. Tie your rockets in the grooves, so that the mouths face alternately in opposite directions.

The turning-cases will have their mouths all in the same direction.

Now lead quickmatch from the end of your first turning-case (i.e., that which lights first) into the mouth of the second, and into the mouth of the nearest rocket.

Lead the tail of the second turning-case into the mouth of your third case, and into the mouth of the second rocket, and so on.

Leading.—Tying match into these cases is done in a way peculiar to pyrotechnists. The two half-hitches, which I have already taught you, are adhered to, but are carried out in another way. This tie is pretty generally known, I believe, as the "firework-maker's tie." I will endeavour to explain the mode of operation.

Firework-maker's Tie.—Suppose we are tying a turning-case on to the hollowed-out end of a spoke of the pigeon block.

Take the end of your string in the right hand. Pass it through the hole at the end of the spoke. With the left hand deliver the end of the string into the right hand. Hold the string close to you. The left hand with the knuckles upwards will take hold of some of the loose string which hangs from the spoke and run to the ball. The left hand, still retaining this position, will draw the string over the case to the left side, thus forming a loop. The right hand will then pass the end of the string through the hole and through the loop.

Change hands, pull tightly, tie an ordinary knot, cut off, and you have completed the firework-maker's tie. Before tying the last knot see that the string lies in the same way as it does in the two half-hitches which you learned in an early lesson.

The advantage of this tie is that the string will slip well in tightening, and will hold firmly while the finishing knot is tied.

In tying match into the mouths or ends of cases, cut off the end of the pipe close down to the match, insert it so that the match is close against the composition, and then neatly and carefully close the paper round the match-pipe, and tie in the manner just described (except that, instead of through holes the twine is passed under the case's mouth) within a quarter of an inch of the end of the paper. If you follow these instructions the appearance will be neat. When you are leading with a continuous length of match from one case to another it will be sufficient, instead of cutting off, to cut a notch in the pipe so as to bare the match; then bend the pipe, and insert the bend in the mouth of the case, so that the bared match is close against the composition.

After the pigeon has been "led" in this way, paste little strips of paper over all the ties.

CHINESE TREES.

These can be made any size.

Composition.—Saltpetre, ten parts; sulphur, two parts; fine charcoal, two parts.

For cases one inch in diameter or less, mix one part of this composition with one part of fine iron borings and one part of meal-powder. For larger cases, two parts of composition should be mixed with one part of iron, and there should be no meal-powder. The iron borings must be flaky or needle-like—not lumpy or dusty. As larger cases are used you should use larger iron, but still of the same description.

Before charging with composition, put in a scoopful of Roman fuse.

In charging, commence and finish with clay to the thickness of one-third the diameter of the bore. Bore the end to be lighted, and insert a piece of match.

The blows with the mallet must be particularly heavy.

If a shower of sparks or cascades is required, the choke or hole in the clay must be larger than when the Chinese tree is to be fired on the ground, but bear in mind that a smaller choke ensures greater brilliancy. However, you must never make the hole less than one-fourth of the bore of the case.

PARACHUTE ROCKETS.

Take one of your quarter-pound rockets which has been bored and matched. You will require a "puff" to blow out the parachute. It is made in this way:

Cut a disc three inches in diameter out of a piece of touch-paper. Lay the middle of the disc on the end of the rocket, and with the hand press the outer part of the disc down the outside of the case. This is to make a shape.

Take this shaped touch-paper, and put it into sixteen grains of powder. Gather up the edges of paper, and insert between the gatherings two one-inch pieces of raw match, and tie up. Cut off superficial paper, and press the match and the paper close down on to the powder, so as to form a little flat pad, showing the raw match. Paste the smooth side of the paper pad, and dab a little fuse composition on it. Glue on one
of your bulged heads, but for the present without a cone. Place the pad with the match downwards into the bottom of the rocket cap.

To make your parachute-light you must make a case of four turns of cartridge paper, with a bore of three-quarters of an inch, and a length of two and a quarter inches.

Pierce a couple of holes in the case one-eighth of an inch from the end, and pass through these holes a piece of thin cap-wire about six inches long, by which the light is to be suspended from the parachute.

