

W. H. ...

MILITARY GEOGRAPHY

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Delivered Before the Class of Officers at the
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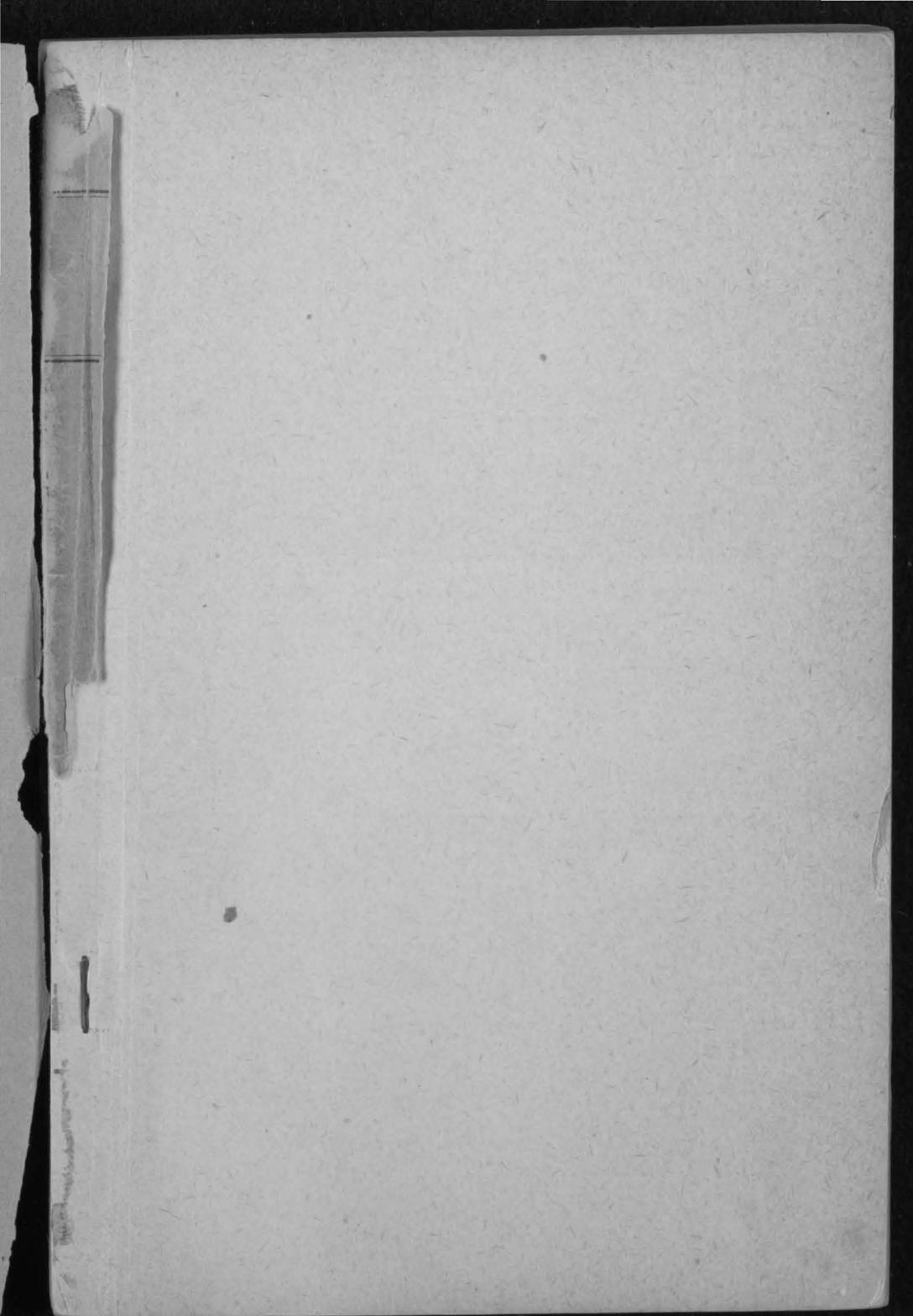
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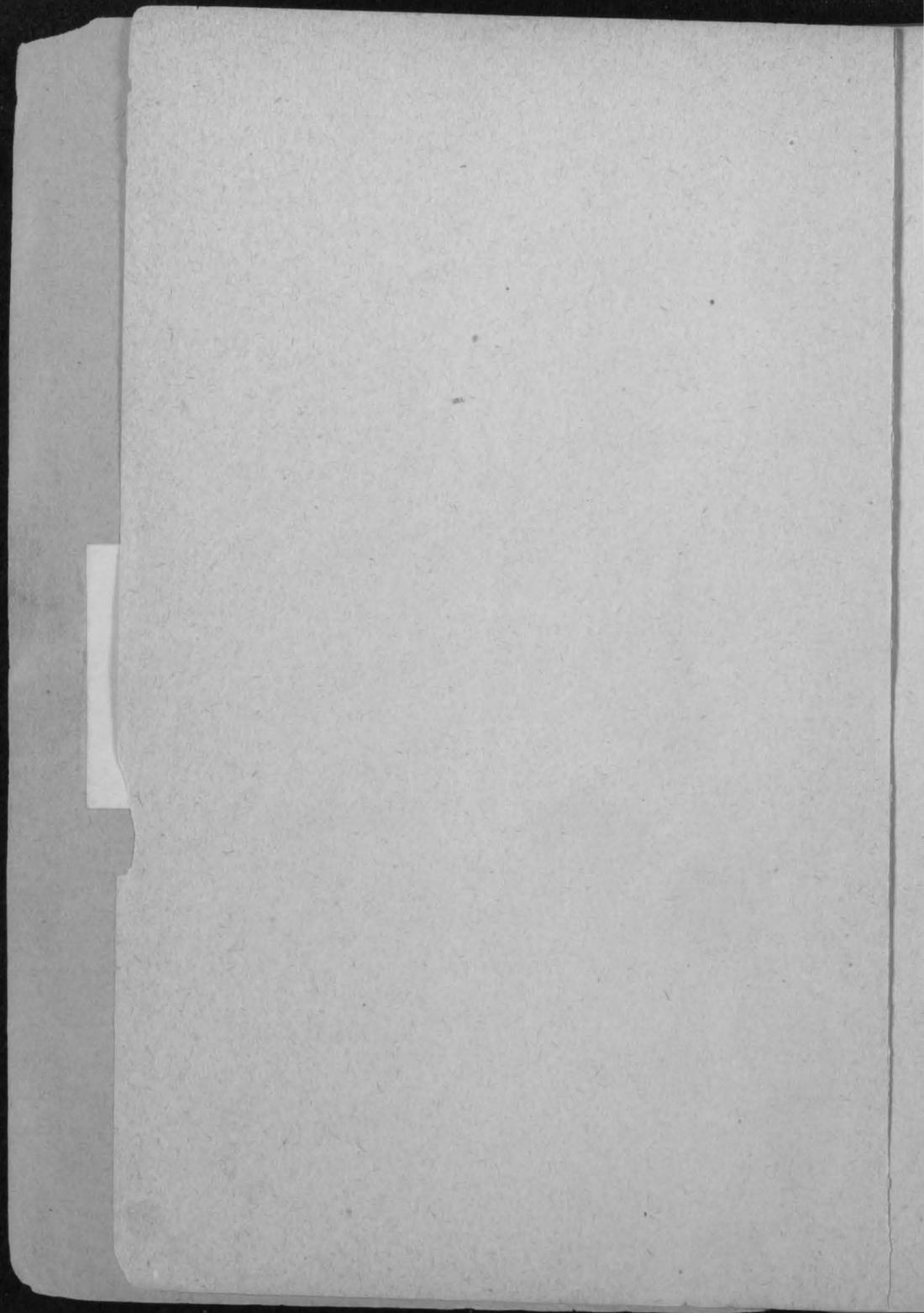
SECTION.

SUBJECT.

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GEOGRAPHY.
CANADA.





MILITARY GEOGRAPHY.

LECTURES IN THE DEPARTMENT OF MILITARY ART,
DELIVERED BEFORE THE CLASS OF OFFICERS AT THE
U. S. INFANTRY AND CAVALRY SCHOOL,
FORT LEAVENWORTH, KANSAS,
1893—1895.

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UNITED STATES INFANTRY AND CAVALRY SCHOOL,
1895.

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NOTE.

It being impracticable to illustrate the following lectures with suitable maps, the reader is referred to the maps in the Encyclopædia Britannica. (Ninth Edition) presented with the subjects America, Canada, Ontario, Quebec, New Brunswick, and Mexico, or to the maps of Canada, Chili, and the West Indies in Stieler's "Hand Atlas."

ERRATA.

- Page 5, line 2, for *statesmen* read *statesmen and generals*.
Page 6, line 8, for *georgaphical* read *geographical*.
Page 47, line 32, for *Novia* read *Nova*.
Page 53, line 13, for *indian* read *Indian*.
Page 53, line 14, for *produceda* read *produced a*.
Page 56, lines 5 and 6, for *Tarcapaca* read *Tarapaca*.
Page 60, line 21, for *pretaining* read *pertaining*.
Page 62, line 14, for *rail-road* read *railroad*.
Page 62, line 29, for *Korner* read *Körner*.
Page 64, line 6, for *mould* read *would*.
Page 65, line 7, for *rail-road* and *rail-way* read *railroad* and *railway*.
Page 65, line 14, for *rail-roads* read *railroads*.
Page 69, line 31, for *verdue* read *verdure*.
Page 74, line 12, for *Mexicon* read *Mexican*.
Page 75, line 4, for *fundemental* read *fundamental*.
Page 75, line 25, for *Governmentene* read *Government*.
Page 76, line 28, for *Polosi* read *Potosi*.
Page 81, line 1, for *indians* read *Indians*.
Page 81, line 17, for *customery* read *customary*.
Page 83, line 1, for *warrented* read *warranted*.
Page 84, line 1, for *parallelling* read *paralleling*.
Page 84, line 13, for *canons cañons*.
Page 86, line 13, for *was* read *were*.
Page 87, line 3, for *Saltille* read *Saltillo*.
Page 93, line 17, for *indians* read *Indians*.
Page 117, line 18, for *definatly* read *definitely*.
Page 122, line 32, for *revivifications* read *revivification*.
Page 126, line 20, for *he* read *the*.
Page 129, line 6, for *westeru* read *western*.

THE MILITARY GEOGRAPHY OF CANADA.

By Captain ARTHUR L. WAGNER, Sixth U. S. Infantry.
Instructor in Military Art.

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WHEN one nation finds itself at war with another, its statesmen are at once confronted with the problem of so shaping the conduct of the war as to gain the greatest possible advantages from existing conditions; to encounter the forces of the enemy under such circumstances as to gain the greatest probability of success, to reap the greatest results from victory, and suffer the least from defeat; and, in brief, so to conduct the war as to lead to an honorable peace with the least outlay of blood and treasure, and to relieve their own people, as much as possible, from the burden of misery inseparable from the state of war.

As we know from our studies in the Art of War, the question which first arises is, whether to assume the offensive or await the enemy in a defensive position. This, as Hamley says, will depend upon many considerations, to wit,—the relative strength of the opposing forces,—the political policy of the nation,—the relative capacity of the belligerents for

the prompt mobilization and concentration of their forces,—or certain geographical considerations which may give to one, and deny to the other, the power of assuming the offensive. Then, if the offensive be chosen, comes the question of the selection of an object; in which also political and geographical considerations enter; the selection of a theatre in which the same considerations are to be weighed; and finally the choice of a line of operations, in which geographical considerations are generally paramount, as affecting the all-important matters of supply, of the composition of the forces, and the general strategy of the campaign.

Taking these questions in their order, we find in the first a greater field, perhaps, for the diplomat than for the general; in the second and third, military circumstances increase in importance; and in the fourth, political considerations generally (though not always) vanish, and the solution depends upon military conditions alone. It is impossible, however, to weigh any of these questions without being influenced by geographical considerations, from the time the war-policy of the nation is discussed in the cabinet, until the problem is wrought out to a practical solution on the field of battle.

Hence arises the importance of the study of military geography; which may be described as the study of geography with reference to the operations of armies; and which from its very nature, necessarily embraces many features of political as well as physical geography.

To a student of the Art of War, the study of the military geography of any country is an interesting one; but it is, perhaps, only when the study is applied to countries whose interests are closely bound to our own, whose foreign policy may clash with that of the United States, and whose territories may be the theatre of operations of our armies—or to those parts of our own land which may feel the tread of the invader—that it becomes to us a study of importance second to no branch of the Art of War. Applied thus to the Dominion of Canada, the subject becomes one of great moment

to every American officer.

British America embraces all of the North American continent north of the main portion of the United States, excepting Alaska and Danish America. With the exception of Newfoundland and Labrador, it is all comprised in the Dominion of Canada, which, with a population of only 5,000,000, has an area of 3,500,000 square miles—an area nearly equal to that of Europe. It comprises the provinces of Ontario, Quebec, New Brunswick, Nova Scotia, Prince Edward Island, Manitoba, and British Columbia, and the territories known as Assinaboia, Saskatchewan, Alberta Athabasca, North West Territory, Keewatin, Northern Territory, and North East Territory. A glance at the map shows us that this immense country is, roughly speaking, bounded on the east by the Atlantic Ocean, on the west by the Pacific, and on the south by the United States; while on the north its boundary is lost in the region of perpetual ice and snow. For us, the southern boundary of the Dominion is the only one which requires careful examination; for Canada is unassailable on the north, while she can be attacked on the east and west only by a nation superior to Great Britain in naval power—in other words, three sides of the irregular quadrangle which forms the Dominion of Canada are practically safe from assault.

The boundary line between the United States and Canada begins in Passamaquoddy Bay and follows the St. Croix River to its head waters; then goes due north to the St. John River; passes up the St. John to the mouth of the St. Francis River; ascends the latter river about thirty miles; then runs in a southwesterly direction on an irregular line (almost coincident with the crest of the watershed of the Atlantic and the St. Lawrence) to the 45th parallel of north latitude; along this parallel to the St. Lawrence River; up the St. Lawrence, Lake Ontario, Niagara River, Lake Erie, Detroit River, Lake St. Clair, St. Clair River, Lake Huron, and St. Mary's River to Lake Superior; through Lake Superior to

the mouth of Pigeon River; up a chain of lakes and small rivers to the Lake of the Woods; then, from the outlet of this lake into Rainy River, across to the point known as the Northwest Angle of the Lake of the Woods; due south to the 49th parallel of north latitude; then, in a great sweep across the Continent, along this parallel to the Gulf of Georgia; and then down this gulf, passing west of the San Juan Island, through the Juan de Fuca Strait, to the Pacific. One-third of this great boundary line consists of natural frontier.

The great physical divisions of the United States known as the Atlantic Slope, Pacific Slope, and Mississippi Valley, each with a more or less pronounced declination towards the equator, have in the Dominion of Canada their continuation or counterpart with a general slope towards the Arctic Ocean. The main chain of the Rocky Mountains, running parallel to the Pacific coast, marks the eastern boundary of the Pacific Slope of Canada; a region some 400 miles wide (from east to west) and 1500 miles long, possessing "a mild and humid atmosphere as far north as the 55th parallel, but inhospitable and barren beyond the boundary." East of the Rocky Mountains lies the Great Northern Plain, the southern boundary of which is the watershed between the waters of Hudson's Bay and those of the Gulf of Mexico or the Great Lakes, and the greater part of which may, roughly speaking, be said to be coincident with the 50th parallel; while south of James Bay, the boundary between the Plain and the Atlantic Slope consists of the Height of Land and the Watchish Mountains, trending in a direction generally parallel to the St. Lawrence River, and about 150 miles from it. The greater portion of this region has been well described as a "bleak and bare waste, overspread with innumerable lakes, and resembling Siberia both in physical character of its surface and the rigor of its climate."

The Pacific Slope of the Dominion may be dismissed from our consideration in a very few words. In one sense, British Columbia is more exposed to invasion than Canada

proper, the boundary line being mainly an artificial one; but the roads leading across the frontier are few and poor, and though there are now two railroads* penetrating the heart of the province from the south, which would greatly facilitate the supply of an invading army, there is no objective in the main portion of the province of sufficient importance to justify military operations of any magnitude. The two points of special importance, Victoria, (the capital) and Esquimault (the great naval station) are both on Vancouver's Island, safe from attack so long as England maintains her supremacy on the sea.

It is scarcely necessary to consider the Alaska-Canada frontier at all, though Colonel Strange in his able paper on the "Military Aspect of Canada" seems to regard Alaska as a possible secondary base for the Americans. If our navy were what we should like it to be, but what we may despair of its ever being, we might protect Alaska; but we could make no earthly use of it as a base, owing not only to the difficulty, under the best conditions, of transporting an army thither, but to the absence of any sane objective after we got there. Under existing conditions, if war should occur between the United States and Great Britain, our flag would, doubtless, be speedily lowered in Alaska, to be raised again only as a result of American victories in other theatres.

The Atlantic Slope of Canada comprises all the older, more populous, and wealthier provinces of the Dominion. In it would lie all the important theatres of war if we were engaged in a conflict with Great Britain; and a consideration of its geography is, therefore, a matter of especial consequence to the American military student. This portion of Canada embraces the provinces of Ontario, Quebec, New Brunswick, Nova Scotia and Prince Edward Island; though the last named province may be neglected as not lying within

*The Spokane Falls and Northern and the extension of the Great Northern R. R. from Everett to New Westminster.

any probable theatre of operations.

Mountains.—Quebec is generally mountainous. The portion of this province lying south of the St. Lawrence is traversed through almost its entire length by the Notre Dame (or Green) mountains, a continuation of the Appalachian range, running almost parallel to the St. Lawrence River, and terminating at the Gulf of St. Lawrence in a high tableland having an elevation of 1500 feet. The highest peaks of these mountains are about 4000 feet high.

North of the St. Lawrence the Laurentian Range, beginning in Labrador, trends in a south-westerly direction, and skirts the north shore of the great river to the vicinity of Quebec, where it leaves the banks of the stream. It then keeps nearly parallel with the river, but some miles back from the shore, until about thirty miles west of Montreal, where it skirts the Ottawa River for a hundred miles, leaps the river, as it were, and trends in the direction of Kingston. From the vicinity of that city, the range extends north-westward to the shores of the Lakes Huron and Superior, and finally tapers off into the levels of the Great Northern Plain. "Some of the hills of the Laurentian Range are 1300 feet high, and below the city of Quebec their altitude is 3000 feet.

In the northern and northwestern portion of New Brunswick are several hill ranges, of altitude varying from 1200 to 2000 feet. In the southern part a considerable range of hills runs almost parallel to the coast of the Bay of Fundy, and at a distance of 20 or 30 miles from it.

In Nova Scotia are several chains of high hills (some having an altitude of 1100 feet) running generally parallel to the coast. These hills lie nearer to the coast of the Bay of Fundy than to that of the Atlantic. The principal chain, known as the Cobequid Mountains, runs east and west, parallel to the path by which an invading army would enter from the isthmus joining Nova Scotia and New Brunswick, and thus might have a strategic value of some importance.

Topography and Products.—The southern, or most popu-

lous part of Ontario is, generally speaking, a plain; though it is rather undulating, and along the shores of Lakes Erie and Ontario is in many places broken by shelving rocks and precipices. The province is often termed "The Garden of Canada," and is a region of surpassing fertility. Its average yield of wheat, oats and barley exceeds that of our best States. It produces fruits of various kinds in great abundance, is without a superior as a sheep-raising country, and its exports of cattle and bread-stuffs are large.

The province is generally well cultivated, and has fairly good roads. On the whole, it is well suited to military operations. The heavily timbered region lies almost altogether north of the probable theatre of operations; and the products of the province would greatly facilitate the supply of an invading army.

In the province of Quebec, wheat, barley, oats, rye and hay are produced in large quantities, and the exports of cattle and beef are considerable. "Dense forests cover enormous tracts of territory," and the province, as a whole, is heavily wooded. The country has a great number of good wagon roads. Artillery could thus be easily transported; but, owing to the mountainous and wooded nature of the province, an invading army would, doubtless, require a minimum of artillery and cavalry and a maximum of infantry. The products of this province, too, would greatly facilitate the supply of armies operating in it.

Except in the mountainous region already referred to, the surface of New Brunswick is generally undulating. Though the country is not infertile, the agricultural products are not sufficient for home consumption. Hay is produced in great quantities, but the province is not suited to the operations of cavalry or the extended use of artillery, being one of the most heavily wooded regions in the world. The supply of an invading army would receive scanty assistance from the products of this province, and its operations would be impeded by natural features which would lend great ad-

vantages to the defense.

Nova Scotia is a more productive province than the one just considered, cereals and fruits growing in abundance. The country contains extensive forests, but its roads are numerous, and of excellent quality. The obstacles that would be encountered by an invading army would, however, be found in other natural obstacles than those yet considered.

Rivers.—The waterways of Canada, whether we consider the creations of the Almighty or the work of man, demand the chief attention of any one who considers the Dominion either from a commercial or military point of view. No country in the world has a more complete system of water communication. First of all is the St. Lawrence River, draining the Great Lakes and extending from its head at Lake Ontario 728 miles to the Gulf of St. Lawrence. This noble stream, which from its very source is a river of the first magnitude, has an average width of about one and three-fourth miles from Montreal to Quebec, narrowing to three-fourths of a mile at Cape Diamond near the latter city. Seven miles below Quebec it is 4 miles wide; 22 miles further down the width is 11 miles; at the mouth of the Saguenay it expands to a width of 16 miles; and at Cape Chat it has a magnificent sweep of 39 miles from shore to shore. The largest ocean vessels can ascend to Montreal.

We may regard the Saguenay River as part of the eastern boundary of the possible theatre of Military operations in Canada. Above this river are many others emptying into the St. Lawrence; the principal ones on the north being the Montmorency, the St. Anne, the Batiscum, the St. Maurice, the Du Loup, the Assomption, and the great tributary, the Ottawa, 600 miles long, with its tributaries Du Nord, Petite Nation, Du Lievre and Gatineau on the north, and the Petewawa, Bonne Chere, Madawaska, Mississippi and Rideau on the south. The St. Lawrence river system is completed by numerous tributaries on the south, of which the principal ones are the Richelieu, the Yamaska, the St. Francis. the

Beconcour, and the Chaudiere.

Emptying into Lake Ontario on the Canada side are the Moira and the Trent rivers; into Lake Erie, the Grand River; and into Lake St. Clair, the Thames and the Sydenham. With the exception of the last two rivers, the courses of these tributary streams are all perpendicular to the path of an invading army from Detroit to Quebec on the left of the St. Lawrence—or from Rouse's Point or Montreal, on the right of the great river to the same objective.

Among the rivers of the eastern provinces of Canada, the St. John is the most important. Navigable for large vessels as far as Fredericton, 88 miles from its mouth, and with its course partly perpendicular and partly parallel to a line of operations east from Maine, it might, in the event of a war with Great Britain, play a great strategical part which we will consider later. The Restigouche, Mirimichi, and other streams in the northern part of New Brunswick lie too far out of any probable theatre to call for notice. At the head of the Bay of Fundy is the Petitcodiac River, navigable for ships 25 miles from its mouth, and for schooners of 80 tons burden 12 miles further. From the head of ship navigation it is less than 15 miles across the isthmus to Shediac Bay, measured from the points Moncton and Shediac which are connected by rail. Thirty miles further to the east, the same isthmus again narrows its width, from Cumberland Basin to Bay Verte being about 15 miles. Two excellent positions are thus made to order, as it were, and we shall in a proper place, consider their great military value.

As to the rivers of Nova Scotia, we will only note that in mapping out a route from the isthmus to Halifax, we find the path crossed by the Phillip, Wallace, Salmon, and Shubenacadie rivers, while the line of the invading army would be parallel to the general direction of the Stewiacke and Musquodoboit. All these rivers are navigable for small craft, and the Shubenacadie is navigable for vessels of large size.

