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L. T. Fowler

MANUAL
OF
Oral Instruction,
FOR
TEACHERS AND PUPILS
IN
GRADED SCHOOLS.

By LAURA T. FOWLER,
Head Assistant in the Cosmopolitan Grammar School, San Francisco.

SAN FRANCISCO:
H. H. BANCROFT AND COMPANY.

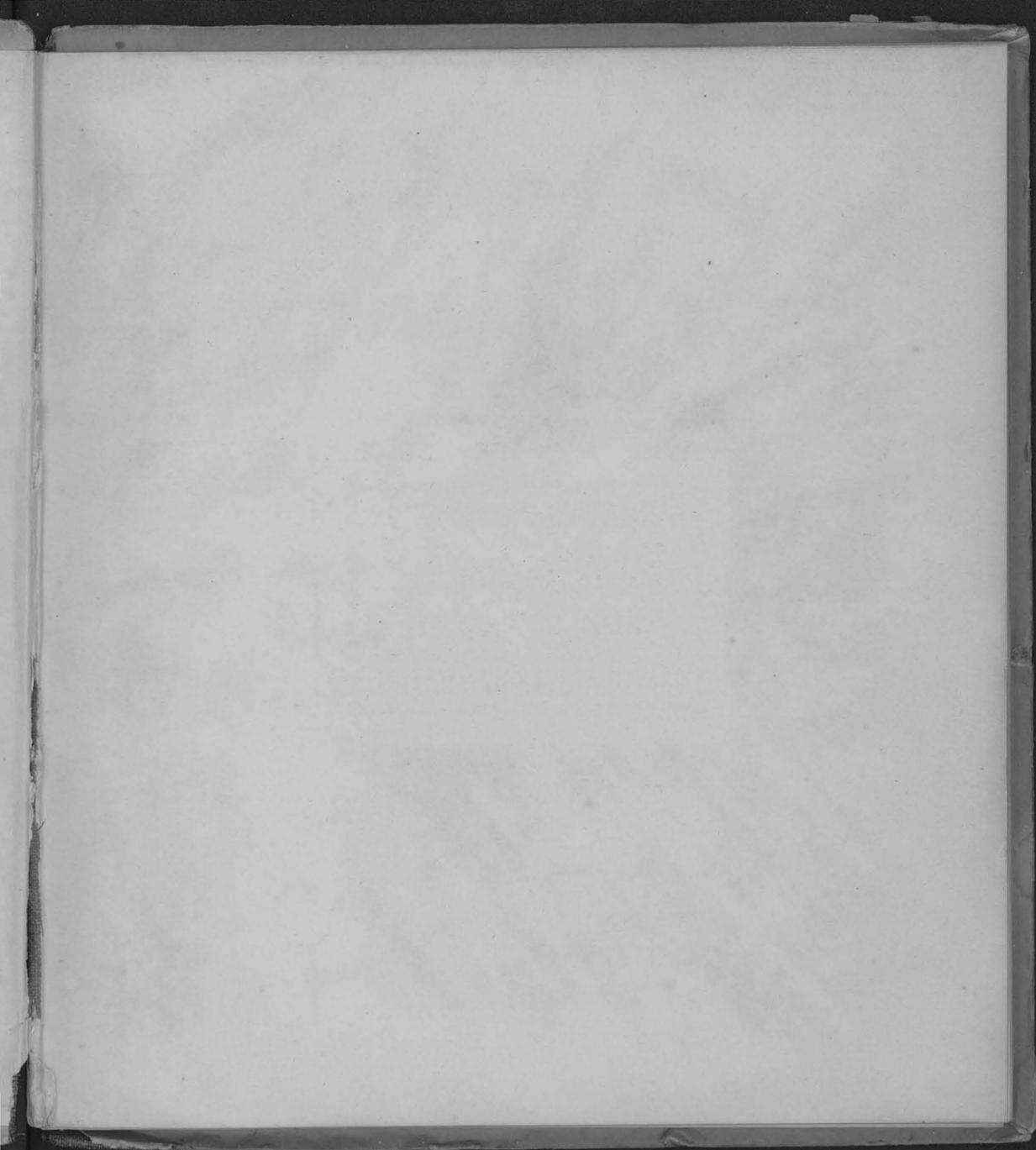
1867.

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UNITED STATES OF AMERICA.





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OF INSTRUCTION

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FOR TEACHERS AND PUPILS

OF GRADE SCHOOLS

BY ELBERT FOWLER

NEW YORK: H. H. BANBROTT AND COMPANY

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PREFACE

Entered according to Act of Congress, A. D., 1867, by

LAURA T. FOWLER,

In the Clerk's Office of the District Court of the United States, for the
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PREFACE.

THE author of this little book sends greeting to every public school teacher and pupil in the land.

Educate the children of the nation; for with them rests the safety and the glory of our beloved Republic.

The technical knowledge of *text-books* does not form a complete education, and does not always make strong and reliable character. Our world is beautiful and grand. The comprehension of its greatness and beauty ennobles the mind, even that of a child. Train, then, these millions of young minds, by a comprehensive, enthusiastic culture to perceive, then to love all things beautiful and true in it.

From every existing thing, from every event, historical or natural, cull some little lesson aside from text-book study. Communicate *facts* that will excite their wonder and attention, elicit their praise, and they will not fail to *think* and to *reason* concerning them.

If we would have noble, intelligent citizens, let the education of our Public Schools be broad, deep and liberal. For every child cultivated and refined therein, the nation shall receive back its thousand fold of strength in its hour of danger, and in its need of defense.

L. T. F.

SAN FRANCISCO, October, 1867.

MANUAL OF ORAL INSTRUCTION.

ERRATA.

- Page 25, question 19. For "glands," read "glass."
Page 26, maxim 6. For "dilligent," read "diligent."
Page 35, line 3. For "controling," read "controlling."
Page 51, question 42. For "iberty," read "liberty."

NOTE TO THE TEACHER.—The lessons on Natural Philosophy and Geology, on pages 35 and 36, should be transferred to the Second Grade, and the lesson on Architecture, on page 46, to the First Grade.



A *Pentagon* has five sides.



A *Hexagon* has six sides.



A *Heptagon* has seven sides.



An *Octagon* has eight sides.

Form—

All objects must have shape, or figure, and occupy space. A lump of sugar, no matter what its form, whether solid or dissolved in water, occupies space. Certain bodies have a form peculiar to themselves, such as the crystals of salt. There is no spe-

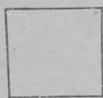
MANUAL OF ORAL INSTRUCTION.

FIFTH GRADE.

FIGURES AND FORMS.

DESCRIBE

Form,	Size,	Lines,
Weight,	Angles,	Color.



A *Square* is a figure with four equal sides and four right angles.



A *Triangle* has three sides and three angles.



A *Pentagon* has five sides.



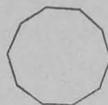
A *Hexagon* has six sides.



A *Heptagon* has seven sides.



An *Octagon* has eight sides.



A *Decagon* has ten sides.



A *Circle* is a line everywhere equally distant from a centre.

DESCRIBE

Attraction,	Divisibility.
Cohesion.	Density.
Force.	

Form—

All objects must have shape, or figure, and occupy space. A lump of sugar, no matter what its form, whether solid or dissolved in water, occupies space. Certain bodies have a form peculiar to themselves, such as the crystals of salt. There is no spe-

cial form to a liquid, for it can assume any shape.

Describe the shape, or form of a tree, a book, an apple.

Size—

Is the exact measure of any object, whether round, square, or cylindrical.

Tell the size of the earth, of the Great Eastern, and the State you live in.

Also any object in your school-room or at home.

Weight—

All objects on the earth are drawn towards the centre of the earth, by a power called *Attraction*, or *Gravitation*. We cannot see this force, we cannot handle it, but we know it exists, and that is why everything, when it falls, will fall to the earth, and that nothing can fall away from the earth; now, the *amount of matter* contained in an object will press towards the earth with a certain force; this is called *weight*. A feather and a piece of iron of equal size will not contain the same amount of matter, therefore, they will

weigh differently; but enough of the one to equal a pound of the other, will press with the same force to the earth. Weight is simply the measure of the force that draws us to the earth. Bodies weigh the most at the surface of the earth.

The law of Gravitation was discovered by Sir Isaac Newton.

Cohesion—

Is another kind of attraction. The particles of an object are drawn towards each other, and cling so closely that the pressure makes them form a *hard* substance, as we call it. The stronger this cohesion in an object, the harder or *denser* it is. Thus, iron is harder than wood or sugar. A piece of cork, or a sponge, is not so dense, or heavy, or hard, as a rock. It is Attraction which enables the wick of a lamp to supply the oil for burning; which will cause a towel to become soaked, by only putting a corner in water. Stockings are bleached by putting the toes in a dish of water. Dew drops are formed by cohesion. The power in a loadstone or magnet is called Magnetism.

Divisibility—

Everything can be divided. When cohesion is slight, the separation is simple, but when it is very strong, as in iron, it will require intense heat to melt it, for melting is simply the release of cohesive attraction in the particles. Rocks and crystals can be reduced to finest powder. That is, they are divided and redivided, till they are powder. We perceive a perfume by the minute separation of its particles. A leaf of gold can be beaten till it is transparent.

SHORT BIOGRAPHIES.

George Washington.
 Abraham Lincoln.
 Benjamin Franklin.
 Christopher Columbus.
 Peter the Great.
 Alfred the Good.
 Israel Putnam.
 Mungo Park.
 Benedict Arnold.

Biographical Sketches—

GEORGE WASHINGTON was born in Virginia. When the Revolutionary war broke out he was selected by the

people of the American colonies to take charge of their army, and when the war ended, he was chosen for the first President of the new Republic. He was a wise and good man, and is generally called "*The Father of his country.*"

ABRAHAM LINCOLN was born in Kentucky. He emigrated to Illinois when he was quite young, and that State became his home ever afterwards. He earned his own support, and educated himself. He became famous as a lawyer, and was elected President of the United States. He was assassinated for sustaining the honor of his country, and wisely carrying it through its greatest peril. For this he has been esteemed as "*The Savior of his Country.*"

BENJAMIN FRANKLIN, was born in Boston, and from a poor boy, working in his father's candle-shop, to the time of his honored death, he was respected and beloved by the American people as the wisest philosopher of this country. He became a printer and author. Afterwards, he was sent as our first ambassador to France, and his good judgment and faithfulness won us many friends in that nation. He was the inventor of lightning rods, to protect houses during thunder storms.

CHRISTOPHER COLUMBUS is noted as one of the first navigators who discovered North America. He was born in Genoa in Italy, and was early educated to follow his father's profession as sailor. He was a very studious and thoughtful man. In crossing the Atlantic from Spain, bound to the East Indies, he accidentally discovered the New World. He landed on the Island of San Salvador, in the Bahama group. The name he gave the island means Our Holy Saviour, but I think he meant to express, "Our Salvation," as the voyage had been tedious, and his crew mutinous.

KING ALFRED was one of the old Kings of England. He reigned at a time when that nation was just entering a period of civilization, for originally it was a barbarous people. He was noted for his goodness and fidelity to his people, and is known as Good King Alfred.

GENERAL PUTNAM was one of the bravest officers in the Revolutionary War. He was born in Connecticut, and when he first heard that war had commenced, he was ploughing in the

field, but he left instantly for the battle, sending word to his wife by his little son that he had gone to fight for his country. He had many hard fights and many narrow escapes. He was one of the foremost at the battle of Bunker Hill.

MUNGO PARK was a celebrated English traveler, who discovered many curious and interesting facts concerning the people and geography of Africa, and the South Sea Islands.

BENEDICT ARNOLD was the first *traitor* this country had. He was born in Connecticut. He had formed many bad habits while young, which caused him to want more money than he could honestly earn, and becoming angry with Gen'l Washington about his promotion, he agreed with the British commander to betray his trust as the protecting officer at West Point, and deliver up this most important point, which was the key to the whole country, but he was prevented from doing it. Escaping to the British ship, he was forced to leave his country, and died in England exiled and despised.