Filling.—Insert a little clay first, say to the height of a quarter of an inch. Then proceed to fill on a flat surface, using a scoop and rammor, with coloured fires made from the same compositions as for Roman-candle stars. Let the colour that burns first, and which you inserted last, be fiercest, say blue, and with it press in a piece of raw match. Cap this end with a couple of turns of plain paper, with one edge pasted so that it will adhere to the case. Then tie a couple of pieces of raw match, one inch long, in the mouth close to the case. Trim off superfluous paper, and flatten this match close down to the composition. It should not stand out from the case.

Take a piece of good saranet without any “dress” in it. When you have crumpled it in the hand it should spring out again, or it is not suited for your purpose. Cut a piece of the same length as the saranet is wide. Sew on at each of its four corners a piece of string about fifteen inches long. Tie the strings together, one inch from their ends, in a knot. Tie these strings to a piece of thick string six inches long, which must have been previously soaked in a solution of alum. To the end of this string fasten your light by means of the wire running through the case.

Now carefully place your little coloured light on the pad inside the rocket cap. Hold the string so that the light is in the middle of the cap, and while it is in this position put in some bran and press it down with a stick.

When the bran reaches to the top of the little case, carefully lay your strings in spirally, insert the silk parachute, and press it down gently. Place the cone on the cap, and join with a pasted strip of paper, as already described. In fixing the cone, be very careful that no paste gets on the silk, as, if it were to do so, the parachute might get pasted to the cap, and so you would have a failure.

It is most important that your rocket should have been well charged for your present purpose. When fired it should just begin to turn over, when the pad should light and blow the parachute out of the case. If you have charged and filled your rocket perfectly the parachute floats, the rocket falls short of and away from the parachute; if there is insufficient “heading” the parachute will be blown out, and very likely the rocket will continue to ascend and go through the parachute.

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**MARBLES.**


There is one thing which ought to be learned, at the very commencement, by all who would play with marbles; that is, the art of shooting them properly. This many boys know little or nothing about. They bowl their marbles, or throw them, or place them in the bent joint of the forefinger, and force them away by means of the thumb, which is placed behind. Now, these are very unscientific methods, and I hope you will never resort to any of them. You should place the marble between the point of the forefinger and the first joint of the thumb, holding the tip of the thumb under the bent middle finger. Then, letting fly the thumb, you should shoot the marble away with the requisite degree of force. You will soon, by practice, get very skilful at this, and when you have attained to pretty near perfection, you may be able to strike a marble at ten yards distance, and only miss once or so in every ten shots. In taking aim you should look to the marble to be struck, and not at the one with which you mean to strike it. In some places there is a habit of moving the shooting hand forward at the moment of discharging the taw. This is not a practice to be commended. One should “knuckle-down” fairly, that is to say, one should place his forefinger knuckle on the ground, and not move it so much as an inch till the marble has been shot.

The first marble game which I shall speak about is Ring-Taw, perhaps the best of all. A piece of moderately level ground is selected, and on it a small circle, say about a foot in diameter, is drawn. Into this ring each player puts one or two marbles, or more, just as may be agreed upon at the beginning of the game. The marbles, or “shots,” as they are called, should be arranged at equal distances, and may be placed either on the ring or within it; every district having its own ideas in regard to this (you see the ring in Fig. 1).

A line is next drawn, six or seven feet from the ring; and this line serves as an “offing,” or “bar,” or ““basik,” or “taw-line,” from which to shoot the marbles.

The order of shooting is determined by any of the rough-and-ready ways so common in playgrounds.

The player who opens the game discharges his taw from the offing-line at the marbles in the ring. Should he knock one out he wins it, and may shoot again at the marbles from the place where his taw rests. Whenever he fails to shoot a marble out of the ring the next player has his turn, and, if he hits a marble out he has a right to shoot again, and he may aim either at the marbles or at the taw of the previous player. So the game goes on till the ring is cleared.

A variety of ring-taw known as “Fortifications” is played in France, but it is not likely to attain to much popularity in this country.

