INDUSTRIAL AND COMMERCIAL SOUTH AMERICA

ANNIE S. PECK

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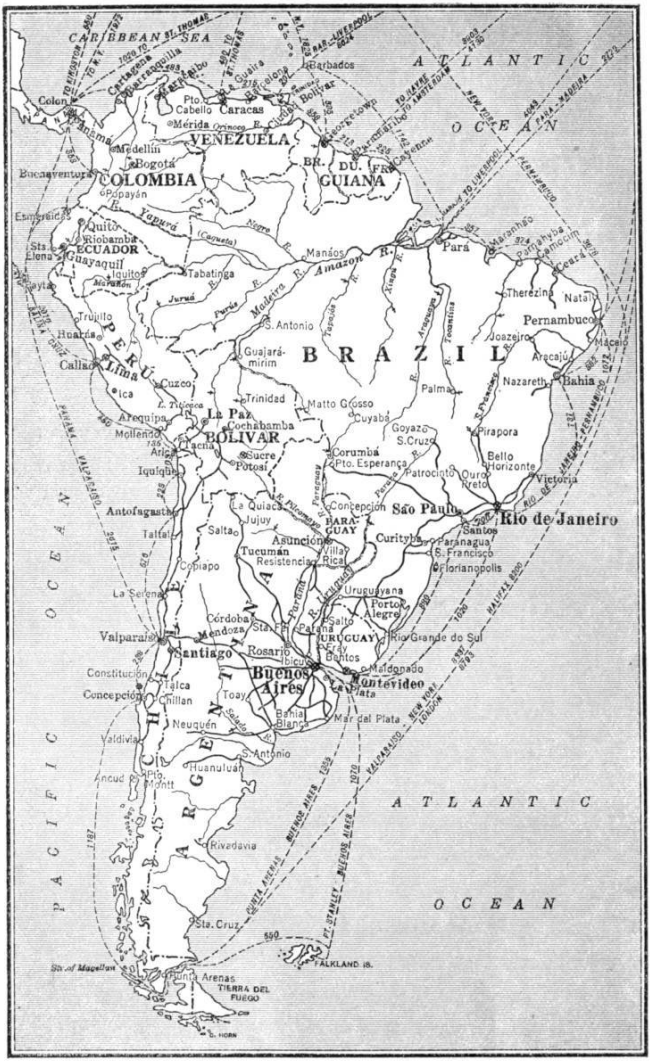
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INDUSTRIAL AND COMMERCIAL SOUTH AMERICA



SOUTH AMERICA

INDUSTRIAL AND COMMERCIAL SOUTH AMERICA

BY
ANNIE S. PECK, A.M., F.R.G.S.
AUTHOR OF
"A SEARCH FOR THE APEX OF AMERICA," "THE SOUTH AMERICAN TOUR, A DESCRIPTIVE GUIDE," etc.



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FOREWORD

"Industrial and Commercial South America" has been prepared, as was the descriptive guide, "The South American Tour," with the desire to aid in promoting acquaintance with South America and, as a natural sequence, friendship and trade.

As far as possible the facts have been gleaned from publications of the various Governments, in a few cases from those of our own, from high officials of many large companies, and from a few authoritative works. While I can hardly hope that despite all care and effort I have made no slip anywhere, I devoutly trust that no errors will be discovered of such magnitude as I have often noted in my reading of important publications and that any here detected will receive lenient criticism.

The vast amount of labor involved in the collection of data and the effort made to attain accuracy has been such that no time remained for rhetorical embellishment unless with delayed publication.

Great pains have been taken with spelling and accents, the correct use of the latter discovered with difficulty, as they are altogether omitted in many works and in others by no means to be depended upon. Yet they are most important for correct pronunciation.

In this text the spelling of some names varies by intention because the two spellings are frequent and authorized, and should therefore be familiar. Thus

Marowijne is the Dutch and *Maroni* the English name for the same river. So *Suriname* is spelled with and without the *e*.

South American names ending in either *s* or *z* are found, the *z* common in older publications. The *s* is a more recent style, taking the place of *z* even in the middle of a word. Thus *Huaráz* is also written *Huarás* and even *Cuzco*, *Cusco*. But I drew the line there, as *Cuzco* is too well established in English to make the new and uglier form desirable.

My spelling of *Chilian* is consistent throughout. Formerly so spelled by all, *Chile* being earlier written *Chili*, when the Spanish form of the name was here adopted many imagined that the adjective should be changed also. For this no reason appears, but the contrary. The accepted ending for adjectives of this nature is *ian*, unless euphony demands a different, as *Venezuelan*. Where the ending *ean* is correctly employed as in *Andean* and *European*, also *Caribbean*, which unhappily is often mispronounced, the *e* is long and receives the accent. This would be proper in *Chilean* as the *e* in *Chileno* receives the accent; but as a change in our pronunciation is unlikely, it is better to drop the final vowel and add the suffix *ian* as is done in many other cases; thus *Italy*, *Italian*.

The frequent writing of *maté* in English is absolutely wrong. It is never so printed in Spanish, though naturally in French; but to copy their form for a Spanish word is absurd. The word of course has two syllables, but is accented on the first; not on the last as the written accent would imply.

Iguassú in Spanish is spelled *Iguazú*, but the Portuguese form has the right, because it is a Brazilian river, nowhere flowing in Argentina, and for a short distance only on the boundary. The

Brazilian spelling should therefore be followed by us, and it has the advantage that it is more apt to be correctly pronounced.

Persons not undertaking the study of Spanish should at least learn the simple rules of pronunciation; the vowels having the ordinary continental sounds, the consonants in the main like our own, though in the middle of a word *b* is generally pronounced like *v*, *d* like *th* in *this* and *ll* like *ly*. The rules for accent are easily remembered, names ending in a vowel being accented on the penult, those in a consonant, except *s*, *z*, and *n*, on the ultima, unless otherwise indicated by an accent.

The heedlessness of many Americans on such matters is notorious and inexcusable. Knowing the correct pronunciation they continue to mispronounce even an easy word. A notable illustration is Panamá, which many former residents of the Canal Zone and others here persist in calling the ugly *Pánama* instead of the correct and agreeable *Panamá*. Although in English the accent is not generally used on this word or on Colón, Panamá is repeated throughout the book to emphasize the correct pronunciation.

It is hoped that other accents given will in general be found correct. It may however be said on Brazilian authority that the accents on Brazilian names are less important than in Spanish.

A considerable divergence in the date of statistics may be noted, for which there are several reasons. In some cases pre-war figures, in others figures for 1917 or 1918, seem to afford a fairer valuation; or they might be the only ones available. Some figures (often in the nearest round number) are given as late as 1921, but to bring all at the same time up to the

moment was quite impossible. Great difficulty has been experienced in choosing between conflicting statements and figures. In one case three sets of figures of areas were presented by the same person, before I finally secured the most accurate.

My grateful appreciation is due and my hearty thanks are here expressed to all who in any degree have helped by supplying or verifying data of whatever nature. Officials of the various countries and of many large companies evinced kindly interest in the work and gave freely of their time, few being too busy to afford information. The names are too numerous to mention, but I trust that all will feel assured that their courtesy was recognized and that the remembrance will be cherished.

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INTRODUCTION

Our recently awakened interest in foreign trade and in world affairs renders imperatively necessary a more accurate knowledge of other countries and a more intimate acquaintance with their peoples. Engaged in settling the various sections of our own country and in developing its manifold resources, we were too long self sufficient in thought and narrow in our activities. Yet years ago a few far-sighted statesmen like James G. Blaine realized that a broader field of action would soon become essential to our continued prosperity. A few manufacturers supplemented their domestic business with a modicum of foreign trade. A few men of affairs devoted their energies exclusively to the field of foreign commerce.

The Spanish War, first inspiring many with the idea that the United States had become a world power with interests beyond its boundaries, served to arouse in others a disposition to have a share in foreign trade. Following a gradual increase in the early years of this century, a sudden expansion of our commerce occurred a few months subsequent to the outbreak of the Great War. A scarcity of shipping prevented its attaining the proportions which might otherwise have been realized. Now that this obstacle is removed and the exactions of war service are over, adequate preparations should be made for the conduct of our developing commercial relations, especially with our Sister Continent at the south.

The supposition that those individuals who are directly engaged in foreign commerce are alone benefited thereby has unfortunately been widespread. Under our democratic form of government it is particularly essential that all should understand the advantages of foreign trade for the welfare of the entire nation, that this may not be hampered by the narrow views of local-thinking politicians, jealous of the prosperity of other individuals or sections, or by persons who concern themselves merely with the question of wages for a few or with other special matters; and thus that our commerce may be fostered by our Government according to the custom of other nations, with no purpose of bitter rivalry or unfriendly greed, but with the natural and proper desire of a great nation to share in the mutual benefits accruing to all countries where suitable and honorable foreign trade is developed, as in the case of individuals who buy and sell in the home market.

Some knowledge of other countries and peoples, of causes contributing to their present condition, and of their prospects for future development, while giving intelligent interest to trade and of service in making plans for permanent rather than transitory gain, is desirable for all who care to rise above ignorant narrow-minded provincialism, to be better prepared for civic and political duties, and to enjoy a broader outlook upon the entire world.

The most superficial observer cannot fail to perceive the enormous advantages which have arisen from division of labor among individuals and

nations. The personal barter of primitive days was soon superseded by a medium of exchange, fixed locally though varying in different regions. There followed the transport from one city to another and from distant lands of the various products, natural or manufactured, of those cities and countries. As many things grow only in certain parts of the world, others we know are manufactured only in certain districts. That in the distant future the time may come when the entire habitable globe will be occupied, each portion produce what is best adapted to its environment, and the fruits of the whole earth be enjoyed by all its inhabitants, is from the physical point of view the ideal to which we may look forward, a goal for the attainment of which every nation may fittingly contribute.

Few are the portions of the earth where it is impossible for man to dwell, providing for his wants from his immediate surroundings. Each section not altogether barren produces such food and requisites for clothing as are essential to sustain life in that locality. The only considerable portion of the globe which is uninhabited, the Antarctic continent, seems likely so to continue, as it appears not merely the most unattractive spot in the world but devoid of the barest necessities for existence.

The North Polar regions, however, support a few people who live upon the products of the country and who probably would not survive if they adopted the customs of civilization as we regard them, though the use of a few articles which have been carried there may slightly ameliorate their hard existence.

The denizens of the tropical forest, who also have adapted themselves to their surroundings, being able

to live with little labor, generally pursue an easy life, since necessity and ambition for improvement are lacking.

In other quarters of the globe where labor is necessary to sustain life but where its results may be a bare existence, comfort, or luxury, man has continually struggled for improvement, braving danger and suffering, and toiling long hours for the future good of himself or his children. Thus has the world made progress.

Here in the United States we might live in comfort with the products of our broad lands only; yet we do not desire to seclude ourselves within a Chinese Wall. We would enjoy the fruits of the whole earth, not by imperialistic conquest, but through friendly acquaintance, the sharing of ideas, and the exchange of products.