PLANTS.

Plants are divided into two great classes, called *Exogens* and *Endogens*. The *Exogens* may be known by the construction of their sap-veins, which resemble a net. These veins cross and interlace each other, while in the *Endogens* they are parallel, running from the root to the tip of the leaf in straight lines.

A rose leaf or oak leaf, will illustrate the *Exogens*, and a corn stalk or lily, will show the *Endogens*.

These divisions are made according to the form and structure of the stalk and green leaf.

Plants that bear flowers are called *Phaenogamia*, and those without flowers *Cryptogamia*. These are sub-divided into *families* and *species*. Every plant that grows on the earth has its own family and name.

Many plants are used for food, some are used for medicine and dyeing clothes; others are used for making paper and cloth, while the woody structure is sometimes used for fuel.

When the woody part is close, and compact it is called *hard grained*, and such are valuable for their strength and polish. Of these the mahogany, ebony, rosewood, black walnut, and

California laurel are used in the manufacture of cabinet ware. The age of an *exogen* can be told by counting the shaded rings or circles, which can be plainly seen when a log is sawed into. Each ring shows a year's growth, it being the bark of each year.

In the arrangement of nature we find all things regulated by *system* and *order*. "*Order is Heaven's first law.*" And in studying this beautiful condition of things, Man has only to give *names* to each department and object. Thus we find all the plants arranged in *families*.

One of the largest families of plants is called *Rosacea*, because of the rose-like blossom it bears. In it we find the *rose*, apple, pear, cherry, strawberry, raspberry, hawthorn, and japonica. Each of these forms a family, some of which have many species, or varieties, as the damask rose, the prairie rose, the giant of battles, etc.

Another large order is the *Cruciferae* in which are the *turnip*, *cabbage*, radish, mustard, and water-cress, and each of these forms a family.

In the *Coniferae* we have all the varieties of pine, fir, spruce, and hemlock.

Some plants grow to be very old, even over two thousand years. A rose tree, in the Cathedral of Hildeshan, is

eight hundred years old. Some trees have become quite famous in the history of the world. Thus the cedars of Lebanon, the oaks of England, and the chestnuts of Vallambrosia are often referred to.

The various kinds of gum are produced by trees. Gum arabic, camphor, India rubber, gutta percha, pitch, myrrh, opium, manna, frankincense, are vegetable gums.

ANIMALS.

ALL things were created for a special purpose. The Animal and Vegetable Kingdoms are arranged in classes and families. The Animal Kingdom is divided into four great divisions :

Vertebrates,
Articulates,
Radiates,
Mollusks.

Vertebrates are so-called, because they have a back-bone made with sockets. Also, they have a frame-work of ribs, which protects their vital organs.

Articulates include all insects, the skeleton of which is simply a jointed wire-like frame. If you look into the dictionary you will find that *Articulate* means jointed.

Radiates are so named because they grow from the centre, as, for instance, the star-fish.

Mollusks form the kingdom of shell-fish, that word meaning a soft jelly-like substance. They are destitute of bones and are enclosed in a shell, like the oyster.

Search all over this earth, on the mountains, in the valleys, through the sea and the mysterious air, and whatever you find having animal life must belong to one of these great kingdoms.

Vertebrates are *warm blooded* or *cold blooded*. That is, the blood fluid which sustains the animal has a temperature suited to the element in which it lives. Warm-blooded animals live entirely out of the water, except the whale, but cold-blooded animals either live in the water, or are so constituted that they can live in it or out of it. If you do not understand the meaning of "temperature" or "element" or "constituted," look in your dictionary, and search it out.

Warm-blooded Vertebrates have two divisions, called the *Mammalia* and *Birds*.

There are *five* subdivisions of *Mammalia*, and *seven* of the *Birds*, which I will put down in regular order, and if the Latin names are too hard to re-

member, then study the English. These divisions are made chiefly according to their hands, or feet, or habits.

The whale is included with the warm-blooded because it cannot live very long under the water, and must come

to the surface to breathe, hence its blood is warm. This little classification will be a good test for your memory, but, as you learn it, you should read and recollect all the little facts you can about each animal.

Mammalia.

Bimana—Man.

Pedimana—Monkey.

Cheiroptera—Bat.

Quadrupeds—Four-footed.

Cetacea—Whale.

Birds.

Raptores—Flesh eating.

Insessores—Singers.

Scensores—Climbers.

Cursores—Runners.

Rasores—Scratchers.

Grallatores—Waders.

Natatores—Swimmers.

MISCELLANEOUS QUESTIONS.

NOTE.—The answers to these questions are to be searched out by the pupil, and the teacher should refrain from giving information, unless satisfied that the pupil has no advantage for finding them out. Then let correct statements be written on the black-board, and the class ordered to re-write them in their blank-books or on their slates.

1. What are the different colors ?
2. What are the five senses ? What animals have the sense of smell strongest ? What bird has the strongest sight ? Why do cats and owls see better in the dark ?
3. What substance is wool, cotton, leather, coral, feather, hair, silk, pearl, glue, musk, coal, amber, and sponge ?
4. What is a chrysalis ?
5. What is cochineal ?
6. From what countries do we get ginger, camphor, tea, coffee ?
7. Where does the date tree and olive tree grow ?
8. What is a microscope ?
9. How are bricks made ?
10. Is a fish the same kind of an animal as a man ?
11. Why does a fish die out of water, and we drown in it ?
12. What is an insect, a reptile, and a larvæ ?
13. How does the cricket sing ?
14. Who invented the multiplication table ?
15. What is soap, cheese, yeast, vinegar, alcohol ?
16. Name five different evergreen trees ?
17. Give ten different kinds of shells.
18. Mention the different kinds of light.
19. Which are the precious metals ?
20. Mention something that is ductile, dense, porous, and brittle ?
21. What are some of the things made of clay ?
22. What is meant by evaporation ?
23. Mention five trades, three professions, and three arts.

24. What is the highest officer in our country, in a state, in a city.
25. What fish yields the most oil ?
26. How does the cow eat her food ?
27. Why do the birds not fall off the trees when the winds blow ?
28. Tell the different points of the compass.
29. What part of a tea-kettle boils first ?
30. Why do we say, The sun rises and sets ?

MAXIMS.

1. A small spark may kindle a great fire.
2. A child is known by the company he keeps.
3. Learning is better than houses or money.
4. A place for everything, and everything in its place.
5. Show me a liar, and I will show you a thief.
6. A good name will shine forever.
7. Honesty is the best policy.
8. A soft answer turneth away wrath.
9. Where there is a will there is a way.
10. None so deaf as those who will not hear.
11. Evil communications corrupt good manners.
12. A good life keeps off wrinkles.

FOURTH GRADE.

ANIMALS.

Man is the superior of all animals, of the order *bimana*, which means two-handed. He has the most complicated organization, and is endowed, above all others, with speech and reason. If you will look in the Bible you will find, at the iv. verse of the viii. Psalm, a beautiful thought respecting Man and his superior creation, and he will, therefore, be held responsible for the well-being of his bodily powers.

There are *five* distinct races of men on the earth; and whether one race is better than another, is for you to study out and decide for yourselves; but be sure you judge rightly. Their physical distinctions are in the formation of the hair, feature and color of the skin. Now, if you can tell why one has a white skin and another has a red one, you will find out one of the secrets of nature and God. Remember, it was discovering a *secret* that made Newton

and Watts, and Franklin, and Morse famous. So, be studious and thoughtful, and sharp, and perhaps you, too, will be noted. When you have found out *that*, you may also be able to tell us why the dolphin and gold-fish have their splendid hues, or why the frog and chameleon are so brilliant sometimes, or why the violet is blue and the rose red.

The names of the races are: Caucasian, American, Mongolian, Malay, Ethiopian. The more you learn about these races, you will find how much depends on a true education. Without it, they would all sink and be degraded.

In the next order, *Pedimana*, we find the

Orang Outang, Chimpanzee,
Monkey, Mandrell,
 Gorilla,

many fine stories of which are given in your Readers, and in Mayne Reid's books.

The *Quadrupeds* form the largest and most useful order. Orders are divided into *Genera*, then into *Families*, then into *Species*. The chief names of the *Genera* are the following: *Carnivora*, which means flesh-eating; *Ruminantia*, which means grass-eating; *Rodentia*, are those that nibble and gnaw, and the *Pachyderms* are those with thick skins. I will arrange some of the families of these *Genera*, that you may understand them. Of the *Carnivora*, there are the

Felidæ.

Lion,
Tiger,
Cat,

Canidæ.

Dog,
Wolf,
Fox.

Ursidæ.

Bear,
Raccoon.

Of the *Ruminantia*, there are the

Bovidæ.

Ox,
Buffalo,
Bison,

Cervidæ.

Deer,
Moose,
Gazelle.

Capridæ.

Goat,
Ibex.

In the *Rodentia*, you will find the

Squirrel,
Beaver,
Rabbit,
Rat,

Porcupine,
Chinchilla,
Hare,
Gopher.

In the *Pachyderms*, there are the

Elephant,	Horse,
Rhinoceros,	Tapir,
Hippopotamus,	Hog.

These are only the principal divisions. There are a few more—such as live on insects, like the Sloth and Ant-eater. The Families are next divided into *Species*. The Dog and Wolf belong to the same family; but there are many varieties of each, such as the Newfoundland, the Mastiff and the St. Bernard Dogs.

The reason why Plants and Animals are thus divided into orders and families, consists in the difference of functions and organs; also in the reduction of the number of organs, and the centralizing and enlargement of organs.

The birds form a very large and interesting division of the warm-blooded vertebrates. They are also subdivided into their "orders," "families," and "species," as well as the quadrupeds. The frame-work or skeleton of a bird is wonderfully curious; and if you could examine one, you would be astonished at the ingenuity and skill displayed. You could not help but praise Him who made it, and who gave the lion his strength and the leopard his beautiful coat, the parrot his voice, and you the power to study about them. Let your

whole life be a sweet hymn of praise to that glorious Creator. In flying through the air, the bird must be very light, so his bones are all hollow and very thin, and the evolutions they perform are so rapid and graceful, that one never tires of watching them. Look at a flock of Blackbirds, or Barn Swallows, on a warm summer day, and I defy you to tell how many changes of motions they make! Then, when they have finished their happy day-life, see how faithfully God cares for the little birds, "not a sparrow shall fall to the ground without His notice." In their thin, hollow legs, is a delicate cord which connects with their toes in such a way that when they sit down on a branch, their feet are firmly clasped; and no matter how the winds blow, as long as they sit down, they are held tightly to the limb, and can sleep se-

curely. When they stand up, the cords relax and their feet are loosened. The *Raptores* are those birds that feed on flesh. They live by slaughter, from the Bald Eagle that lives on the choicest flesh of Swans, Mallard Ducks and Lambs, down to the little field Owl, that contents itself with mice and lizards. The order includes the Vultures, Condors, Eagles, Falcon, Hawks and Owls. They have powerful bills and strong feet. They are very ferocious, and only one "family" have ever won a kindly feeling of praise from man—and that is the Eagle. This bird can look straight at the sun, and fly higher than any other. One stroke of its wing is sufficient, sometimes, to kill its prey. It has been called the "King of Birds," on account of its strength and resolution.

SHORT BIOGRAPHIES.

- | | |
|-------------------------|----------------------|
| 1. Daniel Webster. | 7. Thomas Jefferson. |
| 2. Henry Clay. | 8. James Watt. |
| 3. Alexander the Great. | 9. Robert Fulton. |
| 4. Sir Isaac Newton. | 10. Moses. |
| 5. Julius Cæsar. | 11. Mahomet. |
| 6. Hannibal. | 12. Jesus Christ. |

MAXIMS.