Canals.—Let us now consider the admirable system of

canals, by which the defects of the natural system of Canadian waterways have been remedied, and its advantages increased. Immediately above Montreal the navigation of the St. Lawrence is obstructed by the St. Louis or Lachine Rapids. Other rapids obstruct the navigation of the river between Montreal and Prescott (about 100 miles above), the total fall of the river from the latter to the former city being $206\frac{1}{2}$ feet. These obstacles are overcome by means of the St. Lawrence canals, which consist of the Lachine canal, $8\frac{1}{2}$ miles long; the Beauharnois Canal, $11\frac{1}{4}$ miles long; the Cornwall Canal $11\frac{1}{2}$ miles long, and the Williamsburg Canals, three in number, aggregating $12\frac{1}{2}$ miles in length, or $27\frac{1}{2}$ miles including intervening spaces of river navigation. The total length of these canals is $43\frac{1}{2}$ miles. The Lachine Canal is on the Island of Montreal. The Beauharnois, about 25 miles above Montreal. The Cornwall is about 45 miles, and the Williamsburg about 18 miles, below Prescott. The locks of the Lachine Canal are 270 feet in length by 40 feet in width, with a depth of 14 feet, and the upper canals are being enlarged correspondingly. These canals will then render practicable the passage of vessels of large size, as far as Prescott. Above that city the navigation of the St. Lawrence is without obstruction, and vessels can pass through Lake Ontario to Port Dalhousie, the outlet of the Welland Canal. This canal gives a passage from Lake Ontario to Lake Erie, which would otherwise be barred by the impracticable Niagara River, and is 27 miles long. Its locks are 275 feet long by 45 feet wide, and the depth of water on the sills is 14 feet. On emerging from the Welland Canal at Port Colborne, a vessel can pass without hindrance up the lakes as far as Chicago on the one hand, or the St. Mary's canal on the other. A canal at Sault Ste. Marie, a mile long and 17 feet deep, gives a passage into Lake Superior. As this canal belongs to the United States, and could easily be destroyed if it could not be defended, Great Britain has had the foresight to construct a similar canal lying entirely within her terri-

tory. This canal commences at the navigable channel of the St. Mary's River, opposite the town of Sault Ste. Marie, and extends up stream 5,300 feet, to the foot of St. Mary's Island, thence westward 3,500 feet to the head of the island, thence westward 9,300 feet through shoals, until the navigable channel of the river, above the rapids, is again reached, at an elevation of 18 feet above the lower entrance to the lock. The canal has one lock, in the middle section, 900 feet in length, 60 feet wide, and 20 feet 3 inches of water upon the mitre sills at low water.

The lakes are thus open to any vessel of the British navy that can pass through the canals mentioned; in other words, when the improvement of the canals is completed, they will be open to any vessel drawing less than 14 feet of water. Including the vessels now building, England has just one hundred and forty-six such vessels, three of them armored.

With one exception, all the British canals mentioned lie on the left side of the St. Lawrence. The Beauharnois Canal, which is south of the St. Lawrence and only 20 miles from the northern boundary of New York, was the weak link in the chain of canals, as its defense would be difficult, and its capture fraught with serious results to the British Empire.

This fact was recognized by Great Britain; and measures have been taken to remedy the serious defect by which the seizure or destruction by the Americans of a canal less than 12 miles long might absolutely prevent the reinforcement of the British naval forces on the lakes, or its withdrawal in case of disaster. The Soulanges canal is being constructed on the north side of the St. Lawrence. It is 14 miles long, with five locks, which are 270 feet in length, 45 feet wide, and 14 feet deep. The Rideau canal gives a water passage from Kingston to Ottawa, and thence down the Ottawa River and Lachine canal to Montreal. This canal does not at present admit of the passage of vessels of a draught greater than four and one-half feet, and is, consequently of no strategic impor-

tance. It is a significant fact, however, that it was constructed, sixty years ago, "with a view to the defense of the province," and that its enlargement is contemplated. Its new locks will have a depth of nine feet, and will accommodate fifty-four vessels now on the list of the British navy. But even when the enlargement of the Rideau Canal is completed, its strategic importance will be less than that of the proposed Ottawa and Georgian Bay Canal, by which vessels will be able to go from Montreal (by the Lachine Canal, Ottawa River, Lake Nipissing, French River, and Georgian Bay) into Lake Huron. To obtain the fullest strategic value of the latter canal the construction of two others is requisite, and both are now under construction by the Dominion Government. One of these canals is to connect Toronto with Georgian Bay by way of Lake Simcoe, the other is to join Hamilton with Port Franks on Lake Huron. With these canals completed, the loss of the Beauharnois and Soulanges Canals could be regarded by the British with comparative complacency.

The Trent River Navigation is "composed of a chain of lakes and rivers extending from Trenton, at the mouth of the Trent, Bay of Quinte, north shore of Lake Ontario, to Lake Huron." This system may be dismissed without serious consideration. It does not admit of the passage of vessels of a draught of five feet; and as it would confer no strategic advantages not obtained by the canals just mentioned, and as it seems in its present condition to answer all the demands of local traffic, its enlargement does not seem probable.

There is another waterway of less importance, perhaps, than the Welland and St. Lawrence canals, but which may nevertheless be of great value to Great Britain, or perhaps to the United States, in case of war between the two nations. Forty-six miles below Montreal is the mouth of the Richelieu. This river is navigable up to Lake Champlain, by means of a lock and dam at St. Ours (14 miles above the mouth), and the Chambly Canal, 12 miles long (32 miles further up), for

vessels drawing six and one-half feet. A new canal is proposed from Caughnawauga, on Lake St. Louis, to connect with the Chambly Canal, thus admitting of quick water transport from Montreal to Lake Champlain via St. Johns. The Chambly Canal is to be enlarged to the same dimensions as the Welland, and the new canal is to be constructed on the same scale. The possession of the Richelieu canal system would give to the British navy access to Lake Champlain—a fact sufficient to demonstrate its importance.

It is evident that while the Canadian canals are admirably adapted to the requirements of commerce, their projectors did not labor under the idea that disputes between the United States and Great Britain are always sure to be settled by arbitration.

Railways.—The Canadian system of water communication is supplemented by an extensive system of railways, the most important of which have a general direction almost parallel with the general course of the waterways. Stretching across the continent, from Halifax* to Vancouver, with a total length of about 3600 miles, is the Canadian Pacific Railroad. This road, in commercial aspects one of the greatest in the world, is furthermore of great strategical value to Great Britain. If left intact, it could, in conjunction with the Pacific steamers, in a space of forty days, transfer troops from the banks of the Ganges to the shores of the St. Lawrence; and would enable England speedily to place an Anglo-Indian army anywhere in Canada. But, fortunately for us, the portion of the road from Lake Superior to the Pacific runs parallel to our boundry and within easy striking distance of it; while the branch from Montreal to Halifax not only lies on the wrong side of the St. Lawrence for safety, but a part actually lies within the borders of the State of Maine. Col. Strange, writing more than a decade ago, says: "I have

*From Moncton, N. B., the Canadian Pacific trains run to Halifax over the Intercolonial R. R.

not taken note of the wilderness between Lake Superior and the Pacific, as it can scarcely be said to contain a military objective; an army could not subsist in it, and in any case we could not defend it, unless the Canadian Pacific Railway is constructed."

Since Col. Strange wrote the "railway has been constructed. It now furnishes in itself an objective in the region referred to, and from the very situation of the road, all the efforts of the British Empire probably could not save it from the destructive forays of cowboys from Montana and North Dakota. The Montreal and Halifax branch would, so far as being a part of the system of British communications is concerned, cease to exist as soon as war was declared. But the strategic value of the Canadian Pacific, though greatly impaired by these conditions, is still very great. A great arm of the road runs from Windsor, through Toronto and Montreal, to Quebec, with branches extending to Hamilton, Kingston, Brockville, Prescott and Ottawa.—in brief, connecting the most important strategic points of the Dominion by a railroad behind the great natural wet-ditch of the Canadian fortress. Of secondary, but not insignificant, importance, is that portion of the main line between Montreal and Port Arthur, on Lake Superior, with its branch from Sudbury to Sault Ste. Marie. This part of the road is connected laterally by a branch of the Grand Trunk from North Bay (on Lake Nipissing) to Toronto, and a small road from Renfrew to Sharon Lake.

The Michigan Central R. R., after leaving the boundary of the United States, runs from Windsor to Welland, at which point it branches to Buffalo on the right, and to Clifton and Niagara on the left. From St. Clair Junction a branch extends to Courtright on St. Clair River, from St. Thomas a short branch runs to London, and from two points, not far from Detroit, branches run respectively to Amherstburg and Sea Cliff Park, both on Lake Erie. On the outbreak of war between the United States and Great Britain, the rolling

stock of this road might, perhaps, be speedily assembled on American soil; but the Canadian part of the road would still exist as a part of the British lateral communications.

We will next consider the Grand Trunk Railway, which is, perhaps, the most important of all. One branch of this road runs from Windsor to Fort Erie; another from Sarnia to Hamilton and Niagara Falls, and a third, from Sarnia, through Toronto, Kingston, Brockville, and Prescott, to Montreal. These branches are joined laterally by a number of railways belonging to the same system, which not only connect the main lines, but are extended to points on Lake Huron, Georgian Bay, Lake Nipissing and various points in the interior of Ontario. From Coteau Junction a branch runs to Ottawa. From Montreal the main line continues to Richmond, at which point it divides into two branches, one running to Portland, Maine, and the other to Levis, opposite Quebec. From the latter branch is a sub-branch running from Arthabaska to a point opposite Three Rivers. It is evident that the part of this road, east of Montreal, loses much of its strategic value, as it lies on the wrong side of the St. Lawrence for safety, and a portion of it lies within our own territory.

At Levis, the Grand Trunk unites with the Intercolonial R. R. The latter road follows the St. Lawrence for more than a hundred miles, then turns to the right, skirts the upper part of Chaleur Bay, and continues in a southerly direction to Halifax. At Moncton the road branches east to Point Duchene (near Shediac, on Northumberland Sound) and west to St. John, N. B. From Truro, N. S., the "Eastern Extension" runs to Mulgrave Wharf on the Strait of Canso. It is evident at a glance that the Intercolonial R. R. would be of great value to Great Britain in case of war with this country, as a means of preserving lateral communication between the New Brunswick and St. Lawrence theaters.

From St. John, N. B., the New Brunswick R. R., as far

as its junction with the Maine Central, forms a part of the Canadian Pacific. Through Fredericton a branch of the N. B. R. R., connects the Intercolonial and Canadian Pacific. Another branch from the same city and one from St Andrews unite at Newburg Junction (near Woodstock), and the road then continues near, and in the general direction of the Maine frontier as far as Edmundston; a continuation from that point to Rivière du Loup being now in process of construction.

The roads mentioned comprise all the principal railways of the Dominion, and are the strategic railroads *par excellence* of Canada. There are a few other lines, but they are so short, and their military value is so insignificant, that a description of them would only tend to confuse the subject, without adding any information of importance.*

The Strategic Ensemble.—Bearing in mind the directions and relative positions of the waterways and railroads just described, we can appreciate the appositeness of Colonel Strange's description of the country in question. "Canada," he says, "is a long strip of communications, its main artery, the St. Lawrence, being the fosse of a natural fortress, open during the summer season (winter operations may be deemed impracticable in this climate) to the gunboats of Great Britain, and to them alone as long as the fortress of Quebec is kept in a defensive condition. * * * * The Grand Trunk Railway and others on the south shore are now supplemented by railways on the north shore of the St. Lawrence and the lakes, with their usual telegraphic lines, the whole forming a series of communications which have always enabled Canadian troops to act upon what are practically interior lines, and so concentrate readily upon important strategic points, as was proved in the late Fenian

*In the article "Canada," the *Encyclopædia Britannica* (Ninth Edition) mentions eighteen Canadian railroads. All the important roads there mentioned are included in the railway systems described above.

raids."

That Colonel Strange is right in saying that the St. Lawrence is open to British gunboats, and to them alone, as long as the fortress of Quebec is kept in a defensive condition cannot be denied. The treaty of 1817 limits the naval force to be maintained by the United States and Great Britain to the following vessels on each side, namely:

On Lake Ontario, one vessel, not exceeding one hundred tons burden, and armed with one eighteen pounder cannon;

On the upper lakes, two vessels not exceeding like burden each, and armed with like force;

On the waters of Lake Champlain, one vessel not exceeding like burden, and armed with like force.

Each nation is also forbidden by the treaty to build vessels of war on the lakes.

It would, therefore, be impossible for the United States to place a fleet of gunboats on the lakes without sending them around (by way of the ocean and the St. Lawrence) past Quebec; for we cannot build gunboats on the lakes in time of peace without such violation of the treaty as to furnish a *casus belli*; and after war breaks out the opportunities for unmo- lested naval construction are gone. Quebec is strongly fortified, and can be further strengthened to such a degree that nothing larger than a bird could pass by on the river without the permission of the British commandant. England, on the contrary, could assemble a great fleet on the St. Lawrence without violating the treaty, and, at the first sound of war, could send it thence through her own canals into the great lakes.

The disadvantage under which this unfortunate treaty places us can be overcome only by a careful preparation, in time of peace, of strategic canals within our own borders. The enlargement of the Erie Canal (including the Oswego branch) would enable gunboats to pass from the Hudson into Lake Erie and Lake Ontario. The Oneida Ship-canal

would also be of great value. The proposed route of this canal is from Oswego by means of the Oswego Canal to a point near Phoenix; thence by means of a new canal and the Oneida River to Oneida Lake; thence by the lake and the Oneida Canal to the Erie Canal at Durhamville. The enlargement of the Champlain and Erie Canal (from Lake Champlain to the Hudson) or the construction of a new canal from Whitehall to Fort Edward would be of very evident strategic value.

The Hennepin Ship-canal is designed to connect the Mississippi with Lake Michigan. The proposed route for this canal is from Watertown, Ill., to Hennepin, then by the Illinois River (14 miles) to La Salle, and from that point to Chicago, via the Illinois and Michigan Canal enlarged.

The improvement of the navigation of the Wisconsin and Fox rivers, and their connection by means of a canal would unite by water Prairie du Chien and Green Bay—in other words, it would give water communication between the Mississippi and Lake Michigan.

All these plans seem to have been more or less seriously contemplated by our Government, and the construction or improvement of the canals in question may be hoped for. It is a significant fact, however, that the advocates of the improvements in our internal waterways seem to consider the commercial advantages alone—advantages so marked that the most bitter opponents of the canals are those who are working in the interests of the railroads; and the strategic value of the canals (like most other military matters) seems to have been generally ignored by our people.

Yet the strategic value of the canals would be beyond computation. Our naval depots for the lake fleets could be established in safety far within our own borders; and in case of war an armada of gunboats could be sent from the Mississippi into the Lakes a full month earlier in the year than a similiar naval force could be sent thither from the Gulf of St. Lawrence. The canals joining the Mississippi and the

Lakes are not designed, however, to have a depth equal to that of the Canadian canals; the minimum depth of the Hénepin Canal being specified at eight feet, and that of the Winconsin Canal at five.

The Ohio and Erie Canal (from Portsmouth to Cleveland) and the Miami and Erie Canal (from Cincinnati to Toledo) could not easily be sufficiently enlarged to serve as ship-canals.

We may, however, question the correctness of Colonel Strange's judgment in deeming winter operations impracticable in Canada. Our own troops have endured, in winter campaigns in Montana and the Dakotas, weather of greater severity than they would be called upon to face in most parts of Canada; and the all-but-successful campaign against Quebec made by the ill-clad and half-starved soldiers of Montgomery and Arnold, who conducted siege and assault late in December, shows that "Field-Marshal Frost" is not such a formidable British ally as Colonel Strange would have us believe. In fact, without a naval superiority to Great Britain, our best hopes of success must be found in a winter campaign. I am by no means inclined to underestimate the hardships and difficulties of a campaign in the terrible rigor of a Canadian winter; but I shall endeavor, further on, to show that a winter campaign in the Dominion would be attended with results that could scarcely be hoped for in summer.

Climate.—Although Canada is always regarded as a cold country, its climate is one of extremes of heat and cold. The temperature at Toronto varies from 12° below to 91° above zero, Fahrenheit. At Montreal the limits are 17° below and 96° above. At Quebec the thermometer ranges from 24° below to 91° above zero. At Halifax the lowest point is 9° below, the highest, 88° above; while the greatest extremes of heat and cold seem to be found at Fredericton, N. B., where the mercury has been known to drop in winter to 35° below zero, and in summer to rise to 100° above.

Cities.—The cities of Canada are so well known that nothing but a brief description of them is here requisite.

First in commercial importance is Montreal (situated on an island of the same name) having a population of 216,650, and covering an area of eight square miles. The St. Lawrence is here crossed by three bridges, one of which is the celebrated Victoria bridge, an iron tubular structure nearly two miles long, supported on twenty-four piers of solid masonry. As a railroad centre, the head of unimpeded ocean traffic;* the outlet of the Canadian system of canals; in brief, as the connecting link between the ocean and the Lakes, Montreal is a point of immense commercial and strategical value, and has been termed "the key and the capital of Canada." In strategic importance it is second to Quebec alone.

Toronto (population 181,220) is, in commercial consequence, the second city of the Dominion, and is the capital of Ontario. It owes its importance to its excellent harbor on Lake Ontario and to the junction here of several important railroads. It is also a considerable manufacturing city.

Quebec, the capital of the province of the same name, has a population of 63,090, and is thus the third city in Canada. From a strategic point of view, it is the most important place in the Dominion, completely controlling the St. Lawrence, to which it can admit friendly vessels and from which it can bar out all hostile fleets. The history of every war fought on Canadian soil shows that the possession of Quebec is essential to the mastery of Canada. The place is described as "the most picturesque and the most strongly fortified city on the Continent." It was formerly a walled city, but several of the old fortifications have been demolished, and some of the gates have been removed. The chief forti-

*Vessels drawing 27½ feet can ascend the St. Lawrence as far as Montreal.

fication is the Citadel, which stands on Cape Diamond, 333 feet above the river, and covers an area of forty acres. A large factory for the fabrication of small-arm cartridges and artillery projectiles is located at Quebec. The harbor of the city is excellent, and its extensive docks are among the best in the world.

Hamilton, Ontario, is a considerable manufacturing center, has a good harbor on Lake Ontario, and is the junction of several railroads connecting it with Lake Erie, Lake Huron and Georgian Bay. The population of Hamilton is 48,980.

Ottawa, on the Ottawa River, is the capital of the Dominion. Like the city of Washington, its importance rests almost exclusively upon its character as the political heart of the country. Its population is 44,154.

Next in size is St. John, the chief city of New Brunswick, with a population of 39,179. It has an excellent harbor, which never freezes, and which is protected by strong batteries. It is a port of importance, a considerable manufacturing city, and has good communications with the interior by means of the Intercolonial and New Brunswick railroads.

Halifax (population 38,536) is the chief city of Nova Scotia. It has an excellent harbor, and is the winter port for the Dominion of Canada—the St. Lawrence being frozen over in that season. The hill on which the city stands is commanded by a citadel a mile in circumference and of great strength, and the harbor is defended by several forts and batteries. It is the only place in the Dominion which still has a garrison of British regular troops, and it is a naval station of great importance.

Kingston owes its strategic importance to its situation on Lake Ontario at the point where the St. Lawrence issues from the lake, and to its location at one extremity of the Rideau Canal. It is an important naval station, and its population is 19,264.

London, Ontario, (population 31,977) is of considerable importance as a railroad centre, as are also Guelph and Stratford, in the same province. Sarnia, on St. Clair River, and Windsor, opposite Detroit, are, from their positions, of some strategic importance.

Population.—The population of Canada may be broadly divided into two great classes—Anglo-Saxon and French. The former class consists mainly of the descendants of early British colonists in Nova Scotia and New Brunswick, of later immigrants, and the descendants of Tories who emigrated from the United States to the British provinces after American independence had become assured. The Anglo-Saxon Canadians resemble, in most respects, the people of our Northern States. They are energetic, enlightened, progressive and independent; and to them the prosperity of the Dominion is almost altogether due.

The French Canadians are descended from the old colonists of the days of Frontenac and Montcalm, and now number about 1,083,000. They are limited mainly to the province of Quebec, of which they furnish the great bulk of the population. They resemble their Anglo-Saxon compatriots in tariff, but in scarcely anything else. They are slow, conservative, and as completely priest-ridden as the peasantry of Spain or Bohemia. Secured in their own language, laws, and religion by the treaty of Paris in 1763, their manners and customs have remained unchanged, and the province to day presents the appearance of a portion of France under the folds of the British flag—but it is the France of Louis Quinze, and has nothing in common with the Republic of the present day. Ever since the conquest of Canada the French Canadians have been loyal to the British crown; but theirs has been the loyalty of self-interest rather than affection, and has been largely a matter of obedience to their church, which has in Quebec an influence, authority and sway, such as no church has in any other part of the British Empire. Indus-

trious and humble, the typical French Canadian passes a monotonous existence in working hard, saving money, hearing mass, and obeying the biblical injunction to propagate and multiply. As a result, the population of Quebec not only steadily increases, but overflows into New England, where in some localities it is beginning to root out the native population; for a French Canadian can grow rich on wages that would mean starvation to an American. Many of these people return to Canada; and there is a constant passing to and fro which serves to bind the province in sympathy with its great neighbor, and doubtless engenders in a considerable degree such friendship for the United States as grows out of the natural affection of a man for his treasury. Though this friendship springs spontaneously from the pocket-book rather than the heart, it is perhaps none the less potent for that reason; and it may, and doubtless does, inspire the population of Quebec with an aversion to war, and a desire for peace, with the United States.

But, though the French Canadians are doubtless sincerely desirous of remaining at peace with the United States, their attitude in the event of a declaration of war would be decided entirely by the policy of their church, and it may be doubted that the priests would consent to any change that would make them mere ministers of religion instead of political factors. If war should come upon this peacefully inclined population, it is probable that they would accordingly enter with heart and soul upon the defense of the British flag. Sir George Cartier declared that the last gun in defense of British supremacy in Canada would be fired by a French Canadian, and Sir James Carmichael Smith states that during the entire war of 1812 not a single French-Canadian militiaman deserted.

In addition to these two great classes of population there are many Irish, English, Scotch, Germans, Dutch and Americans in Canada, besides a considerable sprinkling of

Welsh, Scandinavians, Icelanders and Russian Mennonites. The ubiquitous African is found in the Dominion to the extent of 22,000, being mainly a somber reminiscence of the ante-bellum "underground railway."

Military Forces.—I cannot, within the bounds of this lecture, give an extended description of the military forces of Canada. We must, however, have some knowledge of the strength and composition of the enemy's armies before we can utilize our geographical knowledge in deciding upon a general plan of campaign.

The militia of Canada is divided into four classes, as follows:—

1st class: Unmarried men and childless widowers from eighteen to thirty years of age.

2d class: Unmarried men and childless widowers from thirty to forty-five years of age.

3d class: Widowers with children and married men from eighteen to forty-five years of age.

4th class: Men from forty-five to sixty years of age.

This force is divided into active and reserve militia.

The active militia consists of 2,024 cavalry, 1,639 field artillery, 2,099 garrison artillery, 243 engineers, and 28,948 infantry, giving a total of 34,953 men, all of whom are taken from the first class. If a sufficient number of men is not obtained from that class by volunteering, the quota is filled by draft. The period of training is only twelve days each year.

Each company of Canadian militia consists of three officers and forty-two non-commissioned officers and men. In mobilizing the militia for war, it is the intention of the Canadian authorities to increase each company to a strength of eighty-seven non-commissioned officers and men by the addition of privates from the reserve, and it is estimated that a call to arms would raise the militia at once to a strength of nearly 65,000 men. The present militia system was established in 1868, since which time about 30,000 men have been

trained each year. Three years is the period of service in the active militia, but many of the men do not serve more than two. It is estimated that there are accordingly upwards of 200,000 men in Canada who have served in the ranks, and acquired some knowledge of the rudiments of drill and target practice.

There are Cavalry, Artillery and Infantry schools for officers and non-commissioned officers of the active militia. Since 1865, more than 15,000 students have taken certificates of qualification for their respective ranks on the completion of a three months course. Many of these men would be available as officers and non-commissioned officers should the reserve militia be called out.

There is a military college at Kingston, which is modeled after West Point. It has graduated 185 cadets qualified for staff positions. The staff and engineering school attached to the Royal Military College has granted some sixty certificates to qualified active militia officers.

The active militia would probably be immediately available at the outbreak of war, as their mobilization could be quickly effected; for the Canadian government has so far adopted the German system as to divide the Dominion into twelve military districts, each of which is sub-divided into regimental and company districts—each district and sub-district having its own commanding officer and staff, its muster-rolls prepared, and everything in readiness for prompt mobilization. The concentration and supply of these forces would, however, be a matter of great difficulty; for “the weakest spot in the Canadian militia system is the total absence of any nucleus of transport.”

If the Canadians were to accomplish feats of organization and mobilization equal to those of the Germans, and were to call out the four classes of their militia, they might produce an army of 800,000 men. But such results are obtained only when popular clamor absolutely demands war; when

each man feels that his religion, his well-being, or his personal freedom is in jeopardy; or when from some great cause, his combativeness has been roused to the highest degree. The presence of people in Canada favorably disposed to the United States, of those actually hostile to Great Britain, of internal difficulties owing to racial antipathies, and of many other conditions, must be ignored if we imagine this great aggregate possible.

It is more probable that the first call would bring out about 60,000 Canadian militia, essentially the same in quality as our National Guard. The Canadian militia has, doubtless, improved since the day when the "Queen's Own" of Toronto ran away from the Fenians; the American militia is certainly better than it was when it fled from the field of Bladensburg. The Canadian militia would, doubtless, be increased more or less from the reserve. Under the stimulus of victory it might even grow into a formidable army; but under the depressing influence of defeat it would suffer the disintegration characteristic of all militia armies in adversity.

Colonel Strange expects entirely too much, I think, from the militia of the Dominion. He says of Canada: "The history of her struggles against invasion showed that she could and did, with the assistance of but few British troops, bear the brunt of it with her militia, who, almost unaided, rolled back the tide of war from her shores. Before the conclusion of the Treaty of Peace of 1814-15, not a single American post or sentry remained on the Canadian shore, while we were in possession of Fort Michilimachinac and other points in what is now the State of Michigan."