Increase-pound is a British variety of the game. I would describe it, were it not that it does not seem sufficiently attractive to interest the general reader, however much it may be patronised in particular districts of England.
Long-taw is a simple game played by two players. One of them lays down a marble on the ground, (it is shown at A, Fig. 3). The other deposits a marble at B. Then they draw a line to shoot from, at a. The first player shoots his taw at the marble at B. Should he strike it, it immediately finds a place in his bag. He then shoots at A, and, if he is equally fortunate in striking it, he wins the game. But, likely enough, he will miss B when he shoots at it. In that case the second player will take his turn in shooting at B. If he strike it he will have the option of shooting either at A, or at the taw of the first player. Should he hit his opponent's taw he is "killed" him, and wins the game, and he is also, of course, the victor in the event of hitting A. If he fail, however, in his attempt, the first player's turn comes again, and the game is not brought to an end till A is taken, or one of the taws is killed. There is some amusement to be got out of Three Holes, which used to be a very popular game. Three holes—a, b, and c, Fig. 4—are dug in the ground; each of them should be about an inch in depth and two inches in diameter, and the distance between them should be from a yard to a yard and a half. A line, b, is drawn for an offering a yard or more from the first hole. The players then decide in what order they are to shoot. They begin by trying to get their taws into the first hole; if they succeed they proceed to the second, and he who puts a taw into all three holes wins the game, and wins all the marbles on the ground.

After a player has been in the first hole he has the choice of proceeding to the second hole or of shooting at the taw of an opponent. Should he hit it, its owner is put out of the game, and has to ransom his taw by a marble. By way of variety let us consider the game of Arch Board. For this it is necessary to have a board cut like Fig. 5; it is, you see, in the shape of a bridge with nine arches just wide enough to allow a marble to pass through, and over each arch a number is placed. The numbers, it is to be observed, may be placed either in regular order or not, and may be any numbers that the players please. The board may have an extra number of 0's if they like, and may be marked something like 1, 0, 3, 5, 0, 4, 0, 5, 0. A player is appointed to the post of bridge-keeper; the others do their best to shoot their marbles through the arches. For every unsuccessful shot a marble must be paid to the bridge-keeper, and he, on the other hand, has to pay, for every successful shot, the number written above the arch through which the marble is sent. The marbles are shot from about four feet from the bridge.

Knock-out, or Log-out, is a game in which there is an agreeable mixture of chance and skill. The ground most suitable for it is a gentle slope by the side of a wall It opens with the first player throwing a marble against the wall with a sufficient degree of force to make it rebound to a distance of not further than two yards. The next player then throws his marble in the same way, and tries to make it, in rebounding, strike the marble of player number one. Should he manage to do so, he wins the marble struck; should he fail, his own marble remains on the ground, in company with that of the first player. In this manner the game goes on till some one, either by luck or good guidance, hits a marble, which makes him the winner of all the marbles then on the ground.

Suppose a number of players would play at Bounce-eye, they makes small ring on the ground, and in that ring every player places one or more marbles; the number being determined by the players themselves before the game begins. The first player then stands over the ring; he takes up a taw between his finger and thumb, holds it near his eye, and lets it fall into the midst of the marbles in the ring. Should he, by this means, drive any marbles out of the ring, they become his property. Often, however, it happens that no marbles are driven out; in that case the player's taw remains captive in the ring, and is held to become part of the common stock.

In the game of Picking the Plums a line is drawn on the ground, and on that line each player places a marble. An offering is then marked four or six feet away, and the players shoot in succession. Sometimes picking the plums is played in a way very much resembling arch-board. A player starts the game by drawing a line on the ground, and arranging nine marbles on it (see Fig. 6), leaving such a space between each that just two marbles can pass abreast. Each one then pays to the "keeper of the plums" three marbles for six shots, which payment is held to entitle him to keep all the marbles he can knock off the line.
Skiating.

HAVING mastered the ordinary three, the skater should at once begin his study of the "outside backwards." This is a formidable task; yet not so wondrous as it is made out to be.

The lesson is best learnt in the following way:—Make a three—a good bold one—say on the right foot. That will, of course, start you—after the turn is made—on the right inside edge backwards. Then as you go along, put down the left foot parallel with, and quite close up to the other, leaning at first only little weight on it, afterwards gradually more, and at last the whole. If the position of the body be maintained at the same angle as if you were on the right inside edge, while you are, in effect, on the left, you must inevitably use the left outside edge, and that is already done which was to be done.

Of course, the same lesson will be practised on each foot, and then the "backward roll," both crossing and not crossing the feet, will follow, as it did with the outside forwards. When this edge is once learnt, it is sure to become the favourite.