1. A rolling stone gathers no moss.
2. Kind words cost nothing.
3. Better be alone than in bad company.
4. All is not gold that glitters.
5. Little strokes fell great oaks.
6. An idle brain is the devil's workshop.
7. Avoid that which you blame in others.
8. A clear conscience fears no accuser.
9. Good counsel is above all price.
10. It is never too late to learn.
11. Never sport with pain or poverty.
12. Temperance is the best medicine.

 METALS AND MINERALS.

Describe and state the uses of

<i>Metals.</i>	<i>Minerals.</i>	<i>Precious Stones.</i>
Gold,	Granite,	Diamond,
Silver,	Slate,	Emerald,
Iron,	Marble,	Opal,
Copper,	Lime,	Ruby,
Platinum,	Sulphur,	Amethyst,
Brass,	Phosphorus,	Pearl.
Zinc,	Ochre,	
Tin,	Clay,	
Magnet.	Salt.	

Metals—

The metals form a very important branch of study. All metallic substances are *simple*, and are possessed of a bright and polished appearance. They are *fusible*,* *malleable*† and *ductile*‡; and these qualities form their usefulness. The formation of metals is not fully understood. Certain it is, that some have been found in the oldest rocks, showing that they were formed at the first creation. History constantly refers to the metals; even in the description of the Garden of Eden, gold is spoken of. Tubal-Cain was the first worker of metals, and he lived before the flood. Metals are not often found on the surface of the earth, but are found in beds or veins below it. Some of the richest veins are not over eight inches wide. The great silver mine of Washoe is very narrow, while the iron bed at Marquette, Michigan, is one thousand feet wide.

Salt—

The use of salt is very old. The Bible often refers to it; and among the Orientals‡ it was a pledge of peace and

friendship to eat jointly of it. It has many remarkable qualities. It will preserve the flesh of dead animals; but, if eaten in large quantities, will take away life. The coarser kinds are used for packing hides, salting fish, and even the fine damask roses are mixed with salt to preserve their odor for the perfumer. Some nations have used it in the burial of their dead. It is used to give a glazed surface to pottery. It makes glass clearer, gives hardness to soap, and is used in dyeing cloth. It will put out flame. Salt water will not freeze so soon as fresh water. It is abundantly found in all parts of the world. Its varieties are formed somewhat by the process of manufacture. The ocean contains a great deal. All animals require it in their systems. Wild animals go at certain periods to the "*salt-licks*," where saltish water oozes from the rocks. This peculiarity† is known by the beaten paths to and from the salt springs. Some of these springs are called "*deer-licks*," "*buffalo-licks*," or "*bear-licks*." Formerly, salt was used for money, or tribute, and at times was exceedingly valuablē. When the Romans first settled in Britain, they levied‡

* *Fusible*.—Capable of being melted.

† *Malleable*.—Capable of being hammered into sheets or leaves.

‡ *Ductile*.—Capable of being drawn into wire.

‡ *Oriental*.—Belonging to the East; generally Persia, India and Arabia.

† *Peculiarity*.—Curious habit or condition.

‡ *Levied*.—Ordered to be paid.

a tax of salt on the famous Droitwich mines, and paid their soldiers with it. From this custom originated our word *salary*.||

The largest salt mines are in Wieliczka, Austria. They are so extensive that the miners live in them, and have their houses and chapels. Lamps are constantly burning, and give the mines a brilliant appearance. The mines of Norwich, England, are 220 feet deep. Those in Syracuse, New York, are also extensive. In the Gulf of Persia is an island composed entirely of salt. Soda, borax, saltpetre and alum are also called salts. Borax is used in the melting of metals. Saltpetre is used in making gunpowder and preserving meats.

Chloride of lime is another salt used for purifying the air and hospitals. The old English phrase "sitting below the salt," had reference to a custom similar to the Oriental. The salt-bowl was placed in the middle of the table, and the master and his family sat at the upper end; while the servants sat below the salt-bowl, which was an indication of rank. In one of Sir Walter Scott's admirable stories, an order at dinner is given to place the boiled

mutton "above the salt," and the salmon below it, as the former was a rarer dish than the latter.

Paper—

Paper is made by boiling rags to a pulp, and then rolling it into sheets. It is also made from some kinds of wood which can be reduced to pulp. Before paper was known, the people used the parched skins of animals and the bark of trees. These were costly, and only those who kept the records were able to write. Such men were called *scribes*. They called their paper *parchment*. The paper we now use was first made by the Chinese, then the Arabs and the Europeans.

Leather—

Leather is the tanned skin of animals, chiefly the hides of oxen. Its quality depends on the age of the animals, and on the tanning process. Hides are brought from nearly all parts of the world. The skins are first cleansed, then put into large vats filled with a solution of hemlock bark. The beautiful kid gloves we wear are made from kid-skins, monkey-skins and rat-skins, many thousands of the latter being caught in the sewers of Paris.

|| *Salary*.—Stated wages. Derived from the word "salt."

Steel—

Steel is simply iron hardened by putting carbon in it while melted. The carbon makes it firm, and gives it a fine polish when hammered out. It is used in manufacturing cutlery. The chief factories are in Sheffield and Wolverhampton, England. The finest swords are made in Damascus. There is no record when cutlery was first made. Savage nations, such as the Indians, used sharp flint for their knives and arrow-heads.

Gunpowder—

Powder is made of nitre, charcoal and sulphur. The Chinese made it two hundred years before we did. The first Englishman who found it out was Roger Bacon; but the first man who used it as a *force*, was a German named Swartz. The first cannon were used by Edward III. at the battle of Cressy. Muskets were first used by the Spaniards. The best guns now in use are the "Armstrong," the "Parrot," the "Columbiad," and the "Needle."

Glass—

This is an old and important manufacture. It was discovered by accident. A party of Phoenicians, returning from the coast of Africa with a

vessel-load of soda, landed to build a fire. They used some lumps of this soda to make a fire-place; but the heat dissolved it, and it united with the sand, producing a hard, transparent substance. This led to the manufacture of glass. By the help of glass, we have been enabled to learn much concerning the stars above us. The telescope and microscope prove what a valuable discovery glass is. When it was first introduced into Rome, Nero paid 60,000 pounds for two cups.

Heat—

All substances found in the world are of three forms, *solid*, *liquid* and *gaseous*. Heat will change all solids into a liquid or a gas. Most objects are made larger by heat, and smaller or more compact by cold. When water is turned into a solid, it expands. When a blacksmith fits the tire* on a wheel, he first heats it to make it expand†; then, when it is fitted on, he pours cold water over it to cool it, and thus make it shrink‡ suddenly to its first size. The lids of an old stove, when cold, will be crooked and warped||; but, as soon as a fire is kindled,

* *Tire*.—The iron rim of a wheel.

† *Expand*.—To increase or make larger.

‡ *Shrink*.—To contract and make smaller.

|| *Warped*.—In a crooked condition.

they will swell out equally and fit well. Tumblers immersed in hot water will break, because the heat expands them too suddenly. When iron or gold is heated hot enough, their particles separate, and they melt, flowing forth like water. So will any metallic substance. Take away the heat, and it will become solid again. Fruits and vegetables are turned into a liquid jelly. Water boiled sufficiently passes off into vapor and steam, but cold will turn it to ice; and, as an exception to the rule, its bulk § becomes larger; for water frozen in a pitcher will expand and break the pitcher. Heat expands the atmosphere, and slightly affects the weight of objects. Prof. Draper says a vessel which holds just one ounce at New York, at the poles will hold more, and at the tropics will hold less, than an ounce. If the heat is great enough, everything can be melted or turned into gas. Rocks are melted in the volcanoes, and run forth like rivers of fire. The whole earth can be thus changed by heat into gas, which was its original form, before God said "Let there be light, and let the dry land appear!"

Indestructibility—

Nothing is ever lost or destroyed in this world. Fire and death only change

§ *Bulk.*—Magnitude or size.

into another form of existence. The world will weigh just the same to-day as it did when first created. Water evaporates into something else, but is not destroyed. The oil in a lamp when burning only returns to the same form it was before it was made oil. Our bodies return to their original* dust, but not a particle is ruined. Every earthly thing can be measured or weighed. Sir Walter Raleigh illustrated this by a beautiful experiment. He weighed the tobacco in his pipe, and when he had smoked it, he weighed the ashes; and subtracting the weight of the ashes from the tobacco, he told the weight of the smoke.

Oxygen and Nitrogen—

A simple substance is not mixed or united with another. A compound substance is formed of several simple ones, which can be separated from each other. Gold is a simple substance. Water is a compound substance. The chief elements, or simple substances in nature, are oxygen, nitrogen, hydrogen and carbon. These are called gases.

Oxygen is a gas that supplies and supports life. Nitrogen will not sustain life. If the atmosphere were all oxygen, we would live too rapidly, and

* *Original.*—First.

would soon wear out; therefore, nitrogen is mixed with it to soften it and make it better adapted† to our use. The atmosphere is composed of four-fifths nitrogen and one-fifth oxygen.

Carbon—

Carbon is one of the chief elements of vegetable growth; but it is also essential‡ to the animals. When it unites with oxygen, *combustion*|| takes place, and heat is produced. The flame of a candle is thus caused. The carbon in the melted oil unites with the oxygen in the air, and flame is the result. When we breathe, we take in the oxygen of the air, and it unites with the carbon in the body in a very mysterious manner, and the body is kept warm and purified. When oxygen and carbon unite, they throw off carbonic acid gas, which is a rank poison. Every time we expel our breath, we throw off this poison from our lungs. It escapes from burning lamps and candles, and gathers in old wells and many mines, making it dangerous to enter them. But there is a very wise provision in nature to use up all this poison thrown off constantly by

† *Adapted*.—Arranged especially for.

‡ *Essential*.—Necessary to.

Combustion.—The process of burning.

animals. The plants *live* on it; and as they grow, they throw off oxygen for our use. So all animals and plants help each other to live—showing the very wise and beneficent§ care of their Creator over them all.

Carbon is found in many forms. A diamond is pure carbon. So is charcoal, sugar, butter, tallow, oil and black lead.

Sound—

All the laws and conditions of sound are classed under one term called *Acoustics*. Sound is simply an impression made on the organs of hearing by the vibrations* of the air. If there were no air around us, we would not hear any sound. Sound travels at the rate of one mile in about five seconds. Light travels much faster than sound, and this accounts for our seeing the flash of a gun before the report, or the flash of lightning before thunder. When they come together, they are very near us. Water will transmit† sound better than the air; so will iron and wood. The Indians put their ears on the ground when they wish to hear approaching steps. The human voice,

§ *Beneficent*.—Wise and generous.

* *Vibrations*.—Movements of the air.

† *Transmit*.—To transfer.

ordinarily, may be heard one-eighth of a mile; the report of a musket five miles. It has been stated that the ringing of a bell *under* water, has been heard nine miles. The voice of a sentinel stationed at Gibraltar has been heard twelve miles. The eruptions of volcanoes may sometimes be heard over three hundred miles. When a sound is repeated by reflection, it is called an *echo*. The sound strikes against some object and is thrown back before the vibration ceases. An echo near Milan repeats a sound thirty times. There is also a fine one at the Lake of Killarney, in Ireland. Many splendid echoes are heard among the Alps in Switzerland.

The art of music depends mainly on these vibrations of air; the three things considered being loudness, pitch and quality. The highest human voice is called treble; the lowest human voice is called bass. All musical instruments and bells are made according to the laws of acoustics. The speaking-trumpet of the sailor, the ear-trumpet of the deaf, and the tuning-fork † of the musician, are helps to the production of sound. Whispering-galleries show curious conditions of sound. The

* *Vibrations*.—A movement of the air.

† *Transmit*.—Carry, or lead it along.

‡ *Tuning-Fork*.—An instrument used to pitch the right key-note.

dome of the Capitol in Washington and St. Paul's Church, London, are fine examples. In some of the large caves, rooms are found where a sound is doubled or trebled, || one voice sounding like three.

Time—

Our time is calculated from the birth of Christ, which took place 4,004 years after the creation of the world. Since His birth, 1,867 years have passed.