Some things we produce in such abundance that we have a superfluity to barter for others things which we produce not at all or not in sufficient quantities. In the past we have had more trade with Europe than with other continents. In various lines of manufactures and of artistic goods we are still unable to compete. While east and west trade will no doubt continue indefinitely, for natural products it would seem that the chief exchange should be north and south, a difference in latitude causing variety in climates, and a diversity in productions both animal and vegetable. With our expansion of shipping facilities following the conclusion of the War, we may hope for a continuing increase of movement from north to south on this hemisphere, making for friendship and political harmony as well as for material advantage.

In considering South America from a commercial

and industrial point of view it is necessary to study the physical characteristics of the individual countries, their advantages and drawbacks; the climate and soil; the resources, including the animal, vegetable, and mineral products, and the water power; the character of the inhabitants including the quality and quantity of human labor; their present needs and wants; the future possibilities; the opportunity for investments of various kinds and political conditions affecting these; the instruments of exchange, banking and trade regulations; the means of communication and transport by land and water.

In addition we should know the difficulties which have retarded the development of countries settled earlier than our own, that instead of a supercilious mental attitude on account of real or fancied superiority in certain directions, we may have a sympathetic understanding of conditions, and of tremendous obstacles, some of which have been overcome in an extraordinary manner.

A general view of the continent as a whole may well precede a more detailed study of the several countries.

INDUSTRIAL AND COMMERCIAL SOUTH AMERICA

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CHAPTER I
SOUTH AMERICA AS A WHOLE

Physical Characteristics

In the study of South America one may observe certain points of resemblance with others of difference between that continent and North America. The outline of each, we perceive, is roughly triangular, broad at the north and tapering towards the south; but as the broad part of one is not far from the Arctic Circle while that of the other is near the equator, we find that the greater part of North America is in the temperate zone while most of South America is in the torrid; disparity in climate and productions follows.

The geological formation of the two continents is as similar as their outline. There is a correspondence on the northeast between what are called the Laurentian Highlands in Labrador and the uplands of Guiana; on the southeast between the Appalachian system of the North and the Serra do Mar of Brazil, each having a northeast to southwest trend and a fair

similarity in height, though the tallest peak in either range is the Itatiaiá in Brazil, which by 3000 feet exceeds Mt. Mitchel, the highest of the Appalachians. A difference worth noting is that the Brazilian range is closer to the sea.

A similarity, perhaps greater, exists in the west where lie, close to the shore, the loftier ranges of the two continents, of much later origin than the eastern mountains, and containing many volcanic peaks. Each system includes several chains with valleys or plateaus between; but in the United States the system which includes the Rockies is wider than is that of the Andes at any point. The two systems are distinct, having neither the same origin nor the same trend, while the altitude of the South American *massif* greatly exceeds that of the North American mountains.

Between the coastal regions both continents have great basins sloping to the north, east, and south with a large river draining each: the Mackenzie and the Orinoco flowing north, the St. Lawrence and the Amazon east, the Mississippi and the Paraná south. Were the two continents side by side there would be a great resemblance in production instead of the present considerable diversity.

While in area South America is ranked as smaller than North America, it may be a trifle larger in land surface, especially in habitable regions, if the opinion of Humboldt is correct that the Amazon Basin will one day support the densest population on the globe. The southern continent, comprising no large bodies of water like Hudson Bay and our Great Lakes, also has, save the slopes of the highest mountains, no regions like those near the Arctic Circle, incapable of supporting more than the scantiest population.

The outline of the continent is less irregular than that of North America, consequently there are fewer good harbors, especially on the west coast.

Climate

As three quarters of South America lie within the tropics, the entire north coast, and the wider part of the continent including most of Brazil with the countries on the west as far down as the northern part of Chile, a tropical climate and productions might here be expected. But happily within the torrid zone of both hemispheres are the loftiest mountain ranges of the world. These modify the climate of large sections to such a degree that in many places there is perpetual spring, a perennial May or June; in other districts one may in comparatively few hours go from regions of eternal summer to perpetual snow, finding on the way the products of every clime. Thus the mountains and table-lands of South America are effective in causing moderate temperatures over extensive areas within the tropics, with accordant productions.

In comparing the climates of North and South America we must note that while the tropical region of the latter is much the larger, in corresponding latitudes it is in general cooler south of the equator than north. An examination of the isothermal lines, that is *the lines of equal average heat around the globe*, shows:

First, that the line of greatest heat, a mean temperature of 85°, is north of the equator most of the way. In the Western Hemisphere it runs well up into Central America; then it passes along the northeast coast of South America to a point just

below the equator and the mouth of the Amazon, going far north again in Africa.

Second, that of the mean annual isotherms of 65°, which are regarded as the limits of the hot belt, the one in the Northern Hemisphere runs 30° or more from the equator, while that in South America hardly touches the 30th parallel, and on the west coast approaches the equator to within 12°: which means that the tropical region extends much farther north of the equator than it does south.

Third, that of the isotherms of 50° for the warmest month, which are considered as the polar limits of the temperate zones, the one is much nearer to the north pole than the other is to the south. Great masses of water, we know, have a tendency to equalize climate, as the water heats and cools more slowly than the land; but they do not make the average temperature higher. From the movement of the waters of the ocean their temperature over the globe is more nearly equal, while the stable land of broad continental masses has temperatures more nearly corresponding to the latitude, though with greater daily and annual extremes. But for practical purposes, that is for its effect on vegetation, the amount of heat received in summer is of more consequence than the extreme cold of winter. For this reason the temperature of the warmest month instead of the annual mean is taken as the measure; for if that month's mean temperature is below 50°, cereals and trees will not grow. The broad land masses in the Northern Hemisphere have a greater summer heat than the narrow stretch of land in extreme South America. The greater cold of winter in the north temperate zone does no harm.

We may observe further that in the Northern

Hemisphere the west coasts of both continents are warmer in the same latitude than the east, at least in the temperate zone, while in South America a good part of the west coast within the tropics is much cooler than the east. In the temperate zone the variation is slight.

In the matter of rainfall, a most important factor of climate and production, South America is favored with a liberal supply, the arid portions being comparatively small in area, and many of these easily capable of irrigation and of resulting excellent crops.

Dividing the continent into tropical and temperate regions, the former includes (lowlands only) the entire north coast, the whole of Colombia with ports on the Pacific, and Ecuador beyond, the low interiors of Peru and Bolivia, and around on the east the greater part of Brazil, far beyond the mouth of the Amazon; these sections have much in common as to climate and productions. Below Ecuador on the west coast, though still in the torrid zone, we find cooler weather, practically no rain, and for 1600 miles a desert region; beyond this there is a temperate climate with gradually increasing rainfall, and at last in southern Chile too much. On the east coast tropical weather and products continue till we pass Santos and the Tropic of Capricorn, followed by sub-tropical and temperate climates and production. The mountainous regions even at the equator have cooler weather, the temperature ever lowering with increase of altitude.

Other Distinctive Features

In general we may say that the soil is extremely

fertile and that the country contains wonderfully rich deposits of minerals of almost every kind. The immense store of precious metals found on this continent, some assert the greatest in any portion of the globe, was an important factor in its settlement; yet for true national prosperity the humbler coal and iron are of more value. Water power is also of material service. In these three important elements of wealth South America is not deficient, though her resources in these lines are but slightly developed.

Although many settlements were made in South America more than half a century earlier than our first at Jamestown, Virginia, in 1607, the population is much smaller than that of North America, the approximate number of inhabitants being 60,000,000 for South America and 150,000,000 for North; manifestly the development of her countries has been less rapid. For this there are obvious reasons.

The tropical climate of the north coast and of much of Brazil might seem less attractive to residents of temperate Europe and less conducive to strenuous labor on the part of those who came; the cooler regions of the south were more remote than the lands of North America. Moreover, the Spanish colony promising the greatest wealth, Peru, which at the same time was the seat of government, was indeed difficult of access, presenting besides, stupendous obstacles to interior travel. In view of these facts it seems wonderful that so many settlements were made on the west coast and that so great a degree of culture was there maintained.

Growth was further hampered by heavy taxes, merciless restrictions on trade, and other regulations by the home governments, almost until the countries

achieved their independence. During the century of their freedom most of the Republics have suffered from revolutions and other troubles, but in recent years several have enjoyed a rapid development with considerable immigration. All now present opportunities of various kinds for investment by capitalists, for general trade, and for other forms of business. Such opportunities, as well as the conditions of living, vary greatly in different countries and in localities of the same country.

It has long been a source of criticism on the part of the diplomats and residents of the various Republics that in our minds they have been lumped together; that we often refer to those portions of the New World which were settled by the Spanish and Portuguese as Latin America or to all save Brazil as Spanish America. Now that we are entering upon a period of closer relationship with our southern neighbors, it is obviously desirable that we should differentiate among them, learn of the diversity in productions and resources which characterize the various countries, and something of their social and political conditions, all of which have a bearing upon present and prospective possibilities for commercial relations. Therefore the countries must be studied carefully and individually.

So far as transportation and travel are concerned South America is often divided broadly into three sections: the East, the West, and the North Coasts, to which a fourth is sometimes added, the Amazon Basin. We may begin with the nearest, the countries on the North Coast, follow with those on the West, and coming up from the south conclude with Brazil. With the Republics of the North Coast we have the greatest percentage of trade, with those on the East

the largest amount.

THE NORTH COAST

CHAPTER II
COLOMBIA: AREA, HISTORY, GOVERNMENT, POPULATION, ETC.

Colombia, nearest to the United States of the republics of South America, is recognized as one of the richest and most beautiful of the countries of that continent, containing magnificent scenery, with extraordinary variety and wealth of natural resources. Colombia is noted as the first producer in the world of platinum, emeralds, and mild coffee; the first in South America of gold.

Area, Population, Boundary

Area. Colombia is fifth in size of the countries of South America, with an area variously given, but approximately of 464,000 square miles.

Population. She is probably third in population, official figures received March, 1921, of the 1918 census being 5,847,491. 6,000,000 may be credited to her in 1921.

Boundary. Colombia has the good fortune to be the only South American country bordering upon two oceans. Having an irregular shape, with the Isthmus of Panamá dividing the two coasts nearly in the middle, Colombia has the Caribbean Sea on the north and northwest for a distance of 641 miles, and the Pacific Ocean, for a stretch of 468 miles, west of

the main body of the country. Measuring the outline of all the indentations, the coast line would be two or three times as long. On the south are the Republics of Ecuador, Peru, and Brazil; on the east Brazil and Venezuela. The extreme length of the country, from 12° 24′ N. Lat. to 2° 17′ S., is a little over 1000 miles, as far as from New York to St. Louis; the greatest width, from 66° 7′ to 79° W. Long., is about 800 miles.

History

In 1502 Columbus sailed along the northern coast, a fact which may have prompted the inhabitants to give the country his name. As early as 1508 Alonzo de Ojeda, who in 1499 had first touched Colombian soil, made settlements on the coast; and in 1536 Gonzalo Jimenez de Quesada explored the interior as far as the site of Bogotá, where he founded a city after establishing friendly relations with the aborigines.