We may as well take issue with Colonel Strange right here as to the accuracy of his historical statements. Canada was *not* defended by her militia, "with the assistance of but few British troops." In 1814 it was defended by a body of veteran British regulars exceeding in number the largest army that the United States ever placed on the Northern

Frontier; and while the impotence of our attempts to conquer Canada,—owing to incompetent generals, a misplaced reliance on militia, perverse governors thwarting the efforts of the National Executive, and the influence of a powerful peace party,—must ever be a source of mortification to every true American, we may remind Colonel Strange that American soldiers more than once saw the backs of troops who had passed victoriously through the carnage of Badajos and had stood in triumph on the bloody field of Salamanca.

In a later paper by Colonel Strange on "Canadian Defense," reprinted in the number of the *Journal of the Military Service Institution* for January, 1891, that gentleman speaks of the militia law of Canada as "theoretically perfect;" but adds that "its practical result depends upon its administration, which, from the meager pittance applied by Parliament, is faulty."

In 1885 the Canadian government mobilized a force of men 5500 by an order dated March 27 of that year, and in two weeks had concentrated it in the Saskatchewan valley. A speedy suppression of the Riel rebellion was the result. From the small number of troops called out, this prompt action was, however, hardly a fair indication of the time that would be required for the mobilization and concentration of the entire militia force of the Dominion. An anonymous but able Canadian correspondent of the *Military Service Institution* in an article on "Mobilization and Concentration of the Canadian Militia," published in June, 1887, estimates that a total militia force of 81,900 men could be assembled for the defense of the frontier line from Quebec to Detroit; but he adds, "the complete work of mobilization, from the raising of men through all the stages of arming, equipping, clothing and combining into units, up to the final concentration at the strategic points, would occupy an interval of time which could only be calculated by months." A paper in the same magazine for December, 1886, gives a

description of the annual training of the Canadian militia, from which I infer that those troops are not one whit superior in efficiency to our own organized National Guard. Of the twelve days training each year, it seems that one day is consumed in reaching camp, one in leaving it, one in marching through town on a holiday parade, and one in sham battle nonsense, leaving only seven days for real military work, Sunday being, of course, a day of rest.

I am not inclined to underestimate the fighting capacity of the Canadians—their history shows them ever to have been a brave and warlike people—but their forces are merely militia, which could become really efficient only in the course of many months of successful (or at least not disastrous) war. The military importance of Canada lies in the fact that it is a base for the military operations of a powerful empire which controls the ocean and is capable of putting forth great strength on land.

The regular army of Great Britain consists, in round numbers, of 200,000 men. The Regular Army Reserve, the Militia, the Volunteers and the Indian Native Army swell this force to a total war strength of 772,000 men, without including 14,000 armed constabulary in Ireland, and 190,000 native military police in India. Of course this force could not all, nor even a great portion of it, be concentrated on any one theater; for the vast extent of the British Empire and the smoldering discontent of millions of British subjects require the distribution of this huge army among many different regions of the globe. We know, however, that England easily sent 40,000 regular troops to Egypt in 1882, and there is no reason to doubt that she could, without sacrificing her security in other quarters, place in Canada two highly organized, perfectly equipped, and thoroughly efficient army corps and a division of cavalry.* She could spare these

*Colonel Maurice in "The Balance of Military Power in Europe," says that the British Government is aiming to "work up to the standard * * * of putting two army corps and a cavalry division into a condition for effective action abroad." As to the practicability of being able to reach that standard, Colonel Maurice does not seem to entertain the slightest doubt.

troops, and there is no doubt that she has abundant transportation for them. Great Britain could, then, begin the American war with some 70,000 regular troops—the best in Europe—and about 60,000 militia. We could oppose this army at first with 25,000 regulars and 112,000 organized militia. Our ultimate preponderance in military strength cannot be doubted; but I do not share the views of those who think the conquest of Canada would be a military promenade for the American Army.

EFFECT OF THE GEOGRAPHICAL CONDITIONS UPON MILITARY OPERATIONS.

As a means of forming an estimate of the military value of these various conditions of the physical and political geography of Canada, let us suppose that a war has broken out between the United States and Great Britain. The first question, "Shall we assume the initiative, or wait in a defensive position the assault of the enemy?" is quickly answered. As to our Atlantic, Gulf, and Pacific sea-board, circumstances plainly demand the adoption of the latter course. As to Canada, the natural aggressiveness of our people, combined with a confidence born of our traditions, will demand the adoption of a vigorous offensive.

In the selection of an object, it is of paramount importance so to direct our efforts as to isolate the Canadians as much as possible from Great Britain, and to separate the different provinces from each other. Quebec is the most important objective, for its possession by us would prevent the naval or military reinforcement of the British armies or fleets above that point, and history proves that it is the key to the conquest of Canada. Though we should therefore regard Quebec as our ultimate objective, we cannot make it our immediate one. The old line of invasion, via the Kennebec and Chaudière rivers, followed by Arnold—difficult to the last degree for his small force—may be regarded as altogether impracticable for the large army that would now be

required for the reduction of the strongest place on the Continent.

The route via Richmond and Arthabaska would lend a flank to the attacks of the British, and expose our communications to assault from Montreal. The only other route is the one adopted by Montgomery—the line via Montreal: and the reduction of that city must be first effected, in order to protect the flank of the army marching down the St. Lawrence. Moreover, that river is desirable for the transportation of heavy ordnance, without which the siege of Quebec would be a farce. Finally the control of the river by vessels of war or heavy floating batteries is necessary, in order that the city may be invested—otherwise the investing army would be cut in two by the stream. We are, then, at first, neither in a position to reach nor to reduce Quebec.

The capture of Montreal is a necessary stepping-stone to the reduction of Quebec. But there are many other reasons why we should choose Montreal as our primary objective. We have already seen that the Canadian canals give entrance to British war-vessels into the Great Lakes. The capture of Montreal would cut Canada in two; it would give us possession of the Beauharnois and Lachine canals, and protect the country above from naval attacks by any vessels except such as might have ascended the St. Lawrence before the surrender of that city; and the ultimate capture of such vessels would be certain. Moreover, it would place us in possession of the metropolis and chief railroad centre of the Dominion, thus causing such embarrassment to the trade of the Canadians as to bring them to a realizing sense of the inconvenience, if not the horrors, of war. Finally, it would place us in the best possible position for operating in any direction that military circumstances might require.

The operations against Montreal would be of such importance as to demand the efforts of a great army. This army should have its primary base at Albany, a point easily

reached by rail or water from all parts of the country. A secondary base would be at Rouse's Point. The enemy would probably be first met at Fort Isle-aux-Noix near the frontier; and would almost certainly be encountered in force at St. John's, as that place is a strategic point of importance, commanding the junction of several railroads, the Richelieu Canal, and the Vermont Central R. R. bridge over the Richelieu River. If dilatory mobilization and concentration on our part should give time to the British, we should probably find them strongly intrenched at St. John's; at any rate, in this vicinity would be fought the battle for the control of the Richelieu Canal and the possession of the Montreal angle formed by the St. Lawrence and the Richelieu. Victory here would enable us to hold the waterways as far down as Sorel, would cause the retreat of the British to the Island of Montreal, and would give us possession of the Beauharnois Canal. Proximity to its base, and the fact that its front would cover its line of retreat, would save our army from heavy disaster in case of defeat.

Arrived opposite Montreal, the American commander would find himself confronted by a serious problem. The river here is navigable for the largest vessels of the British navy, and is a mile and a quarter wide. Just above the city the stream narrows to half a mile, but the water rushes through the narrow channel at the rate of eighteen miles an hour. It goes without saying that the bridges would be rendered impassable at the first approach of the Americans. A passage of the St. Lawrence at Montreal by a large army while the river was open, opposed as it would be by a formidable force on land, aided by naval vessels in the river or by the active alliance of nature in the foaming rapids, would require military genius of the highest order, and would be an achievement worthy of ranking with Napoleon's passage of the Danube at the Island of Lobau. But even if our army were baffled for months in attempting the passage, the

approach of winter would change matters for the better; and an ice-locked river would place the island and city at the mercy of the Americans as surely as the Dutch ships frozen in the Helder were at the mercy of Pichegru's hussars. An advantage of immense importance that would, in the meantime, be derived from the mere presence of our army before Montreal, would be the holding in check of all naval and military reinforcements for Ontario; for, as the fall of the city would cut off the retreat of such reinforcements, the British would hesitate to place them in jeopardy by sending them beyond the menaced city.

It seems clear, then, that Montreal should be our first objective, and that we should here assume the initiative promptly and with as large and efficient an army as possible. This army, from the nature of the theatre, should be composed of a large proportion of infantry, with field artillery not exceeding three guns to each thousand men of other arms, and with only enough cavalry for screening and reconnoitering duty. The army should not be encumbered with heavy artillery; for its movements should be made with the utmost celerity, and, once before Montreal, its siege trains could be speedily forwarded by rail and water from Albany. A large force should be detached to seize and occupy Richmond, thus holding an important railroad junction, protecting the right wing of the army before Montreal from attack from Quebec, covering Vermont from invasion, and maintaining communication between the army at Montreal and one in Maine which we will consider later.

An army operating from Albany as its primary base, with a secondary base at Watertown, should move against Prescott and the Williamsburg canals. A successful passage of the St. Lawrence and the capture of the canals would snap the water communications of the British at an important point; and if the passage were absolutely secured, the army would be in a position to operate against Kingston, or to

move down the left bank of the river against Montreal. In the latter case, however, the British would have the advantage of interior lines, and the movement against Montreal should not be undertaken unless the army, after masking Kingston with a strong detachment, could still be superior to any force that it might encounter. Otherwise the movement would be an imitation, on the same theatre, of the dismal strategy of Amherst in 1760, and Wilkinson in 1813—the former undeservedly successful and the latter deservedly unsuccessful. If the activity of the British military and naval forces on the St. Lawrence should protect Prescott and the canals by barring the river, this army could, at least, defend New York from incursions of the enemy, protect the left flank of the army operating against Montreal, and in case of need be drawn in to the assistance of that force. It would probably be the part of wisdom to limit the strength of the army in question to the numbers sufficient to insure the destruction of the canals and the defense of the New York frontier.

Hamilton would be an objective of great importance; mainly as furnishing a base for further operations. In the case of Montreal, to designate the object is to name the theatre; but with Hamilton such is not the case. Ontario can be invaded from the west as well as from the east; and an army based on Detroit and Port Huron would have as secure a starting point as one invading from Buffalo and Niagara. But the operations would not be so decisive. If in the former case we were in complete naval control of Lake Erie, the theatre would give us the advantage of a reëntering base; but otherwise the enemy, if beaten back, would continually cover his line of retreat, would abandon only such territory as was actually wrested from him, and would draw nearer to his reinforcements with each step in retreat. On the other hand, an army invading from the Niagara frontier would at once break the general line of the enemy, and a successful battle

would probably mean the reduction of the province. A glance at the map shows that if we were to undertake simultaneous movements from Buffalo and Detroit, the Canadians would have the advantage of interior lines with excellent communications. Instead of invading by double lines, we should, then, throw our greatest weight on the side of Buffalo; but the Detroit line should not (as we shall see) be altogether neglected; and under certain circumstances it might even become the most important line of all.

A large garrison of regular troops should be continually kept at Forts Porter and Niagara; and at the first sound of war they should be thrown across the frontier, seizing and holding the International R. R. bridge between Fort Erie and Buffalo, and the Roebling, Keefer and Cantilever bridges below the falls of Niagara. Pushing on with the utmost celerity, they could then seize the Welland Canal and blow up its locks. If unable to maintain its position on the canal, this force could then fall back and occupy bridge-heads at the bridges mentioned until the main army should begin its passage. Unless the Ottawa and Georgian Bay Canal were completed and in successful operation, the destruction of the Welland Canal would insure the safety of the upper lakes. Lieutenant Schenck in his valuable essay on "Our Northern Frontier," states that within 100 miles by rail of the Welland Canal, the Canadians have 9,000 militia with 42 guns, completely armed and equipped; but he fails to note that the mobilization of this force would require some appreciable time. Recognizing the value of the initiative, the slowness, at best, of militia assembling, and the superiority of regular troops, it seems probable that a force of two regiments of regular infantry with a squadron of cavalry and two or three batteries of light artillery would, if acting promptly and with celerity, be amply sufficient for the destruction of the canal.

A victory in the Niagara peninsula would almost certainly

put us in possession of Hamilton. If defeated we could fall back, covering our line of retreat, to our base. The enemy if defeated would doubtless retire either to Toronto or London. In the former case he would sacrifice all the territory lying between the lakes; and (unless we have read the history of militia wrongly) he would lose by desertion masses of men from that region. In the latter case, he would give up his communications with the forces farther east; and a second defeat would, probably, cause the capture or dispersion of his army. In either case, then, the entire railway system between Detroit and Toronto would fall into our hands; we should have a base at Detroit as well as at Buffalo; new levies or other inferior troops could cross at Detroit and Port Huron to occupy the conquered country and guard the communications; and the victorious army, easily supplied and reinforced, could then safely attack in succession Toronto, Trenton and Kingston, even though the enemy were in naval control of Lake Ontario. The capture of these important points would doubtless be a costly matter in men, material, and above all, in time. If, however, the canals near Prescott had been destroyed in the meantime, the defense of these places would be greatly crippled so far as naval assistance is concerned; and in any event they might be masked while the army pushed on to the capture of Ottawa and the reinforcement of our first army at Montreal or Quebec. The army operating from Buffalo should be composed of the regular proportion of the three arms.

The relations between Russia and England might necessitate the retention in India of a great British military force. But national friendships and enmities are essentially fickle; and arrangements with Russia might enable England to send a formidable Anglo-Indian army against us. At any rate, unless Great Britain were actually at war with the Czar, we should be obliged to provide against a reinforcement of the Canadian armies by troops from India. A small army com-

posed of volunteers raised in Minnesota and the Dakotas should be assembled at St. Vincent and sent against Winnipeg, which place should be captured and strongly held, the railroads to the east and south being carefully guarded, and the railway west of the city being utterly wrecked for miles. Raiding parties should be sent from various parts of the frontier of Montana, with instructions to blow up bridges and viaducts, and tear up the road to the utmost degree in their power. An attempt should be made to destroy the Canadian Pacific in British Columbia, but further than sending a small force for this purpose, the operations of our armies on the Pacific Coast would, as we have already seen, be necessarily limited to the defensive.

Thus far we have considered things in a rather favorable aspect for the Americans. Let us suppose, however, that the war, while of a nature of a surprise to us, has been premeditated by Great Britain. Her 146 war-vessels suitable for service on the lakes, while probably not all available for duty in American waters, permit her to assemble a large fleet on the St. Lawrence; a force is posted on the Niagara River, covering the Welland Canal, and strongly entrenched; the St. Lawrence canals are strongly guarded, and a large army in an entrenched camp at St. John's bars the way to Montreal; in other words it is impossible for us to cross the St. Lawrence or the Niagara, and the British navy has free access to Lakes Ontario and Erie. The Detroit route now becomes of paramount importance. Vessels taken from our merchant marine on the lakes, regardless of cost, are sunk in the channel of the Detroit River, and the passage of the British fleet is further barred by submarine mines. If the Ottawa and Georgian Bay canals be completed, similar obstructions are placed in St. Clair River. We thus secure a passage into Canada, which passage will be greatly facilitated by the completion of the tunnel of the Detroit River. Our worst strategic line now becomes our only one. We must

beat the enemy back upon his natural line of retreat, and drive him upon his reinforcements. The war will be long, bloody, costly, and bungling—in fact it will be just such a war as we have carried on more than once in the past. Our military force must be enormous, because we shall have long lines of communication, and they will be everywhere exposed to combined naval and military expeditions—"naval raids" if I may be allowed to coin that term. Still, by sheer dint of superior numbers and resources, we should probably be able to reach Ottawa, open new communications via the Canadian Pacific to Sault Ste. Marie and Winnipeg, and push on to Montreal in spite of the British gunboats controlling the lakes. It would be a case in which "the longest way round would be our shortest way there"—because it would be our only way. Even in this case, unless such places as Kingston were masked by very large detachments, their reduction might occupy as much time as the capture of St. John's and Montreal by the first army considered. Our lack of preparation and our want of naval force would place us at a heavy disadvantage.

We will suppose, however, that the canals have been seized as already indicated, and operations carried on as already described. Thus far, it may, I think, be safely claimed that the military geography of Canada has favored the Americans quite as much as it has their adversaries. But in the eastern theatre the geographical balance, so to speak, is heavily against us. After the capture of Montreal our next steps are by no means easy. If the St. Lawrence were controlled by our navy, it would be an easy matter to transport the heaviest kind of ordnance by water from the arsenal at Troy to the trenches before Quebec; but otherwise we should be under a very serious disadvantage; for the transportation of heavy ordnance by rail would necessarily be a matter of considerable time and difficulty. Besides the advantages of its situation and fortifications, Quebec would,

therefore, have the advantage of heavier ordnance than we could readily bring against it. Its capture by regular approaches would be impossible; and its reduction by blockade would be a matter of the most serious difficulty. For the latter purpose, the complete investment of the city would be requisite; and this would be quite impossible with the St. Lawrence cutting our lines in two and bearing a British fleet upon its bosom. Winter, it is true, would close the river; but during the open season all the resources in men, munitions, and supplies that the British Empire could afford would have access to the beleaguered city. It would only be when the Americans, succeeding in building a formidable fleet of war-vessels or floating batteries, should send them down the St. Lawrence beyond Quebec, or by heavy batteries on the shore combined with some system of booms and submarine mines, should succeed in permanently barring the passage of the British fleet to the city, that the place would succumb to the slow process of starvation. In any event, whether resulting in success or disaster to us, the siege of Quebec would be one of the most memorable in the annals of war.

With the British navy controlling the St. Lawrence, the American advance from Montreal would be a matter of extreme difficulty. If our army were to move entirely by the left bank of the river, a small force of the enemy could hold Quebec, while with the assistance of the navy a large part of the British army could advance via Richmond against our communications, secure in its own retreat so long as the fleet patrolled the river. If our advance were made entirely along the right bank of the river, the investment of Quebec on the north bank would be practicably impossible. If Montreal were captured in the winter (as it probably would be) the march upon Quebec would be very much simplified, as the river when frozen would cease to exist as an obstacle parallel to the path of our army. Otherwise it would be

necessary to advance from Montreal on the left bank and from Richmond on the right; thus moving by independent lines against an enemy able to concentrate upon either. A military superiority such as to render the American force on each line able to cope successfully with the entire force guarding Quebec would, therefore, be necessary. The communications of the army operating from Richmond would probably be via the Vermont Valley R. R., and its base of supplies might be shifted from Albany to Springfield or Bellows Falls. This force would also serve to maintain communications between the army from Montreal and another important army which it is now time to consider.

The theatres thus far considered do not lend themselves readily to offensive returns by the British; but on our extreme eastern frontier we are peculiarly open to invasion. A British army based upon the St. John River from Frederickton to St. John could invade the state of Maine with a degree of impunity not pleasant for us to contemplate. Having the active support of a fleet superior to anything that we could oppose to it, this army could advance westward, establishing a secondary base at St. Andrew, and moving upon Bangor. The complete naval control of the coast would give the enemy many of the advantages of a reëntering base; for it would enable him to make combined naval and land operations against our communications, with much injury to us and but little danger to himself. The capture of Bangor would be greatly facilitated by the fleet; and the British army could advance as far west as Portland without uncovering its communications by its front, its left flank protected by the sea, and its right covered by a region impracticable for the operations of a large force. The extent to which the communications of an American army operating in Maine would be endangered is shown by the fact that all the railroads by which the army could be supplied lie within about thirty miles of the coast, and thus within easy reach of the enemy's

incursions. On the other hand, the British communications would, as we have seen, be safe from serious menace, and even a heavy defeat would not mean ruin.

The object of a British invasion of Maine would be to deflect the American efforts from unfavorable theatres to those favorable to the British. A successful invasion of the State, especially if accompanied by an ostentatious proclamation of its annexation to the British Dominions, would so rouse popular indignation in our country that the demand for the recovery of Maine would be even more potent in influencing the conduct of the war than was the cry "on to Richmond" thirty years ago; and other operations might be forgotten in a desire to drive the "insolent invader" from our own soil. An invasion of Maine might be conducted, then, as a diversion in favor of the British armies in Quebec or Ontario, or it might be made from the first the supreme military effort of Great Britain.

The military geography of the state of Maine is altogether in favor of an invader. The Penobscot, Kennebec, and Androscoggin rivers, would, it is true, be obstacles lying directly across his path; but we know that such obstacles have no further strategic value than causing delay to the invader—a delay which would in each case be minimized by the coöperation of his navy.

If England were able, as she might be, to seize the initiative promptly and to send a powerful naval and military expedition from Halifax or St. John, N. B., against Portland, the capture of that city would give her all the advantages that could be gained by marching across the State to that point. The place would be at once fortified by the captors, and its supply would be assured from the sea. It would furnish a convenient base for minor operations against various points of the New England coast, which would serve to annoy us and to distract our military plans. Moreover, to anyone familiar with the Art of War, it is evident at a glance that

the occupation of Portland by the British would protect the eastern provinces from invasion; for they would have the communications of the invading army by the throat. It would be necessary to recapture Portland, or to mask it with an efficient force, at least equal in strength to the army holding it, before an American army could advance against New Brunswick.

If the British in Portland found their position effectually masked, and discovered that the American army was pushing on towards New Brunswick, their fleet could quickly transfer them back to the St. John River. If the Americans assembled in great force for the siege or assault of Portland, the withdrawal of the British could be affected in the same way, as easily as Moore's army withdrew from Corunna. If, instead of seizing Portland by a combined military and naval expedition, the British were invading Maine by marching across the State, their army could, in the face of superior numbers, fall back to the same base; and the army thus based on the St. John would be in a position to reinforce, or receive reinforcements from, the army at Quebec or Montreal so long as the New Brunswick and Intercolonial railways remained intact.

It seems clear, then, that at the outbreak of war a large and effective army should be assembled by us, at the earliest possible moment, on the eastern frontier of Maine. Boston, Salem, Newburyport, Portsmouth, Portland, Bath, Belfast, and Bangor, should be strongly defended as a measure of protection to the communications of this army, which should have its primary base on the Merrimac River, with successive bases at Lewiston, Augusta and Bangor. Raids should be early and persistently made against the New Brunswick and Intercolonial railroads, which should be damaged as completely as possible, and kept continually broken, so as to destroy the lateral communications of the British armies. The nearness of these roads to the Maine frontier renders them

peculiarly open to the attacks of raiding forces; but, on the other hand the nature of the country makes the operation unusually difficult for cavalry—the only force with which raiding is possible. It may be confidently asserted, however, that cavalry which can operate in Arizona and Colorado would be able to surmount the natural difficulties of Maine and New Brunswick.

The geographical difficulties of our army, instead of diminishing, would increase with the commencement of the invasion of New Brunswick. The St. John River forms for the enemy a rectangular reëntering base, controlled as far as Fredericton by his navy, and forming a serious obstacle above that point. An attempt by our army to cross the eastern side of this angle would be opposed in front by the fleet, and would lend an exposed flank and communications to British attacks from the other side. An attack upon the northern face of the angle could be met by a retarding force, while a heavy attack from the east could be made against our flank. A passage in the vicinity of Woodstock would compel a separation of our army under penalty of a complete exposure of our communications. In addition to these difficulties, the protection of our communications would require the detachment of a force for the capture or masking of St. Andrew. It is fortunate for us that we could assemble finally in this theatre an army much larger than the British; for the numerical superiority would be urgently needed.

Nor would the difficulties of the situation be ended by a successful passage of the St. John. The Maine Central R. R. would constitute a line of supply via Bangor, McAdam, and Woodstock to Fredericton; but from Fredericton to St. John there are no railway communications on the left bank of the river, and that stream would be in the hands of the British navy. The construction of about 35 miles of railroad would be necessary in order that we might reach Chipman, from which point there is a railroad to Norton on the Inter-

colonial. The somewhat circuitous railway communications resulting would require strong detachments for their protection. The Keswick, Nashwaak, Salmon and Washedemoak rivers would form obstacles lying directly across the path of our army and affording the enemy facilities for delaying us with a rear guard while conducting his retreat in safety.

St. John would offer us some of the disadvantages of Quebec. Though a strong natural position, strengthened by batteries, it does not approximate in impregnability to the old Walled City of the North; but it has the advantage of a never-freezing harbor. Until we could assemble on the St. John River a naval force superior to the British fleet, or line the stream with batteries powerful enough to drive away the enemy's vessels, the reduction of St. John would be well-nigh impossible.