Time is divided into centuries, years, months, weeks, days, hours, minutes and seconds.

The solar year is the time occupied by the earth in passing around the sun. This is divided into twelve months, the names of which were given by the old Romans.

January was named after *Janus*, the Roman God of Gates. Therefore, January is the first month, or "Gate of the New Year."

February is derived from the Roman God *Februas*.

March is named for *Mars*, the God of War.

April is derived from the Latin word *Aperio*.

May is named for the brightest star of the Pleiades.

|| *Trebled*.—Repeated three times.

June is named in honor of *Juno*, the goddess of heaven.

July is named for Julius Cæsar.

August is named for the Roman Emperor Augustus.

September is derived from *septem*, meaning seven, and *imber*, meaning rain.

October is from *octo* eight, and *imber*.

November is from *novem* nine, and *imber*.

December is from *decem* ten, and *imber*.

The week is divided into seven days, the names of which are of Saxon origin.

Sunday was named in honor of the sun.

Monday, in honor of the moon.

Tuesday is derived from *Tuisco*, a Saxon god.

Wednesday, from the god Woden.

Thursday, from Thor, the son of Woden.

Friday, from Friga, wife of Woden.

Saturday, from Seater, the god of Concord.

When the sun reaches the highest point over head, it is Meridian. Time before that is called *ante* Meridian, and we represent it by the letters A. M. Time after it is called *post* Meridian, and we write it P. M.

MISCELLANEOUS QUESTIONS.

1. What are the seasons? What causes them?
2. What is papyrus?
3. What is the mariner's compass? Describe it.
4. What are exports and imports?
5. What are raisins?
6. Where was the potato first found?
7. Where are the best pins and needles made?
8. What is bank-note paper made of?
9. What are cloves, and where do they grow?
10. Why is the blood red?
11. What difference in the teeth of a wolf and a sheep? Why are they different?
12. What does the whale feed on?
13. Why should we breathe pure air?
14. Is the flame of a candle hollow? Prove it.
15. Which way does the earth revolve?
16. What is eider-down?
17. What is ice? What is the freezing point? What is it called?
18. What is coral?
19. What are the different kinds of glands?
20. How is gold-leaf made?
21. Why is Holland surrounded with a sea wall?
22. Does Niagara Falls make any noise when there is no one there to *hear* it? Why?
23. What is the loudest noise in the world?
24. What are geysers? Where are the most famous?
25. What is the nautilus?
26. How do the ostrich and the crocodile hatch their eggs?
27. Why does smoke ascend?
28. What is the difference between an insect and a reptile?
29. What great event happened in 1776?
30. Who is Emperor of France, Queen of England, Czar of Russia, King of Italy, and President of United States? Where does a Sultan, a Tycoon, and a Bey reign?

THIRD GRADE.

SHORT BIOGRAPHIES.

- | | |
|-------------------------|--------------------------|
| 1. Martin Luther. | 11. Sir Walter Raleigh. |
| 2. Peter the Hermit. | 12. Sir Philip Sidney. |
| 3. Queen Elizabeth. | 13. Oliver Goldsmith. |
| 4. Confucius. | 14. Walter Scott. |
| 5. Demosthenes. | 15. Charles Dickens. |
| 6. Homer and Virgil. | 16. Henry W. Longfellow. |
| 7. Napoleon Bonaparte. | 17. Noah Webster. |
| 8. Humboldt. | 18. Alexander Hamilton. |
| 9. William Shakespeare. | 19. Aaron Burr. |
| 10. Oliver Cromwell. | 20. John Quincy Adams. |

MAXIMS.

1. Good nature is natural politeness.
2. God tempers the wind to the shorn lamb.
3. Make hay while the sun shines.
4. Strike the iron while it is hot.
5. Help yourself, and Heaven will help you.
6. The hand of the dilligent maketh rich.

MAXIMS—Continued.

7. Command your temper, lest it command you.
8. Where there is a will, there is a way.
9. Patience is bitter, but its fruit is sweet.
10. What sculpture is to marble, education is to the mind.
11. Courage without conduct is like a ship without ballast.
12. It is never too late to learn.

ANIMALS.

The Insectores include the warblers or singing birds, those that fill the woods the gardens and our homes, with such charming music. There are many families in this order, chief among which are the Robin, the Mocking Bird, the Linnet, the Canary, the famous Sky Lark of England, and the beautiful Nightingales which are found in great numbers around the Lakes in the Italian Alps. Also the Oriole, Swallow, Magpie, Blackbird, Kingfisher, Whip-poor-will and Humming Bird.

The Scansores are the climbing birds, such as the Parrots, Toucans, Cuckoo, and Woodpeckers. Most of them are natives of hot countries, and are famed for their bright plumage.

The Rasores include the Poultry birds, Domestic Fowls, Turkey, Pigeon, Quail, Partridge, Pheasant, Peacock and Bird of Paradise. Of all birds the pigeon is the swiftest in flight. The noted Carrier Dove belongs to this order.

The Cursores are the runners, as the Ostrich, Emu and Cassawary.

The Water Birds have two orders.

Grallatores are the waders, such as the Crane, Flamingo, Heron, Bittern, Snipe, Plover, Curlew, and Stork.

The Natatores are the swimmers, the Swan, Duck, Gull, Pelican, Albatross, Petrel and Penguin.

The migration of Birds is a very interesting topic for you to study about. Nearly all of them change their abodes

with the changing seasons, and they display wonderful discernment in obeying this law of their nature, some of them traveling day and night, scarcely stopping to gather food. Some change their plumage and their food in their new homes. Thus they spend their brief lives of usefulness and pleasure. Michael Bruce, a poor, sick boy, who lived a long, long time ago on the hills of England, wrote these lines to

THE CUCKOO.

Hail, beauteous stranger of the grove!
 Thou messenger of Spring!
 Now Heaven repairs thy rural seat,
 And woods thy welcome sing.
 Sweet bird! thy bower is ever green,
 Thy sky is ever clear,
 Thou hast no sorrow in thy song,
 No winter in thy year!

O, could I fly, I'd fly with thee!
 We'd make, with joyful wing,
 Our annual visit o'er the globe,
 Companions of the Spring!

Reptiles and fishes form the two great divisions of cold-blooded vertebrates.

The reptiles are a curious class. They include some of the most beautiful, and some of the most disgusting and terrible animals. They possess singular powers of fascination and torpidity that instinctively create in us a dislike for them. But they doubtless serve a wise and useful purpose.

The following are the different orders of reptiles :

Ophidia—Snakes.

Batrachia—Toads and frogs.

Saurians—Lizards and Crocodiles.

Chelonians—Turtles.

Chief among the Ophidians are the rattlesnake, adders, and boa-constrictor. A missionary lady, from Africa, once told me that she saw an immense boa captured, but it was done after it had eaten an animal, which brought on a torpid condition. The boa is very shrewd. Before going into that long sleep, it will mark out a large circle around its resting place, and then cover the ground and bushes in that circle with its peculiar poison. This is so powerful, that no insect or animal will cross it to devour it.

The reptiles have the power of changing their coats every year, and when a toad is in the act of "shedding his skin," it is worth more to see than the best circus in the world. Try and catch them at it.

The Batrachians are generally very harmless, and are very useful to the farmer. The horned toads, found in California, are very curious, but when they have shuffled off their old skin, and donned their bright coats of red and brown faced with yellow, they look quite handsome.

The Saurians inhabit hot countries. Among them are the famous salamanders of Asia, and the beautiful chameleon that changes its color.

The Chelonians are a valuable class. The rare tortoise shell, of which such choice combs and knife-handles are made, is taken from the back of a species found in the Indian Ocean. It is the new shell that is taken, and is a very painful operation to take it off. If you will get that queer old poem, called "The Ancient Mariner," you will find at the last of it this sweet little verse—learn it—

"He prayeth best, who loveth best
All things both great and small;
For the dear God who loveth us,
He made and loveth all."

We now come to the second grand division, the Articulates, among which we will find much to instruct and interest us. In the first lesson, I told you the distinction between them and the Vertebrates, was their skeleton. The skill of the spider, the industry of the bee and ant, the beauty of the butterflies, and the seemingly useless life of flies, will serve us with many lessons for reflection. And in studying about these little insects, you will notice the same skill and arrangement that is developed among the higher orders. Remember, it requires the finger of God

to make a worm, or a fly, as much as the greatest planet in the heavens. The following is a list of orders of the Articulates:

Lepidoptera—Butterflies and moths.

Coleoptera—Beetles and bugs.

Orthoptera—Crickets, locusts, and grasshoppers.

Diptera—Flies and mosquitos.

Hymenoptera—Bees, wasps, hornets and gnats.

Arachnida—Spiders and scorpions.

Myriapoda—Centipedes.

Crustacea—Crab, lobster, and shrimp.

Annelida—Worms, leeches.

There are a few other inferior orders, but these will give you a clear idea, I think, of the Articulates.

AIR.

The atmosphere surrounds the earth. It extends above it about fifty miles, and grows rarer, or thinner, as it ascends. It presses down on the earth with a weight equal to fifteen pounds to a square inch. The body of an ordinary man has a surface of 2,000 square inches, therefore the atmosphere presses on him equal to 30,000 pounds. It has no special color, but its distance makes it seem blue, and that blueness we call

the sky. Whatever is lighter than the air will float on it. Hot air is lighter than cold air, hence the warmest part of a room will be near the ceiling. A balloon floats on the air because the gas in it is lighter. A soap-bubble is filled with warm gas from the lungs, and will float till it becomes as cool as the outside. Hydrogen is the lightest gas known.

To test the heat and coldness of the air, a little instrument called a Thermometer is used. Learn how it is made. To test the dryness and dampness of the air, a barometer is used. Barometers are very useful on board of a ship, and also in measuring the heights of mountains. When a space without air is formed, it is called a *vacuum*. When such a vacuum is formed, the force called *suction* is produced. Pumps are made on this principle. If a piece of wet leather be pressed on a stone, and lifted with a string, the suction is strong enough to lift the stone. Thus flies crawling on the ceiling are perfectly safe, because their feet form just such a vacuum. Heat passing through the air puts it in motion, and this changing and rushing of the air we call *wind*.

There are various kinds of wind. When it blows from one direction a long time, it is called a *trade wind*.

Winds are beneficial to the climate often. When it moves two miles in an hour, it cannot be felt; at fifteen miles per hour, it is a breeze. A storm travels at the rate of fifty miles an hour, and a hurricane one hundred. Monsoons are common in China and India. Explain them.

Air is formed of oxygen and nitrogen, with a few other substances floating in it. The composition of *pure* air is four-fifths of nitrogen and one-fifth of oxygen. See the lesson on the simple elements.

WATER.

Water is a compound substance, formed of oxygen and hydrogen. Three-fourths of the earth's surface is covered with water. Rain water is the purest; that of the ocean is salt. The rivers washing through the earth carry with them into the sea its mineral substances, such as salt, alum, magnesia, sulphur, and even its gold and silver and mercury. The sun pouring its hot rays on the ocean, causes it to evaporate and ascend in the form of vapor or mist. Only the pure vapor of water ascends, leaving the salt behind. This vapor is blown over the land, and falls in the shape of rain or snow, to purify

and refresh all things upon it.

There are a few places on the earth where the rain never falls—in some portions of Peru and Egypt; while in other places it rains nearly every day. In Egypt, the river Nile overflows and inundates* the country for hundreds of miles. In olden times, it was a custom with the farmers to go out in little boats and throw their grain upon the water, which sank; then, when the water was gone, the seeds sprouted and grew. A verse in the Bible refers to this custom. It says: "Cast thy bread upon the waters, and thou shalt receive it again."

No life can exist without water. It is used in all manufactures, and as a force to turn the wheels of a mill. It is converted into steam to propel the steamboat and locomotive, as well as the great printing press. All washing and cooking depend upon it; and some have even tried to make it *burn*, by separating its gases.