The country was first named New Granada. By the middle of the century Spanish power was fairly established along the coast and in part of the interior. The territory was under the authority of the Viceroy at Lima, with a local presidency, until 1718, when a Viceroy, ruling Ecuador and Venezuela as well, was established at Bogotá. In 1810 an insurrection broke out against Spain, the war continuing at intervals until 1824. During those troublous years Simón Bolívar was the chief leader, both acting as commanding general and in 1821 becoming President. In 1819 Bolívar had inaugurated the Great Colombian Republic which united Venezuela and Ecuador with New Granada; but in 1829 Venezuela withdrew and in 1830, the year of

Bolívar's death, Ecuador also.

In 1831 the Republic of New Granada was established, but disorders followed. Many changes occurred in the form of government, which was at one time a confederation, then the United States and now the Republic of Colombia. There have been strife and insurrections: in 1903 that of Panamá made the United States and its people extremely unpopular in Colombia and for some time unfavorably affected our commercial dealings. The adoption by the Senate of the Treaty of Bogotá will doubtless increase the already more friendly feeling on the part of Colombians, which can but be of value for our investments and trade.

Government

Since 1886 Colombia has been a unitary or centralized republic, the sovereignty of the States being abolished. The Departments, as they are called, have Governors appointed by the President, although each has an Assembly for the regulation of internal affairs. Besides the Departments, there are Territories of two varieties: Intendencias, directly connected with the Central Government and Comisarías, sparsely settled districts depending upon the nearest Department.

The President is elected for four years by direct vote of the people. He has a Cabinet of eight members, the heads of the various departments: the Ministers of the Interior (*Gobierno*), Foreign Affairs (*Relaciones Exteriores*), Finance (*Hacienda*), War (*Guerra*), Public Instruction (*Instrucción Pública*), Agriculture and Commerce (*Agricultura y Comercio*), Public Works (*Obras Públicas*), Treasury (*Tesoro*).

Instead of a Vice President two *Designados*, a first and a second, are elected annually by Congress to act as President in case of his death, absence from the country, or inability to serve.

The National Congress consists of a Senate and a House of Representatives. The 35 Senators are elected for four years by persons chosen for that purpose; the 92 Representatives, one for each 50,000 inhabitants, are elected for two years by direct vote. Two substitutes are chosen for each Member of Congress to replace them in case of inability to serve. Congress meets annually at the Capital, Bogotá, July 20, for 90 to 120 days. The President may call an extra session.

The Judicial Branch includes a Supreme Court of nine judges, a Superior Tribunal for each Department and a number of minor judges.

Colombia has 14 Departments: four bordering on the Caribbean, Magdalena, Atlántico, Bolívar, Antioquia; three on the Pacific, El Valle, Cauca, Nariño; seven in the interior, Huila, Tolima, Cundinamarca, Boyacá, Santander, Santander del Norte, Caldas; Intendencias: Meta at the east; Chocó bordering on the Caribbean and the Pacific; the Islands, San Andrés and Providencia; six Comisarías: La Goajira, Arauca, Vichada, Vaupés, Caquetá, Putumayo.

The names of the Departments, their area, population, capitals and population follow:

Departments	Area, in square miles	Population	Capitals	Popu

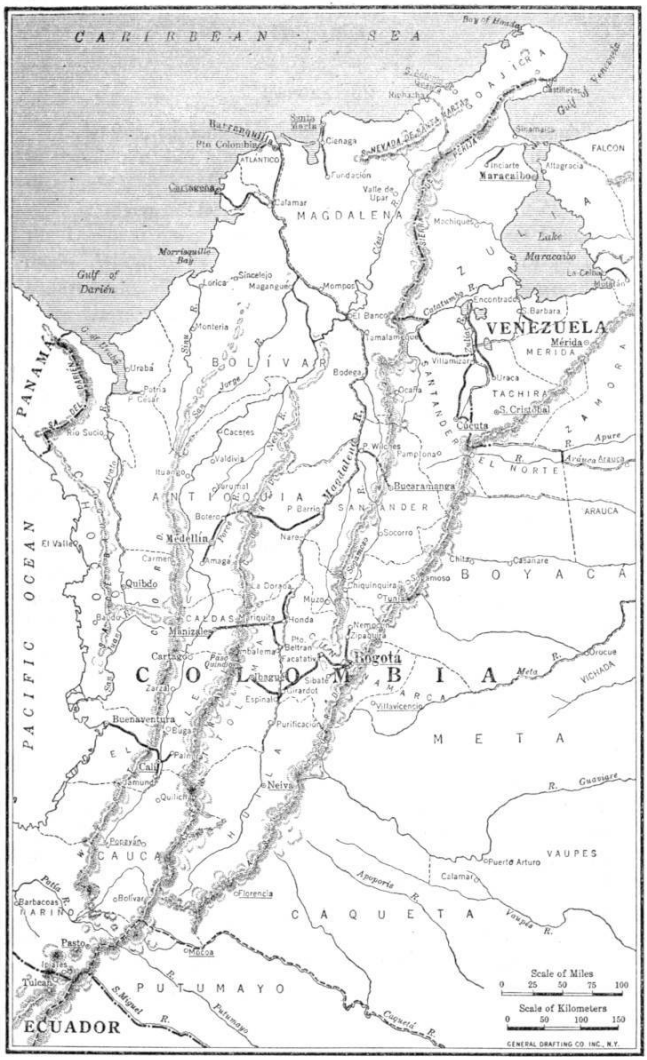
Magdalena	17,022	204,000	Santa Marta
Atlántico	1,200	135,000	Barranquilla
Bolívar	25,800	457,000	Cartagena
Antioquia	27,777	823,000	Medellín
El Valle	10,802	272,000	Cali
Cauca	9,625	240,000	Popayán
Nariño	11,574	340,000	Pasto
Huila	8,873	182,000	Neiva
Tolima	9,182	329,000	Ibagué
Cundinamarca	8,622	809,000	Bogotá
Boyacá	3,330	659,000	Tunja
Santander	11,819	439,000	Bucaramanga
Santander del Norte	7,716	239,000	Cúcuta
Caldas	3,300	428,000	Manizales
TERRITORIES:			
Meta	85,000	34,000	Villavicencio
Chocó	15,000	91,000	Quibdó
San Andrés y Providencia		6,000	San Andrés
La Goajira	5,000	22,600	San Antonio
Arauca	5,000	7,500	Arauca
Vichada	[1]	5,540	Vichada

Vaupés	[1]	6,350	Calamar
Caquetá	187,000	74,000	Florencia
Putumayo	[1]	40,000	Mocoa

[1] No figures available.

[2] At or near sea level.

NOTE.—The figures for Meta doubtless include the area of the new Comisaría, Vichada, and those for Caquetá the areas of Vaupés and Putumayo.



COLOMBIA

Population

Colombia, ranking third of the South American

Republics in population, has about 6,000,000 inhabitants, very unevenly distributed, as is obvious from the figures of the Departments, already given. The average is 12 to a square mile, but in the Departments 26 to a square mile. The smallest Department, Atlántico, is the most densely populated, 114 to the square mile. The largest Department, Antioquia, more than three times the size of Massachusetts, has also the largest population, which is reputed to be the most enterprising.

The character of the population is varied. According to the Colombian statesman, Uribe, 66 per cent is composed of pure whites and of mestizos of white and Indian and white and negro origin, who through successive crossings during four centuries have acquired the traits of the Caucasian race, in some cases showing no traces of the extreme elements; the pure Indians are 14 per cent, pure black 4 per cent, and colored mixtures 16 per cent. The tendency is towards a closer fusion making a unique type which will give the desired national unification. There are about 600,000 Indians, the greater number more or less civilized; perhaps 150,000 wild Indians, some friendly, others hostile. How many there are in the forested Amazon region is uncertain; the recent census places the figure at a little over 100,000. Among all the Indians one hundred or more different languages are spoken.

A great diversity in social conditions is to be expected. A large proportion of the inhabitants dwell in the cities or smaller towns. In a number of these may be found the culture, dress, and refinements of European cities, splendid salons or modest drawing rooms with equal urbanity in each. The wants of the middle and lower classes and of the Indians would be

quite different, and would depend further upon their place of residence; the requirements of dwellers in the tropical plains and valleys, and of those who live on or near the bleak *paramos* are obviously very diverse.

Education

Considerable attention is paid to education, which in the primary grades is free but not compulsory. The percentage of illiteracy is about 70. Bogotá has a National University with Schools of Medicine, Law, Political Science, Engineering, and Natural Science. Connected with it is the National Library, an Astronomical Observatory, a School of Fine Arts, and an Academy of Music. A free institute of learning is the Universidad Republicana; there is also a School of Arts and Trades, giving both general and technical instruction, as in printing, carpentry, etc.; a *colegio* or school for secondary instruction, La Salle Institute, the largest in Colombia, which prepares for the University; and a Homœopathic Institute, from which at least one woman has been graduated.

There are universities also at Cartagena, Popayán, Pasto, and Medellín; in the last named city, a School of Mines, which is a part of the National University. Elementary instruction is the most zealously promoted in Antioquia, Caldas, Boyacá, and Cauca; in the other Departments the school attendance is poor. In Colombia, Spanish is spoken with greater purity than in most of the other Republics.

Institutions giving instruction in agriculture, in arts and trades, and in general science are greatly needed, as also the teaching of sanitation and hygiene.

Press, Religion, etc.

Press. The Press is free, and bold in discussion.

Religion. The Constitution recognizes the Roman Catholic Religion as that of the country but permits other forms of worship.

Telegraph. The 700 telegraph offices are connected by 13,750 miles of line. Colombia has cable connection at Buenaventura, San Andrés, and Barranquilla; wireless stations at Santa Marta, Puerto Colombia, and Cartagena. An international wireless station is expected at Bogotá in 1921. Other stations will be at Barranquilla, Arauca, Cúcuta, Cali, Medellín. There are 13,000 miles of telephone wire. [3]

[3] For postal regulations to all the countries see Appendix.

Money. The money of Colombia approximates our own: that is, a gold peso is worth 97.3 cents. Five pesos equal an English sovereign. A condor is 10 pesos; a medio condor, 5 pesos, an English pound. Silver coins are 50, 40, and 10 centavos or cents; nickel coins are 1, 2, and 5 cents.

The **Metric System** of weights and measures is legal and official as in all the other Republics, although to some extent in domestic business the old Spanish measures are used; as libra, 1.10 pound, arroba, 25 libras, quintal, 100 libras, cargo, 250 libras. The vara, 80 centimeters, and the fanega, about a bushel are other measures. The litre is of course the standard of liquid measure.

CHAPTER III
COLOMBIA: PHYSICAL CHARACTERISTICS

Colombia is called a very mountainous country, and the most casual visitor would not dispute the statement. Mountains are in evidence along both shores and on the way to interior cities; but the unseen part, the hinterland, is of a different character. Only two fifths of the country is mountainous, but this part extremely so. In this section, very sensibly, most of the people live, as in the neighboring countries; for as the mountains are near the sea the majority of the early settlers soon found their way up into the more healthful and agreeable highlands. The chief drawback to these is the difficulty of access; and we can not but admire the courage and endurance of those stout-hearted people who settled in remote places among the mountains of Colombia, Ecuador, Peru, and Bolivia, and amid untold hardships there preserved for centuries civilization and a high degree of culture.