It may be assumed, however, that the entire British army in New Brunswick would not shut itself up in St. John. Easily defended by permanent batteries and the navy, that place could be entrusted to a comparatively small force, with full confidence that, owing to its position on the flank of our communications, we should not dare to neglect it, but should have to mask it with a force much larger than the garrison. The main force of the British would doubtless retreat behind the Petitcodiac River, where it would find a position of remarkable strength. With a front of less than fifteen miles, the army could rest its right flank on Northumberland Sound and its left on the Petitcodiac, a great part of its front covered by a small river, and a railroad running along the rear of the position. The flanks could not be turned, the navy could deliver a flanking fire along the lines, reinforcements could be speedily sent from one part of the line to any other, and supply from the sea and by rail from Nova Scotia would be sure and easy. I have not been able to learn the exact nature of the topography of this place; but unless it presents disadvantages not hinted at by any ordinary map, would be a

position not one whit inferior to the Lines of Torres Vedras; for while there would be no Monte Junto to divide the assailant's front, the position is scarcely more than half as long as Wellington's famous lines, the navy (from the nature of the position and the increased power of its ordnance) could lend a greater degree of assistance than it was able to give the Iron Duke, and the railroad would give advantages not dreamed of eighty-four years ago in Portugal. St. John would be connected with the lines by about 120 miles of waterway, by means of which, should the New Brunswick metropolis prove untenable, its garrison could be withdrawn to the lines of Petitcodiac. Should the freezing of the river deprive the line of the support of the navy, and thus expose a flank, a position of almost equal strength could be taken up thirty miles to the rear, where the army would form on about the same front as before, its left resting on Cumberland Basin, its right on Bay Verte. On the left is a high hill, occupied in colonial times by the French Fort Beauséjour, while a great portion of the front is covered by the marshes of Missaguash and Tantemar. In fact, the absence of the railway in rear of, and parallel to, the lines is the only point in which this position is inferior to the one on the Petitcodiac; while the marshes covering its front would make it much stronger as a purely defensive position.

It is not necessary to consider at length the strategic features of Nova Scotia. Without great naval strength we probably could not overcome the lines on the Nova Scotian isthmus, if Great Britain saw fit to make a strong exertion at that point, and an invasion of Nova Scotia would be out of the question. If, on the other hand, we had a navy superior to that of England in American waters, we could land a force at any point on the coast of Nova Scotia, and the defense of the province would be so difficult that it probably would not be seriously undertaken. It may, however, be well to note that if (though having a naval inferiority) we should force the lines

on the Isthmus, it would be an evidence of such enormous military superiority as to make a rapid retreat upon Halifax the only thing left to our adversaries; but the Philip and Wallace rivers, the Cobequid mountains, and then the Salmon and Shubenacadie rivers would furnish fine obstacles for the use of the British rearguard; and, if skilfully commanded, their army could safely reach Halifax. We should then have a repetition of the old problem; namely the reduction of a city strongly fortified, fully garrisoned, assisted by a powerful fleet, and open the year round to supply from the sea.

It is, I think, evident that with a suitable naval force coöperating with our armies, the conquest of Canada, if not speedy, would be at least sure. But in the absence of such naval auxiliary the situation could, perhaps, be best expressed by a Celticism: England could not hold Canada, and we could not conquer it. In other words, our military power, properly directed, would enable us to conquer Canada from the Georgian Bay to the city of Quebec, and perhaps to the Nova Scotian isthmus. *But the conquest of Quebec, if com-*manded, their army could safely reach Halifax. We should then have a repetition of the old problem; namely the reduction of a city strongly fortified, fully garrisoned, assisted by a powerful fleet, and open the year round to supply from the sea.

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Many weighty considerations have necessarily been omitted. I do not profess to have indicated the only lines of invasion, or counter invasion, nor to have outlined all the military possibilities presented by the geography of Canada. We may be sure, however, that, whatever be the plans of campaign or the conduct of the war, the next invasion of Canada, whether successful or unsuccessful, will furnish an illustration of the truth of Von Moltke's apothegm: "Geography is three-fourths of the science of war."

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THE MILITARY GEOGRAPHY OF CHILI.

By Captain EBEN SWIFT, Fifth Cavalry.
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CHILI occupies a long, narrow strip of country lying between the Andes and the Pacific, with an average width of 120 miles and a coast line of over 10,000 miles. On the east its boundary follows the main divide of the most impassible mountain range in the world—a mountain range which runs up as high as 22,000 feet and is crossed only by a few muletracks cut out of the solid rock at twice the elevation of the highest point of the Union Pacific Rail-road. On the west the coast is beaten by a sea which has been misnamed Pacific. Unlike the northern continent this line has few indentions; good anchorages are scarce, being mostly open and exposed.

At the north the region along the coast, like that of Peru, consists of a series of deserts separated from each other by narrow valleys which are watered by rivers taking their

source in the mountains. Throughout these lands rain is unknown and the deserts are dry, sandy plains, broken sometimes by rugged heights or by hills of shifting sand. By day the tropical sun beats upon the earth and produces a suffocating heat; at night the temperature falls 25 to 30 degrees and the extreme of cold is encountered.

The largest of these barren tracts is the desert of Atacama, extending for several hundreds of miles along the coast, without water, without verdure and without roads. The number of travelers who have dared to penetrate into these deserts has, until recently, been small. They would prefer to go to the coast and to make their trips by sea.

To travel in such a country you must carry fuel, food, forage and water. If you have two wheeled vehicles you must cut a road for yourself in many places. The trials of the small armies which have campaigned there have been told many times, and the difficulties must surely increase immensely with the size of the army. In the Campaign of Tacna, to be noticed hereafter, the provision for water had to be made at a rate of 10,000 gallons per day, which was small indeed for an army of 10,000 men with their animals.

The valleys at the north are no more suitable for an army of foreigners than the deserts themselves for the climate is deadly to strangers.

In the central portions of the country the deserts disappear, the valleys are wider, the rivers longer, and considerable areas are available for cultivation and pasture; the climate is healthy, the rainfall is very great, and in fact nearly every condition is different from that just described.

At the south Chili controls the Straits of Magellan and ends on the barren islands of Cape Horn.

The rivers are mostly mountain torrents, running by short, straight courses from the mountains to the sea. Several ~~the valleys are but narrow and the longest is a little~~ army of foreigners than the deserts themselves for the climate is deadly to strangers.

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With an area of over 300,000 square miles, which is as large as Texas with Western Kansas tacked on, there is only eighteen per cent. of arable land. One fourth of this area lies near the snow line, one fourth is near the level of the sea, and from north to south, or east to west, all extremes will be found. Hence portions of the country are mutually dependent upon each other. A blockade of certain ports leaves the population in the hopeless condition of the inhabitants of a barren island. This state of affairs existed many times in the last war.

The population was estimated at three and a quarter millions in 1890, which at that time was smaller than a half dozen of our states. The mixture of white and indian blood seems to have produced a race not inferior to the Spanish of the Sixteenth Century and not unworthy of the very last native tribe to be conquered by the whites.

There are few generalities which apply to such a land, except that it is particularly inaccessible from without and that its inhabitants have been aggressive and warlike from their earliest traditions.

Looking at Chili from a military point-of-view, with an eye to its opportunities for attack from without and its capacity for resistance from within, it will be profitable to study some of the wars of which we have knowledge, in the same theater. In this way we will discover that a certain general character has been given to all military operations; invading armies have been forced to follow similar lines and all strategy has been made the same by the nature of the country.

We know that the Incas, a hundred years before the discovery, conquered the country as far south as the Maulé river. They took the hard road through the deserts.

The Lieutenants and Successors of Pizarro carried their conquests further to the Bio-Bio river; but were driven back again and their cities were destroyed. It is stated that the

first century of this conflict cost Spain a hundred thousand lives and eighty millions of ducats.

The way through the desert is not the only road from the north. Another road may be had along the high, snow covered plateaus and passes of the Andes. Almagro, the companion of Pizarro, with an army of Spaniards and Indians, took this route. He assembled at Jujuy, crossed to Coquimbo and fought battles with the natives in the neighborhood where Santiago now stands. He met with great difficulties and great suffering and retreated finally, taking the way of the desert. Valdivia came next and accomplished the permanent settlement of the Spaniards. He came by the deserts.

In these campaigns little reliance could be placed on the sea. The natives used rafts which were not suited to naval warfare or to long expeditions. The number of ships available to the Spaniards on that coast was not sufficient to furnish a solid support.

In 1810 the Spanish colonies in South America revolted. In Chili the rebels were at first driven from the country, but receiving assistance from Buenos Ayres in 1817, they collected an army of four thousand men and crossing the mountains at the Uspallata Pass they defeated the royalists in two decisive battles. The independence of the country was not assured, however, until the rebels called to their service the celebrated English Admiral, Lord Cochrane. This commander with an inferior force blockaded the Spanish fleet, captured their base of supplies at Valdivia, and in fact obtained control of the sea.

The freedom obtained by this means gave opportunity for further operations. Peru was still under Spanish dominion when the Chilean army of 4,000 men embarked on the transports of the fleet and sailed north. They were landed a few miles south of Lima, advanced on the capital and declared the independence of the country on July 28, 1821.

The countries were at war in 1836 again, in the same

way and with the same result. The Chilians again entered the capital of Peru, and destroyed its army in the battle of Yungai.

After this the deserts which had been considered to be the most worthless parts of creation, began to assume a great importance. They were found to contain immense mineral wealth and the sandy covering of the ground hid inexhaustible supplies of nitrate of soda—used largely as a fertilizer in Europe. The jealousy of neighboring states and their conflicting interests brought on the war of 1879. Peru and Bolivia, owning the nitrite provinces, were allied against Chili. Chili was first in the field with five hundred men and occupied the seaport of Antofagasta at the edge of the desert of Atacama on February 1st. Other troops followed quickly and finally 16,000 men were assembled there under drill and instruction. The Allies collected 2,500 at Tacna, 4,000 at Arica, and 14,000 at Iniquiqui.

Meanwhile the main struggle for supremacy was going on at sea. It was ended in October by the capture of the Peruvian ironclad Huascar. After this the plans of the Chilians developed rapidly and received no check. Arms, ammunition and war material arrived from Europe and were distributed to their troops.

Early in November, after ten months in preparations, the army of 10,000 men embarked at Antofagasta and sailed to Pisagua. It seems that this would have occurred much sooner if the Peruvian Navy had been sooner disposed of. Pisagua is a poor roadstead, like most places along the coast, but its strategical advantages were of importance. It placed the Chilian army midway between the allied forces massed at Arica and Iniquiqui and was intended to cut off the retreat of the main allied army. As matters turned out the Chilians did not get the full advantage which it would seem they had a right to expect from their position. They pushed a division to Dolores, where they were attacked by the allies from Iniquiqui. Reinforcements were brought up and the allies

were beaten, but the Chilians did not follow, did not know the direction of the hostile retreat and, in fact, failed to cut them off. The main body of the allies retreated to Tarapaca, and the garrison of Iniqui itself evacuated that place and made good its retreat. A body of Chilians marching to Tarapaca, expecting to encounter a disorganized rear-guard, was roughly handled by the main allied force which then made good its retreat to Arica without being harassed or delayed. To us it will seem strange that the opportunity was missed to destroy or capture this allied force, but we must not fail to consider the difficulties on the Chilian side, campaigning in a desert where cavalry horses and animals of the train must be transported by sea and landed at an unprotected anchorage. You can easily see what great and careful provision would have to be made to transport such an army even one day's march into the interior.

At Pisagua the Chilians were fortunate in finding the great works for the distillation of sea water and casks for its preservation and transportation. In these provinces the water used is mostly obtained in this way. An invading force would generally find these things destroyed by the enemy, and the fact points to one of the many odd conditions which attend a campaign in that country.

The allies now collected 8,000 or 9,000 men at Tacna and Arica. The Chilians perfected their organization and equipment and made ready for the second campaign.

On February 24, 1880, 10,000 men embarked at Pisagua and under convoy of the fleet went up the coast and landed at the port of Pacocha. A second division of 3,000 or 4,000 men followed. The strategy employed was the same as in the first campaign. The Chilians now closed all the roads by which the allies south of Pacocha might reach Peru. The difficulties and obstacles to be encountered were similar in this campaign to those in the first, but the Chilians had more success. They successfully maneuvered their

army in the desert, made roads for their wagons in places, and fought the allies in the battle of Tacna. The result of this battle was to beat and disperse the army of the allies. The capture of Arica followed and the second campaign closed in June, 1880. Since then the Nitrite provinces have remained in control of Chili.

Bolivia did not oppose the Chilian armies after the battle of Tacna but another campaign was necessary to subdue Peru. The capital was surrounded by a large army and was provided with excellent means of defense. To capture it, it was calculated that an effective field force of 25,000 men would be needed. To bring such a force to the colors and to garrison the conquered provinces as well as to have suitable reserves at home required greater efforts and larger preparations than had ever been made before in that country. In August of 1880 the Lima campaign was decided on. New battalions were mobilized, additional transports were obtained, and the army and navy was reorganized, and at the end of three months more the first division of the new expeditionary force embarked at Tacna. They landed upon that spot where sixty years before the republican troops had disembarked to undertake the capture of Lima for the first time. This division continued its march up the roads to the north. The fleet conveyed the remainder to a point on the coast nearer to Callao. Finally the army was collected on the Lurin River, eight or nine miles from the entrenchments of Chorillos.

One of the features of the campaign is here shown. The Peruvians were in doubt as to the direction of the Chilian advance and had to make preparations to resist an advance from the north as well as from the south. Much useless labor in fortifications had been expended at the north when the Chilians landed at the south and there indicated their intentions.

The battles of Chorillos and Miraflores were favorable to the Chilians and placed Lima in their possession for the third time.

Up to 1891 Chili could boast of an absence of those frequent civil wars which have ruined the development and disturbed the peace of all other Spanish-American Republics. It seemed to be peopled by a race, more serious, more stable, and more patriotic than that of any other country of similar origin. Its laws seemed better, its development more secure, than any others up to the very moment when the revolution broke out.

The conflict came from a quarrel between the president of the republic and the congress. The army declared for the president Balmaceda, and the navy took the side of the opposition.

The army at that time, January 7, 1892, was composed of about 5,000 men of all arms with Headquarters at Santiago, and a battalion of 500 men stationed at the Forts of Valparaiso. This standing army was a nucleus for the forces called out and as the country had on hand all equipments necessary for an army of 75,000 men the Government had no difficulty in uniforming and arming all recruits.

The field artillery and mountain batteries were of Krupp's make. The Infantry were armed with the Gras, Beaumont, and Comblain rifles—weapons which were not of the latest type of military fire-arms, but still good arms and probably as efficient as our own Springfield. The Cavalry had a twelve-shot Winchester.

The coast fortifications, before the outbreak of hostilities, were insignificant with the exception of those at Valparaiso where 19 guns were mounted, commanding all the water approaches.

The available navy consisted of seven vessels of a good type, well armed and manned.

Both the Army and the Navy contained many veterans of the war with Peru and Bolivia eleven years before. But the command of the Government forces was in the hands of two men of nearly equal power, who did not agree on military

or other matters and were probably jealous and distrustful of each other. The latest developments of modern tactics had not reached them for they adhered to the use of mass formations and they underrated the raw and newly recruited army of their enemies. On the other side Colonel Del Canto commanded the forces of Congress. He also was distinguished in former wars, but he was wise enough to place himself in the hands of a German officer, Emil Körner by name, who came to organize a military school, but who now joined the congressional army. To the skill and energy of this one man the final result seems to be due.

The novel condition was now presented of one side with an army and the other side with a navy. Such a state of affairs was unfavorable to both sides, with the advantage in favor of the Government at the outset. So long as the navy remained without a base of supplies on land, from which it could obtain coal, provisions, recruits and revenues, it could not count on success or maintain itself long. This was afterwards shown in Brazil, when Admiral De Mello revolted with the fleet, but the character of the country was different and he could not establish himself firmly on land, and after wandering about like a pirate for a while he was finally entirely defeated.

These facts were appreciated at once by the party of the Congress. They seized as many large steamers as possible for use as transports. In a short time they had thirteen large vessels and some smaller ones, capable on the whole of carrying a force of 10,000 men with artillery, animals, ammunition and stores. In the selection of a base they chose to fasten on to the nitrate provinces at the north in order to obtain money by seizing the revenues arising from the custom duties on the exports of nitre. The provinces were protected by very few troops and the raid was successful. The mining camps afforded a good recruiting ground. In the matter of money, recruits, and security from attack, they had thus secured an ideal base. It is true that nothing in the way of

provisions or any other supplies could be obtained there, but they had control of the sea and the ports of Peru were near at hand where they had free access. In fact foreign merchantmen during the whole war plied freely between the Government and the rebel ports.

To equip a brand-new field army many things were needed which were entirely lacking, but when the money is available the supplies will be gotten in the course of time. One effort of the Congressists to obtain these necessary articles resulted in the Itata incident which came near getting our own country involved in a war. This attempt, as is well known, resulted disastrously for the Congressional party, but in the month of May, a little over four months after the beginning of the revolution, they finally succeeded in landing a cargo of 10,000 Manlicher rifles and ammunition and a large quantity of field artillery, blankets and other military stores.

Colonel Körner applied himself with great energy to the task of organizing, disciplining and drilling the new troops. A noteworthy part of his system was to call together the chiefs and officers of the different commands, and to give lectures on various matters pertaining to the military art—particularly giving attention to detailed instruction in the open order of fighting. On the evening before the last battle of the war he perfected all the details and explained them to each brigade and regimental commander, drawing with charcoal on the floor of a room the positions of the enemy and the movements of the various fractions of his own army.

His success in forming a modern army in three months may be judged by results. We tried it in 1861 and the result was the battle of Bull Run in which few laurels were gathered by either side.

When all details were ready the army of the constitutionalists, 9,000 men in three brigades, embarked upon its transports, and under protection of the navy, went to Quinteros

Bay, where it was safely disembarked on August 20. (Quintero to Valparaiso 15 miles.)

The army of the Government was placed as follows:

7,000 at Santiago.

7,000 at Valparaiso.

7,500 at Concepcion.

8,500 at Coquimbo.

2,500 scattering.

32,000 men in all.

The railroad running from Valparaiso by Santiago to Concepcion should have been able to concentrate $\frac{2}{3}$ of this force in a few hours. But the force at Coquimbo, consisting of the best of the troops, was so far away that it was cut off from participation in the war. The troops were constantly drilled and maneuvered and were supposed to be in a high state of efficiency.

The plan of the Congressional leaders was to act by surprise. To carry out such a plan it was necessary to disembark rapidly, to cut the telegraph line to Valparaiso, to make a difficult march and pass a mountain torrent where there were only two fords. Their careful preparations were not entirely successful. The fleet was drifted northward by the ocean currents so that the work of disembarking, instead of beginning at daylight, was delayed four hours. The plan to cut the telegraph by sympathizers on shore failed, and the Government was promptly notified. The roads were difficult and when the Congressional troops reached the Aconcagua river they found the passage barred by an equal force of the enemy.

The Government troops had apparently an easy task to defend an impassible stream, crossed by only two fords which could not be flanked. But they made such a faulty disposition at the ford at the mouth of the stream that the crossing was not properly commanded by the artillery. Körner discovered this promptly and at once led a brigade across with

little trouble, turned the flank and caused the complete defeat of the Government troops. This was the battle of Concon.

The Government troops then occupied the strong position of Vina del Mar in front of Valparaiso and brought up reinforcements from Santiago and Concepcion. The Congressists did not venture to attack.

The original plan of campaign had therefore failed because the Government was not taken by surprise as was expected.

Valparaiso is accessible on the land side by only two roads, and this fact might be generalized to show the difficulties of operating in every other part of Chili. One road is by Vina del Mar and the rail-road, entering the city on the north. The other is the old road formerly used before the rail-road was built. It was then in poor repair and entered the city from the south.

It was decided to strike over to this last road by difficult paths. It was a bold and dangerous move. It was almost a desperate undertaking to cut entirely loose from the fleet and all communications, marching over roads which in the rainy season were as bad as any in our own country, and fighting a battle in a position where defeat would be ruin. Looking for a similarity in the Vicksburg Campaign we see at once that there was not the chance which Grant had of retreating upon a new base, and there was not the justification which Grant had of a largely superior army and a theatre of operations where supplies were abundant. The Prussian Colonel Korner argued against the movement and advised an attack on Vina del Mar for the reason that the city could be defended from an attack at the south in positions just as favorable as those at the north. In this he seems to have been correct. Del Canto says that his reason for taking the southern route was to save a Chilian city from an open assault. It seems more probable that the Chilian Congress expected to deceive

the Government generals as to the direction of their attack, relying upon secrecy and rapidity of movement and upon the difficulty the enemy would find in taking up new positions.

(Fort Callao to Quilpue 4 miles.

Renaca to Quilpue 8 miles.

Quilpue to Las Palmas 12 miles.

Las Palmas to Las Cadenas 9 miles.

Las Cadenas to La Placilla 6 miles.)

To accomplish that march of twenty-seven (27) miles the troops marched mostly at night on two days. A large portion of the artillery was left behind on account of the difficulty of getting across the rough country between Renaca and Quilpue. In addition to the natural difficulties of the country the troops suffered greatly from exposure, from rain and cold. The Government troops, under as great or greater difficulties, managed to change the position of the army to a formidable position at La Placilla across the road by which the Congressional troops advanced.

The battle that ensued was well contested. Out of 20,000 men engaged, 5,000, or twenty-five per cent, were killed and wounded. The battle was won by a charge of cavalry in a way that cannot fail to excite our admiration and wonder in these days when cavalry is not supposed to win victories as in the days of Frederick and Napoleon.

Three hundred of these troopers, whom we may easily imagine were not the embodiment of a high type of cavalry, because they were new levies mounted on the underbred, undersized horses of the country, threw themselves upon the flank of the Government troops with a vigor and dash that was truly extraordinary. They lost 74 men and eight officers, of whom 44 men and five officers belonged to the leading squadron.

Valparaiso was entered in a few hours and the war was ended.

We have now seen that on several occasions small armies

have succeeded in crossing the Andes and entering Chili from the east but they met with no resistance and they suffered greatly. However we have little interest in such a line of operations. We have also seen that small armies, not strongly opposed, have penetrated Chili from the north, but a study of the difficulties of such a march would deter most commanders. We have found that the true key to the situation lies in control of the sea. The strategy of all recent campaigns has been the same, that is to obtain supremacy at sea before anything else is attempted. Military operations will not occur along the greatest length of the country. Few movements, independent of a co-operating naval force, can be attempted. Attacks by the fleet upon sea-ports can have only a local effect owing to the impossibility of extending its operations over more than a limited territory. It is necessary to capture place after place along the coast and work into the interior from these ports as bases. For these purposes an active field army of 10,000 to 25,000 men must be formed, and each part of the country becomes the objective of a campaign by itself. Such an army, supported by such a navy, with its advantages in choosing its point of attack each time, must surely overpower the country, in the end.

In two campaigns the nitrate provinces, although unprovided with everything that we rely on to sustain life, have been important strategic points. The export duties on nitrate of soda amount to about thirty million dollars in a year. By their loss in 1879 the Peruvian government was impoverished. By their possession in 1890 the Congressional party gained the means for carrying on the war.

The strategical advantage of the possession of the Nicaragua Canal by the United States would be great. As it now stands Chili has a central position while we have a coast line on the Pacific as well as one on the Atlantic to defend, both separated by many thousands of miles. While the Chilean navy may be concentrated for attack or defense, ours

must be dispersed in either case. I am not sure what influence the possession of the Straits of Magellan and the neighboring lands and islands may have, but I imagine that a small force could there be used effectively by Chili against a greatly superior force from our Atlantic coast.

Since the last war great changes have taken place in the rail-road system of Chili. A trans-Andean rail-way is probably now completed by way of the Uspallata pass—I may say *under* the pass—with a single tunnel three miles long. Several other trans-Andean roads are contemplated. It is also intended to attempt to connect the rail-way systems of Chili by a north and south line. Such improvements would add immensely to the defensive power of the country. With rail-roads running into friendly territory in the interior of South America and to its seaports on the Atlantic, a blockade would not mean starvation or surrender to many portions of the country as it would at a prior date. There, too, allies might be found beyond the Andes to send their armies to the assistance of Chili by these roads. The projected road in the interior would make it easy to supply and reinforce distant points, but it would always be in easy reach of a superior navy with a mobile field force which could raid any point of a line several thousand miles long.

Since 1891 Chili has added to her navy and within a few weeks nineteen German officers have been granted a leave by the Emperor to take service in the Chilian army.

(BOOKS CONSULTED.)

- Estadística y Geográfica de la República de Chili.
 Manual Hispano—Americano.
 Une Campagne de Huit Jours, par le General Lamiroux.
 La Guerre de Pacifique, par Don Diego Barros de Arana.
 Chili by B. V. M.
 Dark Days in Chili.
 The Chilian Revolution of 1891 by Lieutenants Sears and Wells, U. S. N.

THE MILITARY GEOGRAPHY OF MEXICO.

By 1st Lieutenant A. L. MILLS, 1st Cavalry.
Assistant Instructor.