Need it be added that in this beautiful style of skating, the rules of attitude must be rigidly observed? A bent knee, wriggling arms, or downcast eyes, are fatal at once. The "up" foot should be kept always close to the heel of the other with the toes pointed very much outwards.

We arrive now at a totally new stage, that of "edges"—technically so called—that is to say, the practice of changing from one edge to another without altering the foot or the speed. Easy as this movement would appear to the uninitiated, it is wonderfully difficult. Yet a perfect skater must be able in a twinkling, at the tenth part of a second’s warning, to change from the outside to the inside, or back again, without difficulty or even apparent effort. Only an intimate and practical acquaintance with the laws of balance will enable one to do this. Long and tedious practice is again required. Many falls will probably have to be endured again. The most difficult "edge" of all is the turn from inside to outside backwards, and few indeed are those who can start on a common three, and then edge the fall into an outside backwards.

When once the turn is learnt, it should be practised till there is no difficulty in cutting the figure S. This figure is admissible only on the two backward edges, the inside forward being, as we have seen, tabooed by figure skaters. After the S, practise a long serpentine line, and you may attain at length to the power of keeping up and even increasing speed by the management of the balance, as in the forward or back-ward you will upon both feet. By this device a good skater will
wander about for minutes over the surface of the river without putting down more than one foot during the whole of the time, and without bending the knee of the leg he is using.

Next to the S and its sequel the serpent, comes in a difficult but beautiful and favourite figure called the Q. This involves an edge and a three; for instance, stars on the right outside forwards; when the circle is nearly completed, change the edge suddenly to the right inside forwards, and at almost the same moment, shift again by making a simple three, thus arriving at the right outside backwards. In the latter the curve of the Q is made much less complete, and the figure bears a very distinct resemblance to the letter Q. But it is called by the same name nevertheless. It will be observed that in executing the double shift quickly the body is completely turned round, while the direction of the stroke is hardly interrupted at all. By a lightning-like movement, wholly inexplicable to the bystander, the face of the skater appears where the back of his head was a second before, and yet his course continues practically unchanged. Q’s may be made suddenly when going at a high rate of speed, and the effect is electrical. This is, in fact, by far the most ‘sensational’ figure. It is also the most dangerous, as the least slip brings the performer to grief. Q’s may be made “short-tailed,” or “long-tailed.”

Then there is the “reverse Q,” in which the three comes first, and the edge is made in the tail of it, equally difficult but less effective.

Finally, “continuous Q’s” by which the skater, always on the same foot, slits along over the ice in a succession of beautiful and mysterious revolutions, perfectly wonderful to the eye of the looker-on. He who can do this well has little left to learn in the way of skating figures.

One or two other well-known exercises demand a word of notice. One of these is the “loop,” effected by over-balancing of the body, and recovering equilibrium by a quick turn of the foot.

Another is the “flower-pot,” in which the balance is still further lost, and recovered by a backward stroke, and then a three. And a third is the “broken-backed three,” a trick by which the tail of the three, instead of following its ordinary direction, or say the inside edge backwards, breaks back irregularly on to the outside.

Few sights are finer than a really good eight, in which picked men, veterans of the club, are taking part. The machine-like regularity of their rapid movements, the quiet grace and ease of their attitudes, are almost as admirable as the consummate skill with which they converge, diverge, shift, and vary their course simultaneously upon some apparently inexplicable system.

To describe the higher mysteries of these great figures would not be within the scope of our space. All that can be attempted now is to explain the principle and system of the simpler combined figures, upon the model of which the others are formed. We assume that the skater, perfected in the solitary figures, is capable of executing his own part in all the problems. It remains, therefore, only that he should accommodate his own actions to those of his partner or partners.

To begin them, let him stand face to face with another skater, if possible, a proficient in the art, and at a few yards distance from him. The two then start forward, on the inside forwards, and at the moment of closely passing one another—each being on the left—they begin the stroke of a forward three on the right foot. This three is continued until the long tail of it comes round to the same point whence each skater started. The two partners will thus arrive again close to one another, only instead of facing one another, they will be sideways, each on the right inside backwards, and looking over the left shoulder towards the other.