Mountains

The great mountain chains of Colombia constitute the northern terminal of the great Andean system. In northern Ecuador the Andes has become a single massive chain; but beginning in Colombia with an irregular mass of peaks, the mountains soon divide into three distinct ranges, the East, West, and Central Cordilleras.

The **Central Cordillera** may be considered the main range, having the highest peaks: three above 18,000 feet, and a number nearly 16,000. Many of

the summits are crowned with eternal snow, and many are volcanoes, as are peaks in the southern group and in the other two chains.

The **West Cordillera**, branching from the Central, follows the coast line to 4° N. Lat. where it leaves a space on the west for another coast ridge, the Serranía de Baudó, which has come down from the north as the conclusion of the low Panamá range and terminates the North American system. Between this and the West Cordillera are the valleys of the Atrato and the San Juan Rivers; the former flowing north into the Caribbean Sea, the other south, turning into the Pacific where the low Baudó ends. On the other (east) side of the West Cordillera is the Cauca Valley with the Central Cordillera beyond. These two Cordilleras end in low hills some distance from the Caribbean coast.

The **East Cordillera**, with the Magdalena Valley between that and the Central, divides into two branches: one running far north dying out at the extremity of the Goajira Peninsula, the other more to the east, extending into Venezuela.

Curiously, along the coast of the Caribbean, northeast of the mouth of the Magdalena, is another seemingly independent range of mountains, detached from the East Cordillera and quite in line with the Central: the Sierra Nevada de Santa Marta, which has snow crowned summits rising 16,000-17,000 feet above the sea. The entire mountainous region of Colombia is subject to earthquakes, which, however, are less severe than those in Ecuador and Venezuela; in some sections there are volcanic disturbances.

Plains

Between the mountain chains, besides the narrow valleys are limited plateau regions, the latter occupying about 900 square miles; while more than half of the country, an immense tract east of the Andes, broadening towards the southern boundary, is a great plain slightly inclining towards the east and south: the northern part belonging to the Orinoco Basin, the larger section at the south to that of the Amazon. This Amazon region has an area equal to that of the entire State of California. Its higher portion, as well as most of the Orinoco Basin in Colombia, where there are wet and dry seasons, is composed chiefly of grassy plains called llanos. Nearer the Amazon, where it rains a good part of the year, the country is heavily forested.

Rivers

Rivers entering the Caribbean Sea. Most important at present as also best known are the rivers which flow into the Caribbean Sea. Chief of these is the Magdalena, 1020 miles long, the principal route to the interior. The most important affluent of the Magdalena is the Cauca, which enters it about 200 miles from the sea, after descending nearly 15,000 feet in a distance of 810 miles. The Magdalena has many other tributaries, 500 or more, a few of which, entering from the east, are navigable for small steamers. The Atrato River, 340 miles long, flows north between the highlands of the West Cordillera and the Coast Range, later turning east into the Gulf of Urabá. Of smaller streams flowing into the Caribbean, the Sinú bears considerable traffic. Besides these, there are the navigable Zulia, 120 miles, and the Catatumbo, 108 miles, which by way of Lake Marcaibo in Venezuela also enter the

Caribbean.

Rivers entering the Pacific. Into the Pacific flow many streams carrying much water, as the rainfall of the region is excessive; but the courses are mostly so short and the fall is so steep that few are navigable for any considerable distance. The longest of them, the Patía, 270 miles, is the only one which rises on the east side of the West Cordillera. Worth noting is the fact that this river and four others, the five belonging to three different basins, rise very near together in the highlands of southern Colombia; the Cauca and Magdalena going north to the Caribbean, the Putumayo and Caquetá southeast to the Amazon. The Patía penetrates the West Cordillera by a remarkable gorge with perpendicular walls several hundred feet in height. On the swampy lowlands the river channels are navigable. The San Juan River, 180 miles long, is navigable for 140 miles, as it, like the Atrato, flows a long distance parallel with the coast between the Baudó Range and the Cordillera, until it turns west into the Pacific.

Amazon Tributaries. The Amazon receives two large tributaries from the southern part of Colombia: the Putumayo, 840 miles; and farther east the Caquetá, 1320 miles, the last also called the Yapurá, especially in Brazil. These rivers are navigable by canoe and by steamers of shallow draft for hundreds of miles, though with interruptions in places from difficult rapids. The Putumayo is the better, having been ascended a distance of 800 miles from the Amazon in a steamer drawing six feet. (The entire length of the Hudson is 350 miles.) Smaller rivers, the Guainía and the Vaupés, unite with the Casiquiare from Venezuela to form the Rio Negro, another important affluent of the Amazon. These

rivers have many smaller tributaries, but the section has been little explored save for going up or down the main stream.

The Orinoco River, which part of the way forms the boundary between Colombia and Venezuela, receives several important tributaries from the former country: the Guaviare, 810 miles long, the Vichada, 312 miles, the Meta, 660 miles, and the Arauca, 480 miles. Though all are more or less navigable the Meta is the most important. Joining the Orinoco below the Maipures cataract and the Atures rapids, which higher up obstruct the greater river, it permits continuous navigation to the Atlantic Ocean. Where joined by the Meta the Orinoco is a mile wide. The Meta is navigable for 150 miles above the junction, in the rainy season 500 miles, to a point but 100 miles from Bogotá.

Climate

It has already been noted that the altitude of a district as well as its latitude affects the climate, which may be modified further by the direction of prevailing winds and by ocean currents. The extensive and lofty mountain ranges of Colombia therefore give the country a greater variety of climate than it would otherwise enjoy, with temperatures agreeable to every taste and suited to products of almost every character. The configuration of the mountain ranges and valleys causes a further difference in temperature and in rainfall among points at the same altitude; the elevations being responsible not only for their own lower temperatures, but for the greater heat of secluded valleys, and for other variations.

In the forest region of the Amazon there is much precipitation. The open plains of the Orinoco section have less rain, with a dry season when the rivers, which overflow in the wet season, return to their channels and the vegetation withers. Farther north, the Sierra de Perija of the East Cordillera condenses the moisture of the northeast trade winds, causing heavy rainfall on the eastern slope, but having a dry section on the west. The Caribbean coast near Panamá has plenty of rain, which diminishes towards the north, Goajira being quite arid. Excessive precipitation occurs on the West Cordillera, on the Baudó Range, and on the southern part of the Pacific Coast, where the plains are heavily forested and unhealthful like the valleys of the San Juan and Atrato farther north. The lower valleys of the Magdalena and Cauca, shut off from the prevailing winds, are decidedly hot. These and other lowland plains have the tropical climate, in general great humidity, and many dense forests, except for the open drier llanos.

Above this region are enjoyable climates, the subtropical ranging from 1500 to 7500 feet; still higher to 10,000 feet the seasons are agreeably temperate in character. Beyond this altitude it becomes quite cold, with bleak plains and passes, here called *paramos*, mostly from 12,000 to 15,000 feet above the sea. Higher yet are regions of perpetual snow.

The Santa Marta Plateau, the upper section of the Cauca Valley, the greater part of the country traversed by the East Cordillera, and the northern end of the Central enjoy the subtropical or the temperate climate. Here is a large proportion of the white population, and here the chief industries are located. In the tropical forests and in the lower plains

and valleys the annual mean temperature is from 82° to over 90°; at Medellín with an altitude of 5000 feet it is 70°, and at Bogotá, altitude 8600 feet, it is 57°.

In the north there are two seasons a year, a wet and a dry, though not everywhere well defined; nearer the equator there are four, two wet and two drier, as the sun passes overhead twice a year. On the damp *paramos* the moist wintry seasons are long and cold, so these parts are unfrequented save by shepherds in the warmer periods. It is estimated that a section of 150,000 square miles, twice the size of England, has an elevation of 7000 feet or more, and there are few points on the coast from which an agreeable climate could not be reached in a few hours by automobile or train if roads were provided.

CHAPTER IV
COLOMBIA: THE CAPITAL, THE STATES AND TERRITORIES, CHIEF CITIES

The Capital

Bogotá, the Capital of Colombia, is situated on a plateau or savanna, a sort of shelf over 8000 feet above the sea, on the west side of the East Cordillera. The shelf, overlooked by fine snowclad volcanoes, has a low rim on the west and a high ridge on the east. About 70 miles long and 30 wide, it is entirely covered with towns and farms. The city is the largest in Colombia (population probably 150,000), on account of its being the capital and having a good climate; the mean temperature ranges from 54° to 64°. 600 miles from the north coast and 210 from the Pacific, Bogotá is the most difficult of access of any of the South American capitals. Nevertheless, the city has always been noted as the home of culture and of intellectual tastes. It is well laid out and covers a large area, as the houses are of only one or two stories with interior patios or courts, as in most South American cities. Many streets have asphalt pavements; there are hundreds of carriages and automobiles, also 23 miles of electric tramways. Like all South American cities, it has large plazas, open squares usually with trees and other green in the centre, and public gardens. The Capitol is an imposing building covering two and a half acres. Other good public buildings include the Presidential Palace, a public library, a museum, etc. Of course there is a cathedral and many churches, two theatres of the first rank, several fair hotels, a large bull ring,

a hippodrome, polo grounds, etc. Here are telephones and electric lights as in all other considerable cities. The people are industrious, intelligent, and fond of amusement.

A more precise idea of the geography of Colombia and of the commercial possibilities of the different sections will be gained by reviewing them in order, beginning with the north coast, going around the outside, and concluding with the interior.

States and Territories

The Goajira Peninsula, a Comisaría at the northeast, is inhabited chiefly by Indians who are practically independent. They gather forest products such as tagua nuts (vegetable ivory), breed useful horses, and do some trading at the port of Riohacha in Magdalena. A few savage tribes make travel in some sections dangerous. The peninsula contains much wet lowlands, as well as mountains, extensive forests, and fine fertile country, with considerable mineral wealth yet unexploited: gold, and probably extensive veins of coal. Large sections covered with guinea grass are capable of supporting great herds of cattle.

Magdalena, adjoining the Peninsula, is a Department a great part of which is low and hot. The inhabitants include many Indians, a friendly tribe on the Sierra Nevada. Back of these mountains are rich valleys, where white settlers have been disturbed by savage Indians who live on the lower slopes of the East Cordillera. Among the products of the region are coffee, cocoa, sugar, and bananas. The upper valleys are the better settled and cultivated; mineral wealth including petroleum is evident.

Santa Marta, the capital, an ancient city and port, founded 1525, has recently entered upon an era of prosperity, largely due to the enterprise of the United Fruit Company. Finely located on a good harbor west of the Nevada of Santa Marta, some distance east of the mouth of the Magdalena, the city is an important centre of the banana industry, to which it owes its present development; other agricultural products are for local consumption. The climate is hot but healthful, though the banana zone is malarial. An excellent hospital is maintained by the United Fruit Company. Within a few miles are regions with a delightful temperature. A Marconi wireless, one of the most powerful in South America, is of general service, though the property of the Fruit Company. Their enormous banana trade is served by a 100 mile network of railways into sections favorable to this fruit.

Atlántico is a small Department occupying the flat hot delta of the Magdalena River.