MEXICO extends from the United States to Central America, and from the Gulf of Mexico and the Caribbean Sea to the Pacific Ocean. In extreme limits it embraces about thirty degrees of longitude and eighteen degrees of latitude. Its superficial area is about 744,000 square miles, equal to about two and three-fourths times that of the State of Texas. The length of the northern frontier line is about 1,900 miles, of which 1,000 miles is formed by the Rio Grande River; that of the eastern coast line is about 1,600 miles. The Pacific coast line, including that of the Gulf of California, is about 4,500 miles in length; the southern boundary is about 500 miles.

Mexico's greatest length is about 2,000 miles; her great-

est breath is about 750 miles. At the Isthmus of Tehuantepec her width is only 140 miles. Geographically, Mexico, lying between two great oceans, is highly favored.

TOPOGRAPHY.

The Cordillera of the Andes, as the mountains of Mexico are called, enter Mexican Territory from Gautemala, and, to about latitude 18° extend east and west, almost midway between the two oceans. From this line the mountains follow, in a general way, both the eastern and western coasts. Between these branch chains lies a great central table-land, called the Plateau of Anahuac, embracing nearly three-fifths of the entire area of Mexico. The highest portion of the plateau is in the vicinity of the City of Mexico, south and east, where it culminates in four volcanic peaks, ranging in height from 15,271 to 17,720 feet. From this locality, where the general elevation is more than 7,600 feet, the plateau has a general inclination toward the north-west, gradually subsiding until the United States is reached. Low mountain ranges divide the great plateau into smaller ones, the general but gradual northerly tilt being shown by the altitudes of Mexico City, Durango, Chihuahua, and Paso del Norte, on the frontier, which are respectively 7,600, 6,630, 4,600 and 3,800 feet. There is no point of the great plateau from which mountains may not be seen in clear weather; they are all the same in appearance—abrupt, bleak, and without vegetation. No great valleys traverse the plateau, nor are there many small ones. By avoiding the mountains, according to authority, “there is a good natural carriage road from Santa Fe, N. M., to the city of Mexico, a distance of 1,400 miles, with only slight variations from the level.” Between Saltillo and San Luis Potosi, a distance of 240 miles, the plateau is a treeless region, containing but little water, and is practically a desert, the greater part of the remainder is a habitable region, largely under cultivation. In 1883, Captain Dorst, Fourth Cavalry, made a horseback journey through

Mexico; he gives the following general description of the plateau: "Some fifty or sixty miles from Laredo, Texas, traveling by rail to Monterey, a long, flat topped hill is seen some miles to the right, extending in the distance nearly parallel to the road. After traveling fifteen or twenty miles further, this hill is higher and broken, its top has become serrated and jagged, and it finally merges into a range of mountains. Other mountains then appear to the left, and all increase in height towards Monterey. From thence southward to every place visited on the Mexican plateau, mountains were always in sight, either near or distant, and generally in every direction. Saltillo is regarded as located at a point on the northern edge of the Mexican table land. Starting from it and proceeding southward, the traveler at once enters a chain of mountains extending in an easterly and westerly direction and more than forty miles in breadth. After passing through it he comes upon a broad and almost desert plain, flanked by distant mountains, which produces scarcely anything besides a few stunted bushes and cacti, is sparsely populated, wholly uncultivated, poorly watered, and extends without change one hundred miles further to the south. He then meets a few towns, some evidences of cultivation, and near Charcas,—a town more than two hundred miles from Saltillo,—the first stream of running water. The plain has become more or less hilly and broken, and both population and cultivation increase perceptibly as he nears San Luis Potosi. The country to the west of that city, however, as far as Zacatecas, is barren and almost uninhabited. Farther south lie more fertile, though partly sterile plains and valleys, cultivated by irrigation to as great an extent as the water supply will permit, and separated from each other by intervening mountains. This alternation of plains and valleys with mountains extends southward to the City of Mexico, and eastward from thence to the edge of the plateau. Except where the soil is tilled, nearly all this great expanse

of country is bare, and the whole is almost treeless and but scantily supplied with water. * * * As far south as the state of Guanajuato, the mountains are bleak, dry, and desolate in appearance; but there, and farther south, a partial covering of bushes, stunted live oak, or occasionally pine, is not unusual." Scarcity of water and fuel will be the greatest obstacles to military operations on the great plateau, as they have been to the development of its resources.

The mountains of the western coast, the Sierra Madre of the Pacific, are continuous, extending from Oajaca to Arizona, at a mean elevation of over 10,000 feet. The mountains of the eastern coast, the Sierras Madres of Nuevo-Leon and Tamaulipas, have a mean elevation of about 6,000 feet; they gradually subside toward the north, and finally merge into the great plains of the Rio Grande river. The eastern range slopes abruptly to the sea, while the ranges of the western and southern coasts fall through a series of well marked terraces to the Pacific.

Between the foot of each of the great mountain chains, bounding the plateau, and the sea, lies a strip of low flat country, called the Tierras Calientes, or Hot Lands. Along the western coast, these lands form a strip from thirty to seventy miles in width. They are much more extensive along the eastern coast, where they include the greater part of the States of Tamaulipas, Vera Cruz, Tabasco, and Yucatan.

The Territory of Lower California, comprising the peninsula of that name, has an area of 61,544 square miles. It is about 750 miles long and from 30 to 150 miles broad. The Peninsula is traversed throughout its length by a continuation of the Sierra Nevada Mountains of California, which range from 1,000 to 5,000 feet high, and are bare of verdure. The soil of the Peninsula is wonderfully fertile where there is water, but the greater part of it, being subject to excessive droughts, is but thinly settled. It is credited with a population of less than 30,000. Separated from Mexico proper by

the great Gulf of California and the Colorado River, and its resources being comparatively small, the importance of Lower California in war between the United States and Mexico would be confined probably to some point on its coast being taken as a secondary base in operations against the ports on the west coast of the main country; the original base being some point on the coast of California, probably San Diego, or on the Colorado River below Yuma, Arizona.

HARBORS.

The seaboard of Mexico is little varied either by deep inlets, bold headlands, broad estuaries, or large islands. On the west side is the Gulf of California, the open Bay of Te-hautepec, and the smaller inlets of Acapulca and San Blas; the two last named are two of the finest harbors in the world, and almost the only safe ones in Mexico. The coast of the Gulf of Mexico is low, flat and sandy, and is without one good harbor. Those of Progreso, Campeachey, Tabasco, Vera Cruz, Tuxpan and Tampico, (the last three being of the greatest strategic importance), are mere open roadsteads, affording little or no protection from the "northers," which frequently blow, with great violence, along this coast. Vessels lying in these harbors are liable to be wrecked during these storms and often are compelled to put to sea to avoid their dangers. The best anchorage on this coast appears to be at Anton Lizardo, south of Vera Cruz, where the fleet conveying General Scott's army assembled before disembarking the troops to attack that city. The harbors on the Caribbean Sea are excellent, but owing to their distance from what must necessarily be the main objective in the event of war they have but little strategic value.

RIVERS AND LAKES.

Mexico is imperfectly watered. Its rivers as a rule are small and unimportant, and owing to the peculiar topography of the country, but a small number are navigable, and

then but for a short distance. On the north, the Rio Grande is navigable for large vessels but a few miles above its port, Matamoras. The Panuca, 290 miles long, and the Coatzacoalcos, 112 miles, are the principal rivers of the eastern coast; the former is navigable for small vessels for over 100 miles, and the latter, were it not for a bar at its mouth, might be navigated for a considerable distance by large vessels. The Grijalva, or Tabasco river, rises in Guatemala, flows through the two states of Chiapas and Tabasco, and empties into the Gulf of Mexico through two mouths; it is navigable for small vessels for about one-half its course. The longest rivers of the Pacific coast are the Santiago, 540 miles long, and the Balzas, 420 miles; both of these rivers rise in the State of Mexico, the former entering the sea at the small but good port of Zacatula, and the latter at San Blas. Neither are navigable on account of rapids; nor are any of the other rivers flowing into the Gulf of California, except the Colorado, which is open to the largest vessels from its mouth to the frontier of the United States.

Mexico has 59 lakes. Most of them are shallow lagoons, the remains of what were once large basins of water. Like the rivers, they are all small and of little value for the purposes of commerce or communication. The most considerable one is Lake Chapalla, in the State of Jalisco, which is about 70 miles in length and from 10 to 20 in width. The Santiago river flows through this lake. The valley of Mexico, about 42 miles long by 30 wide, contains six lakes, which were originally one large lagoon. Their total area is about 58 square miles. The largest is Lake Texcoco, directly east of the city. It, and the three lakes to the north, are salt, while the two remaining ones, about ten miles south-east of the city, are fresh. Many of the so-called lakes along the Gulf coast, such as the Laguna Madre, Laguna de Terminos, etc., are really arms from the sea.

Upon the whole, Mexico is poorly supplied with water,

and, upon the great plateau, the supply has been steadily decreasing since the Spanish Conquest.

CLIMATE.

Intersected about midway by the Tropic of Cancer, and stretching across seventeen parallels of latitude, Mexico necessarily enjoys a great diversity of climate. The four seasons are more or less distinctly marked in the northern portion, but in the central and southern portions there are but two seasons—Summer, or the Rainy Season, which lasts from May to October, and Winter, or the Dry Season, comprising the remainder of the year. The heaviest rains fall in August and September. With reference to temperature, Mexico, in common with all the countries of Spanish America, is divided into three great terraces: the coast regions, or *tierras calientes* (hot lands); the mountain slopes, or *tierras templadas* (temperate lands); and the elevated plateaus, or *tierras frias* (cold lands).

The Hot Lands include the region along each coast lying between the sea and an elevation of 2,500 feet. In these lands the usual temperature ranges from 70° to 85° F.; but near the sea level, consequently at all sea ports, the summer temperature frequently rises higher than 100 degrees; during the winter months the average temperature is only a few degrees lower than in the summer.

The Temperate Lands lie between 2,500 and 5,000 feet above the sea, and here the ordinary daily temperature ranges between 65° and 70° F. throughout the year.

The Cold Regions include the portions of the surface higher than 5,000, and this division embraces more than three-fourths the area of Mexico. The extremes of 45° and 80° F. are seldom exceeded below 8,000 feet altitude. The climate is cold as compared with that of the coast country; but not as compared with that of any portion of the United States, except portions of Florida and the Gulf Coast.

The healthfulness of the different regions of Mexico de-

pend upon their climate; the most healthy being those enjoying a dry climate, whether hot, temperate, or cold; and the most unhealthy being those in which humidity prevails. The climate of the Temperate Lands is healthful and pleasant, and that of the Cold Regions is salubrious below the elevation of 8,000 feet; but the climate of the Hot Lands is one of the worst and most unhealthful on the face of the earth. Yellow Fever and Black Vomit are the great scourges of the coast regions. They usually set in at Vera Cruz about the middle of May and last until November. At Campeachy, Tampico, and Acapulco the season often passes without a single case, but no such respite is ever enjoyed by Vera Cruz, Merida, or any of the coast towns of Yucatan, at all of which the mortality is generally great. Mexico has therefore every variety of climate from tropical heat to cold, but it should be noted that the climate of any particular place will depend far more on its elevation than on its latitude.

FOOD PRODUCTS.

The soil of Mexico is for the most part extremely fertile. The comparatively few exceptions are nearly all attributable to insufficient irrigation due to lack of water. In the Hot Lands the entire surface, excepting certain small areas of sand, is covered with a very luxuriant vegetation. Oranges, bananas, rice, hemp, and all kinds of tropical plants are found in abundance. In the Temperate Lands, coffee, sugar, cotton, tobacco, and other plants are cultivated. In the Cold Regions, wheat, corn, barley, and other products of temperate latitudes are found; the maguey, whose fruit is edible and which supplies the famous "pulque," the national beverage of Mexicans, is however, the principal object of cultivation. Wheat is cultivated with some success in portions of all but five of the Mexican states, but corn, frijoles or brown beans, and chile colorado constitute the subsistence of nine-tenths of the population, and are extensively produced in every state. On the plateau north of the 20th parallel, crops

depend upon irrigation. South of this, the rain fall is often sufficient, but cannot always be depended upon.

Two crops of either corn or wheat are grown on the same ground every year in the various parts of Mexico, and in the States of Vera Cruz and Tabasco on the Gulf coast, Mexico on the plateau, and in Jalisco, Guerrero and Oaxaca on the Pacific coast, three crops of corn are cultivated on the same ground in a single year. The yield per acre per annum is considerable greater than in the United States. All this is done with the simplest farming implements..

The following items will afford an idea of the annual Mexican food production:

Corn.....	200,000,000	bushels.
Wheat.....	12,000,000	“
Barley.....	10,000,000	“
Potatoes.....	4,000,000	“
Frijoles.....	508,000,000	pounds.
Sugar.....	158,000,000	“
Rice.....	33,000,000	“
Coffee.....	17,500,000	“

The annual value of the food crops of Mexico is estimated at \$60,000,000, and of all agricultural productions at \$110,000,000. A large portion of the area under cultivation gives indifferent results, but the remainder is equal in fertility to any country in the world. Mexico has been described as composed of regions of great fertility, separated by mountain ranges, or by tracts of very unproductive country, which, in many cases, are simply deserts. The portions of the country not suitable for agricultural purposes are, in general, more or less suitable for grazing, and support large numbers of horses, cattle, sheep and goats. The rivers and lakes abound in excellent fish, as do also the waters of the coasts. Mexico is also rich in precious metals, which are extensively mined.

GOVERNMENT.

Mexico is a federative republic, consisting of 27 States, a Federal District and 2 Territories, each of which has a right to manage its own local affairs, while the whole are bound together in one body politic by fundamental and constitutional laws. The powers of the Federal Government are divided into three branches, the legislative, executive, and judicial. The legislative power is vested in a Congress consisting of a House of Representatives and a Senate, and the executive in a President. Representatives and Senators are elected by the suffrage of all respectable male adults and hold office for two years. The President is elected by electors popularly chosen, as in our own country and holds office for four years. The administration is carried on under the direction of the President and a Cabinet of seven secretaries.

Each separate State has its own internal constitution, government and laws, with its governor and legislature popularly elected.

DISTRIBUTION OF POPULATION.

In 1892 the estimated population of Mexico was 11,885,607, of which 19 per cent are of pure, or nearly pure, white race, 43 per cent of mixed race, and 38 per cent of Indian race. The great mass of the people are extremely poor and densely ignorant, the natural result of their treatment by the Spanish conquerors and their successors; but under the enlightened policy pursued by the Government of the Republic, a great change is in progress and education is now compulsory. The Indian population has been very little affected by nearly four centuries of contact with the white race. They are to-day very similiar to their Aztec forefathers in manners, customs and mode of life. They follow the same pursuits and use exactly the same implements as did the Aztecs.

Nearly the whole of the Mexican population live in cities, towns or villages. Detached houses are rarely seen; travelers report riding from town to town, in the most popu-

lated districts, without observing a house. Except in the Hot Lands the houses are usually built of stone or adobe, and are very strong for defense, and almost impossible to set on fire.

The chief cities are the capital, Mexico, with a population of about 326,000; Guadalajara, 95,000; Puebla, 78,000; San Luis Potosi, 62,000; Guanajuato, 52,000; Leon, 47,000; Monterey, 41,000; Aguas Calientes, 32,000; Merida, 32,000; Vera Cruz, 29,000; (about four-fifths of the exchanges of Mexico pass through this Port.) Colima, 25,000; Pachuca, 25,000; Jalapa, 18,000.

For convenience in considering the Military Geography of Mexico, the States of the Republic are divided into three groups. The northern groups comprising the States of Sonora, Chihuahua, Coahuila, Nuevo Leon, Tamaulipas, Sinaloa, Durango, and the Territory of Lower California; the south-eastern group comprising Yucatan, Campeachey, Tabasco, and Chiapas; and the central group comprising all the remaining States and the Federal District. Of these groups, the northern, containing more than half the area of Mexico, contains less than one-ninth the population; while the central group, containing less than one-third the total area, contains more than four-fifths of the population. This central region must therefore be regarded as "the heart of the country," not only in geographical position, but also in population; it is so also in wealth, productions, manufactures, in fact, in everything but the grazing and mining interests; its boundaries, approximately, are two east and west lines, the one drawn through San Luis Polosi on the north, the other through Orizaba on the south.

COMMUNICATIONS.

Mexico is lacking in good roads. From the City of Mexico roads radiate to the different cities of the central plateau, but from this plateau, communication with the coast, with a few exceptions, is limited to bridle paths. There is a carriage road from Saltillo to Monterey and Matamoras; from

San Luis Potosi to Tula and Tampico; and from the City of Mexico to Vera Cruz, Tehautepec, Acapulco and San Blas; but the Sierra Madre Mountains of the Pacific are crossed by no road from Guadalahara to Arizona. Travel from the State of Sonora to the Capital must be by sea to one of the Pacific ports, or by way of El Paso in the United States. The roads of the central plateau, poor under the most favorable conditions of weather, are quagmires during the rainy season; those leading to the coast are steep, rough, and always difficult to travel. The government has of late years been engaged in improving its highways, but much yet remains to be accomplished.

In railroad communications the country is much better off. It is now pretty well intersected by railways, and their construction is being pushed forward rapidly. In a short time Mexico will possess a system of railroads that will not only develop her great natural wealth, but will greatly increase her power of defense. At present her railway mileage is over 7,000 miles.

The principal lines are: The Mexican Central, from El Paso, Texas, to the City of Mexico, 1,225 miles, with branches: Irapuato to Guadalahara, 160 miles, and under construction to San Blas: Aguas Calientes to Tampico, 415 miles.

The Mexican International, from Eagle Pass, Texas, to Torreon Junction, 383 miles, where it connects with the Mexican Central. Its branches are: Torreon to Durango, 157 miles: Trevino to Tampico, 387 miles.

The Mexican National, narrow gauge, from Laredo, Texas, to Mexico City, 840 miles. Branches: Mexico to El Salto, 19 miles: Acambaro to Patzcuaro, 96 miles. (This branch is being constructed to Manzanillo, 440 miles); Matamoras to San Miguel, 75 miles.

The Mexican railroad, from Vera Cruz to Mexico, 263 miles, with a branch to Puebla, 29 miles.

The Mexican Inter-Oceanic, narrow gauge, from Vera

Cruz to Mexico, with branches from Mexico to Jojutla, 122 miles; and from Puebla to Chialta, 64 miles. This last branch is being continued to Acapulco, 200 miles.

The Mexican Southern, from Puebla, through Oaxaca, is now in operation to Tehautepec.

The Tehautepec Railroad, from Coatzacoalcos to Tehautepec, 140 miles.

The Sinaloa and Durango Railroad, from Altata to Culiacan, 60 miles, is to be continued to Durango.

The Sonora Railroad, from Nogales, Arizona, to Guymas, 265 miles.

The Eagle Pass and Laredo lines are connected by cross lines from Sabinas to Lampaxos, and from Jaral to Saltillo.

A glance at the direction of these roads will show how greatly Mexico is favored by them with the advantage of interior lines for her forces.

Still more developed is the telegraph system of Mexico, which is now extended to all the State capitals and the principal cities, and is connected with the systems of the United States. In 1893, there were 37,800 miles of telegraph lines in operation.

MILITARY STRENGTH.

The total land fighting strength of Mexico, in 1893, was reported to be 131,523 infantry, 25,790 dragoons, and 3,650 artillery. As every Mexican capable of bearing arms is liable for military service from his twentieth to fiftieth year, there would be a general reserve of over one-half million men to draw on in case of necessity.

Her naval strength consists of 1 7-knot gunboat, 2 despatch vessels, 2 unarmoured gun-vessels, 1 transport, 1 steel training ship, 5 first class torpedo-boats, and 1 police-steamer. The fleet is manned by 84 officers and 416 men. In 1890 the mercantile marine, of vessels over 100 tons, comprised 16 steamers, and 16 sailing vessels. Her shipping also includes many smaller vessels engaged in the coasting trade.

The forces immediately available in case of war are about 2,000 officers and 36,000 men, as follows:—

1. The regular army—29 battalions of infantry, 13 regiments of dragoons, 4 battalions of artillery, engineers, etc. Total 1,700 officers and 30,000 men.
2. The Rural Guards and Gendarmes, mounted, 3,000 men.
3. The local troops of the several states, about 3,000 men.

The regular troops are well armed and equipped, the artillery being provided with steel breech-loading guns of modern pattern. They do not lack field experience and have shown high efficiency in Indian warfare. Remarkable marching qualities, combined with ease of subsistence, are ascribed to the infantry, while the "Rurales," as a mounted body, is said to be without a superior in the world. It is to be regretted that no information has been received as yet of Mexico's partial mobilization of her forces for war, which recently seemed imminent with Guatemala. Such would be of interest now as indicating her readiness for war, and on which to base an opinion of the efficiency of her general staff.

Railroads constitute Mexico's best means of transportation, and pack animals the next; wagon transportation is undeveloped, due to the nature of the country and the kind of service her regular forces have been called upon to perform.

Mexico has no permanent fortifications of modern design. Works exist at the Capital, Puebla, Vera Cruz, Perote, Acapulco and Mazatlan, but they and the guns manning them are obsolete. An excellent military school, modeled largely after West Point, is maintained near Chapultepec. The country also has in operation a national armory for the manufacture of small arms, and works for the production of powder.

FINANCES.

The fiscal value of property in Mexico in 1892 is given

as \$497,865,195, the fiscal value being taken as one-third less than the actual value. The total debt of the country, June 30, 1892, was \$174,449,510. The exports of the country, in 1892-93, amounted to \$87,509,221. The budget estimates of the government for the year ending June 30, 1895, were as follows: Revenue, \$43,074,053; Expenditures, \$43,054,371; of the latter, \$10,402,866 were for the army and navy.

MILITARY CHARACTER.

Captain Shunk, 8th U. S. Cavalry, in an article on the Military Geography of Mexico (freely used in the preparation of this lecture), describes the military character of the Mexican as follows:

“Readers familiar with Mexican history, knowing that Mexican armies have been defeated repeatedly by greatly inferior forces of Spaniards, Americans, and Frenchmen, will be inclined probably to regard the Mexican soldier as inferior to the soldiers of other civilized countries, and there is much in history to justify such an opinion. However, before accepting this conclusion as final, several facts should be taken into consideration, among them the following:

1. In the encounters referred to, the Mexican troops were invariably poorly instructed, poorly armed, and destitute of good officers in the lower grades; disadvantages that could not be equalized by the efforts of a few able men in high command. In future wars, this state of affairs will no longer obtain in their regular forces, nor to so great an extent as formerly in any part of their forces.

2. Their want of good communications and the general poverty of the country have been such that their resources could not be made available on a threatened line in any reasonable time. This condition has almost completely disappeared.

3. The Mexican soldier has also been accustomed to handle and use fire arms from childhood, and he often displays the recklessness and prowess that we are familiar with

among our native indians. In physical bravery and contempt for danger, he will probably be found equal to any soldier he may be called upon to meet. Instances show that Mexican troops, bravely and skillfully led, fight well; poorly led they are easily stampeded.

4. The true point of inferiority of the Mexican soldier lies in his dense ignorance; but compulsory education is correcting this evil and will in time eradicate it.

5. The marching power of Mexican troops has been commented upon by many officers who have visited the country; and if it has been correctly reported, it far exceeds that of all other countries. It is asserted that Mexican infantry, in small bodies of 2,000 or 3,000 men, has repeatedly marched about 50 miles a day for several consecutive days. While this can scarcely admit of belief, it can not be doubted that Mexican troops are accustomed to march with greater rapidity than is customary in any other country."

From the foregoing it appears that our neighbor on our southern frontier is not unprepared for war. Her condition is prosperous; her finances are good; her resources in soldiers and supplies are large. Nature, with mountains, deserts and climate, has made her strong in defense, and her communications, giving all the advantages of interior lines, increase this strength. Finally it is apparent, with a determined defense, her conquest by an enemy from without must prove to be a great undertaking.

POSSIBLE LINES OF OPERATIONS.