Let them now complete the stroke till they almost touch one another, and then, putting down the left foot, start afresh on a second three on the left foot. By this movement, the points of the body being altered, each is just enabled to clear the other, and pass on to the right side of him; that is to say, the two left shoulders just escape touching one another as the right shoulders just escaped at the start. Of course, the second three on the left foot brings the two skaters round as before to meet one another, and ready to start on a third stroke.

After the “simple three” comes a series of figures, the name of which is sung out by the leader of the party as he comes into the centre just as the leader of a peal calls the changes on the bells. A few of them may be mentioned, but they are all adaptations of various simple figures to the one already described. “Once back” is done by putting down the left foot after the turn of the three, making a long sweep on the left outside back, and then starting afresh on the right outside forwards, and coming back to centre as in the first figure. “Twice back” is the same with a repetition, the left foot coming down twice. For “back and meet,” complete the stroke on the left outside backwards, and then, when your back is close to that of your partner, start afresh on the right forward with a three. For “back and back” the same, only instead of starting on the right forward as before, start on the right backward with the cross-roll.

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F ORFEITS.

By James Mason.

THOSE who have, in previous numbers, watched the proceedings of the Round-Game Club, must have remarked that the meetings of that society concluded with the crying of forfeits.

The manner of “crying the forfeits,” as it is called, is so well known as hardly need description. Two players are selected, the one to be the crier and the other the teller. Two young ladies of the party, the first with a sedate air, and the second with a ready wit, will do best if they are to be had. The crier sits down, and the teller kneels before her, either with her eyes blindfolded or with her face hidden in the crier’s lap, so that in the assignment of her tasks she cannot be accused of partiality. The crier has all the forfeits handed over to her, by whoever has occupied the responsible post of collector during the evening. She takes up one article, holds it over the teller’s head, and says, “Here’s a pretty thing, a very pretty thing! and what shall he [or she] do that owns this very pretty thing?” or she cuts the speech short, and merely asks, “What is the owner of this to do?” The teller, having quite a stock of penalties at her command, at once names what is to be done.

The following tasks present several pleasant features.

Making One’s Will is the first of them; at least I put it first, for one must begin somewhere. The penitent ordered to make his will has to state what legacy he leaves to each one of the company present. He may bestow on them either personal property, or physical peculiarities, or mental characteristics. To one he may leave his gold snuff-box, to another his red hair, to a third his stupidity, and so on.
Blowing Out the Candle is not so easy as you might suppose. The player is blindfolded, and the candle is held before him. His attempts to extinguish it are sure to give rise to fun.

Acting Proverbs.—This performance is not unlike the game of Acting Rhymes, which may be seen on page 74, Vol. I. A proverb is assigned to the penitent, and he has to represent it by action, or he may be allowed to choose a proverb for himself, the company being left to guess what it is. Should the acting be bad, he is not allowed to redeem his forfeit.

Making a Perfect Woman is an original penance. It is said that the world has just been blessed with two perfect women; one of whom is lost, and the other is not to be found. The player's task, however, is comparatively simple; he has only, in imagination, to manufacture this rare article. He has to select from each of the ladies present some charming feature of mind or of person, thus building up his perfect woman.

Making Comparisons.—When this task has been appointed by the forfeit-teller, the penitent is furnished with the name of a lady or gentleman, and has to compare the person named to some object or other, and to explain in what way he or she resembles it. The nature of the business may be seen by referring to the game "What is my Thought Like?" on p. 340 of Vol. I.

Giving Good Advice.—You have to give any piece of advice that comes into your head to each one of the company in turn. The forfeit-teller may order this to be done either aloud or in a whisper.

In Acting Dummy, the player takes his stand in the centre of the room, and, without speaking a word, executes various little tasks set him by the company; each one giving him a task.

Showing the Spirit of Contradiction is exactly the opposite of "acting dummy." Instead of doing the tasks imposed, you have to do exactly the contrary.

Giving One's Private Opinion resembles the penance of "Good Advice;" only, instead of giving advice, you give each one of the company your private opinion of them. This is to be done either in a whisper or aloud, as may be directed.

The Natural Historian.—In this task each one of the company names a quadruped or a bird, and the player has to imitate its cry. He may have to bark like a dog, or roar like a lion, or grovel like a bear, or mew like a cat, or produce the notes of any of the birds of the air. A selection from the cries of the birds may, by the way, be seen at p. 341, Vol. I.