Barranquilla, the capital, is a busy place with many resident foreigners. It has quays, a large new warehouse, hotels, one of which is said to have all conveniences, theatres, two clubs, electric lights, trams, and telephones. In spite of the heat, which averages 82° for the year, the deaths are less than 25 per 1000, a percentage better than in some other tropical cities.

Bolívar follows, a very large Department, with the Magdalena River for its eastern boundary. Bolívar like Atlántico has vast plains suited to tropical agriculture and to cattle raising, now a growing industry. The great natural resources of forest, agriculture, and mineral products are but moderately developed. The breeding of horses, donkeys, and

mules is a profitable business followed by many. Ten gold mines are worked.

Cartagena, the capital, is considered the most interesting city on the Caribbean coast and one of the most picturesque in South America. Its massive walls and fortifications were erected at great expense nearly four centuries ago—1535. It has fine buildings both ancient and modern, and comfortable hotels. Montería and Lorica are busy commercial cities on the Sinú River, each with a population of 20,000 or more.

Antioquia, the next and largest department, has a smaller coast line. The coast section has Bolívar on the east and the Gulf of Urabá on the west; but the larger part is south of Bolívar, bordering at the east on the Magdalena River, with the Departments of Santander and Boyacá opposite. At the west is the Atrato River and through the centre the Cauca River. All these rivers are more or less navigable by steamboats as are some of their affluents; others at least by rafts and canoes. Traversed also by the West and Central Cordillera Antioquia has great diversity of character. It is the leading Department in mining, in education, and as centre of industries; it is among the foremost in agriculture, has the largest, most enterprising, and prosperous population. Nearly one-fourth of the coffee exported from Colombia comes from Antioquia, that from Medellín bringing the highest price. The forests contain hard wood and rubber. The Department has five cities besides the capital with a population of 20,000 or above, and 30 more with a population over 10,000.

Medellín, the capital, the second largest city of the Republic, is said to be the wealthiest for its size of any city in South America. It has wide streets, well

built houses, many factories, and many educational institutions. The climate is excellent, the altitude being 4600 feet. Here is the National Mint.

Caldas, south of Antioquia and formerly a part of it, is a small Department, very mountainous, with Cundinamarca east and Chocó west. The population, mostly white, possessing sturdy qualities, is devoted to mining, stock raising, and to agriculture of various zones. The rivers have rich alluvium inciting to 2600 mining claims. In the valleys the mean temperature ranges from 77° to 86°. Palm straw and fibres are employed in making hats, cordage, and sacking.

Manizales, the capital, is an important, comparatively new city, founded in 1846. Although distant from any river or railway at an altitude above 7000 feet, it is growing rapidly as a distributing centre. Sulphur and salt mines are near and thermal and saline springs; large herds of cattle graze on the plains.

Chocó, the next coast region to Antioquia, is in striking contrast to Caldas. An Intendencia bordering on Panamá and the Pacific as well as on the Caribbean, it is rich in possibilities for mining, and for agricultural and forest products; but the excessive rainfall and great heat, unpleasant throughout the district, make the lowlands swampy and unhealthful, and the whole region unattractive to settlement. Less than one-tenth of the population is white; negroes form the great majority of the rest, and there are some Indians. Of the latter, there are three principal tribes in the Atrato Basin and four near the rest of the Caribbean Coast. The Atrato Basin with that of the San Juan forms one of the richest mining sections in Colombia, important for the rare platinum, most of the tributaries carrying this metal with gold. The

San Juan Basin is probably the richer in platinum. Rubber, cacao, hides, and timber are other exports. The region will be developed some time.

Quibdó, the capital, is a busy trading centre, which within the last ten years has increased in population fourfold in spite of the disagreeable climate.

El Valle, the Department on the south, again is a striking contrast. Although including a strip of coast with the chief Pacific port, Buenaventura, the name of the Department indicates the part deemed of the greatest importance; and the one that is The Valley among so many we must expect to have especial merits. With an altitude of 3000 feet and upwards, it is a beautiful garden spot between the West and Central Cordilleras, where plantains grow two feet long, a bunch of bananas weighs 200 pounds, the cacao without cultivation commands a higher price than that of Ecuador, where its culture is a specialty; and sugar plantations are said to yield for several generations without replanting or fertilizing. At greater altitudes grow the products of temperate climes. Such a region must some day receive intensive culture, although now the leading industry is cattle raising; since the upper classes are indolent, it is said, the negro laborers also. Yet a brilliant future is sure to come. The mining outlook is good. Many claims for gold mines have been filed, some for platinum and for silver, one each for emery, talc, copper, iron. There is a large deposit of coal and of rich crystal. The rivers possess auriferous alluvium.

Cali, the capital, is an old, but progressive and important commercial city, with a fine climate, altitude 4000 feet, mean temperature 77°. It has fine old buildings and new ones, poor hotels, banks, automobiles, etc. Other busy cities farther north, are

Palmira, 27,000 population, and Cartago, 21,000.

Cauca follows, five times the size of El Valle but with no larger population, of which 25 per cent is white. It extends back from the ocean south of El Valle and of the Department Huila as well. The region has many undeveloped coal mines, and other minerals, with vegetation tropical and temperate in abundance. In some parts there are dense forests. Over 4000 mining claims have been filed, and gold and platinum are exported, but agriculture is the chief industry.

Popayán, the capital, was founded in 1536 at an altitude of nearly 6000 feet. At the foot of an extinct volcano and 17 miles from an active one, with a good climate it has violent electric storms and earthquakes. It has some fine old buildings, a university, and some say that here the best Spanish in the New World is spoken.

Nariño, the last Department at the south, has a large settled Indian population, with some Indians uncivilized. It contains a number of volcanoes a few of which are active; several rivers flow into the Pacific, the Patía the most important. Gold mines have been worked from colonial times and gold is one of the chief exports. Other mines exist and 2500 claims have been denounced. Rich copper has been noted; corundum and sapphires have been found. Besides gold the chief exports are Panamá hats, hides, rubber, coffee, tobacco, and anise.

Pasto, the capital, at an elevation of 8650 feet, at the base of the volcano Galera, has a beautiful location, a fine climate, and a hardy industrious people. There are 21 Indian settlements near. Barbacoas, 100 miles from the coast, is a considerable city of over 12,000 population where

the making of Panamá hats is a leading industry. Tumaco, population 15,000, is a picturesque island port with a better climate than Buenaventura.

Putumayo, a Comisaría east and extending far to the southeast of Nariño, is on the northeast boundary of Ecuador, from which it is separated by the watershed between the river Napo and the Putumayo, which latter separates it from Caquetá, both rivers affluents of the Amazon. The northern part with an elevation of 3000 feet or more has a comfortable climate.

Mocoa, the capital, is in this section, and a few small towns, several entirely Indian.

Caquetá, the adjoining Comisaría, is similar in character, the higher portion a good cattle country. The animals with other products could easily be shipped down stream to Manaos, where they would command high prices. The lower section is a good rubber district; cinnamon, cacao, tagua, hides, oils, balsams, sarsaparilla, varnishes, and feathers are other products of the region.

Vaupés, the next Comisaría shares the characteristics of the low, untrodden, rainy, forest region and of the more open and agreeable lands higher up, a promising territory for the rather distant future. In the Vaupés section the rivers are of black water, near which are no mosquitoes, therefore a more healthful region. Along the rivers of white water, which are in the majority, mosquitoes are a terrible pest. The distinction generally prevails in the countries of the north coast.

North of the Amazon region is that of the llanos belonging to the Orinoco Basin. There is hardly a real watershed between the two; in a number of

places channels, especially in the rainy season, connect different tributaries, besides the well known Casiquiare connection between the Orinoco and, by way of the Rio Negro, the Amazon.

The **Meta** Intendencia, formerly separated from Vaupés by the Guaviare, the most southern tributary of the Orinoco in Colombia, extends to the Meta River on the north. This section with some country farther north is similar to the llanos of Venezuela, chiefly grass lands of inferior quality, with patches of forest. It supports some cattle and might a great many more, although much of the pasture land is very wet in the long rainy season, and so dry in the short dry season that in many districts the grass practically disappears. The Meta River in its lower part has Venezuela on the north; higher at the northwest is the Casanare region (similar) of the Department of Boyacá. Near the Meta River are more towns, a few cattle centres, richer soil, with easier outlet to Venezuela, to which the few exports chiefly go. The forests of the section teem with deer and other animals, the rivers are full of alligators; the only entrance to Casanare safe from tribes of wild Indians is the Cravo highway from Sogamoso, an ancient town in Boyacá, where Chibcha priests once dwelt in palaces roofed with gold.

The **Vichada** Comisaría, so recently organized as not to appear on any map (1921), is along the Vichada River between Vaupés and Meta.

Arauca, a small Comisaría, is a part of the region north of the Meta River between Boyacá and Venezuela.

Arauca, the capital, on the river Arauca is called but three days by water (generally seven) from Ciudad Bolívar, the eastern port of Venezuela on the

Orinoco.

Boyacá, west and north, except for the Casanare Province, is a Department chiefly in the *tierra fria* of the East Cordillera. The population is mostly Indian and mestizo, the agriculture is mainly of temperate character: wheat, barley, maize, alfalfa, potatoes. Mining is actively carried on: gold, silver, copper, iron, quicksilver, marble, have been denounced, and 157 emerald claims. Asphalt is worked; there are salt works at Chita, an old Indian town, population 11,000.

Tunja, the capital, is called a fine old city with three public libraries.

Santander del Norte, north of Santander, is also traversed by the East Cordillera. The mean temperatures vary greatly: 46° on several *paramos*, and 81° in the valleys of the Catatumbo and Zulia. Gold, silver, copper, lead, coal are mined. Rio de Oro, tributary to the Catatumbo, has rich auriferous deposits, and what is now of greater importance, it passes through a district rich in petroleum. The varied crops are the chief source of wealth: wheat and potatoes, coffee and cacao.

Cúcuta, the capital, altitude 1000 feet, with a temperature of 84°, is an important commercial city.

Santander, written also with Sur, south of Santander del Norte and of Magdalena, has Boyacá on the east and south; Antioquia and Bolívar are across the Magdalena River on the west. Similar to Santander del Norte, it has more low plains. Gold, silver, copper, talc, asphalt are found.

Bucaramanga, the capital, has a mean temperature ranging from 64° to 84°.

Cundinamarca, south of Boyacá, has Meta on the east, Tolima and Huila south, and Tolima west. Less than one-half of the population is white; about one-third is on the high plateau, the rest on the slopes or in the Magdalena Valley, or on the Orinoco watershed. The scattered population is in 110 municipalities. Agriculture is most important, the land near Bogotá being especially well cultivated. In the city many factories are operated and a variety of trades followed. Mines are widely distributed: iron, gold, silver, copper, lead, coal, jasper, etc.

Bogotá is the capital of the Department as well as of the country.

Huila, south of Cundinamarca and Tolima, has Meta and Caquetá east, Cauca south, and Cauca and Tolima west. Half of Huila is Government land, forest and mountain. Cattle raising is well developed. Wheat, maize, rice, coffee, sugar, tobacco, are cultivated on a large scale. There are four quartz mines, and gold placers receive attention.

Neiva, the capital, is practically at the head of steam navigation on the Magdalena River. With an altitude of about 1500 feet it has an even temperature approximating 80°.