In the event of war between the United States and Mexico, our country will naturally assume the offensive; if not at first, then shortly after the breaking out of hostilities, and will carry the war into Mexican Territory. To prosecute the war to a successful conclusion, it is evident, from what has already been pointed out, that our forces must conquer the great central plateau of Mexico from San Luis Potosi, on the north, to Orizaba, on the south. Our first objective there

would be the capital city. Examining the map, we find a number of routes to it. We might base ourselves on the Rio Grande river, and assisted by the railroads, invade Mexico by way of El Paso, Eagle Pass, or Laredo; or, having control of the sea, we might establish ourselves at one of the Gulf or Caribbean ports, or at a Pacific port south of Guymas, and move thence towards the Capital. Considering these several routes, reflection will show that the great distance of the Pacific ports from our resources and the lack of roads to the capital, puts these lines out of the question when compared with nearer routes; and that similar reasons—distance from the objective and the character and climate of the intervening country—throw out all sea ports south and east of Vera Cruz. Taking up the other routes, the following table gives the lengths of the remaining lines:

El Paso to Mexico City.....	1,225 miles.
Eagle Pass, via Torrean, to Mexico City.....	1,091 “
Laredo to Mexico City.....	840 “
Tampico, via San Luis Potosi to Mexico City...	637 “
Vera Cruz, via the Mexican R. R., to Mex. City	263 “
Laredo to San Luis Potosi.....	478 “
Tampico to San Luis Potosi ..	275 “

These figures are significant. Controlling the sea as we would in the case considered, they show Vera Cruz to be the available point on the Gulf coast nearest the capital, 374 miles nearer than Tampico, and 577 miles nearer than Laredo, the point on the Rio Grande closest to the objective. The shortest line, to fight for, if a possible and an effective one, is plainly the best. In the past, Vera Cruz has been an effective point of invasion as attested by the fact that the greatest successful invasions of Mexico have been based on it—in 1519, by Cortez; in 1847, by General Scott; and in 1863, by the French. Cortez followed the route Vera Cruz, Jalapa, Tlascala, Mexico; General Scott: Vera Cruz, Jalapa, Perote, Puebla, Rio Frio, Mexico; the French: Vera Cruz, Orizaba,

Esperanza, Puebla, Rio Frio, Mexico. We are warranted in assuming that these lines are still practicable, for, although the armament of armies has been vastly improved since they have been tried, and railroads now follow the routes, yet, as our studies show to be true, the relative advantage of improvements, to the defense and offense, remains about the same.

The absence of suitable roads to the plateau must confine any effective invasion of Mexico, at the present time, by the Gulf coast, to a base at Vera Cruz or Tampico. A writer in the *Cavalry Journal*, of June, 1892, advocated the latter point as a better base than Vera Cruz, but its few advantages do not offset one great disadvantage. The Mexican Central railroad runs directly from Tampico to the plateau at San Luis Potosi, distant 275 miles. This line is equally as long as the lines from Vera Cruz, and evidence is wanting that it would be any less difficult to force. The advantages of the port are that it is some 200 miles nearer by sea to the United States than Vera Cruz: that we could count on securing early in the war the control of the railroad from it to Monterey and Laredo, thus giving, in addition to the sea route, an all rail route from our country; and, lastly, the Rio Panuco river, being navigable for small vessels for over 100 miles and following closely the line of the railroad, would afford greatly increased means of advancing. These advantages are apparent, but the controlling objection to the port as a base is that the point of the plateau we would gain by it would find our army, not at the gates of the capital and chief city of Mexico, but over 300 miles north of it, with a further advance of 140 miles to the west, to capture the city of Aguas Calientes, before we could turn towards it. The great effort that would be necessary to move our army from San Luis Potosi to the capital will be shown later, in discussing invasion from the Rio Grande frontier.

Returning to the Vera Cruz line, two railroads, the Inter-Oceanic (narrow gauge), and the Mexican (standard gauge),

paralleling the respective routes of General Scott and the French are now in operation from Vera Cruz to the City of Mexico; they cross each other at San Marcos, 150 miles from Vera Cruz, but for the greater part of the way are separated by lofty and impassable mountains. An old carriage road follows the course of each railroad about one-half the way to the capital. One or both of these railroads must be the line of advance, the possession of either to San Marcos would give control probably of the other back to Vera Cruz; but possession would be obtained only by overcoming great obstacles and at the cost, certainly, of desperate fighting. Both roads abound in strong defensive positions; both ascend tremendous grades, cross deep canons, traverse brinks of precipices and pass through tunnels; they will be easy for the enemy to destroy and difficult for us to repair, but in the light of past experience they ought not to prove insurmountable obstacles.

A short description of the course of the Mexican railroad will be sufficient to give some conception of the obstacles that must be overcome in gaining the central plateau. Leaving Vera Cruz, the road crosses a strip of the hot lands, a plain 30 miles wide, to the Soledad river, where the ascent to Orizaba, 82 miles from Vera Cruz, begins. Orizaba is 4,000 feet above the sea, and in attaining this height the road ascends a tremendous grade and crosses the Barranca de Matlac on an iron bridge, 350 feet long and 90 feet high. A few miles beyond Orizaba the road runs in the Barranca del Infernillo with numerous bridges, tunnels and steep grades, thence to the plains of La Joya, crossing which the road rises an additional 3,600 feet in a short distance and attains the plateau, at an altitude of 7,900 feet, at Esperanza, 111 miles from Vera Cruz. The road then follows, for 90 miles, a broad and generally level plain to Apam, 58 miles from Mexico city, where it passes through a narrow gap into a flat valley, generally 5 to 6 miles wide, which it traverses, past the north-western shore of Lake Tezcoco, to the capital.

With the difficult Sierra Madre mountains in rear and with insufficient communications for the prompt withdrawal of a large body of troops, it is not likely that Mexico would seriously oppose invasion in the State of Vera Cruz. Her first great efforts would be met in the defense of the mountain chain. If these efforts should prove futile we must then expect to meet the Mexicans in large force on the plateau in the vicinity of Puebla, which from its position, would be a strategic point which we would have to take. Victory there will open the way to the capital, and to the objective of the campaign—the destruction of the main army of the enemy. Preliminary, however, to any sustained operations to gain the central plateau, a large depot and entrenched camp must be established across the hot lands, at a sufficient elevation above the sea to afford the army security from sickness.

No time should be lost in doing so; the army as soon as debarked should be pushed forward rapidly to the point selected. On the line of the Mexican railroad, Orizaba would be such a point; or, the vicinity of Jalapa, if the advance be by the Inter-Oceanic road.

With Vera Cruz as the point of invasion, our operations on the northern frontier and the Pacific coast should be limited to diversions, having for their object the capture of important points and the detaching of bodies of troops from the enemy's main army to defend them. The sea port of Tehuantepec at present, and when the railroads now being constructed are completed, Acapulco, Manzanillo, San Blas and Mazatlan, are all especially important points and must be blockaded, and occupied if possible.

Let us now consider the northern frontier. Without entering into a discussion of the War of 1845-7, it may be safely asserted that the expeditions of Generals Taylor and Wool proved that a decisive invasion of Mexico from the Rio Grande frontier was not then practicable, due to the great distance to traverse, the want of necessary supplies in the

country, the lack of sufficient wood and water, and the impossibility of protecting long lines of supply from guerrilla warfare in which Mexicans are adepts. General Taylor advanced with the greatest difficulty to Saltillo although successful in every battle. Urged by the War Department to push on to San Luis Potosi, he objected to doing so, and recommended that Saltillo be held only as a defensive line and all remaining troops be thrown into the column operating from Vera Cruz. Ambition, alone, would have spurred General Taylor on had success been probable. The Saltillo desert was in front of him, and its ruinous effects on Santa Anna's army, which crossed it to meet him and be defeated at Buena Vista, was known to him. Railroads did not then exist in Mexico. To-day they do, and from our knowledge of the use that may be made of them in war, it is believed the lines running from our frontier now make a decisive campaign from the Rio Grande practicable. But when we consider what such a campaign will require in men and efforts, it is not likely our government would undertake it, unless Mexico should have an ally denying us control of the sea, or making uncertain our ability to establish ourselves at a suitable point on the Gulf coast. The probable course of such a campaign and the efforts necessary for its successful prosecution are well set forth by Captain Shunk, in his article already referred to, as follows:—

“The choice of a line of operation would be from among the railroads leading into Mexico from the Rio Grande. The first effort of the main army would probably consist in a movement upon Monterey and Saltillo. Eagle Pass or Laredo would be the starting point. A choice would, no doubt, be largely influenced by topographical considerations. The Laredo route is more direct; but the Eagle Pass route favors an attack in a more effective direction, and would probably be preferred at first, for this reason, and because it is a standard-gauge road, while the Laredo road is a narrow-gauge,

and especially because points thereon, such as Treviño and Jaral, must be occupied to protect the flank while moving upon Monterey and Saltillo.

Selecting the Eagle Pass route, the army would probably advance to Jaral. Holding that place by means of a detachment, it could then advance from Treviño upon Monterey and then upon Saltillo. The Mexicans observing these movements would probably evacuate the country from the Rio Grande to Monterey; and, concentrating all their available forces, would either fight a battle in defense of Monterey or Saltillo, or would retire without much fighting, beyond the desert, using both the railroad line to Tampico and that to San Luis Potosi for the purpose. It is plain that Mexico could not better serve our interests than by putting forth her whole strength in this region; just as the Russians in 1812 might have served Napoleon by fighting him on the Vistula, instead of which they preferred to retire among their deserts. But the probability is that the Mexicans would evacuate this region without severe fighting, destroying the railroads, and the water tanks in the Saltillo desert. In any event, it must be occupied, and an intrenched camp would probably be formed at Monterey or Saltillo which would be occupied by a strong force to guard against an attack from Tampico and to give security to a further advance. The strategic value of this locality would be very considerable.

It would next be necessary to establish the army in the fertile and populous districts of the Great Central Plateau. The point to be ultimately secured is San Luis Potosi, as being the first important point south of the desert, on our direct line; by which line it is 240 miles from Saltillo. In the entire distance, water, in sufficient quantities for a force of some size, is found only in artificial tanks, easily destroyed by the retreating enemy. If the railroad could supply with water, as well as other necessities, a force large enough to attack San Luis Potosi with a reasonable prospect of success, the at-

tempt should, of course, be made to advance directly. But, as this is out of the question, the army must pass to that point either by following the railroad lines to the east of the desert, or by following those to the west of it.

The distances are as follows:

From Monterey to Tampico.....	321 miles.
“ Tampico to San Luis Potosi.....	275 “
Total via Tampico.....	596 “
From Trevino to Torreon.....	160 “
“ Torreon to Aguas Calientes.....	342 “
“ Aguas Calientes to San Luis Potosi.....	140 “
Total via Torreon.....	642 “

The Tampico line is somewhat shorter; but the Torreon line passes through a far less barren country and is entirely secure from the enterprises of an allied army that might land at Tampico, and interrupt the communications, should the attempt be made by the eastern line to reach San Luis Potosi.

By whichever line the attempt be made, the whole strength of Mexico will certainly be encountered. Her railroads furnish ample means for concentrating all her forces at any point between Tampico and Aguas Calientes, or between the latter place and Torreon. This is her time to beat back the invading army, if she can do this at all; and the greatest battle of a war begun under such conditions might be expected before the Americans would be allowed to get possession of their objective, San Luis Potosi.

The distance from Eagle Pass to Torreon is 383 miles; to Zacatecas, 651 miles; thus the Americans, guarding a line 600 or 700 miles in length, would need vastly superior forces in order to put equal numbers in line of battle. Torreon Junction is a point of much strategical importance and, when captured, an entrenched camp would, no doubt, be established there. Detachments would occupy Chihuahua and Durango, and the resources of the country would be secured,

while Mexico would be cut off from her north-western States, about one-fourth of her area.

Under the supposed conditions, it has not been supposed that Mexico would fight a pitched battle north of Zacatecas, because guerillas operating on the American communications, would compel them to detach so many men that their superiority of numbers would rapidly disappear. But, it has been assumed, that the great battle would be fought in defense of Aguas Calientes, because, while that point was in their possession, the Americans would not dare to attempt to march on San Luis Potosi. If the Mexicans win the battle, the American campaign is checked until reinforcements enable them to resume it. If the Americans win, they establish themselves at San Luis Potosi, thus shortening their line of communications about 250 miles, form an entrenched camp, repair the railroad in their rear, and are now prepared to move upon the capital from their new temporary base, meanwhile guarding a line 475 miles in length—a line about as long as Sherman's line from Louisville to Atlanta. But the capital is still 365 miles distant.

The Mexican National Railroad is a narrow guage road, while the other lines are of standard guage. The above change of base would be greatly facilitated if the two lines were of the same guage, and this change could be made in a few days as we know by experience. (The P. Ft. W. & C. R. R. was changed in a single day from narrow to ordinary guage, and every regular train ran on time as usual.)

With the principal army thus established at San Luis Potosi, (or perhaps at Aguas Calientes,) the war, so far as decisive results are concerned, has really only begun. It has progressed only so far as a European war has done when one army has crossed the frontier and has gained the first action; the army has only reached a position from which a vital part may possibly be struck.

The next operation would probably have in view the

capture of Celaya Junction which would effectually isolate the capital from the north and west. But when the army finally arrived before the capital, there would be behind it a line of communications 840 miles in length. This would have to be guarded against the efforts of a hostile population, greatly addicted to guerilla warfare. The city itself would be defended by an army behind powerful works, and an ally could land troops at Vera Cruz and send them by rail to their assistance.

To give an idea of the force necessary to guard such a line, 840 miles in length, let us compare the supposed situation with the very similar one on a much smaller scale of Sherman before Atlanta. "On the 31st of August, 1864, Sherman had at the front about 72,000 men, and in his rear about 68,000. (These numbers represent combatants only. He had besides, in his rear, an army of civilian employes engaged in running his trains and keeping the track in repair.) His main line, Louisville, Nashville, Stevenson, Chattanooga, the Chattahoochee Bridge, Red Oak, was about 480 miles.

* * * It is worthy of note that the portion of the line north of Chattanooga was held by about 533 men per *étape* (distance of fifteen miles), while that from Chattanooga to Red Oak required a force per *étape* of 3,500 men."

When we consider the force necessary to conduct an operation such as the above, and estimate the strength that would necessarily be employed in guarding the line of communications, enforcing requisitions, checking partisan operations, besieging or garrisoning important places such as Monterey, Saltillo, Torreon Junction, Aguas Calientes, San Luis Potosi, Celaya, and many others, quelling uprisings, the difficulties of supply so far from the base, etc., then we begin to appreciate the magnitude of such an undertaking in case we did not control the sea.

In fact, if Mexico, in the case supposed, should make a respectable resistance, according to the number of her popu-

lation and the advantages of her topography, the conquest of the country by the overland line of operations (and without the use of the sea) would constitute a task of immense magnitude. And, even with control of the sea, another Mexican war will bear only a faint resemblance to the war of 1846-7, so far as the scale of the operations is concerned."

In that war, Mexico was poor, her people were not united and her government was threatened with revolutions during its progress. To-day Mexico is prosperous, her people are fairly united, and her government is strong. The United States employed forces in the last invasion aggregating about 100,000 armed men—26,690 regular troops, 56,926 volunteers, and the balance in the navy and supply departments. In another war, these numbers will be but a fraction of the force that will be necessary to bring Mexico to terms.

NOTES ON THE MILITARY GEOGRAPHY OF
CENTRAL AMERICA.

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THE continents of North and South America are connected by a narrow strip of land of varying width and irregular outline. From the purely geographical point of view the term Central America would apply to all the land between the isthmus of Tehautepec and that of Darien. Several states of the Mexican republic as well as Panama, one of the United States of Colombia, would thus be comprised in Central America. In its political meaning, however, the term Central America is exclusively applied to the territory embraced by the republics of Guatemala, Salvador, Honduras, Nicaragua and Costa Rica. This territory lies between 8° and 18° northern latitude and is thus wholly within the northern torrid zone. It was discovered by Columbus, who landed at Point Casinas, now called Cape Honduras, on

August 14, 1502. The Spaniards rapidly overran and subdued the country, and formed it into the Spanish kingdom of Guatemala, which it remained until 1821. In that year the Spanish yoke was shaken off, the states of Chiapas and Soconusco joined Mexico, while Guatemala, Honduras, Salvador, Nicaragua and Costa Rica formed the federal republic of Central America. This federation was dissolved in 1848, since which date these several states have remained independent.

The general topography of Central America is entirely determined by the Andes, that mountain range which extends under various names from Patagonia to Alaska and forms the backbone of the two American continents. In Central America this mountain range runs approximately parallel to the Pacific coast at an average distance of 50 miles. The eastern slope is gradual, the western slope is abrupt and furrowed by many torrents. The population consists of whites, negroes and indians and an intermixture of the three.

GUATEMALA.

Guatemala, the northernmost of the five republics of Central America, is bounded on the west and north by Mexico; on the east by British Honduras and the Bay of Honduras; on the south-east by the states of Honduras and Salvador; and on the south-west by the Pacific Ocean. The territory thus circumscribed has an area of 48,238 square miles, a population (in 1892) of 1,510,326, and extends between $13^{\circ}45'$ northern latitude, and between $88^{\circ}10'$ and $93^{\circ}12'$ western longitude. For administrative purposes the republic is divided into 22 departments; the capital is the city of Guatemala with a population of 70,000, and an elevation above sea level of 5,720 feet. The city is defended by the adobe fort of San José,

The character of the country is essentially mountainous. The Andes traverse the republic from south-east to north-west with a mean elevation of about 7,000 feet; some of the peaks, among them volcanoes, are as high as 14,000 feet. In

point of climate the surface of the state may be divided into three zones according to altitude. The first zone comprises the low, hot and unhealthy districts along the coasts of less elevation than 1,300 feet. The second zone comprises the highlands with elevations between 1,300 and 4,900 feet, where the climate is temperate and salubrious. These highlands constitute the greater part of the surface of Guatemala. The third, cold, zone comprises all land of 5,000 feet elevation and more.

The greater part of the northeastern portion of the state is drained by the Usumacinta river and its numerous tributaries. For a considerable part of its course the river forms the boundary between Guatemala and the Mexican state of Chiapas. It empties into the Gulf of Mexico and is navigable for small vessels from its mouth to Tenosique in the Mexican state of Tabasco, so that no benefit accrues to Guatemala directly from its navigability.

The chief drain of the southeastern portion of the state is the river Mutagua, which has its sources on the northern slopes of the Andes; its valley is covered by forests and the head of navigation is at Qualan, whence a wagon road starts and accompanies the river upward for some distance. The general direction of the course of this river is eastward; it empties into the Bay of Honduras. The river next in importance is the Polochic, north of, and smaller than, the Mutagua, to which it runs approximately parallel and from which it is separated by the Sierra de las Minas. In its lower course the river flows through the large Lake of Yzabal and through the smaller one of Golfette, and empties in the Gulf of Amatique under the name of Rio Dulce. Sternwheelers ascend the river from Lake Yzabal to Panzos, where a wagon road begins. The port of Yzabal on the lake of like name is defended by an old fort to the west of the town. The narrow gorge through which the river leaves the lake is defended by the old and tumble-down fort of San Felipe.

The rivers flowing into the Pacific are numerous and small with abrupt courses. In the rainy season they become furious torrents and obstacles to land communication along the coast.

Numerous lakes are spread over the surface of the state. In the highlands of the northern, thinly settled, part of Guatemala there is a multitude of small lakes, the largest one, that of Peten, being 45 miles long and 3 wide. The Lake of Yzabal, which has been mentioned before, extends 30 miles east and west with a width of 12 miles. It is deep enough for all vessels, but a bar at the mouth of the Rio Dulce prevents any but small vessels from coming up into this lake. In the southern portion of the state is the Lake of Atitlan, completely landlocked, 5300 feet above the sea, 18 miles long and 10 wide. Lake Amatitlan lies about 4,000 feet above sea level. Astride of the border between Guatemala and Salvador lies the Lake of Gulja, 2,100 feet above sea level, and 20 miles long by 12 wide.

The harbors are all of indifferent character. On the Atlantic, Livingston is a free port, but the water is so shallow that vessels have to lie a great distance off shore. The harbor of San Thomas in the southernmost recess of the Gulf of Amatique has 18 feet of water, but is unhealthy; its port, Puerto Barrios, is three miles to the northeast, and the terminus of a planned, but not yet constructed, transcontinental railway, San José on the Pacific being the other terminus. So far this railroad has been constructed from San José to the city of Guatemala. The chief ports on the Pacific are Champerico and San José, but both have poor harbors, shallow water and unprotected anchorages. San José has a pier 600 feet long, but the water is too shallow for vessels to come up to it.

Two railroads are in operation;

One from San José to Guatemala, 75 miles, which it is proposed to extend to Puerto Barrios, 186 miles from Guate-

mala. This railroad is owned by an American company and subsidized by the government of Guatemala.

The other railroad runs from Champerico to Retalhuleu, 25 miles, and thence to San Filipe, 15 miles further; it is proposed to extend this road to Quetzaltenango, 50 miles from Retalhuleu.

Quite a number of wagon roads exist in Guatemala, but many of them are not to be relied upon. Three roads lead from the Pacific shore to the highlands north of the main chain of the Andes: one from Champerico to Quetzaltenango and Totonicapan, another from Ocos to San Marcos, and a third from San José to Escuintla and Guatemala.

There are several roads running in the foothills of, and parallel to, the main course of the Andes; these should be regarded with suspicion on account of the many watercourses they cross. An east and west road in the highlands, mentioned before, serves to connect most of the prominent towns: San Marcos, Quetzaltenango, Totonicapan, Quiché, Solola, Chimaltenango, Antigua, Amatilla, Guatemala, Guajiquilapa, and Jalapa. No wagon roads run from the interior to the Atlantic coast.

There are 2,411 miles of telegraph with 127 offices. A line to Libertad in Salvador reaches the cable at that point.

The principal articles of export are coffee, cacao, hides and wool. The mines produce gold, silver and copper. In 1893 the imports and exports amounted to 6,384,000 pesos and 19,087,000 pesos. For the fiscal year 1893-94 the revenue and expenditures were 10,422,752 and 11,401,418 pesos respectively, while the interior and foreign debts amounted to 6,020,062 pesos and £920,000 respectively. (The peso is nominally equal in value to a silver dollar, in fact it is worth but 77 cents.)

In 1891 the army consisted of 3,718 men, the expenses for which constituted one-tenth of the public expenditures. The militia numbers 33,700 men (on paper).

The country is capable of producing great wealth, but the prime requisite for development, as in all Central American states, is the construction of roads and railroads, which, however, presents unusual difficulties on account of the very irregular surface, and is at present beyond the means of the states. The next great requisite is the development of agriculture.

The Mutagua river leads from the Atlantic to the very heart of the state and the harbor of San Thomas is but a short distance from the valley of this river, through which as yet no wagon road runs from the coast to the capital. By means of light draught vessels an invading force might enter the Lake of Yzabal from Livingston and have its supplies transported by water up the Polochic as far as Panzos, whence a wagon road leads to Coban and Salama. The occupation of these points would cut the northern half of the state off completely, but on the other hand this force would be practically cut off from troops operating in the southern part of the state, as no wagon roads cross the Sierra de las Minas or lead to Guatemala from the two places just named. Invasion from San José or Champeico or both, would reach more directly the capital as well as the highlands which produce and contain the wealth of the state. In any event, from whatever point an invader may start, he will find in his path many strong natural positions and mountain passes, he will have difficulty in moving his artillery and have to rely on pack animals for transportation and on mounted infantry for fighting. The highlands once conquered, the invader is master of the country.

SALVADOR.

This is the smallest of all Central American states, having an area about 8,000 square miles, with a population of 780,000. The state extends between $13^{\circ}15'$ and $14^{\circ}30'$ northern latitude, and between $87^{\circ}45'$ and $90^{\circ}15'$ western longitude, and is bounded on the north by Honduras, on the

east by Honduras and the Gulf of Fonseca, on the south by the Pacific and on the north-west by Guatemala. The capital is San Salvador with 20,000 inhabitants and an altitude of 2,800 feet. For administrative purposes the state is divided into 14 departments. The outline of the state is practically a rectangle with sides of 140 and 60 miles in length.

The greater part of the country consists of a plateau, with an average elevation of about 2,000 feet above sea level, broken by a large number of volcanic cones. The main chain of the Andes lies to the north, beyond the boundaries of the state.

The river Lempa drains the greater part of the state; it rises in the Lake of Gulja, follows for two-thirds of its course an easterly direction, then curves to the south and empties into the Pacific. It discharges a considerable body of water throughout the year, but is not navigable on account of rapids.

The harbors are those of Acajutla, La Libertad and La Union. The first has a pier, but the water is so shallow that vessels have to lie quite a distance off shore and lighters have to be employed. La Union is situated in a recess of the Gulf of Fonseca, forms a landlocked basin with four or five fathoms of water, and is spoken of by some writers as the best harbor of Central America. This statement is disputed by others, who maintain that the harbor has but eight feet of water. La Libertad has an iron pier running three-quarters of a mile out into the sea, but the water is so low that vessels cannot approach within less than two miles of it.

A railway connects the port of Acajutla with the inland towns of Santa Anna and Ateos, 53 miles, and is nearly completed to San Tecla (1892). The country is said to be traversed by many miles of good wagon road. "Although San Salvador is the smallest in area of the group of republics, and only a little larger than Connecticut, it is the most prosperous, the most enterprising, and the most densely populated,

having even a greater number of inhabitants than the land of wooden nutmegs. The population averages about 80 to the square mile, almost twenty times that of its neighbors. The natives are inclined to civilized pursuits, being engaged not only in agriculture, but quite extensively in manufacture. They are more energetic and industrious than the people in other parts of Central America, work harder, and accomplish more, gain wealth rapidly, and are frugal; but the constantly recurring earthquakes and political disturbances keep the country poor. When the towns are destroyed by volcanic eruptions, they are not allowed to lie in ruins, as those of other countries are, but the inhabitants at once clear away the rubbish and begin to rebuild. The city of San Salvador has been twice rebuilt since Leon of Nicaragua was laid in ruins, but the débris in the latter city has never been disturbed. The capital of San Salvador has been thrice almost entirely, and eleven times in its history partially, destroyed by earthquakes and volcanic eruptions coming together.