Telling a Secret is a simple penance, which consists in whispering a secret to each one of the company in turn.

The Grecian Statue may be made to give rise to much amusement. The penitent stands on a footstool or low chair, in the centre of the room, and each one present lends a hand in moulding him into position. One adjusts his right arm, another his left, a third pulls his head backwards, a fourth turns out his toes, a fifth bends his right knee, and so on.

Saying a Proverb Backwards is a task requiring a little coolness. The proverb is named by the teller, and the penitent has to repeat it backwards without a mistake.

Putting Yourself Through the Keyhole.—When you are commanded to do this, your only way to fulfill the law is to write "Yourself" on a piece of paper, and pass that through.

Flattering Speeches.—This is a task for a gentleman. He is ordered to make half a dozen or a dozen flattering speeches to a lady, without using the letter I. He may say to her, "You are good, pretty, kind, entertaining, fair, and witty," but not lively, lovely, beautiful, graceful, charitable, or, indeed, anything which necessitates the introduction of the forbidden letter.

Answering "Yes" and "No."—Here we have a penance specially adapted for the ladies. The lady penitent is sent out of the room, and the company fix on three questions, to which, without being informed of their nature—she is only told their number—she is expected to answer either "Yes" or "No" on her return.

The Deaf Man.—The character of the deaf man is played by the penitent. He is made to stand in the centre of the room, and the company invite him to perform several agreeable tasks. To the first three invitations, he, standing stock still, must reply, "I am deaf; I can't hear." To the fourth, which those present usually take care to make of a disagreeable nature, he must reply "I can hear," and at once proceed to the execution of the task.

Asking a Question which Cannot be Answered in the Negative.—Many a poor player has been puzzled by this penance. To be short, and to help all future players out of a difficulty, let me say that the question is, "What does 'y-e-e-s' spell?"

Teaching the Parrot.—He who is condemned to this penance is supposed to become a parrot. He goes round all the rest of the players, and asks of each one, "If I were your parrot, what would you teach me to say?" The inquiry is answered as the players think best, and the parrot has to repeat every answer before putting the question anew. Should a lady say, "and perhaps some kind-hearted soul will do so—" Kiss poor polly," the parrot will at once act on the suggestion.

Spelling Constantinople.—This is a trick. The penitent is told to spell Constantinople. He begins C-o-n, Con; s-a-a-a, stan; t-i-n, tin; here several of the players cry out "No, no, no, no." This confuses the speller, who thinks he must somehow have made a mistake, and some fun is created.

Paying Compliments.—The penitent may be ordered to pay a compliment to one or more, or even to all, of the company. If it be required in prose, anything made up on the spur of the moment will do; if in verse, a few lines of a song suitable for the purpose should be chosen.

Dancing under Difficulties is a task that may be introduced should the business of forfeit-telling ever be found to grow tedious. That will happen sometimes, you know, even in the most lively circles. Eight penitents are selected, and made to dance the first figure of a quadrille with their eyes blindfolded.

The Sensational Concert is another contrivance by which many players are enabled at once to redeem their forfeits. Any number of owners of penances may be selected. By way of penance each one has to choose a tune, and then all are bound to start together, every player singing the tune of his choice, and starting on his own key-note.

NOTE.

The Author of the articles upon Rowing is greatly indebted to that admirable work on aquatics, "The Rowing Almanack," by Mr. Brickwood, from which various extracts have been made, more especially the excellent notes appended to the laws of boat-racing.—L. Y.
Egg Collecting (continued).