Tolima, west of Huila and Cundinamarca, is a long Department with the Magdalena River on the east and the Central Cordillera west. Cacao and coffee are raised on the warm lowlands. Twenty-six million coffee trees have been producing; perhaps 4,000,000 more are now in bearing. Over 2,000,000 tobacco plants grow on the foothills, other crops higher, also cattle. Of the last there are 580,000, also 140,000 horses, 100,000 hogs, with fewer sheep and goats. The rivers are auriferous and 60 properties are worked for gold and silver.

Ibagué, the capital, is a pleasant and important city, an active commercial town with mines and thermal springs in the neighborhood, exporting a variety of articles, and with a considerable cattle trade.

CHAPTER V
COLOMBIA: PORTS AND TRANSPORTATION

Sea and River Ports

Foreign commerce is carried on chiefly through five ports, Buenaventura on the Pacific; on the Caribbean, Cartagena, Puerto Colombia, Santa Marta, and Riohacha. Besides these are Tumaco far south on the Pacific, and Villamizar in Santander on the river Zulia, near the boundary of Venezuela, well situated for trade with that neighboring country.

Puerto Colombia, the chief seaport of the country, is situated a little west of the mouth of the Magdalena River. Although with a notable pier a mile in length, the place is small, merely a landing port for the greater city on the Magdalena, to which leads a railway $17^{1}/_{2}$ miles long.

Barranquilla is frequently mentioned as the port instead of Puerto Colombia, since it contains the national custom house through which at least 60 per cent of the commerce of the country passes. Yet it is not a real seaport, being 15 miles up the river, which is inaccessible to ocean steamers. When a channel is dredged through the Boca de Ceniza so that such steamers can reach Barranquilla, it will be of great advantage to commerce. This work, previously arranged for, but blocked by the outbreak of the European War, may soon be accomplished.

It might have been better to make use of the “Dique,” a natural river channel 60 miles long extending from Calamar to the sea 15 miles south of Cartagena. This is now used in the rainy season by

river steamers, though swamps near Cartagena present difficulties. Intended improvements in the channel from Sincerín, where there is a large sugar plantation and refinery, will make it navigable for boats of a few hundred tons. Beginning at the "Dique" rich agricultural land extends south.

Cartagena, the port second in importance, has a fine natural harbor and excellent wharfage facilities; the custom house depots alongside are among the best in South America. It is less than 2000 miles to New York (4500 to Liverpool) and 266 from Colón.

Santa Marta, northeast, is finely located on a good harbor. Like the ports already mentioned, it has weekly steamers to New York, New Orleans, and also to England.

Riohacha, population 10,000, still farther east, is a poor port of much less importance. Merely an open roadstead, it is seldom visited by steamers but is frequented by sailing vessels from Curaçao and other points.

Buenaventura, the chief Colombian port on the Pacific, with a population of 9000, is situated on an island in the Bay of the same name, which can accommodate vessels of 24 foot draft. A new pier, 679 feet long, just completed, has twin docks and two railway approaches; on one side water is 28-44 feet deep. The place is regularly visited by steamers and is an important port of entry for the rich Cauca Valley.

Tumaco, farther south, a town of 15,000, is a port of some importance for southern Colombia, the bay receiving ships of 21 foot draft, which are served by lighters.

Villamizar on the River Zulia through that and the

Catatumbo is connected with Lake Maracaibo and the Caribbean.

Orocué, population 2500, on the Meta, and **Arauca** on the Arauca River, may be reached by steamer from Ciudad Bolívar on the Orinoco and so communicate with the sea.

Inland Transportation

It is evident that the physical conformation of Colombia is such as to render extremely difficult the construction of railways or indeed roads of any kind. Lack of capital, and internal disturbances have contributed to retard development in this direction. The rivers therefore have been of prime importance for inland travel and transport. While these are supplemented by local railways and cart roads, the greater part of transportation over this extensive territory is, aside from the waterways, accomplished by means of pack and saddle animals over *caminos* or bridle paths of varying degrees of excellence.

The **Magdalena River** is the main artery of traffic, its normal transportation being more than doubled because of the important railways leading to or branching from the River. As its mouth is navigable only for light launches, nearly all freight and travel comes by rail either from Puerto Colombia to Barranquilla, 17 miles, or from Cartagena to Calamar, 65 miles. However, Barranquilla has some traffic with Santa Marta by means of steam launches of light draft through channels of the delta. By the Cartagena railway freight is shipped without cartage to Calamar within five days. At this town of 10,000, there is a good pier, but poor hotel accommodations for the traveler, who may be compelled to wait some

time for a steamer. The river has a width of from half a mile to a mile, and an average depth of 30 feet, but in the dry season shoals sometimes prevent for a month the ascent of the river by steamer. Much time is consumed in loading wood for fuel, as well as in other calls, and part of the way is unsafe for navigation at night. This at least has been the case, but recent and prospective dredging both on the Magdalena and the Cauca promise much better conditions in the future.

The Magdalena, the regular route of travel for Bogotá, is navigable about 600 miles, to La Dorada on the west bank, for steamers of 500 tons. The facilities for comfort for the six to nine days' journey (which has been prolonged to three weeks in periods of low water) include staterooms with electric lights; but passengers must now carry their sheets, pillows, and mosquito netting; and some take food to supplement the table fare, or make purchases en route. It is reported that 100 eggs were bought for $2.00 in February, 1919. If the five gliders drawing but a few inches, which have been ordered in France for the Magdalena, prove a success, facilities for travel will be immensely improved. A hydroplane service for passengers and mail, Barranquilla to Girardot, is now in regular operation. Other service elsewhere is proposed.

At La Dorada, the terminus of the sail on the lower river, a change is made to the railway 70 miles long, which was built to Ambalema, population 7000, to avoid the Honda Rapids. Overlooking these is the busy town of Honda, population 10,000, in the Department of Tolima, for 300 years an important centre of trade. A suspension bridge crosses the river from which, by a rough bridle path, until 1908 most

of the traffic went to Bogotá 67 miles distant. Some freight still goes over this trail to Bogotá, or to Facatativá, 45 miles, a two days' ride, as well as a few tourists, better to enjoy the scenery, to escape the heat of the valley, or more likely, when compelled by the upper river being too shallow for steamer traffic.

Usually the railway is left at Puerto Beltrán, altitude 755 feet, population 2000 (just below Ambalema), where a 100 ton steamer is taken for the 100 miles on the shallower stream above to Girardot, a new town, population 13,000, on the east bank, with ten hotels, and rapidly growing in commercial importance.

From Girardot, altitude 1000 feet, to Facatativá, population 11,000, the Colombia National Railway climbs the East Cordillera about 8000 feet in a distance of 82 miles on the way to Bogotá. Twenty-five miles more on the Sabana Railway, a road of a different gauge, brings one to the capital, having made six changes from the ocean steamer: first to the railway at the port; next to a steamer on the lower river; third to the railway at La Dorada; at Puerto Beltrán to a smaller steamer for Giradot; fifth to the railway to Facatativá; thence to the one to Bogotá.

Aside from the traffic to the capital, the Magdalena with its 500 tributaries is of enormous service. The boats call at many small places (sometimes a single house) along the river, from which mule trails (or a stream) lead to interior towns in the various Departments. The first river port of importance, about 70 miles from Barranquilla, is Calamar, where travelers and freight from Cartagena are taken on board. Magangué, population about 15,000, is the next considerable town. Between Magangué and

Banco the Cauca enters the river.

Up the Cauca steamboats run 170 miles to Caceres; also on one of its branches, the Nechi. Through most of its length the Cauca is nearly parallel to the Magdalena, but confined in a narrow valley its course is far less smooth. Above Valdivia navigation is prevented by a stretch of 250 miles of narrow cañon and rapids; in the upper valley is another navigable section of 200 miles, from Cali to a little below Cartago. Being disconnected from the Caribbean this section must seek an outlet on the Pacific.

The San Jorge River, nearly parallel with the lower Cauca and entering the Magdalena a little farther down, is navigable for 112 miles.

At Banco, a town of 7700 on the Magdalena, a smaller boat may be taken up the Cesar River coming from the northeast; at Bodega Central, population 4000, one up the Lebrija towards Bucaramanga, to which there is another route by way of Puerto Wilches beyond. From the latter a railway, long ago planned and in operation for 12 miles, is now in construction, imperatively necessary for the development of this part of the country. The distance is 90 miles. From La Ceiba, 70 miles up the Lebrija, a mule trail leads to Ocaña, population 20,000, as well as one to Bucaramanga, which is also reached by a shorter route from a point 22 miles up the shallower Sogamoso when that is practicable.

The first railway above Calamar, found at Puerto Berrío, population 1000, nearly 500 miles south of Barranquilla, leads to the important city of Medellín. This, the oldest road in Colombia, has a break where a 15 mile ride is necessary across the mountains. When the tunnel contracted for is completed the

entire length of the road will be 120 miles. Its prospects are excellent. A second railroad has Medellín, the Amagá, running 23 miles south towards the rich Cauca valley, which it will soon reach. These two roads are said to carry more freight than any others in the country.

From Mariquita, population 6000, on the Dorada Railway, an aerial Ropeway Line goes up to Manizales, in Caldas, an excellent service for freight. From Manizales a railway is building towards the Cauca River; 15 miles open, 1921.

From the Magdalena River opposite Girardot, where a bridge is being constructed, the Tolima Railway extends a distance of 99 miles to Ibagué.

Above Girardot the steamers in high water run up to Neiva, at times a little beyond. Here and higher, small boats and rafts are in general use.

Cartagena, in addition to its connection with the Magdalena River, has commercial relations with the surrounding districts, including the Chocó region, which might be served directly by ocean steamers were it not for the fact that the Atrato River is barred to them by sand at its mouth, though navigable within, 280 miles to Quibdó. As only boats of three or four feet draft can pass, and as there is no good port on the Gulf of Urabá, commerce is carried on through Cartagena by transshipment, as to cities on the Sinú River also.

From **Buenaventura**, the chief Pacific port, a railway leads over the West Cordillera, 100 miles, to the important city of Cali. From here the road branches south 21 miles towards Popayán, and east 16 miles to Palmira, population 27,000, then north towards Buga, population 13,555, and Cartago,

population 21,500. From Buenaventura, steamboats run up the San Juan River 140 miles, which with its tributaries has 300 miles of navigable channels, for boats of 7 or 8 foot draft only, on account of sandbars at its delta.

From **Tumaco** several steamers ply on the Patía and other rivers to Barbacoas and other towns for many miles.

Transportation by the tributaries of the Amazon has already been referred to, and that by the Meta and Orinoco. To Puerto Villamizar on the Zulia, there is a railway from Cúcuta, 45 miles long. From this road much traffic of the Department, Santander del Norte, is transferred to steamers running down the river to Lake Maracaibo in Venezuela.

Other Existing Railways and Plans

In connection with the plantation railways, one 60 miles long runs from Santa Marta to Fundición, from which point a continuation has been talked of to Banco on the Magdalena, at the mouth of the Cesar tributary. At present it is thought better to extend the line 30 miles toward Ariguani, a district with water for banana irrigation, timber, and good cattle land; and later to Valle de Upar to tap the rich copper and coal deposits found there.