Water forms a part of almost everything created. The beautiful opal is only flint and water. Potatoes have 75 per cent. water, and turnips 90. A sunflower evaporates† one and a quarter pints of water each day; a cabbage the same quantity, and a wheat plant

throws off in 175 days 100,000 grains of water. An acre of wheat passes, therefore, about ten tons each day. Timber in France is dyed by mixing colors with water and drenching the roots. Dahlias‡ are colored in the same way.

The Ocean—

The ocean is the great purifier of the earth. The Atlantic is much saltier than other portions. When salt is decomposed, *soda* is produced; and the marine plants growing in the sea are the active workers that change much of the salt into their natural food. Were it not for this, the salt would accumulate so fast as to solidify.*

There are many currents in the sea—some running south, others north, yet never mixing or turning each other aside. The largest one is the great Gulf Stream of the Atlantic. The true cause of these currents is not yet known. They have a very great influence on the climate† of countries. This stream rises in the South Atlantic, blown by trade winds across the Caribbean Sea through the Gulf of Mexico out into the North Atlantic, and breaks on the coast of Ireland. This stream is so warm that, without it,

* *Inundates*.—Overflows.

† *Evaporates*.—Throws off in the form of vapor.

‡ *Dahlia*.—A beautiful garden-flower.

* *Solidify*.—To turn into a solid.

† *Climate*.—The condition of the atmosphere.

Europe would be as cold and barren as Labrador. It sends up a great deal of moisture, and keeps Ireland especially moist and fertile, and most of the year her hills and valleys are green with verdure. This is why she is called the "Emerald Isle."

The deepest place in the ocean is just north of the Bermudas. The tides of the ocean are caused by the attraction of the sun and moon. The highest tide in the world is at the Bay of Fundy. It rises there seventy feet.

No object will sink unless it is heavier than the water. If a bottle be sealed and sunk deep enough the pressure of the ocean will fill the bottle with salt water. The sea is filled with many rare and useful plants, and from the common sea weed is produced the valuable medicine called Iodine. Most of the fish are found in the colder waters. A whale will not cross the warm Gulf Stream. The weight of the ocean is sufficient to crush most objects to powder.

Clouds, Snow and Hail.

The clouds are a beautiful topic for study. Not only are they beautiful, but they are important. When the *rain* clouds are very near the earth, the drops will be large, and fall rapidly. This is owing to their distance. A pail

of water poured from a window will fall in a single mass; but pour one from the top of a steeple, and it will separate into drops. The higher the distance the less cohesion there is in the water. Shot are made in this way. Melted lead is poured from a high tower into cold water below; that hardens the leaden drops in their spherical* forms. Clouds are mere masses of vapor that float in the atmosphere. If very moist, they will assume† the darker shades of color, and float near the surface of the earth. In some places they are constantly gathering, not an hour passing without them; while in other places, many days and months pass without any. California is noted for its cloudless days, and the exceeding blueness of its sky.

Snow is formed by the cloud freezing before it turns to rain, hence it is frozen vapor; but hail is the rain freezing as it falls. The hardest hail-storms are in Switzerland. The hot, dry air over the Sahara Desert is blown north, and, as it passes over the Mediterranean Sea, absorbs its moisture; and, striking on the tops of the cold Alps, it suddenly drops in the form of hail. One of the most beautiful pictures in the world is seen from the tops of the Alps, covered with

* *Spherical*.—Round like a ball.

† *Assume*.—Take the shape or form of.

perpetual‡ snow. As the traveler ascends the most southern ridge and looks beyond, he suddenly beholds in the warm blue distance the blooming land of Italy, with its fruits and flowers and sunny fields.

ORGANIC BODIES.

Plants are *organic*; that is, they are arranged with different organs* that have a special work to do. They depend on water and light for support. If shut in the dark, they will pale and bleach white. If kept in a closed window, their leaves will turn to the outside light. Some plants grow only on other plants. Such are called *parasites*. The miseltoe is one. Mildew and the mould of old bread and cheese, are vegetables; so is the green and red scum seen so often on standing water. The chief things found in plants are starch, sugar and gum. Potatoes and grain abound in starch. Sugar is found in beets, cane, maple and fruits. It is the starch of grain that forms flour. Another name for it is *albumen*. It is the albumen that makes a plant nutritious. The white of an egg is pure

‡ *Perpetual*.—Constant, continual.

* *Organ*.—An instrument arranged to do a certain work.

albumen. When flour is mixed with water and allowed to stand, it will swell and throw off bubbles of air. Those bubbles are filled with *carbonic acid gas*. When that gas has escaped, it is kneaded into bread. If it stands too long, a second change will take place, and it turns *sour*. The sugar and acids of fruit form wine and vinegar. This change is called fermentation. This change does not destroy the smallest particle, but assumes another form. Nothing can be destroyed in this world. These things have been found out by study and thought; so the astronomer† can sit in his little room and measure the size and weight of the stars. The sun is *one million* times larger than our earth, and is 92,000,000 miles away from us. The sun is the source of all our light and heat.

LIGHT.

The branch of study concerning light is called Optics. We do not know what light is. It comes to us in straight rays, and travels at the rate of 190,000 miles in a second of time. The sunlight produces all the variety of color in plants. The rainbow is caused by the sun shining on a distant

† *Astronomer*.—One who studies about the stars.

shower in such a way the rays are separated into the different colors reflected on the clouds. [The teacher should illustrate this on the black-board.] Light passing through a *prism* will be separated in the same way. These colors increase in heat from the violet to the red, the latter being the warmest. When a ray of light enters a dark room, it will throw a small dot of white light on the opposite wall; but put a *prism* before it, and the ray will be separated, and throw on the wall in natural order the seven primary colors. This is called the *solar spectrum*. It is the action of light on certain chemicals that produces our beautiful photographs. When light passes freely through an object, it is called *transparent*; when it is partly obscured, it is called *translucent*; and bodies that will not admit the light are called *opaque*. It is the effect of light and shadow that makes a landscape charming. Another peculiar effect of light, is the reflection of distant objects on the atmosphere. This is called a *mirage*. Sometimes a vessel thirty miles off, and below our reach of vision, will be reflected on the air so that we can recognize it. The cliffs of France are sometimes seen thus by the natives of England. When a body gives out light itself, it is called *luminous*; and when an object only

shines by the light of something else, it is reflected light. The sun is a luminous body; but the moon and stars *reflect* light.

The knowledge we have of light has led to the invention of many useful instruments, such as the telescope, the microscope, mirrors, and spectacles for those who have deformed eyes. The little kaleidoscope illustrates the color of light finely. The *refraction* of light is one of the most interesting phases of this subject; and to understand it thoroughly, a knowledge of the structure of the eye should be given from the black-board.

ELECTRICITY.

This is one of the most powerful and terrible forces in nature. It is invisible, but can be ignited. Philosophers have learned a good deal about it, but there is still much more to learn. We know there are two kinds of electricity, called *Positive* and *Negative*. The positive will repel the positive, but will attract the negative. Thunder-storms are caused by a disturbed condition of the electrical forces in the atmosphere. Those objects that draw or attract electricity are called *conductors*; those that do not are called *non-conductors*. The

magnetic needle contains an element similar to this, called *magnetism*. The telegraph is arranged by controlling the electricity that passes through the wire. The hair of animals, at times, is full of it. Sliding on a carpet with slippers will produce such a current in some bodies, that a gas jet may be lighted with a snap of the fingers. There are some fish that can throw off a shock strong enough to seriously affect persons and objects. Feathers, silk and amber will repel it; therefore they are non-conductors. Metals and water will attract it. Benjamin Franklin invented lightning-rods to protect houses. The fluid is attracted from the cloud to the earth, and whatever will conduct it directly to the ground, protects surrounding objects. Thunder-clouds, generally, follow the course of rivers; and if two clouds meet where two rivers form a junction, the storm will be severe.

NATURAL PHILOSOPHY.

Matter—

All substances that we can see or touch is called matter. A rock, a drop of water, the air, all objects that we find on the earth are known by that general name. This matter is either

ponderable or *imponderable*; that is, has weight or not.

Natural Philosophy teaches us of the properties of matter, and the laws that govern it.

Figure—

This term is used to represent the shape or form of an object. A solid will retain its figure forever, unless changed by some greater force; while a drop of water will change into vapor.

Inertia—

Every object will keep in a state of inaction if let alone; or, if it is moving, would continue in motion if it were not acted upon by outward force. This power or property of matter is called *inertia*.

Divisibility—

All matter is formed of atoms called particles. These adhere by a kind of attraction called *cohesion*; whenever that attraction is severed, the object becomes *divided*. The smallest grain of sand can be subdivided, and each part divided again. This is why substances can be reduced to a *powder*. As instances of divisibility, or the wonderful power of being separated, I will mention that a grain of copper, dissolved in nitric acid, will give a blue

color to three pints of water. A grain of musk will separate and mix with the air, and will be perceived in an apartment for twenty years. The human blood contains small globules which contain all the elements of life, yet a drop of it holds nearly a million. These globules can be divided into others.

Porosity—

The particles of matter are kept together by cohesion; but between these particles are little holes, called pores, for the passage of air. Some objects are more porous than others. Thus, pumice stone is more so than granite, and, therefore, lighter. A sponge is porous. Iron is made smaller by hammering because its particles are brought closer. If the pressure be great enough, water will ooze through a glass bottle, or an iron or gold tube.

Density—

The less pores an object has, the heavier and more *dense* it is. When they are numerous, they are called *rare*.

Compressibility—

This means that a body can be reduced in size; and when it can be enlarged, it is called *expansibility*. A

sponge can be compressed in the hand, but remove the hand and it will expand. Air can be compressed also. Elasticity is that property by which a body will instantly resume its original form when outward force is removed. India rubber, or the Indian's bow, are examples of it. Fine steel also possesses the property; the more elastic it is, the better the quality.

Malleability—

Some of the metals can be rolled or hammered into thin sheets or leaves, and this property has the above name. Gold, silver and copper are the best examples of it. A leaf of gold can be beaten so thin that it will be transparent. Gold thus prepared is used for gilding frames, and also for dentists' use. Tin can be reduced also.

Ductility—

When a body can be drawn out into fine wire, it is said to be *ductile*; and gold is the most ductile of the metals, as well as the most malleable. Glass can be made exceedingly ductile by the action of fire, and many fine articles are thus made.

GEOLOGY.

Geology teaches us about the struc-

ture of the earth, and the formation of rocks. It is believed that the earth was originally in a gaseous form, and that by chemical action, it has gradually assumed its present form of solidity. In changing thus into solid matter, the harder portions of it are termed *rocks*. A rock is simply the particles of earthy and mineral substances held together by cohesion. Whatever loosens or separates that cohesion, breaks the rock.

There are many varieties of rock; but a true geologist understands the nature of each as well as a botanist knows each flower. Of all these rocks, oxygen forms nearly one-half. One of the most curious things we learn concerning the rocks, is their crystalline structure, or tendency to form into beautiful cubes and octahedrons. As they harden into shape, they assume these regular forms, as in quartz, salt and alum.

Rocks are either stratified or unstratified; that is, they are either found in layers or are compact. The stratified rocks were formed by the action of water, and then dried; while the unstratified were formed by strong heat. Stratified rocks abound with fossils. Fossils are the remains of plants and animals found buried or petrified in the

rocks. Rocks that bear such remains are called fossiliferous rocks.

One of the hardest and most useful of the unstratified rocks, is granite. It is made of quartz, silex, mica and feldspar. It is very durable, and is used for making the strongest buildings and monuments. Granite is found in the Alps; in the Andes it rises 12,000 feet, and New Hampshire is so full of it that she is called the "Granite State."

Slate is a stratified rock, for it is found in layers and slabs. The best kind of slate is used for writing on, and for roofing houses. It is a formation of clay, and is very common.

Quartz is a simple rock; that is, it has but one substance in it. It is very hard, and is used for hearth-stones, pavements, and in the form of cobblestones.