Robin, Th., i, 142.
Rook, Th., i, 6.
Sparrow Martin, Th., i, 373.
Scissors Required, i, 332.
Sedge Warnings, Th., i, 230.
Sky Pigeon, Th., i, 200.
Sparrow Hawk, Th., i, 237.
Sparrow, Rodent, Th., i, 237.
Sparrow Hawk, Th., i, 237.
Spotted Flycatcher, Th., i, 375.
Starling, Common, Th., i, 394.
— Place of Nesting, i, 51.
Stock Dove, Th., i, 325.
Stoneschat, Th., i, 356.
Swift, Th., i, 573.
Teal, Th., i, 371.
Thrush, Th., i, 99.
— Nest of, i, 99.
Turtle Dove, Th., i, 200.
Tussock Moth, Th., i, 356.
Titmouse, The Great, Th., i, 142.
— Long-tailed, Th., i, 89, 91.
— Nest of, i, 91.
Tits, Th., i, 103, 200.
Tits, Diet of, i, 142.
Tree Creeper, Th., i, 143.
Tree Sparrow, Th., i, 356.
Tufted Titmouse, Th., i, 200.
Wagtail, Th., i, 200.
Wren, Th., i, 200.
Willow Warbler, Th., i, 573.
Woodpecker, Spotted, Th., i, 372.
Woodcock, Th., i, 200.
Woodpigeon, Th., i, 356.
Wryneck, Th., i, 372.
Yellowhammer, Th., i, 293.

EGGS, ORNAMENTAL.

Eggs, Ornamental, Articles on, i, 40, 106.
Ancient Egg Work, i, 102.
Artificial Eggs, i, 47, 49.
Blending of Colours, Th., i, 102.
Broken Egg Shells, Use of, i, 40.
Cremer's, Mr., Work on Ornamental Eggs, i, 102.
Decalcomanie as Applied to Eggs, i, 47.
Easter Eggs, i, 47, 49.
Eggs to Dye, i, 40.
— to Dry Moth, i, 46.
— to Blow, i, 47.
Figures in Relief, i, 45.
Glass Tube for Blowing Eggs, i, 47, 49.
Gresse, To Remove, i, 40.
Mosaic Work, i, 48.
“Pace” Eggs, i, 48.
Plaster Foss, To Ornament, i, 47, 48.
Shell, The, How to Cut, i, 47.
— How to Wash, i, 47.
Stand, Cheap for, Vase, i, 47, 48.
Vase, To Make from an Egg, i, 147.

ELECTROLYTIC.

Electrolysing, Articles on, i, 250, 263, ii, 52, 55, 177, 372.
Acids, Action of, i, 289.
Apparatus, Simple, i, 140, 141.
Basso Batteries, i, 140.
Batteries, Various, i, 363.
Bird, A, To Obtain Cast of, i, 375, 379.
— in Elastico Moulin, Illustration, i, 376.
Black-leaded Costume, i, 141.
Bunsen's Battery, i, 363.
Cast in Plaster, To Make, ii, 178.
— in Wax, To Make, ii, 178.
— to Coat, ii, 178.

ELECTRICITY (continued).

Cells, Arrangement of, for Six-cell Battery, ii, 53.
Copper as a Conductor, i, 202.
Copper Mould, Th., i, 179.
Daniell's Battery, Th., i, 200, 265.
Electricity, i, 190, 201.
— Positive, i, 203.
— Negative, i, 203.
— Production of by Decomposition, i, 239.
Electroscope, Use of, i, 54.
Electrode Deposits from Natural Substances, i, 257.
Faulkner, A, i, 201, 202.
Figure, Method of Slinging, ii.
Fish, To Obtain Cast of, i, 375.
Gold Solution, To Make, ii, 58.
Gore's Method of Making Elastic Tied, ii, 52.
Grove's Battery, i, 293, 295.
Instability, i, 51.
Lead Tree, To Make a, ii, 35, 53.
Matrix, Permanent, i, 142.
Medallion, To Copy, i, 142.
Model, To Make a, ii, 142.
— Elastic, To Make a, ii, 61.
— The Soluble, i, 177.
Phosphoric Solution, To Make, i, 52.
Plaster Dust, To Copy, i, 52.
Precipitation, i, 177.
Process, Solution, To Make, ii, 53.
Smeck's Batter, Th., i, 102, 103.
Solution, Th., i, 149.
Steel Pins, to prevent Corrosion, i, 52.
Voltaic Cell, To Make, ii, 149.

FEATHER WORK.