A plan has been presented by Americans for a railway from Bahia Honda, an excellent harbor near the end of the Goajira Peninsula, to pass through good timber and cattle lands and Valle de Upar, ultimately to reach Bogotá. A branch would go from Tunja to a port opposite Berrío, and cross roads, from Cúcuta to Tamalameque and from Puerto Wílches to Bucaramanga. The work requiring six years would be

financed by Americans.

The **Sabana Railways** are of great importance. Besides the railway to Facatativá, two others lead from Bogotá, one south about 20 miles to Sibate, one north about 40 miles to Zipaquirá and Nemocón, population 5000. From Zipaquirá, population 10,000, a road is being continued to Chiquinquirá, population 22,500, in Boyacá, whence it is planned to carry it down the Carare Valley to the Magdalena. Reaching the river below La Dorada, handlings of freight will be saved, and the time of the trip from Barranquilla greatly shortened.

The **Tolima Railway** it is expected to prolong to the Cauca Valley over the Quindio Pass to Palmira on the Pacific Railway by way of Zarzal at the foot of the Pass. Bogotá will then be connected by an all rail route with the Pacific at Buenaventura, a distance of 210 miles.

A contract has been made for a railway, to be completed in 1923, from Ambalema (Beltrán) to a point on the Tolima Railway, to give Tolima direct connection with the Lower Magdalena. A railway from Beltrán to Flandes opposite Girardot is said also to have been arranged for.

A much desired rail connection is from Cúcuta to the Magdalena. Although a road to the river port, Tamalameque, 265 miles above Barranquilla, would pass through a dense tropical forest with few inhabitants save wild Indians, to avoid paying tribute to Venezuela by bringing the freight of Santander del Norte out by Barranquilla might prove well worth while; and a new rich forest country might thus be opened. A cart or motor road is already under construction.

The **Pacific Railway**. Besides the cross country connection from the Cauca Valley to the Magdalena, it is expected to prolong the existing road from Buenaventura to Cali, farther down the Cauca Valley to the Medellín, Amagá, Cauca Railway (Amagá, a city of 10,000), the latter soon to be completed to the Cauca River; this link with the Magdalena Valley may be formed first. The Cauca Valley Road now running south towards Popayán will later be prolonged to Pasto and thence to the Ecuadorian frontier, there to join the Pan American all rail route, which may be concluded through Ecuador and Peru before the northern connection is made through Panamá to Colombia.

Among other railways planned is one from Medellín to Cartagena by way of Monteria.

Road Transportation and Building

Road building in Colombia is only less difficult than railways; hence few good roads exist. The Central Northern extends 200 miles or more towards Bucaramanga; as far as Sogamoso, population 16,500, 140 miles, it is used by automobiles, the best stretch of road in the Republic. A Northeastern Road extends for some distance. The Carretera de Cambao leads from that Port on the Magdalena 130 miles to Bogotá, thereby avoiding the changes by way of La Dorada. A road from Bogotá to Pasto, the Southern, is partly in use or in construction. From Pasto it is being continued to Tumaco and may be to Ibarra in Ecuador. A road with parts in service leads from Pasto by way of Mocoa towards Puerto Asis on the Putumayo, important for national defense as well as for the development of the region. A road from Pamplona, an old town, population 14,000, in

Santander del Norte, is partly made towards the Casanare region. In Antioquia several roads diverge from Medellín. The Cauca Valley has a few, on one of which from Palmira to Buga auto service is established. Other roads are in various sections, as the important highway building from Cúcuta to the Magdalena. Many bridges have recently been constructed.

Aside from the river traffic by steamers and small boats, the greater part of travel and transport over this extensive territory is by means of horses and mules on *caminos* or bridle paths of varying degrees of excellence, many of them extremely poor, at times almost or quite impassable; a few paths are for foot passengers only. The best known *camino* is from Ibagué over the Quindio Pass to Cartago in the Cauca Valley. Another ancient way of great importance is from Neiva across the *paramos* of the Central Cordillera to Popayán. A network of these *caminos* overspreads the well settled part of the country, the meshes greatly varying in size.

CHAPTER VI
COLOMBIA: RESOURCES AND INDUSTRIES

While the varied sources of Colombia's wealth have already been touched upon, some paragraphs follow concerning the different lines of production and export.

Agriculture

The country has such variation in altitude as well as such fertility of soil that not only does almost every sort of vegetation thrive within its borders, but it exists in most of the Departments. An enumeration of all the localities where the different articles are found would be needless repetition. Reference will be made, however, to Departments where certain products are chiefly grown. With proper cultivation and ample labor food stuffs might be produced to satisfy every requirement, but many are imported from other countries more easily than they could be carried from one section of Colombia to another.

Coffee, from the commercial and export point of view, is the most important agricultural product, in quantity coming next to Brazil, while in quality the coffee by some is considered second only to Arabian. Preëminent for its culture are the Departments traversed by the Central and East Cordilleras, especially Cundinamarca, Antioquia, Caldas, Santander del Norte; also Cauca, El Valle, Tolima, and the north slope of the Nevada de Santa Marta. In Colombia coffee grows best at altitudes of 2000-6000 feet, the higher the milder the coffee. At 5000 feet no shade is required, though necessary when first

planted in most places where it is raised. Everywhere coffee seems to prefer sloping ground. In Cauca, where 720 trees are planted to the acre, they produce for 50 or 60 years. Coffee from Santander, mostly going out by way of Maracaibo, is sold under that name. We hardly think of coffee as a product of the temperate zone, but in Colombia it is so classed, growing in the same altitudes as temperate fruits, vegetables, and cereals.

Bananas are the most important crop of the lowlands, especially since the exploitation of the Santa Marta district by the United Fruit Company. Ninety per cent of the bananas raised in this section are exported by the company under contract with private growers. Banana land of the company is well laid out with irrigating canals, managers' and laborers' houses, etc. Export has increased enormously. As the section is watered by five rivers and many brooks, it is especially favorable for the irrigation needed. The trunks and leaves of the plant, which might be utilized for cordage, paper, cardboard and textiles, at present go to waste. The cost of clearing and preparing land for the industry, with 350 trees to the acre, is about $45. Within two years the annual receipts are $40, largely profits. The Company owns 28,000 acres of improved land (10,000 devoted to cattle) and twice as much land unimproved. The bananas are free of export duty and taxation. The fruit may be grown in all the lowland sections where irrigation is practicable, which is almost everywhere. Before the War the Germans near the Gulf of Urabá started a plantation of 12,000 acres, one third of which is under cultivation.

Plantains are widely raised for native use, as they form the chief article of food for the masses in the

lower districts. Higher up maize is the staple. The plantain requires little cultivation, the crops are heavy, and the plantations last for years. The fruit is eaten either green or ripe.

Sugar cane, grown extensively on the fertile lands of the valleys, without fertilizer and with occasional hoeing, gives crops of 80 tons per acre, averaging 40 tons. It flourishes up to 7000 feet. Small primitive mills are the rule, but a few with modern machinery have been established, one near Cartagena. A brown sugar is chiefly made in the small mills, *pantana*, which is palatable and nourishing; but some is refined for table use and for the chocolate factories. A large amount of sugar is used for *chicha* (sugar syrup fermented with corn), for denatured alcohol, and for *aguardiente*, a kind of rum; the last is a government monopoly. The sugar production is hardly sufficient for local needs.

Tobacco, which some think equal to the best Havana, is raised, mostly for local consumption; formerly much was exported to Bremen.

Cacao grows wild on thousands of acres, some trees reaching a height of 45 feet; but to give the best results it must be cultivated. It is planted for early protection under bananas, together with other trees which will give shade later. Local demand consumes most of the supply. Little attention is paid to its cultivation, though the Magdalena and Cauca Valleys are well adapted to it. Trees 60 years old are found in bearing.

Coconut palms might be more largely cultivated, plantations existing chiefly on the coast and islands. The fibres and oil are useful and many nuts are exported.

Rice grows freely in rich, hot, irrigated land, but it is not largely cultivated.

Cotton of excellent quality is raised from Egyptian seed on the Caribbean coast and in Antioquia; it is found growing wild at low and moderate altitudes all over the country. But little use is made of it except where factories are near, these promoting its culture. The plants, perennials, grow 12 feet high. The cotton, unrivalled for length of fibre, is all used locally.

Other fibrous plants are the *Agave Americana* or century plant, which is cultivated as a hedge; enough is produced to satisfy most of the home demand for fibre for ordinary rope and twine, also for making common packing sacks, and alpargatas, sandals worn by the poorer people. Here grow ramie and other shrubs, the fibre of which is used for vegetable silk. Ramie on the Bogotá River yields 6 crops a year without irrigation, the stems 6 feet long having a very tough fibre. Most of the Magdalena land could not be better used than for raising such plants. A recent invention to extract the fibre by a chemical process makes its culture important. Jute in Colombia on the same soil as ramie reaches double the height attained in its native country, and gives two cuttings a year, the first crop three months after planting.

Wheat gives good crops on the highlands, and **maize** (corn) grows everywhere, in the rich lower valleys producing three crops a year. Potatoes and other vegetables grow in various altitudes.

Forestry

The natural wealth of the forests is enormous,

though at present largely inaccessible for lack of transportation facilities, a condition which might easily be remedied so far as the forests of the Pacific Coast and of the Atrato and Magdalena Basins are concerned. The chief products now are rubber and tagua nuts.

The **Rubber** is of both the *caucho* and the *hevea* varieties, the former of inferior quality, procured by cutting down the trees, the *hevea* or fine Pará by tapping. The former is obtained by the Tolimenses from the Rio Negro section, the latter by Indians of Vaupés, this being sent down to Manaos. Rubber also comes from Chocó, being collected by Indians and negroes who exchange it for goods at Quibdó, at places on the San Juan River, also at Barbacoas, back of Tumaco. A few plantations have been started in the Atrato and Magdalena Valleys and near Tumaco. Balatá and chicle are also exported.

Tagua Nuts, which have only to be picked up, are gathered in the forests on the Pacific slope and in the Atrato and the Magdalena Basins, the best quality from the Sogamoso tributary of the latter. This is called vegetable ivory, from which buttons, etc., are made.

Timber of great value exists, a little of which is exported: Colombia mahogany, cabinet and dye woods; but there are few saw mills, and the great variety of trees in a small area renders their exploitation difficult.

Medicinal plants are numerous: cinchona, sarsaparilla, ipecac, balsams, etc. Many other valuable plants abound but are little exploited.

Live Stock

The **Cattle** raising industry is one of the most favorable for immediate profit. The best quality of grass is found on the plains of Magdalena, Bolívar, and Atlántico, where there are large areas of planted pasture. An acre and a half supports a steer. Pará grass, native to Brazil, is used on wet or swampy ground and guinea grass on drier. On the eastern llanos are millions of wild cattle, with some ranches; but the grass is generally so poor that the cattle are sometimes brought to the Magdalena Valley to be fattened, though this is difficult. There are 4,000,000 head in the country with 80,000 annually available for export. Modern packing houses are now being established with important Government aid. Material and supplies for construction are exempt from import duties; and outgo for 20 years from export taxes. With attention to breeding and to good fodder for fattening the production may rival that of Argentina.