Marble is a limestone rock, and forms really the most beautiful rock found; for it can be polished and chiselled into many rare ornaments of statuary. The finest quality is brought from Carrara, in Italy, and from the island of Paros. It is supposed that marble is formed from the deposits of the shells and skeletons of animals that have been acted on by fire. Lime and chalk

are of the same formation, and are very useful.

The trappean rocks are so called because of their forming into columns and stairs. Fingal's Cave and the Giant's Causeway in Ireland are fine examples. The banks of the Columbia and the Hudson Rivers show the same arrangement.

BEAUTIFUL EXTRACTS.

There is a perennial nobleness, and even sacredness in work. All true work is sacred. Labor, wide as the earth, has its summit in heaven. If

this is not "worship," then I say, the more pity for worship, for labor is the noblest thing yet discovered under the sky.—*Thomas Carlyle.*

Man can be nothing, achieve nothing, fulfil nothing without labor. They, indeed, have the *hardest* work in the world who do nothing.—*Dewey.*

Why shrinks the soul
Back on herself and startles at destruction,
'Tis the divinity that stirs within us :
'Tis Heaven itself that points out an hereafter
And intimates eternity to man.
—*Addison.*

The character of the true philosopher is to hope all things not impossible, and to believe all things not improbable.—*Sir John Herschel.*

MISCELLANEOUS QUESTIONS.

1. What is cloth? Describe velvet, linen, lace, silk, carpet, mohair.
2. What is asbestos? Where found?
3. What is spermaceti?
4. What is ivory? Where do we find it in Liberia?
5. Why is Ireland called the Emerald Isle?
6. What is a pearl?
7. Where do we get the tortoise shell?
8. Has a cow teeth on both jaws?
9. What animals have the feet cloven?
10. Why is the Caspian Sea salt?
11. Why is Norway colder than Sweden, since they are in the same latitude?
12. What is an eclipse of the sun? of the moon?
13. What are the Pyramids of Egypt?
14. Describe the hanging gardens of Babylon.
15. Who were the Saracens?
16. What were the Crusades?
17. Who invented printing?
18. What was the first work printed in English?
19. Who invented the telescope?
20. What is meant by nature?
21. What is the Aurora Borealis?
22. What is dew?
23. What is the horizon and zenith?
24. What substance is a sponge?
25. Where is the nightingale found?
26. What is the lowest class of animals called?
27. What organ of the body is the "seat of thought."
28. In what climates are fur-bearing animals found?
29. Why can you drive nails in wood and not in iron or stone?
30. How is illuminating gas made?
31. How many bones in the human body?

32. Why is cotton cloth cooler than wool.
33. Why are light-colored clothes cooler than dark ones?
34. Why should we not bathe just after eating, or when we are fatigued?
35. Why should we sit and walk erect?
36. Mention five deadly poisons and their antidotes.
37. How are the bones of the skull united?
38. What is history?
39. What plants are found highest on mountain-tops?
40. What part of a ship is the capstan, bow, bulwarks, keel, boom, and hatches?
41. Tell the difference between a schooner, brig, ship, and yacht.
42. What is a clipper-ship? Mention the names of a few in your harbor.
43. Mention ten of the most terrible ship-wrecks.
44. Mention five noted naval commanders.
45. What is petroleum, ising-glass, and putty?
46. Describe the plumage of the oriole, linnnet, meadow lark, bob-o-link, and bird of paradise.
47. Describe the nautilus.
48. Mention ten of the largest stars.
49. What are the tropics?
50. From where do we get musk and ottar of roses?

SECOND GRADE.

SHORT BIOGRAPHIES.

- | | | |
|----------------|-----------------------|-------------------------|
| 1. Cadmus. | 8. Dido. | 14. Duke of Wellington. |
| 2. Pythagoras. | 9. Dante. | 15. Nero. |
| 3. Pliny. | 10. Geoffrey Chaucer. | 16. Garibaldi. |
| 4. Tasso. | 11. John Milton. | 17. Prof. Morse. |
| 5. Galileo. | 12. Voltaire. | 18. Hannibal. |
| 6. Socrates. | 13. William of Orange | |
| 7. Cleopatra. | | |
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MAXIMS AND VERSES.

1. Too much haste makes waste.
2. Learn to labor and to wait.
3. Where ignorance is bliss,
'Tis folly to be wise.—*Thomas Gray.*
4. Virtue, when proved and full
Matured, inclines us up to God.—*Robert Pollock.*
5. A moment's thinking is an hour in words.—*T. Hood.*

6. Learn how sublime a thing it is
To suffer and be strong.—*H. W. Longfellow.*
7. Thank God for grace whoever weeps.—*E. B. Browning.*
8. Every man is the architect of his own fortune.
9. An ounce of prevention is better than a pound of cure.
10. Example teaches more than precept.
11. Civility is a charm that attracts all men.
12. Know thyself if thou wouldst know others.

GEOLOGY.

Coal—

Coal is a vegetable substance. It is formed from decomposed trees. It is dug from the earth similar to minerals, and is therefore classed with them. There are two kinds of coal found in the earth. They are called *anthracite* and *bituminous*. Charcoal is pure carbon, and is manufactured by piling wood in stacks, covered with turf, and burned so as to draw off the oxygen and leave the carbon of the wood. The anthracite is the hardest coal, and freest from flame. It burns slower and longer. Anthracite is found, chiefly, on the eastern slope of the Alleghanies. The bituminous is softer, and contains more oil; therefore it has more smoke and flame. It is found abundantly along the Ohio Valley, in California and in Great Britain.

These great coal-beds prove that there is a kind Providence over all the affairs of this earth. To form them required a long time. At some past time, the earth has been submerged with water; and where these beds are, were great forests. The water passing off, they were imbedded in clay; the surface hardened, and under the action of heat, they were gradually turned to *coal*. In some mines, whole trees are sometimes

found turned to coal. Many of these mines are very large, and a great many people are employed to work them. Coal mines are often very dangerous, owing to the accumulation of a gas called fire-damp, which will explode when it comes in contact with flame. To prevent it, Sir Humphrey Davy invented the safety-lamp, which is simply a lamp surrounded with wire-cloth; because flame will not pass through the holes of wire-cloth. One of the great coal-mines of England has been on fire for thirty years, and has at last been put out by throwing immense quantities of *carbonic acid gas* into the mine. Fire will not burn in that gas; and when lamps in a room burn very dimly, it proves that the air is not pure.

Petroleum oil is made from the bituminous coal, and is often found in springs and wells near the coal-beds.

Lava—

When the melted substance that flows from a volcano hardens, it is called lava; and is as various in its structure as the materials are that are melted with it. Some of it is very fine, and can be used for the finest ornaments. The Chinese use it for vases and water-pitchers.

Coral—

This is a wonderful formation of rock, made by millions of little animals that cannot be seen by the naked eye, unless united together in a mass. The coral insect works in the warm tropical seas, and its work is prodigious. Near the coast of Australia is a reef of over 1,000 miles. Florida is made up of these reefs—age after age joining the new islands to the main land. Coral is found, mainly, of two colors, red and white.

Fossils—

I have said fossils were the remains of plants and animals found in rocks and earth. The term is derived from a Latin word which means to dig. These fossils are very abundant, and teach us many a curious fact concerning the past history of our earth. Prints of feet and leaves, shellfish and petrified wood, are all fossils. In Siberia are found great beds of fossil remains of elephants, proving that once that was a warm climate. All through Europe, are found such beds of extinct animals. Limestone is found near Paris containing 1,200 species of shells. These fossil remains, found all over the earth, show us that our globe has passed through other conditions than the one

now existing; and in studying this "testimony of the rocks," as Hugh Miller, of Scotland, called it, we will find much to wonder at.

OLD CITIES.
Rome—

Rome was built 753 years before Christ. It is situated on the Tiber river, and built on seven hills. It was at one time so powerful that it was called "the mistress of the world;" It was founded by Romulus. From a small tribe, the Romans grew to be a great people. They were brave and cultivated. They adorned their city with all that art could do. But she is now a fallen city, and is only a wreck of what she was once. Among her famous buildings are the Coliseum, and Vatican. Some of her great men were Brutus, Scipio, Marius, and Julius Cæsar.

Babylon—

This city is now buried beneath the sands. It was built on the Euphrates river, which ran through it. It was founded by Nimrod, and became one of the most noted and powerful cities of

the world. It was surrounded by an immense wall 350 feet high, and had one hundred gates of brass. This wall was wide enough for three chariots to pass at a time. The city was conquered by Cyrus, King of Persia, who turned the Euphrates river into another channel, and then his army entered the city by the old river-bed, which ran under the walls. There is scarcely a stone left to tell its place, and the country around is well nigh a desert.

Carthage—

Is also buried and lost. It was situated on the north coast of Africa, and was built by Dido—a Queen from Phœnicia. It was twice destroyed, the last time by the Romans. The last city is now about eight or ten feet below the surface; and from twenty to thirty feet below that, the remains of the first Carthage are found.

Herculaneum—

A beautiful city in Italy, was destroyed by a volcanic eruption, and buried beneath a storm of hot ashes. Excavations have been made, and many rare things have been found.

Athens—

The capital of Greece, was renowned for its fine buildings, and the culture

and refinement of its inhabitants; but its glory has departed.

St. Petersburg—

Is the oldest city of Russia. It was founded by Rurik, the pirate, and was called the "Novgorod." Moscow is another famous Russian city, which had the oldest and grandest palace, called the *Kremlin*. This city was burned by its inhabitants, rather than let it fall into the hands of Napoleon Bonaparte, who had marched from France with a large army to take it.

Venice—

Is built on the Adriatic Sea. Its origin was quite humble; yet it is now considered one of the most beautiful cities in the world. It was built on marshy islands, seventy-two in number. As they grew and became strong, they united into one city for their mutual defence and benefit. The channels between the islands they have ornamented and turned into canals. These canals are now the *streets* of the city; for the people travel mostly in boats, called *gondolas*.

Also describe

Jerusalem,
Troy,
Palmyra,

Mexico,
Calcutta,
Yeddo.

ARCHITECTURE.

From the earliest period, mankind have been in the habit of building a shelter for themselves. This is a sort of instinct that is common to all animals. The fox has his own home, the beaver builds his mansion with great skill. The birds have their nests, the spider his web, and the fish seeks the shelter of the beautiful sea-weeds, or carries his home on his back, into which no other dare intrude. Some will even live together in the same house. Thus, the prairie-dog, the owl and the snake will share the same hole in peace.

There is as great a variety among the habitations of men, as there is diversity in their natures and circumstances. The ice-huts of Labrador are as comfortable to the northmen as the thatched tents of Africa, are to the Ethiopian.

Architecture is a symbol of civilization. As man improves in character, he shows it by improving his home and all its associations. The Bible mentions several fine buildings; among them, the temple built by Solomon. The Tyrians and Egyptians were the oldest architects, many of their great works still remaining. The Greeks and Romans also excelled in this art. It

was customary in the old cities to surround them with high walls, the building of which required great labor and time. The walls of Babylon and Jerusalem were works of great architectural skill. There is also one in China which is very old.

ARCHITECTURE—CONTINUED.

It was in Greece and Rome that this art received the most attention and culture. Pericles was the Grecian who was most famous as a master of it. In Rome it prospered under the fostering care of the Emperor Augustus.

There are five orders of ornamental architecture. They are called *Tuscan*, *Doric*, *Ionic*, *Corinthian* and *Composite*.

Several other styles are used, but these are considered the highest standards. The Normans use the Gothic; the Chinese and Moors have peculiar styles of their own.

The Tuscan is the most simple order, being devoid of all ornament. It was used in Tuscany. The Doric, of Greece, was also simple; but it had more ornament than the Tuscan. The Ionic was also Grecian, and was still more ornamental than the Doric.

The Corinthian was exceedingly elegant, having fluted pillars and their capitals adorned with carved leaves.