San Salvador has always taken the lead in the political affairs of Central America. It was the first to throw off the yoke of Spain, and uttered the first cry of liberty, as Venezuela did among the nations of the southern continent.*

In 1893 the revenues and expenditures were \$7,133,000 and \$7,153,000, the internal and foreign debts \$3,964,000 and \$1,305,000, the imports and exports \$1,853,000 and \$7,491,000. The chief articles of export are coffee, indigo, minerals and tobacco.

There are in existence 1,803 miles of telegraph with 138 offices; La Libertad is the cable office.

The army numbers 4,000 men and the militia 15,000, all males between 18 and 40 years of age being liable to military service.

*W. E. Curtis, "The Capitals of Spanish America."

HONDURAS.

The state of Honduras extends between $13^{\circ}10'$ and $15^{\circ}45'$ northern latitude, and between $85^{\circ}30'$ and $89^{\circ}45'$ western longitude, and is bounded on the north by the Caribbean Sea, on the south-west by the Gulf of Fonseca and the state of Salvador, on the north-west by Guatemala. The population is 306,048, the area about 45,500 square miles. The capital of the state is Tegucigalpa, which has 12,000 inhabitants and is situated 3,200 feet above the sea. The state is divided into 13 departments.

The character of the country is mountainous and very irregular. The general direction of the watershed between the Atlantic and Pacific is east and west, its course tortuous. The river system is the best developed in Central America, the principal rivers, all of which flow into the Atlantic and are navigable by small vessels for considerable distances, being the following:

The Ulua, which drains nearly one-third of the area of the state and is navigable for small vessels for many miles; it flows into the Bay of Honduras.

The Aguan, emptying into the Antilles Sea east of Tujillo.

The Rio Negro,

The Rio Patuca and

The Rio Segovia (also called Wanks or Cocos), which rises in the Corpus Christi Mountains within 35 miles of the Gulf of Fonseca, and in the lower half of its course forms the boundary between Honduras and Nicaragua.

The three principal rivers which flow into the Pacific (Gulf of Fonseca), the Goascaran—forming the boundary between Guatemala and Salvador in the lower half of its course—the Nacaome and Choluteca, are smaller than those flowing into the Atlantic and not navigable.

The headwaters of the Ulua and the three rivers flowing into the Pacific, enclose a plateau in the center of the state.

The climate as in other Central American states, depends on the altitude; the greater part of Honduras consists of salubrious highlands.

The principal harbors are those of Omoa and Trujillo on the Atlantic and Amapala on the Pacific. Omoa, near Puerto Caballos, which it has supplanted, has docks "on which the largest steamers can tie up" (?) and "is defended by a strong (?) work 'El Castillo de San Fernando.'" The harbor of Trujillo has little depth and the ships have to anchor a mile from shore in an unprotected roadstead. The best harbor is that of Amapala in the Gulf of Fonseca. This magnificent gulf, 50 miles long and 30 wide, is entered through a gate 18 miles wide, a massive volcano on either side forming the gate posts as it were. The gulf is dotted with islands belonging to Honduras and Salvador. On Tigre island, belonging to Honduras, is the port of Amapala with a harbor which is safe and has sufficient depth for seagoing vessels. The traffic between the port and mainland, the towns of La Brea and San Lorenzo, is carried on by lighters. "The first impression on landing at Tigre Island is its splendid facilities for fortification, and the formation of a great central commercial depot from which to command the trade of the three states bordering on the Bay of Fonseca. Its resources fully developed, Amapala might be made the most important port on the Pacific south of San Francisco." In the southern portion of the gulf is the mouth of the Nicaraguan river Estero Real, which is navigable for large vessels for a considerable distance.

The construction of a transcontinental railroad was begun some time ago, and shared the fate of all such railroads in Central America except those of Tehautepec and Panama, i. e., it has not been completed. Beginning at Puerto Caballos the railroad runs to San Pedro Sula, its present terminus; from here it is to follow the course of the Ulua river, cross the watershed and terminate at the Gulf of Fonseca. The length of road in operation is 37 miles. A good wagon

road leads from San Lorenzo to Tegucigalpa, and thence to Puerto Caballos, but its quality over the latter course is not vouched for.

1,800 miles of telegraph with 70 offices are in operation.

Agriculture is in a most primitive state, the chief products being tobacco, sugar and bananas. In minerals Honduras is the richest of all Central American states, but mining like other industries, is of primitive character. In view of this undeveloped state and the recent wars in which Honduras has been engaged, we need not be surprised at finding in matters financial a large balance against her. The foreign debt, on which no interest has been paid since 1872, amounts to \$26,992,850 and the internal debt to \$2,742,574. In 1892 the revenues and expenditures were \$1,764,137 and \$2,603,000. In the same year the imports and exports were \$2,005,000 and \$1,873,000, the chief exports being live stock, bananas and silver.

The army numbers 500 men; the militia consists (on paper) of some 20,500 men.

The Ulua river and Gulf of Fonseca form the natural gateways of the country. The capital is 65 miles from the latter and 150 miles from the former. In view of this difference in distance, in view of the facilities offered by the Gulf of Fonseca and the harbor of Amapala, and in view of the good communication from San Lorenzo to Tegucigalpa, an invader would naturally base himself on Amapala.

NICARAGUA.

This state, lying between $10^{\circ}30'$ and 15° northern latitude, and between $83^{\circ}11'$ and $87^{\circ}40'$ western longitude, contains an area of 49,500 square miles and a population of 312,845 souls; it is bounded on the north by Honduras, on the east by the Caribbean Sea, on the south by Costa Rica and on the west by the Pacific Ocean. The capital, Managua, has 16,700 inhabitants.

The territory is traversed by the Andes from the south-

east to the north-west, with a mean elevation of about 5,000 feet. The eastern slope is gradual, and the land falls in broad terraced plateaus down to the Mosquito Coast and is drained by the Wanks, Wawa, Rio Grande and Escondido rivers, all unsuitable for navigation. In the northern part of the state the Andes send out a spur, the Sierra of YelUCA, which penetrates far to the north-east between the Wanks and Wawa rivers. The east coast is flat and unhealthy, fringed with lagoons and keys.

The western slope of the Andes is abrupt; at its foot lies an extensive depression stretching 300 miles from the south-east to the north-west, parallel to the coast, and with a mean elevation of about 100 feet. In this basin lie the great lakes of Nicaragua and Managua, the former of which measures 100 miles in length and 40 miles in width and has about 15 feet less elevation than Lake Managua, which is 50 miles long by 25 wide. The communication between these two lakes bears the name of Tipitapa river: it contains water only when the rainy season has swelled Lake Managua, and, at any rate, cannot be utilized for navigation because of the abrupt drop of 15 feet into Lake Nicaragua. The Nicaragua Canal Company is required by its contract to build a canal connecting the two lakes. Between the lakes and the steep rocky coast of the Pacific intervenes an elevation which from a mere range of hills in the south-west swells to a high ridge dotted with volcanic peaks and runs to the north-west parallel to the coast. A similar chain of volcanoes extends from the north-western shore of Lake Managua to the Gulf of Fonseca, where its northernmost volcano, Consequina, forms the southern gatepost of the gulf. In the depression in which the lakes lie, is concentrated the civilization and wealth of the state, here lies the capital Managua, the commercial center Leon, which formerly was the capital, and most of the towns of any importance. Here are also the large estates and plantations which produce the wealth of the country. The eastern slopes of the Andes are almost uninhabited.

Nicaragua boasts of two railways, one from Corinto (also called Realejo) to Momotombo, on Lake Managua, 58 miles in length, and another from Managua to Grenada, 38 miles in length. Concessions for several other roads have been granted. "There is only one road in the country suitable for carriages and that is seldom used except by carts. It runs from Grenada, the easternmost city of importance on the shore of Lake Nicaragua, to Realejo, the principal seaport; and over this road, which was built 300 years ago by the Spaniards, all the commerce of the country passes. * * Over it have passed hundreds of armies and no end of insurgent forces, and the whole distance has been washed in blood, shed in public and private quarrels."

The harbors are those of Corinto and San Juan del Sur on the Pacific, and San Juan del Norte (Greytown) on the Atlantic coast. The latter has a very poor harbor (not many years ago it had sufficient water for the largest vessels, but has been rapidly filling with sand), which is now being improved by the Nicaragua Canal Company. San Juan del Sur is an open roadstead, vessels anchoring five miles from shore. Corinto is said to be a magnificent harbor with deep water, but there are also statements to the contrary.

The mines produce gold and silver, other products and chief articles of export, are coffee, rubber, woods, indigo, sugar, cacao and bananas. There is practically no manufacture. The revenues and expenditures in 1892 were \$1,764,928 and \$2,983,576, the interior and foreign debts \$2,742,565 and (estimated) \$6,000,000; the imports and exports in 1890 were \$2,780,000 and \$3,500,000.

The army numbers about 700 men, the militia 25,000.

"There is no spot of equal area upon the globe in which so much human blood has been wasted in civil war, or so much wanton destruction committed. Nature has blessed it with wonderful resources, and a few years of peace and industry would make the country prosperous beyond comparison;

but so much attention has been paid to politics that little is left for anything else. Scarcely a year has passed without a revolution, and during its sixty-five years of independence the republic has known more than five times as many rulers as it had during the three centuries it was under the dominion of Spain. It was seldom a principle or policy that brought the inhabitants to war, but usually the intrigue of some ambitious men. It is a land of volcanic disturbance, physical, moral and political, and the mountains and men have between them contrived to almost compass its destruction.

For sixty years the country has been going backward; its population is less than when independence was declared, and its wealth has decreased even more rapidly. Its cities are heaps of ruins, and its commerce is not so great as it was at the beginning of the century" *

COSTA RICA.

Costa Rica, the southernmost of the five republics of Central America, extends between 8° and $11^{\circ}16'$ northern latitude, and between $81^{\circ}40'$ and $75^{\circ}40'$ western longitude. The area is 31,220 square miles, the number of inhabitants 262,700. The state is bounded on the north by Nicaragua; on the east by the Caribbean Sea; on the south-east by Panama and on the south-west and west by the Pacific Ocean. The state is divided into five departments and two provinces.

The boundary between Costa Rica and Panama seems as yet unsettled; on some maps it is shown as an irregular line from Punta Burica on the Pacific to Punta Tervi on the Atlantic, which is the boundary claimed by Panama. Other maps make the boundary an imaginary line from Punta Burica to Punta de Chiriqui, which is the boundary claimed by Costa Rica and is the ancient boundary under Spanish dominion. The northern boundary has only quite recently been settled by President Cleveland, by arbitration between Nica-

*W. E. Curtis, "The Capitals of Spanish America."

ragua and Costa Rica. On the Atlantic side the boundary begins at the Punta de Castilla and follows the San Juan river as far as Castillo Viejo; at this point the line recedes two miles to the south of the river and continues westward in this relative position to the river and to Lake Nicaragua until the Sapoa river is reached, whence the line turns to the south-west and runs in one straight course to the Bay of Salinas.

The east coast is flat, fringed with lagoons and stretches in almost straight line from south-east to north-west. The water is shallow. The only port is that of Limon which has a pier 900 feet long and 22 feet of water at low tide. The town is surrounded by marshes, has bad drinking water and is unhealthy. The Pacific coast is more diversified and possesses numerous gulfs and bays, the most important of which, beginning from the north, are those of Salinas, Santa Elena, Murcielago, Culebras, Nicoya, Herradura (said to be a magnificent harbor (?)), and Dulce. There are also two considerable peninsulas, those of Nicoya and Dulce, both embracing gulfs of like names. In the northern one of the two gulfs lies the port of Punta Arenas; there is but seven feet of water in the harbor so that vessels have to lie a long distance off shore. The locality is hot and unhealthy. Culebra, lying farther to the north at the head of a small bay of the same name, is said to have a very fine harbor and anchorage for the largest vessels.

The Andes traverse the country from the south-east to the north-west in a course more nearly parallel to the west than the east coast. In its northern portion this range cuts off the peninsula of Nicoya from the rest of the state.

The Pacific slope is abrupt and furrowed by numerous watercourses, which in the rainy season, November to May, come rushing down the mountain side with great force and carry everything before them. The Atlantic slope is more gradual and contains the greater area. Along the coast the

climate is hot, but in the highlands of the interior it is mild and very pleasant. On the Atlantic side of the mountains are vast stretches of impenetrable, virgin forests; the north-eastern part of the state, which is comparatively level and unexplored, is likewise covered in part by great wooded districts, in part by extensive prairies, and traversed by two rivers, the San Carlos and Sarapiquí, tributaries of the San Juan, and navigable for some distance by small craft.

At about 10° northern latitude the mountain chain shows a broad gap in the direction from east to west. In this gap lie highlands of an elevation of 5,000 feet, which descend on the one side to Punta Arenas, on the other to Limon. These highlands constitute the healthiest, most populous and cultivated part of the state. Here lies the capital San José, the city of Cartago and most of the large towns.

Calvo in his work on Costa Rica states that all the towns and villages are connected by more or less well built wagon-roads. The only good wagon road vouched for is that from Punta Arenas to Cartago. Other roads, as those from Punta Arenas north to Rivas and Managua, from Cartago to Greytown, from Cartago to Terraba and David (Panama), and from Cartago to Limon are stated by some to be mere trails; they should therefore not be unconditionally relied upon.

The construction of a transcontinental railroad from Punta Arenas to Puerto Limon was undertaken in 1871. It is a narrow gauge and the portion from Esparta to Alajuela, some thirty or forty miles, has not yet been completed. Limon and Punta Arenas are the termini of the road.

620 miles of telegraph with 43 stations are in operation.

The resources of the country are great but poorly developed. There are practically no manufactures. Coffee and bananas form the chief exports. The forests abound in valuable timbers and cabinet woods, the mines produce gold, silver and copper. Of live stock there were in 1888, 50,000 horses, 262,000 cattle and 2,152 sheep in the country, which

does not produce all the cereals it consumes, as flour figures largely among the imports from the United States. The revenues in 1892 amounted to 5,808,474, and the expenditures 5,449,290 pesos. The interior and foreign debts in the same year were 2,811,102 and 18,864,541 pesos. No interest has lately been paid on the foreign debt, and the state is now trying to compromise with its creditors on 50 per cent.

The standing army numbers 600 men, the militia (on paper) 31,824 men; every male between 18 and 50 years of age is liable to military service.

From what little has been stated, it is evident that the highlands in the gap of the Andes form the key to the country. The gap contains the only communication between the east and west coast. From the towns in this gap radiate what few communications the country boasts of. The cultivation, civilization and wealth of the state are concentrated in this gap. To an invader either Limon or Punta Arenas might serve as a base. If Limon were selected, no benefit would be likely to accrue from the railroad as it runs over so many high bridges, that it could easily be disabled beyond repair, for a long time at least. The only communication with the interior would then be a fairly good trail suitable for pack animals only, for the road from Cartago to Limon is nothing more than that. To these disadvantages should be added the deathly climate of Limon. On the other hand if an invader base himself on Punta Arenas, he will have good wagon roads assured him; the climate of Punta Arenas, if bad, is better than that of Limon, and last, but not least, the distance from the coast to the capital is much shorter and more easily traversed from the Pacific than from the Atlantic side.

A new railroad has lately been planned starting from Rio Jimenez on the Limon—Cartago railroad, to the north, crossing the San Carlos and Sarapiqui at the head of navigation and terminating at some point on Lake Nicaragua. This railroad is designed as a competitor of the Nicaragua Canal.

In the area described in the preceding pages are two districts, which of late have come prominently before the American public, but have not yet been described here. They are British Honduras, or Belize, and the Mosquito Coast.

British Honduras is a strip of territory in northern Guatemala to which state it originally belonged. The boundary begins at the mouth of the Sarstoon River in the Gulf of Amatique, ascends the river to the rapids of Gracias a Dios, turns to the right in a straight line to Garbutt's rapids in the river Belize, whence it runs due north until it meets the Rio Bravo; from this point it follows the Bravo to the mouth of the Hondo, of which the Bravo is a tributary. The first British settlement was made here by log cutters; by successive treaties the settlement was enlarged until it assumed its present boundaries. In the treaties with Spain as well as in the treaties made by Great Britain subsequently to the independence of Central America with other states, it was expressly stipulated that Great Britain should not acquire any sovereignty over this district. If, nevertheless, Belize is a British colony to-day, it is chiefly to be ascribed to the fact that in the Clayton—Bulwer treaty concluded between the United States and Great Britain in 1850, an exception was made in favor of the British settlement in Belize as in favor of everything else that might enable Great Britain to gain a foothold in Central America or the West Indies and prevent us from doing the same. This treaty was for the United States a diplomatic defeat of the first magnitude and since its conclusion our people have vainly endeavored to find out whether its ratification was due to culpable indifference or gross lack of foresight.

The area of Belize is 7,652 square miles, with a population of 31,000. The climate along the coast is unhealthy. The chief exports are mahogany, logwood and fruits. "The approach to the coast is through keys and coral reefs and is both

difficult and dangerous. The population is mainly negro, introduced originally as slaves, whence has sprung a hybrid race from intermixture with Europeans and Indians." The chief importance of Belize lies in the fact that it constitutes a British foothold on the mainland of Central America and that it is situated so as to flank the water route from the eastern outlet of the Nicaragua Canal to the Gulf of Mexico.

The Mosquito territory is a quadrangular piece of land extending about 180 miles north and south and 40 miles east and west, and constituting the greater part of Nicaragua's Atlantic coast. The southern boundary begins at the mouth of the Rama river, ascends the same about 40 miles, turns due north until it meets the Wawa river, which it follows to its mouth. Great Britain exercised a protectorate over the Mosquito coast from 1660 to the conclusion of the Clayton—Bulwer treaty. In accordance with this treaty Great Britain ceded the protectorate of the Mosquito Coast along with the Bay Islands to Honduras, a proceeding which gave rise to much discontent among the natives of the coast and a complete rebellion of the islanders. By a subsequent treaty, concluded January 26, 1860, the whole territory was finally handed over to Nicaragua.

The principal settlement is Bluefields, of recent notoriety. The coast is flat, fringed with keys, and difficult to approach. The chief exports are mahogany, cocoa, ginger and sarsaparilla. The population is much like that of Belize, and is insignificant in numbers. Importance attaches to this strip of land only on account of its proximity to the eastern outlet of the Nicaragua Canal, and to the evident endeavors of Great Britain to recover her foothold there under one pretext or another.

After giving this brief outline of climatic, topographical, and political conditions of Central America, it becomes the further task of military geography to discuss the relative ad-

vantages and disadvantages that would accrue in time of war from the configuration and nature of the frontiers and the geographical situation of each state relative to its neighbors, and to consider the probable lines of operation and communication, and theaters of war. In this task we are greatly restricted by the limited information as to topographical detail and routes of communication. With the exception of San Salvador the Central American States are very sparsely settled, in fact the greater part of the territory they comprise may, for our purposes, be considered uninhabited. This is true of the northern half of Guatemala, a large part of Honduras, nearly all of Nicaragua east of the Andes (with the exception of a small portion of the Mosquito Coast), and the northeastern as well as the southwestern portion of Costa Rica. That is the real reason why the sources of information are deficient, yet for placing an estimate on the military adaptability of theaters of operation, topographical knowledge is the first requisite. Still what information we have, will allow us to draw some military conclusions of a general character.

The military forces of the Central American states consist of small standing armies and of the militia. The former all writers agree are of the most miserable character and unworthy of the term "armies" as understood by the military student. The regular forces are recruited from the lowest classes, and as regards intelligence, training, armament and equipment, are as sorry a lot of men as ever styled themselves soldiers. The lower classes of the people are a mixture of white, negro and Indian blood, uneducated and ignorant, lazy and averse even to what little labor the fertile soil requires to furnish them with subsistence. In the veins of the whites runs the fiery southern blood, but their arrogance and pride are equaled only by their ignorance. The militia, which is called out in cases of emergency, would, on account of the admixture of this white stock, no doubt prove far superior to

the regular army as a fighting body. In the absence of any training of this militia in time of peace, it is not believed that in war it would amount to more than an assemblage of armed bands; but if ably led and with its fierce passions roused, it would no doubt give a good account of itself. If it were confronted, however, by good regular troops, it would be the old story of enthusiasm, patriotism and valor pitted against organization, training and discipline, so frequently and luridly illustrated in war history. The country would succumb today to any civilized power as readily as it did 300 years ago to a handful of avaricious cavaliers from Spain. Once dispersed these armed bands would probably carry on a troublesome guerrilla warfare and be hard to hunt down.

It lies in the nature of such forces to operate in small, mobile columns. Unencumbered by the impedimenta of a modern army, they are able to move by routes impracticable for regular troops. Moreover in such sparsely settled countries as those under consideration, forces of this character, besides being the only ones available, may be perfectly able to bring the war to a decisive issue. In the following discussion no notice can of course be taken of such operations, for there may be many passes over the many mountain chains on the frontiers and elsewhere of which we are not aware and of which they may avail themselves. The discussion is therefore limited to such considerations as would be important to regularly organized and trained troops.

GUATEMALA.

This state has lately attracted some attention by its dispute with Mexico, which at one time threatened to become a *casus belli*. On the west and north Guatemala is bounded by the Mexican states of Chiapas, Tabasco and Yucatan. This frontier may be divided into three unequal portions as follows:

1. The Pacific portion from the mouth of the Suchiate river to the crest of the Andes.
2. The central portion from the crest of the Andes to

the point on the Usumacinta river where the frontiers of Tabasco, Chiapas, and Guatemala meet.

3. The northern portion from the Usumacinta river to the Hondo.

The territory contiguous to both sides of this northern frontier seems to be almost uninhabited and devoid of communications; both sides would therefore find great difficulty in assembling their forces here. The valley of the Rio San Pedro, a tributary of the Usumacinta, might serve either side as a route for a raiding invasion.

Along the northern half of the central portion of the frontier, according to one division, the course of the Usumacinta marks the boundary line. The territory on either side is mountainous, sparsely settled even for those parts, and devoid of communications. For these and other reasons, it is not expected that in case of war we shall hear of strategic feats based on the salient and re-entrant angles formed here by the S shaped course of the Usumacinta. The southern half of this central portion of the frontier is crossed by many ridges and water courses, tributaries of the Chiapas river, which empties into the Gulf of Mexico. The maps here show a road from San Cristobal, the capital of Chiapas, to Huehuetenango in Guatemala. A Mexican army taking this road would thus reach the settled and cultivated parts of Guatemala, the highlands mentioned in the first part of this paper and the roads by which its towns are connected. Operations on this road would therefore strike at the heart of Guatemala. It is probable that difficulties of supply would detract much from the eligibility of this road as the principal line of communication. A Guatemalan army invading Chiapas by this road would of course encounter similiar difficulties, though perhaps to a less degree, since it would descend into the more open country on the banks of the Chiapas. The selection of this line by Guatemala, were she able to assume the offensive, would enable her to meet her superior opponent on more

nearly equal terms by depriving him of the services of his shipping in supplying his forces, which would not be the case if the operations took place near the coast; for Mexico has a few war vessels and some merchant shipping, while Guatemala has neither.

The Pacific portion of the frontier would seem to constitute the natural line of operations for Mexico which, by its great superiority over Guatemala, ought to force the latter on the defensive from the beginning. Advancing along the coast against Champerico the invading army could march light, having its supplies carried and subsistence insured by a fleet moving abreast of the army. Champerico might be made into an immediate base. This place gains all the more importance from the fact that it is not only a port, but the terminus of the railroad to Retalhuleu. At the latter point, if it could be gained and the railroad be made available, the invading force would be within a few marches of the rich part of Guatemala with short and commodious communications in its rear. Still more decisive would be a direct descent on San José, the port of the capital and terminus of a railroad leading to that city. There the invader would find himself on the shortest road to the most important part of Guatemala. Whether Mexico possesses sufficient shipping for such a move is not known. It is likewise impossible to state what difficulties the invader would encounter when striking out for the interior either from Champerico or San José, but it seems safe to assert that they would be many and considerable on account of the mountainous character of the terrain and the many defensive positions offered by such ground. Mexican infantry has been known to march forty miles per day in midsummer on the lower Rio Grande, and for all we know, the road from San Cristobal to Huehuetenango may be as practicable for it as is a *chaussée* for an European army.

Perhaps it is not out of place here to point out the advantages Mexico derives from her trans-isthmian railway of Te-

huatepec which places the resources of her east and west coast alike at her disposal on either coast.

In the discussion of the other frontiers of Guatemala, as well as of those of the remaining Central American states, it will be found that the spaces are few where armies could move with effect. This is due partly to the uninhabited state of the contiguous territories, partly to the impenetrable obstacles offered by the frontiers. It is only along the Pacific coast that communication throughout seems to exist.

GUATEMALA—HONDURAS.