Feather Work, Articles on, i, 9.
— Bird's Quill, Th., i, 106, 125.
Owl's Head, Th., ii, 333.
— Natural, i, 106.
— Of Foreign Birds, i, 106.
— Of Domestic Birds, ii, 106.
— Of Birds in Flight, i, 106.
— Of Birds in the Nest, ii, 106.
— Of Birds in Flight, i, 106.
— Of Domestic Birds, ii, 106.
— Of Foreign Birds, i, 106.
— Of Birds in Flight, i, 106.
— Of Domestic Birds, ii, 106.
— Of Foreign Birds, i, 106.
— Of Birds in Flight, i, 106.
— Of Domestic Birds, ii, 106.
— Of Foreign Birds, i, 106.
— Of Birds in Flight, i, 106.
— Of Domestic Birds, ii, 106.
— Of Foreign Birds, i, 106.
— Of Birds in Flight, i, 106.
— Of Domestic Birds, ii, 106.
THE POPULAR RECREATOR.

Shuttlecock, The, i, 124.
Skip-Jack, The, i, 172.
Shrug, The, i, 173.
Soap Bubbles, ii, 155.
Spliokina, i, 54.
Squawer, The, ii, 214.
Squirt, The, ii, 334.
Stillz, ii, 19.
Sucker, The, ii, 53.
Testoton, The, ii, 258.
Thaumatrope, The, i, 171, 172.
Toy Microscope, The, ii, 93.
Wand, Magnetic, The, ii, 258, 259.
Watch-Spring Gun, The, i, 44.
Whalebone Cross-bow, ii, 331.
Wonderful Trumpet, The, ii, 19.

WHIST.
Whist, Articles on, i, 61, 121.

Bad Habits at, i, 122.
Book Whist, i, 121.
Cavernish on, i, 125.
Charles Dickens and the “Pickwick Papers,” i, 52.
Complete Gamer on the, i, 61.
Conventional Rules, i, 122.
Deschappelles on Long Whist, i, 65.
Elementary Hand, i, 65, 66.
Finnesing, i, 348.
Fourth Hand, The, i, 348.
Hands, Examples of, i, 155, 156, 157.
History of the Game, i, 29.

The Popular Recreator.

_Hoyle's Treatise on, i, 65._
_Hoyle's Treatise on Whist, i, 65._
_Lead From The Boat, Headed By—_ 
_Ancient, i, 221._
_A King, i, 221._
_A Knave or Ten, i, 221._
_A Queen, i, 221._
_Modern Whist, i, 121._
_Olden Whist, i, 61._
_Original Lead in Trumps, i, 222._
_Second Hand, Play of, i, 347, 348._
_Summary of Leads in Plain Suits, i, 222._
_Technical Terms, The, i, 61._
_Third Hand, Play of the, i, 348._
_Treatise, Hoyle's, on, i, 62._

WINDOW GARDENING.
Window Gardening, Articles on, i, 55, 115, 169, 243, 311, 382; i, 54, 191.

Bay Windows, Decoration of, i, 118.
Decorated Window, Illustration of, i, 56.
Ferns in Large Case, with Edging of Virgin Cork, i, 121.
Pine-Cone Decorated Trough, i, 57.
Flowers in Pots, Cultivation of, i, 53, 56.
Fountain in Fern Case, ii, 102.
Fuchsia Ladder, The, i, 57.
Gipsy Fern Case, i, 112.
Glazing Fern Case, i, 120.

HOUSE ORNAMENTATION, i, 55.
Illustration of Large Fern Case, i, 169.
Inside Case for Bowl Window, i, 54, 55.
— To Make, ii, 101, 102.
— Illustration of, i, 120.
Kamptulicon for Ornamentation, i, 59.
Moulding, How to Put on the Case, i, 119, 120.
Outside Window Cases, i, 382.
— Disadvantages of, i, 54.
Price of Fern Case, i, 169.
Rectangular Fern Case, To Construct a, i, 123.
Roof, for Fern Case, i, 243, 244.
Simple Fern Case, How to Make a, i, 118, 119.
Virgin Cork, Use of, i, 129, 121.
Window Box, To Make a, i, 56.
Window Garden Proper, The, i, 383.

ZETEMA.
Zetema, Article on, i, 125.
Assembly, The, i, 125.
Cards, The, i, 125.
Declaration, Making a, i, 129.
Description of the Game, i, 127.
Draw, The, i, 125.
Game, The, i, 120.
Methods of Scoring, i, 125.
Marriage, The, i, 125.
Modification of for Two Players, i, 120, 127.
Table of Scores, i, 127.
Tricks, i, 125.
Variations in the Game, i, 127.

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274.