The origin of this order was simple. A lover had lost his intended bride; and gathering all her jewels and trinkets in a basket, placed it on her grave with a marble slab upon it. A wild acanthus growing near soon threw its convoluting leaves over it; and an artist, passing by, observed its peculiar beauty, and drew it for the head of the *Doric* column. The name of the artist was Callimachus.

The Composite is formed of the other

four, and is entirely Roman or Italian. Learn the meaning of the different terms used in architecture: Column, Architrave, Capital, Frieze, Dome, Abutment, Transept.

Describe, also, the following famous buildings and ruins: Coliseum, Kremlin, St. Peter's, Duoma, Westminster Abbey, Notre Dame, Vatican, Abbotsford, Sphinx, Strasbourg, Catacombs, Appian Way, Faneuil Hall, Independence Hall.

MISCELLANEOUS QUESTIONS.

1. What are Mosaics?
2. What are Frescoes?
3. Where is the Bridge of Sighs?
4. Where is the Hellespont?
5. What is a Mausoleum?
6. What is meant by *The Rubicon*?
7. What is spontaneous combustion?
8. What are the seven wonders of the world?
9. What are the Fine Arts?
10. Who first made musical instruments?
11. What musical instrument is mentioned oftener in history and poetry?
12. Who were the Gracchi?
13. What are hieroglyphics?

14. Who were the Druids?
15. What does Anglo-Saxon mean?
16. Where was the Charter Oak? What made it famous?
17. What race are called Aztecs?
18. Where is the geranium native?
19. What country was called Helvetia?
20. What was the Armada?
21. Where is the Republic of San Marino?
22. What is a glacier?
23. What is a mosque and a pagoda?
24. Describe the proportions of the first ship.
25. What straits were called Hercules' Pillars?
26. Who were the Moguls?
27. Who was Montezuma?
28. Where is the best marble found?
29. How old are the California Big Trees?
30. What is their botanical name?
31. To what family do the redwood, banana, and pine tree belong?
32. Who said "*Never give up the ship?*"
33. Who demanded the surrender of Tyconderoga? By whose authority did he do it?
34. What is the favorite form of architecture in England?
35. Describe "Fingal's Cave," "Giant's Causeway," "Mammoth Cave," "Grotto of Antiparos."
36. What are stalagmites and stalactites?
37. Where is the Valley of Chamouni?
38. What cities have been destroyed by earthquakes?
39. What is a lever?
40. What did Archimedes say about a lever?
41. What terms are used in philosophy for a poker, the oar of a boat, chisel, needle, and axe?
42. What is meant by the thread of a screw?
43. What was the origin of the word Eureka?

44. Who was Daniel Boone, Black Hawk, Moll Pitcher, Paul Revere, and the "Mill Boy of the Slashes?"
45. Who are the principal authors on Geology?
46. What is gneiss and gypsum?
47. Tell the constituent properties of milk.
48. How many teeth have human beings?
49. What was the origin of the days of the week?
50. What is an amice, ailette, ampyx, amulet, and toga?

FIRST GRADE.

MISCELLANEOUS QUESTIONS.

1. Describe the terms of the "Magna Charta."
2. What was the Ostend Treaty?
3. How much money was paid for Louisiana?
4. What is the plummet?
5. Where is the Mont Cenis Tunnel?
6. What is the island of St. Helena noted for?
7. What birds are found at Cape Horn?
8. Who wrote "Paradise Lost," "Jerusalem Delivered," "The Deserted Village," and "Canterbury Tales."
9. How far up can men live on the mountains?
10. What is the action and result of glaciers?
11. What is the Tower of London?
12. Why are plants and animals arranged in families?
13. Mention the principal trees found in the Amazon Valley?
14. What is the nature of the Dead Sea?
15. Who was Belshazzar?
16. Who was Touissant L'Ouvreture?
17. What is the Colossus at Rhodes?
18. What was the Alexandrian Library?
19. What writers are called "The Bard of Avon," "The Father of English Poetry," "The Etrick Shepherd," and the "Sweet Singer of Israel?"
20. What is the Koran?
21. What is meant by the "Orient" and the "Occident?"

22. What are the national emblems of England, America, and the United Kingdom of Great Britain?
23. What race has the crescent for an emblem?
24. Which is the higher land, Minnesota or Canada? How can you tell?
25. What does "Vox Populi" mean?
26. What is the solar system?
27. What is the zodiac?
28. Why is the planet Mars red?
29. What is mythology?
30. Describe the characters of Neptune, Vulcan, Jupiter, Juno, Apollo, Minerva, and Prometheus.
31. What were "The Graces" and "The Muses"?
32. What was the Gordian Knot?
33. For what is Mt. Athos noted?
34. Of what kind of rock is Mt. Sinai formed?
35. What people spoke the Celtic language?
36. What poets were called the "Rhyming Chronicler," "Trovores," and "Troubadour"?
37. Tell the difference between the pine cones and fir cones.
38. How may the varieties of pines be distinguished?
39. What are the different falls of Yosemite named?
40. What geological peculiarity is noticed in the "Half Dome"?
41. Where are the chamois, yak, and llama found?
42. What is liberty? What is bronze?
43. Ought men to obey and be governed? Whom shall they obey? What kind of sculpture is styled alto-relievo and basso-relievo?
44. What is conscience? What is a balister, portcullis, and redoubt?
45. What is "The Right"? What is "The Wrong"? What is heraldry?
46. Who wrote these lines?—

"To thine own self be true,
And it must follow as night the day,
Thou canst not then be false to any man!"

BIOGRAPHIES.

- | | |
|-------------------------|----------------------|
| 1. Charlemagne. | 13. Rufus Choate. |
| 2. Frederick the Great. | 14. Edward Everett. |
| 3. Sir Humphrey Davy. | 15. Prof. Agassiz. |
| 4. Mary Queen of Scots. | 16. William Cowper. |
| 5. Lord Bacon. | 17. Edmund Spencer. |
| 6. Elizabeth Browning. | 18. Gen. Mitchell. |
| 7. Victor Hugo. | 19. Gen. Baker. |
| 8. Dr. Kane. | 20. Cotton Mather. |
| 9. Lamartine. | 21. Roger Williams. |
| 10. Gen. Lafayette. | 22. Miles Standish. |
| 11. Victor Emmanuel. | 23. Dr. Livingstone. |
| 12. Kossuth. | |

EXTRACTS.

A man should never be ashamed to own he has been in the wrong, which is simply saying that he is wiser to-day than he was yesterday.

—*Alex. Pope.*

He prayeth best, who loveth best
All things, both great and small.

—*Samuel Coleridge.*

There is a moment of difficulty and danger, at which flattery and falsehood can no longer deceive, and simplicity no longer be misled.

—*Junius.*

Virtue, like the clear heaven, is without clouds.

—*Sir Philip Sydney.*

You would not make the guardian of your child the man who has no sense of God or conscience. If not, why make him guardian of a State?

—*Bishop Berkeley.*

Whatever withdraws us from the power of our senses, whatever makes the past, or the future predominate over the present, advances us in the dignity of thinking beings.

—*Dr. Johnson.*

SCULPTURE.

This art is very old. It is a method of representing ideas by carving on stone, or shaping clay. In old times, it was the way they recorded national affairs. It has various forms. Printing is only an improvement on the old methods of stamping records. Heathen nations have always represented their gods by some crude image carved in wood or stone. The "golden calf" was a specimen; also, the "brazen serpent."

Greece was the first nation that cultivated it, and made it a beautiful art. She had many famous artists and sculptors. Phidias was considered the master of it. He was born in Athens. He carved many statues in ivory.

The Romans did not practice the art much, but they patronized the artists of Greece, and collected many fine works in Rome. But it was a long time before the art was cultivated out of Greece. The first academy of art was founded in Florence in 1350. Then Michael Angelo became the grand master of it.

PAINTING.

The art of representing objects in paint is also an old one. The Bible refers to

it in the city of Babylon. There is no record of painting among the Hebrews or Egyptians. It is old with the Chinese, but not a perfect art with them. As with sculpture and architecture, Greece and Rome took the lead with painting. Among the old Etruscans it was practiced. Etrusia was the old name of Tuscany. The different styles of painting are named after the nations that excel in it. There are about six "schools" or styles. Italian, Flemish, Dutch, French, German, and English.

Of the Italian, the artists famous in it are Angelo, Raphael, Titian, Vinci, Corregio, and Guido.

Of the Flemish, are Rubens, Teniers, and Vandyck.

Of the Dutch, Rembrandt, Berghem, and Ostade.

Of the French school, there are Claude, Vernet, and Poussin.

The English are Hogarth, Reynolds, Northcote, Turner, and many others. In this school are classed the Americans, among whom are Allston, West, Copley, Trumbull, Cole and Church.

A thing of beauty is a joy forever.

—John Keats.

FAMOUS BATTLES.

DESCRIBE

1. Thermopilæ.
2. Flodden Field.
3. Waterloo.
4. Battle of Cressy.
5. Bridge of Lodi.
6. Siege of Saragossa.
7. Massacre of St. Bartholomew.
8. Austerlitz.
9. The fall of Jerusalem.
10. The capture of the Guerriere.
11. Bunker Hill.
12. Saratoga.
13. Long Island.
14. Antietam.
15. Gettysburg.

EXTRACTS.

FORCE OF HABIT.—It is almost as difficult to make a man unlearn his errors as his knowledge.—*Colton.*

A KIND HEART.—How easy it is for one benevolent being to diffuse pleasure around him; and how truly is a kind heart a fountain of gladness, making everything in its vicinity to freshen into smiles!—*Irving.*

Honor and shame from no condition rise;
Act well your part; there, all the honor lies.

—*Pope.*

MEMORY is the cabinet of imagination, the treasury of reason, the registry of conscience, and the council-chamber of thought.—*Basile.*

NATURE gives to every time and season some beauties of its own; and from morning to night, as from the cradle to the grave, is but a succession of changes, so gentle and easy, that we can scarcely mark their progress.

The seeds of our own punishment are sown at the same time we commit the sin.—*Hesiod.*

When a man has not a good reason for doing a thing, he has one good reason for letting it alone.—*Scott.*

There is no study that is not capable of delighting us, after a little application to it.—*Pope.*

VALUE OF BOOKS.—Except a living man, there is nothing more wonderful than a book!—a message to us from the dead—from human souls whom we never saw, who lived, perhaps, thousands of miles away; and yet these, in those little sheets of paper, speak to us, amuse us, terrify us, teach us, comfort us, open their hearts to us as brothers.—*Kingsley.*

FAMOUS BATTLE

1. The first battle was fought in the year 1066 at the battle of Hastings. The king of France, William the Conqueror, defeated the king of England, Harold Godwinson. This battle marked the beginning of the Norman Conquest of England.

WATFORD

Watford is a town in the county of Hertfordshire, England. It is situated on the River Watling, which is a tributary of the River Great Ouse. The town is famous for its Watford F.C. football club, which has won the FA Cup in 1964.

1. The first battle was fought in the year 1066 at the battle of Hastings. The king of France, William the Conqueror, defeated the king of England, Harold Godwinson. This battle marked the beginning of the Norman Conquest of England.

2. The second battle was fought in the year 1088 at the battle of Clontarf. The king of Ireland, Brian Boru, defeated the king of the Vikings, Sigtrygg Silk-Beard. This battle marked the end of Viking rule in Ireland.