The line of demarcation between Guatemala and Honduras lies on the crests of the Sierras del Espirito Santo and Merendon, which extend, one in prolongation of the other, from the bay of Honduras to Lake Culja (situated astride of the Guatemala-Salvador frontier.) What kind of passes, if any, lead across these mountains, we do not know. This chain of mountains is the water-shed between the Mutagua in Guatemala and the Ulua in Honduras. The valleys of both form the natural thoroughfares from the east coast to the interior. These rivers converge as they approach the Bay of Honduras, and are less than 40 miles apart at their mouth.

GUATEMALA—SALVADOR.

The frontier between these countries offers two highroads of invasion, the one along the Pacific coast, the other, separated from the first by an intervening range of mountains, along the shores of Lake Gulja. The valleys leading down to the lake on the Guatemalan side and up to it on the Salvadorian side, furnish the shortest thoroughfare from the center of one state to that of the other. Of their practicability or otherwise nothing is known.

SALVADOR.

The frontier between Salvador and Honduras is irregular in outline and intersected by mountains and watercourses. Too little is known to allow us to venture any statement on this point beyond this, that the valleys of the Lempa and its

tributary Guarambala seem to constitute the only natural communication between the two states along the northern frontier of Salvador. The eastern boundary of this state runs almost due north and south and is formed by the Goascoran river which empties into the Gulf of Fonseca. Nothing further can be stated here except the fact that a Salvadorian force on the Goascoran would threaten the highroad from the gulf to Tegucigalpa, while a Honduran force similarly placed on this river would not threaten the communications of the Salvadorian capital with its port. Of the islands situated in the gulf, that of Amapala has been mentioned before on account of the many advantages it offers. To the south of Amapala, just inside of and opposite the center of the entrance to the gulf, lies the island of Manguera so as to command the entrance. When Honduras and Salvador shall have developed into powerful states on land and sea, these islands are bound to play a great role in matters military.

HONDURAS.

The frontiers of this state toward Guatemala and Salvador have been discussed, and it only remains to deal with the Nicaragua frontier. Beginning at Cape Gracias a Dios on the eastern coast the boundary is marked by the course of the Wanks river for about 150 miles (on the air line) and is then taken up by a series of sierras continuing to within 25 miles of the Gulf of Fonseca. The uninhabited state of the country on both banks of the Wanks and the long mountain barrier point to the shores of the Gulf of Fonseca as the probable theater of hostilities in case of war between these states.

NICARAGUA.

As in the north, so in the south, Nicaragua is limited as regards maneuvering ground, to the narrow strip adjoining the Pacific. Those parts of Costa Rica which adjoin the great lake and the San Juan river, consist of extensive plains, dense forests and some hilly country almost unexplored and uninhabited. North of the San Juan the Nicaraguan territory

next to the lake is very rugged, and what few settlements there are, are in the low lands adjacent to the eastern coast. There remains thus but the small part of the frontier marked by the line from the Sapoa to the Bay of Salinas, in which to conduct operations. By advancing thence toward the head of the Bay of Nicoya, a Nicaraguan army would skirt the western slopes of the Andes, that side of the mountains on which the wealth and population of Costa Rica are to be found. A Costa Rican force taking the same route for invading Nicaragua would have to gain in the first place the command of the lakes as otherwise it might be assailed in rear and have its communications intercepted. On the other hand the control of the lakes would confer enormous advantages on the invader as this control means the control of the wealthy and settled part of Nicaragua.

COSTA RICA.

The northern frontier of this state has just been considered. Of the southern boundary nothing can be said, of course, since that boundary is not as yet definitely established.

We cannot conclude this part of the subject without making a few remarks on the Gulf of Fonseca, and its adaptability as a central base of operations in Central America, by land and sea. It has previously been pointed out that the Pacific surpasses the Atlantic coast in salubrity of climate, number and quality of its harbors, density of population, production, wealth and routes of communication. To all of these considerations so important from the commercial as well as from the military point of view, we must add the advantages offered by the Gulf of Fonseca to any power which might entertain designs of general conquest in Central America.

Situated about midway between the northwestern and southeastern extremities of the Pacific coast of Central America, the Gulf of Fonseca may be termed the doorway to the whole country. The Gulf itself makes a splendid place of rendezvous for any fleet or fleets of whatever size. Of the

southeastern arm of the Gulf Mr. Wells, in his "Adventures and Explorations in Honduras," says: "It would be safe to say that the whole mercantile fleet of America might ride in security together in this great southern bay, inferior in no respect to that of San Francisco and bordered by three states possessed of the greatest natural resources within the tropics, their hills stored with the richest mineral deposits in Spanish America." And of the northern half of the gulf the author remarks in the same place: "We had now shut out the ocean beyond the outer islands, and were cutting through an expanse of water, smooth as a trout lake, but deep enough to float the largest vessels in the world; not a hidden rock or shoal in any direction; the playas or beaches approachable with large ships to within pistol shot of the rock and room to anchor or move a thousand vessels, even in the comparative nook made by the four islands, which here form almost a completely landlocked circle of water, in which the frailest canoe might safely navigate." The island of Amapala offers a commodious harbor and place for a grand central depot and can readily be strengthened by fortifications. The island of Manguera, situated south of Amapala, protects the latter and at the same time commands the entrance as well as the interior of the Gulf. Once firmly established here decisive operations by land and sea may be begun. For operations by sea the Gulf of Fonseca would be a magnificent central point for blockading the Pacific coast of Central America. All the harbors can be reached from here in less than 24 hours, for the most distant harbors, Champerico in Guatemala and Punta Arenas in Costa Rica, are but 300 miles away (measured on the air line), San José in Guatemala and San Juan del Sur (outlet of the Nicaragua canal) are but 200 miles from the Gulf, while Acajula and Libertad in Salvador and Corinto in Nicaragua can be reached in a few hours steaming, and the Salvadorian harbor of La Union and the Honduran landings at La Brea and San Lorenzo as well as the Estero Real would be closed by the occupation of the Gulf.

For operations on land the situation of the Gulf of Fonseca is no less favorable. A semicircle described from the island of Manguera as a center with a radius of 125 miles, incloses the most populous and productive portions, as well as the capitals of Salvador, Honduras and Nicaragua. The capital of Honduras is but 75 miles inland and were it desired to open communication with the eastern coast, the valley of the Ulua would seem to present the shortest and otherwise most favorable route from Tegucigalpa to the Bay of Honduras. As regards the capital of Salvador, it may be remarked that it is situated but 18 miles from the coast (air line) and 25 miles from its port of La Libertad, which latter is but 100 miles from the Gulf of Fonseca.

In the southeastern recess of the gulf is, as previously stated, the mouth of the Estero Real, said to be navigable by large vessels for a considerable distance inland; how far it has not been possible to ascertain. The mouth of this river is but 50 miles from the waters of Lake Managua, on whose shores lie the capital of same name and the termini of the two Nicaraguan railroads, the one connecting the lake with the port of Corinto and passing the city of Leon, the commercial metropolis, the other connecting the cities of Managua and Granada and furnishing the transportation between the two lakes. Brito is the western outlet of the Nicaragua canal and within short steaming distance from the Gulf of Fonseca. The strip of land which separates Lake Nicaragua from the ocean, is here but 15 miles wide. The command of Lake Nicaragua would imply command of the southern half of that portion of Nicaragua which lies west of the Andes. The shallowness of the water near the shore would be a disadvantage which, however, may not be insuperable. Brito would therefore be an attractive point to an invader.

THE NICARAGUA CANAL.

The strip of earth which we have attempted to describe from the military point of view, is destined to play a promi-

ment part in the future. Yet such prominence seems hardly in keeping with present conditions. The resources of the states are undeveloped, their treasuries empty, their people arrogant and ignorant, their governments unstable, their powers insufficient to preserve peace at home, their land defenseless against aggression from without, their existence guaranteed only by what tardy respect our not always forceful foreign policy has heretofore been able to exact from foreign powers. It is neither by virtue of her people, her civilization, her policy or her power that Central America to-day forms a prominent topic in diplomatic circles, it is entirely due to her geographical situation. America may be said to occupy a central position on the surface of the earth, with her face toward Europe, and her back toward Asia, and Central America lies in the middle of America. The construction of a trans-isthmian ship canal, the water communication between the Atlantic and Pacific oceans, which has been the dream of the nations since the days of Charles V., is about to be realized. This canal is to be constructed across Nicaraguan territory, and for a short distance will skirt the Costa Rican boundary. It is this canal that raises Central America to such high importance.

The construction will be an American enterprise, and the work will be done by the Maritime Canal Company, an American corporation. This company is at present laboring under financial difficulties, and needs but the moral support of our government to enable it to complete the work already begun. So far this support has been denied, but patriotic and far seeing statesmen have advocated it, chief among them Senator Morgan, from Alabama, and demonstrated the importance of the work for ourselves and the world at large. Owing to the dismal failure of the French enterprise at Panama, some doubts are still entertained as to the feasibility of the work, but the good cause has made such progress that, although the congress just passed has declined its support, it

has authorized the President to appoint a commission to verify the claims of the Maritime Canal Company as to the practicability of the scheme, and voted the necessary funds. The President has appointed the commission and it is to be hoped that, when its report is rendered, another congress will be friend the Maritime Canal Company and thereby pave the way to that commercial and political supremacy on the western hemisphere, to which our republic is rightfully entitled.

The subject has been so thoroughly discussed in all its details by abler pens than mine, that nothing new can be produced here; and it is merely intended to outline the chief features the construction of the canal will produce.

With regard to our own commercial interests it is sufficient to point out, that the water route from New York to San Francisco around Cape Horn is 15,100 miles, and that the Nicaragua canal will reduce this distance to 5,640 miles. This means a great reduction in time and cost of transportation; the products of the east will be cheaper on our Pacific coast, in eastern Asia and on the whole coast of South America, and the reverse, than heretofore. The market will therefore be enlarged. To what degree it will stimulate our industry is impossible to calculate now.

From the military point of view the possession of such a canal will greatly augment our naval power in the adjacent as well as in more distant waters. Not only could our Atlantic and Pacific squadrons combine on either side of the isthmus, but a fleet might be maintained in the waters of Lake Nicaragua as a central reserve, with which to reinforce either of our squadrons, while the fresh water of the lake would remove many features which impair the efficiency of vessels in salt water and render their maintenance costly. In his able and truly patriotic speech on the Nicaragua Canal, Senator Morgan says in this connection: "It is a simple and inadequate illustration of the military feature to say that it requires two fleets, separated by 12,000 miles of sailing distance, to

blockade one fleet of equal power to either in Lake Nicaragua. But this doubling of the power of a fleet at anchor in Lake Nicaragua over that of any great maritime power that is moving across the Atlantic or the Pacific to attack our coasts, is but a small part of the strategic advantage of such a situation."

"As a *point d'appui*, a foothold from which to attack or defend, to threaten or protect, all the coasts of this hemisphere and the islands and adjacent seas, it is more a point of commanding power in the Atlantic and Pacific oceans, than Gibraltar in the Mediterranean Sea."

Another aspect of the canal is the way in which it affects the world at large. On this point Major Wachs of the German army says:* "As early as 1847 Napoleon III. compared in a detailed essay this artificial water communication of the future with the advantageous geographical situation of the European channels. Any comparison of the completed water route in the new world with the natural ones between the Pontus and the Aegean Sea must, in our opinion, be unfavorable to the latter. For, though the importance of the latter is certain for all times, yet they cannot compete with a highway on which the whole world is dependent. When the barriers of the isthmus shall have been pierced and the central gate of the Pacific opened, then the strength of the two oceans must disclose itself, founded upon the incomparable base in Nicaragua; the battlefield of peaceful and warlike competition. Incomparable we call this base, not merely because here there will be established the great warehouses of the world, but because high politics will be directed in other paths, and because every stone thrown in the canal will produce wide circles to the east and west. From its completion will date a transformation and revivifications of the great economical, political and military relations.

*"The West Indies and the Nicaraguan Canal."

“Because this one is straightest and easiest, there will be but one world route, one universal path, joining the Pacific to the Atlantic and the latter to the Indian Ocean, and thence leading back into the Pacific. This is the great ring whose eternal passes, constructed by nature herself, are represented by the gates Gibraltar and Singapore, to which are now added the one rendered practicable by human skill at Suez and the one to be rendered so in Nicaragua. Natural superiority is assured the possessor of the Nicaragua canal; this, however, does not in itself entail strategic superiority.” Such is the geographical location of the canal that is to be. It lies on an air line from western Europe to Polynesia and Australia, and almost on an air line from New York to the Pacific coast of South America.

Notwithstanding our previous remarks on the great military advantages the possession of the canal will confer on us, the strategic situation to the east of the isthmus is, nevertheless, not altogether favorable to us under existing conditions. We would control the canal but not its approaches.

The watery elements have encroached upon the central part of our western continent until nothing is left but the narrow strip of Central America and a chain of islands marking what would be the natural eastern coast line of America. The body of water to the west of this chain of islands is divided into two basins of unequal size, the Gulf of Mexico and the Caribbean Sea. The Gulf of Mexico is encircled on the east and north by Florida and our gulf states, on the west and south by the states of the Mexican republic, and is open only to the south-east where an opening 500 miles wide is left between the peninsulas of Florida and Yucatan. Squarely opposite the center of this opening, lies the western extremity of Cuba which diverges from the general direction of the island and bends away to the south-west. In this manner two passages are formed: the Yucatan strait connecting the Gulf with the Caribbean Sea, lying between Cape San Antonio of

western Cuba and Cape Catoche of northeastern Yucatan, 110 miles distant from each other; and the Florida Strait connecting the Gulf with the Atlantic and situated between the southern extremity of Florida and the north-west coast of Cuba, which are here about 85 miles distant from each other. Opposite this passage lie the Bahama islands which extend from opposite the eastern shore of Florida in a southeasterly direction to opposite the island of Haiti, thus commanding the Florida strait as well as the Windward Passage between Cuba and Haiti, which furnishes the direct route from the isthmus to New York. The Bahama islands belong to Great Britain which has established a station for coaling and repair on the island of New Providence (Nassau). Opposite Key West, our military station, lies Havanna, the strongly fortified and garrisoned capital of Cuba.

The Caribbean Sea is encircled on the west by Central America, on the south by the isthmus and the northern coast of Colombia and Venezuela, on the east by the Lesser Antilles, on the north by the Greater Antilles, and communicates with the Gulf by the strait of Yucatan, with the Atlantic by the Windward Passage (between Cuba and Haiti) and the Mona Passage (between Haiti and Porto Rico). Porto Rico belongs to Spain as does Cuba, and that power is thus placed in position to command the three principal approaches to the Nicaragua canal. Since we are more than a match for Spain on land and sea, her favorable position gives us no disquietude.

A more powerful rival is Great Britain, both on account of her sea power and her commanding position in the Caribbean. There she owns the island of Jamaica and many of the islands which bound the Caribbean toward the Atlantic. In Kingston (Jamaica) Great Britain possesses a strongly fortified naval base. The island is situated 100 miles west of Haiti and 90 miles south of Cuba. Its situation as regards the Caribbean is, therefore, central, it commands the Windward Passage directly and flanks the approaches to the Nica-

ragua canal through the strait of Yucatan and the Mona Passage. To the west of Jamaica Great Britain possesses the Caymans, and (the Monroe doctrine notwithstanding) has gained a footing on the mainland in Belize in the same manner in which she is now trying to regain a footing on the Mosquito Coast, at the very mouth of the Nicaragua Canal.

The islands on the eastern front of the Caribbean belong nearly all to England except Martinique, Guadeloupe, and a few minor islands which are French. Trinidad has a good roadstead and is fortified. Tobago, north-east of Trinidad, has good anchorages in Man of War Bay and Cumberland Bay, while St. George's Bay is almost completely landlocked and encircled by heights. "The island capital of the same name lies in terraces along the northern edge of the basin, the entrance to which is constricted to 800 metres by two promontories. The harbor, city, and all military establishments (hospital, arsenal, coal depot, etc.) are protected by strong forts and water batteries. The aspect of St. George reminds one of La Valetta at Malta, only this Malta is as luxurious as that of the old world is bleak and rocky." The island of St. Vincent, where the American and European cables meet, has a harbor protected by fortifications. Barbados, the British military headquarters in the West Indies, has a splendid harbor and strong fortifications. Santa Lucia also boasts of good harbors, anchorages and fortifications. Of the many islands possessed by Great Britain in these waters, those enumerated are the most important.

Among the French possessions in the West Indies are to be noted, besides a number of small islands, those of Guadeloupe and Martinique, the latter of which possesses a good harbor and is defended by forts.

The Virgin Islands belonging partly to England, partly to Denmark, form the connecting link between the Greater and Lesser Antilles. St. Thomas, the principal Danish island, is a coaling station, has a good harbor with docks, and is defended by strong batteries.

The Netherlands also have possessions here, i. e., Curaçao and two smaller islands off the coast of Venezuela, and a few small islands of the Leeward group. A small garrison is maintained at Curaçao and a vessel kept cruising between the several islands.

Spain, as we have seen, commands by her West Indian possessions the three principal approaches to the Nicaragua canal. This is still more the case, however, with Great Britain. Leaving her superior sea power out of consideration she commands the interior of the Caribbean Sea from Jamaica, she owns most of the Lesser Antilles on the eastern edge of the Caribbean, she owns the Bahamas north of the Spanish islands, and within convenient distance she has a great naval base in the Bermudas. Thus if Spain commands the passages to the Nicaragua canal, Great Britain does the same and more directly so, and more than that, she commands the approaches to the Caribbean as well as to the Gulf of Mexico; She has isolated Spain in the West Indies. The Bermudas are connected by separate cable with the naval fortress of Halifax, rendering concert of action on the part of her scattered fleets possible.

While many nations thus have footholds in the West Indies near the Nicaragua canal, we have none. Worse than that, by the Clayton-Bulwer treaty concluded July 4, 1850, Great Britain and the United States agreed on a joint protection of the canal and mutually pledged their faith that neither of them would ever colonize, annex, fortify, or exercise exclusive dominion over any portion of Central America. At the time when this treaty was concluded, the United States possessed a vast undeveloped territory and had just acquired from Mexico an immense district. In view of this fact and the love of peace ever professed by our country, it may seem excusable at the time that the military part of the question was disregarded and that the present rather than the future was kept in view. The fact nevertheless remains that we

were outgeneraled. We had no possession of any kind in the West Indies or in Central America; Great Britain had both, and fortresses, arsenals, etc., to boot. Great Britain gave up nothing except a defective title to the Mosquito Coast, we gave up the right of exclusive control of the canal, the prerequisite for our future commercial and political supremacy. The treaty has become a thorn in our flesh. Until recently the disregard of the military features of such questions has been, on our part, a notorious and deplorable fact, Great Britain on the other hand has kept them steadily in view. For illustration we will only quote that Great Britain has provided the means for assembling a powerful naval force on the great lakes, we have done nothing of the kind. In consequence our great cities on the lakes would in case of war lie helplessly under the guns of British gunboats. But the sentiments that animated us in 1850 are no longer the same. Even now our boundaries are becoming too narrow for us. The immense importance of the Nicaragua canal has been fully recognized and we are chafing under the obligations imposed on us by the Clayton-Bulwer treaty.

We are to-day but seven days steaming from Europe. We are gradually coming under the operation of the same laws which affect the nations of Europe and render naval power a necessity. The element of overpopulation which causes the overflow of European boundaries by tides of emigration, does not affect us yet. But we are affected as European countries are, by the conditions created by the age of inventions, the 19th century. The introduction of labor saving machines has enormously increased industrial production, rendered the home market inadequate and has made competition sharp and acrimonious. The electric telegraph and steam transportation have contributed largely in this direction. Every nation seeks to gain new territory by which to expand its market, to antagonize those nations which are the strongest competitors, to enhance its markets where they are

existing, and last but not least, to provide the means for protecting its commerce, the source of wealth and strength. The principles, that combined effort is superior to isolated action, in politics and war, in industry and commerce; that commerce means wealth and wealth means power; that military strength on the sea, the bearer of commerce, insures its safety; have never been more generally lived up to than now. They have given rise to grander combinations commercially, to grander territorial aggregations politically. To promote his ends in the struggle for existence man has opened passages between waters heretofore separated by land barriers. Notice the Suez canal, the cut across the isthmus of Corinth, the Manchester ship canal, the Amsterdam ship canal, the canal between the Baltic and North Sea, the proposed canals across Italy and France connecting the Adriatic with the Tyrrhenian, the Atlantic with the Mediterranean. Wherever there is wealth or a source of wealth, there a nation must safeguard it from the covetousness of others. Great Britain has shown great foresight in obeying these laws and principles. She is linked to India by a water route defended by a series of military and naval strongholds, Gibraltar, Malta, Cyprus, Aden, Singapore, Hongkong, Esquimalt. She has supplemented the strongholds by powerful fleets, she has converted the Indian Ocean into a British lake, as she has the West Indian waters and the Mediterranean. A glance at the map shows her flag on every continent. What we are pleased to call the British game of grabbing, is nothing more nor less than true foresight, though it may be selfish. If Great Britain now should gain control of the Nicaragua canal, she would control the commercial routes of the world. Even now she is said to cast longing glances at the Galapagos Islands, from which to control the approaches to the western outlet of the canal. Other nations are developing the same policy of expansion, foremost among them France, who has indeed become a powerful rival of Great Britain, and gives promise of seriously

contesting the latter's supremacy on the seas. Wherever the cross of St. George floats in the breeze, there the French tricolor waves from the neighboring shore. If France has no foothold on the North American continent, she holds two islands at the mouth of the St. Lawrence, and Clipperton Island opposite the western outlet of the Nicaragua canal.

The commercial struggle of the nations which is now going on before our eyes and becoming more embittered every year, this struggle which is in fact a contention for power and supremacy, compels every nation to make provisions for the future, for extending and protecting its sources of wealth. It will readily be perceived how the control of the Nicaragua canal will enable us not only to hold our own in the international competition, but will give us the means for acquiring that supremacy in American waters to which we Americans feel ourselves entitled by virtue of the civilization and genius of our people. The control of the Nicaragua canal is as necessary for our development and greatness as was in the past that of the harbors of New York and San Francisco. The control of that canal will also prove in our hands a powerful instrument for enforcing the Monroe doctrine. This national creed of ours implies more perhaps to-day than its author foresaw. Occasionally, disclaimers notwithstanding, it may be said to mean the championship of the United States for the cause of all America against all others, however various may be the interests involved. The principal people we have to reckon with, are our cousins across the Atlantic; their interests and ours are even now coming in daily conflict, and will do so still more in the future. If history teaches anything, it is that no nation worthy of the name, will tamely surrender valuable possessions and highly prized privileges. However averse we may be to a war with Great Britain, our interests will continue to clash until history repeats itself, i. e., until friendly negotiation can no longer reconcile the conflicting interests and the arbitrament of the sword is appealed

to. No nation will arbitrate where vital interests are at stake; Great Britain has amply proved, that she will not submit to arbitration unless she is sure she has a clear case, nor is she in the habit of giving up valuable rights or privileges such as a share in the control of the Nicaragua canal without receiving something equivalent in return. In view of the importance of the Nicaragua canal to Great Britain, none but a blind opinionist will assert that we shall ever be the sole possessors of the canal without a determined and protracted struggle with Great Britain.

When the great struggle comes, the possession of the Nicaragua canal will place us in much better position for meeting our opponent than is the case at present. But as is evident from the present conditions in the West Indian waters, we shall still be under grave disadvantages until in one way or another we gain a firm foothold there. It has often been suggested that we purchase the Spanish islands in those waters. That would place us at once on a par, strategically, with Great Britain. Whether it be these or any other islands, a firm footing in the West Indies is a prerequisite for our future national welfare. Its absolute necessity will be clear to all the moment the struggle begins. That struggle is unavoidable. We shall not be supreme on the American continent, until we free ourselves from the influence Great Britain exercises by means of her American possessions. That we can no more hope to accomplish without war, than Germany could rid herself of Austrian and French influence without the wars of 1866 and 1870. We are not advocating wanton national aggrandizement, but merely such prudent measures as will guarantee us that future supremacy in America which every American is deeply convinced we must have. Commerce means wealth, wealth means power. The nation that fails correctly to interpret the signs of the present, to make suitable provisions for safeguarding its future welfare, to pave by a wise policy its way to the high plain it feels itself destined

to reach, will fall behind in the international struggle for existence. At no time could a nation disregard the military feature of her policy with less safety than now. To do so would be a sign of hopeless inferiority. The fortification of our seacoast was the first step taken upon the correct interpretation of the military question of our situation, the increase of the navy was the second wise step. The control of the Nicaragua canal will be the corner stone of our future greatness. To carry out our policy consistently, we must further increase our offensive and defensive forces on land and sea, and we must acquire a strong foothold in the West Indies. Then we shall be ready to enter the lists and do battle for the hegemony in our hemisphere, a prize which no nation yet has been permitted to gain without hard battle and spilling of much precious blood.

The foregoing are some of the reasons that make the geography, political as well as military, of Central America, so important to us.











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