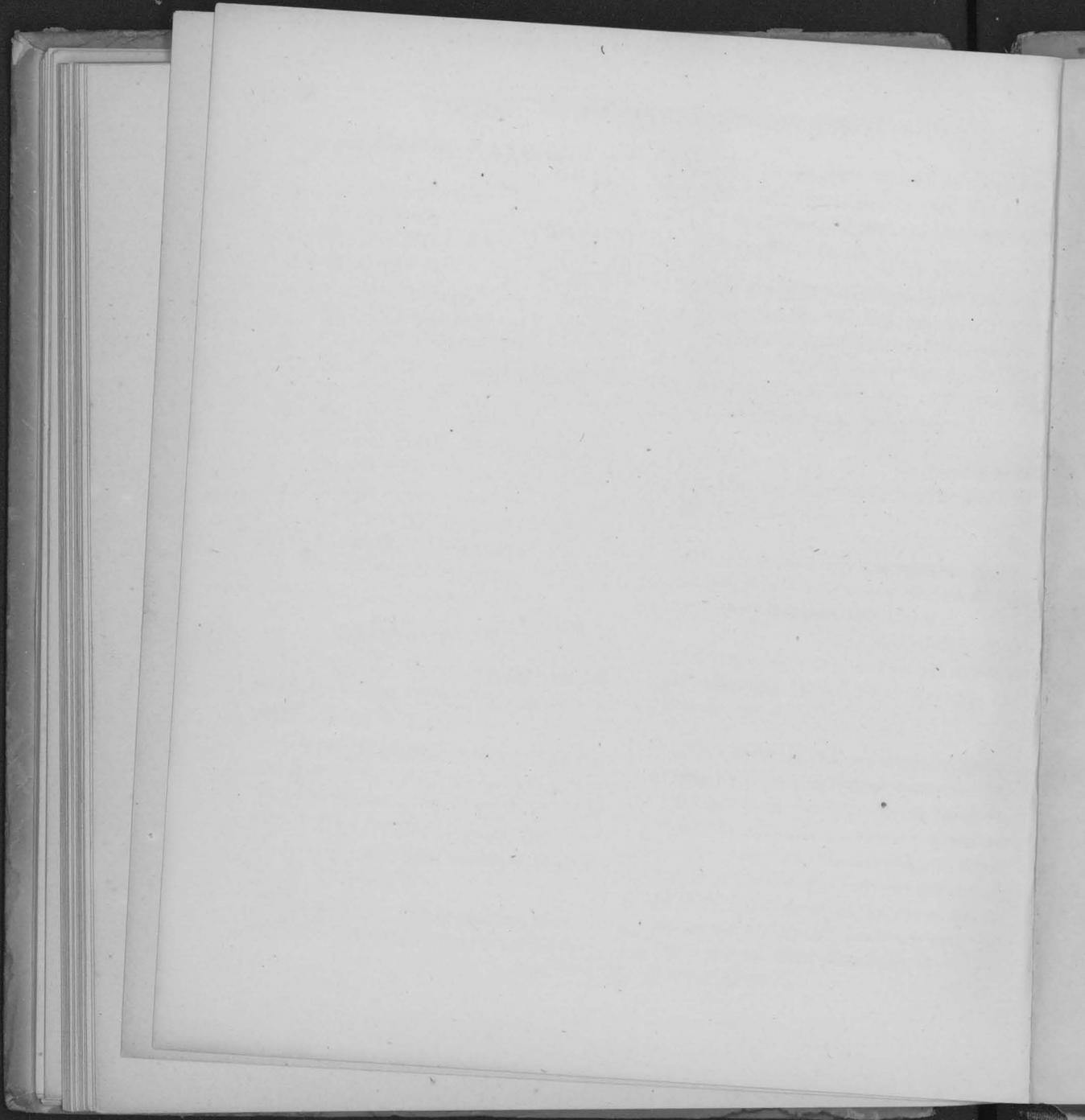
3. The third battle was fought in the year 1171 at the battle of Clontarf. The king of Ireland, Brian Boru, defeated the king of the Vikings, Sigtrygg Silk-Beard. This battle marked the end of Viking rule in Ireland.

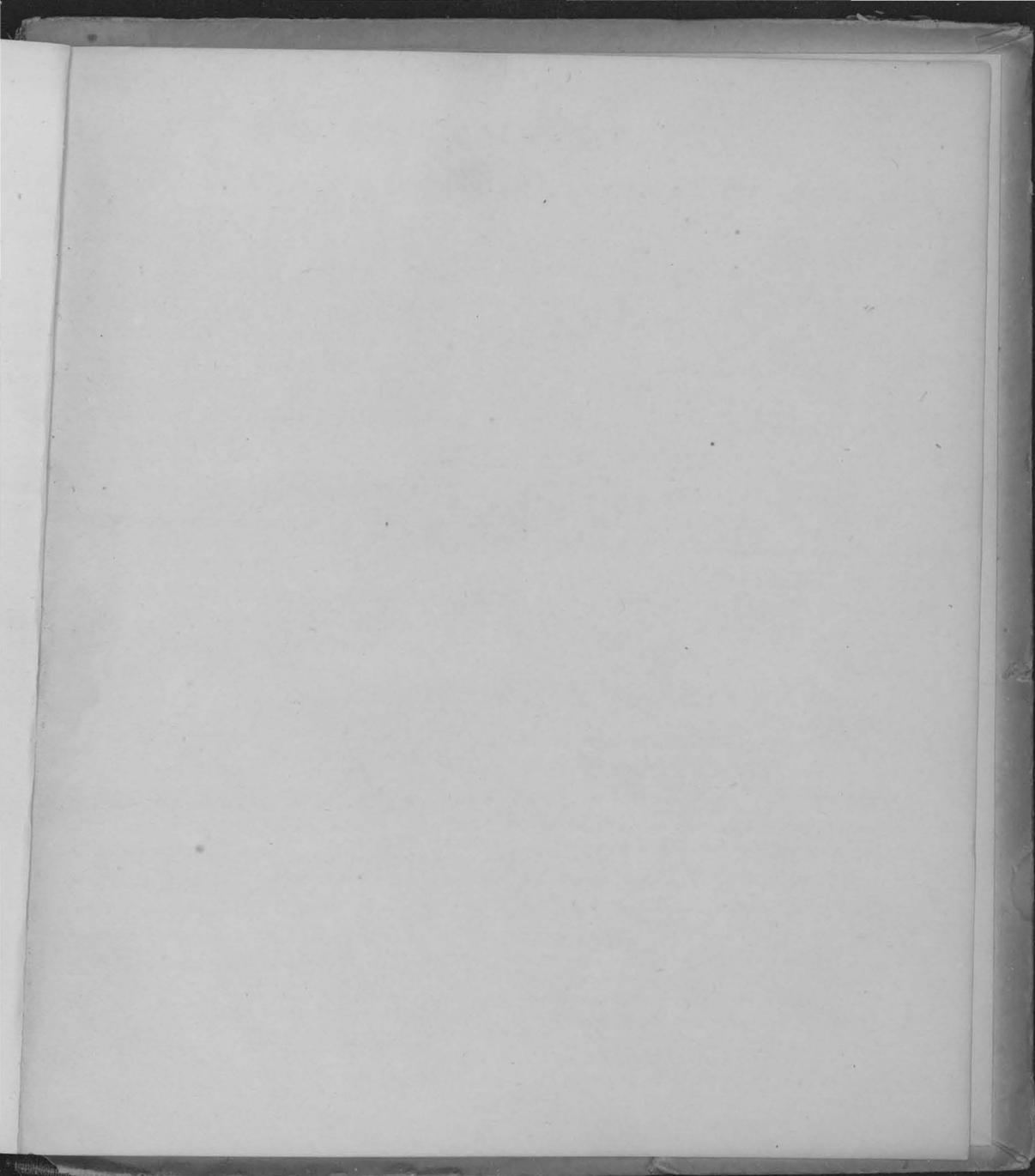
4. The fourth battle was fought in the year 1213 at the battle of Brunanburh. The king of Scotland, Alexander II, defeated the king of England, John. This battle marked the end of English rule in Scotland.

5. The fifth battle was fought in the year 1297 at the battle of Stirling. The king of Scotland, Robert Bruce, defeated the king of England, Edward I. This battle marked the beginning of Scottish independence.

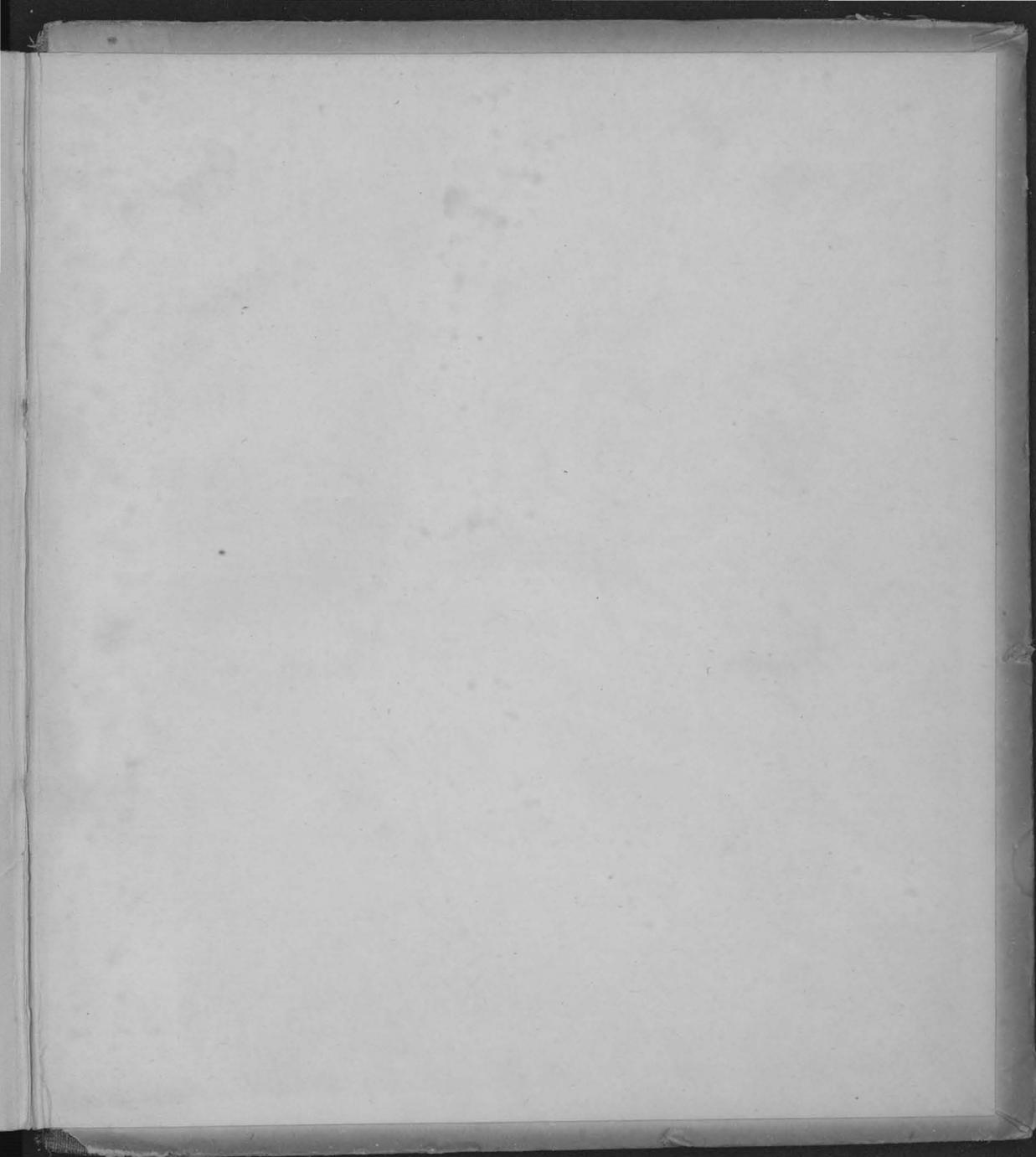
6. The sixth battle was fought in the year 1314 at the battle of Bannockburn. The king of Scotland, Robert Bruce, defeated the king of England, Edward II. This battle marked the beginning of Scottish independence.

7. The seventh battle was fought in the year 1320 at the battle of Falkirk. The king of Scotland, Edward Bruce, defeated the king of England, Edward I. This battle marked the beginning of Scottish independence.











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