In the Sinú Valley region are said to be 1,000,000-1,500,000 cattle. An American and Colombian Company holding 75,000-100,000 acres along the River, with a herd of 40,000 cattle, is now (1921) erecting a packing house costing $1,750,000 on Morrisquillo Bay, 60 miles from Cartagena. They expect soon to begin operations, slaughtering 500 head a day. On account of proximity to the United States, the prices of Colombian cattle could probably not be equalled here by the countries farther south. A packing house at Cali may be desirable.

Other Stock. Horses. As an absolute necessity on account of the scarcity of wagon roads, many saddle horses are raised, Andalusian crossed with Arabian or English. Some saddle horses are imported from Peru. Mules and donkeys are found in large numbers. Goats are numerous in all quarters, and sheep are

raised on the highlands. There is a large exportation of hides and skins.

Mining

This is an industry of great promise, the as yet bare scratching of the surface showing infinite possibilities for the future. Practically every mineral of commercial value has been found, including the rarer metals. The lack of proper transportation makes some sections impracticable and others difficult, but important work has been carried on in many places; opportunities lie open in many more. Gold is found in almost all sections, both in quartz veins and in placers. There is native silver, and some with gold and tin. Platinum ores running from 80 to 85 per cent are found with gold and other metals. Iron is widely distributed; also copper; often with gold, tin, and in primitive rock formation. Manganese, lead, mercury, sulphur, zinc, antimony, arsenic, nitre, alum, exist, but are not much worked except sulphur, which is taken from some volcanoes. The working of the salt mines is a government monopoly, rock salt and springs existing in large numbers. From the Zipaquirá salt mine in Cundinamarca the Government receives a revenue of approximately $1,000,000 a year.

Coal was first discovered in 1865 near Santa Marta Bay, and subsequently other deposits. Most important just now are the beds near Cali, which are thought to be very extensive, and to extend through the mountains to the Pacific slope. It is said that enough coal could be mined to supply the neighboring Republics as well as Colombia. The probable supply is estimated at 27 million tons. The character of coal in the country varies from lignite to

bituminous. A wide vein of cannel coal leads from the Nevada de Santa Marta towards the Goajira Peninsula; an anthracite deposit 25 feet thick extends 50 miles north and south near the Gulf of Urabá. Coal deposits exist for a distance of 300 miles north and south of Bogotá near the East Cordillera, others in the formation of the Central and West Ranges. One bed near Cali in places is 22 feet thick. Coal beds in three layers are cut by the Amagá Railway, and the locomotives are fired on the track.

Petroleum exists in quantity indefinite, but hardly to be overestimated. The great tract of country extending several hundred miles back from the entire south shore of the Caribbean apparently contains a collection of oil reservoirs which may exceed in magnitude those of any other section of the Western Hemisphere. Nowhere else in the world, it is said, is there so great a display of seepages and of petroliferous mud volcanoes.

Colombia presents three more or less distinct regions with various fields in which operations have been conducted; others in which the surface indications will doubtless incite to careful examination in the future. The three well known regions are the Caribbean, the Magdalena, and the Maracaibo; the last two are also spoken of together as the Magdalena-Santander Field, since an oil belt extends from Venezuela south-southwest across Santander and the Magdalena River. But as a mountain range separates the Maracaibo Basin from the Magdalena Valley, the two are quite distinct.

The Caribbean Region which extends along the coast from Riohacha to the Gulf of Urabá has 300 or more square miles of supposedly productive territory. Many American companies have obtained

concessions; more than 100 are organized for the exploitation of this and other districts. So rapidly have sections been taken up that a considerable part of the coastal tract west of the Magdalena is already occupied. British interests also have acquired extensive holdings in the Republic. Emissions of gas occur in many places, this being the first country in South America where large amounts have been observed. Among the petroliferous mud volcanoes is the largest known anywhere. In the Tubara field is a well 3000 feet deep from which enormous quantities of gas came off. It has been proposed to pipe the gas to Barranquilla for use in the city.

The Magdalena pool or region extends along the river valley for several hundred miles. The fields already occupied are mainly on the east side. In this section the first oil gusher of Colombia was brought in not far from Barranca Bermeja, about 400 miles south of Barranquilla. A second well 2270 feet deep shot oil over the derrick several hours before it could be capped. It was rated at from 2000 to 20,000 barrels daily. Steady flow is estimated at 6000 to 8000 barrels daily. The oil, which is dark with some asphalt, gives about 30 per cent gasoline, 6 of kerosene, 20 lubricating oil, and 12 asphalt. A pipe line and wagon road are being constructed from the three wells drilled near the Colorado River 35 miles to Barranca Bermeja where a refinery has been erected. It is said that this is to supply Colombia with gasoline, kerosene, and lubricants at prices not above those of New York. The use of residual fuel oil on the river steamers will greatly facilitate their operation. It is likely that a larger refinery will be erected at Cartagena or as rumored on an island at the mouth of the Magdalena, but the cost of reported pipe lines 300 or 400 miles long in this region would be

prohibitive. Tank steamers will well serve the purpose.

Higher up the river near Honda is the Tolima field where live seepages occur and a well has been drilled. [Many locations have been secured in a stretch of several hundred miles along the valley.] This field includes the upper Magdalena Basin, with which are classed the groups on the edge of the San Martín and Casanare plains east of the Cordillera. In the Orinoco Basin oil has been seen floating on the surface of the rivers.

The Maracaibo Basin, which is chiefly in Venezuela, has a section running over into Colombia where the Barco concession is located. An area of more than a million acres is occupied by an American company. Here oil seepages include some wonderful springs. Oil from one of these runs a small refinery which produces 25 barrels a day. The oil with a loss of only 1.1 per cent is said essentially to match the high grade Pennsylvania oil, selling for $4.00 a barrel at the well. Wells were first drilled on the Venezuelan side of the Rio de Oro, tributary to the Catatumbo; later on the Colombian side.

There is further a Pacific district extending north and south from Buenaventura a distance of 60 or 70 miles, from Quibdó on the Atrato to Cali on the Cauca with a small section on the coast. The probable productive area is 18 miles but none is proved.

The location of these extensive deposits, many within 200 miles of tide water, is of prime importance to the commercial world, especially because of their proximity to the Panamá Canal, soon to be one of the great shipping routes of the world. Moreover the port of Cartagena, which already has

several refineries and will serve as the chief depot of export and supplies, is nearer to New York than is Tampico by 400 miles, than Galveston, Texas, by 50 miles. It is also much nearer to London, to Panamá, and to our own Pacific Coast. Clearly, the development of the petroleum deposits of Colombia is of the greatest interest and importance to the United States. It is believed that its oil fields will equal or surpass those of Peru.

Platinum. At the moment the greatest mining wealth is in gold, with a good bit in platinum. Over $2,000,000 worth of the latter was exported in 1917. Platinum, usually with gold, is found in rivers near the Pacific: the Atrato, Condoto, Platina, and San Juan. Operations have been carried on in several districts. The concessions of an American company include a tract on the San Juan and one on its tributary Condoto and its branches, with holdings north and east of the river deposits. By means of a small wood burning dredge with annual capacity of but 250,000 cubic yards, about $600,000 worth of platinum was obtained in 1918 when the Government price was fixed at $105 an ounce. With a second and larger dredge now operating and a third expected soon, much greater production will be realized. In 1920 the value fluctuated from $70 to $165 an ounce. In June, 1921, it was $75. The value of the two tracts is estimated at $52,000,000 at the former Government price. Costs are little greater than in the California and New Zealand fields, and with suitable precautions taken in the way of drainage, mosquito netting, etc., as at Panamá, and with good medical attendance, health conditions have been made about the same as on the Isthmus. Extraordinary platinum values have been shown; the gravel handled in 1918 furnishing $2.50 gold and

platinum per cubic yard. The extensive use of platinum in dental work, in jewelry, and for important though limited service in certain manufactures, in sheet, wire, and granulated form, indicates an annual need of 165,000 ounces in the United States alone. A unique opportunity is offered in Colombia for the production of this valuable metal.

Gold. The gold of the Chocó placers has been widely known since the Spanish Conquest. Four hundred million dollars was taken by the Castilians from shallow waters and easily worked river banks. In recent years a number of companies have been operating. The Pato mines cover 40,000 acres near Zaragoza, population 2700, Antioquia, where a dredge is operated. At the Nechi mines the dredging cost is 9 cents a yard, the return about 75 cents. In Antioquia there are 20 rivers with gold alluvium, but operations are chiefly on the Cauca, Nechi, Pato, and Porce. The bench gravel is very deep and can be worked profitably (except at times by the natives) only with machinery, as is the case generally. Therefore considerable capital is necessary for a successful enterprise. More than 12,000 gold bearing sites are known in Antioquia; many in Nariño, Caldas, El Valle, Tolima and Chocó. The gold production in Colombia since the Conquest is estimated as above $600,000,000 and that of silver as $30,000,000.

Emeralds. The most famous mining industry of the country is emeralds; for nowhere else are they produced in quantity and here are the best. The mines were worked long before the coming of the Spaniards, and the actual labor has been performed by the Indians ever since. The mining has been a

Government monopoly. The area is a region of 4000 square miles, but the only mine recently operated is the Muzo, 92 miles northwest of Bogotá. It is now worked by the open system though formerly by tunnel. The workers live on the ground in buildings provided for the men and officers, with police to prevent thieving. Present operations are in almost vertical cliffs rising from 100 to 550 feet above small valleys. The loose soil is not removed by water, as is stated elsewhere; the emeralds are separated from the soil by a dry method; water is used to carry away the detritus and also to wash the residue left by material from rotten veins in order to expose small emerald crystals. The output in normal years approaches 800,000 carats. No attempt should be made to obtain a possible concession without thorough investigation and ample capital. The same may well be said of any mining venture. A concession for emerald mining has been secured by an American company.

Other Industries

Manufacturing is fostered by high duties on many goods; further by concessions such as exemption from taxes, land grants, or money, to persons establishing factories. In return the goods must be sold lower than those imported. Some large business firms finance other enterprises such as coffee and factories. Of manufactures textiles are the most important. In Barranquilla there are 200 British electric looms run by boys and women; British yarns are imported and worked up into domestics and drills; there are other factories at Bogotá, Cartagena, Medellín, and two for fine woolen cloth at Bogotá. Some cotton spinning is done; two new spinning

mills in Barranquilla each have 2500 spindles. In cottages are many looms for the spinning of wool, in which the Indians are very proficient.

In one place or another are factories of almost every kind: silk, flour, chocolate, matches, shoes, tanneries, ice, mineral waters, breweries, tiles, iron and steel, glass, candles, soap, etc. Bogotá has the largest number of factories, about 40, Medellín the next; others are well scattered over the country. Few do much more than supply local wants, partly on account of the difficulties of transportation.

Export. The only manufactured product important in export is *Panamá hats*. The principal centers of the industry are Antioquia, Nariño, Huila, and Santander Sur. The hats are made of *toquilla* palm, the young leaves of which are cut off, split into thin strips by a small wooden knife, spread out in the sun to dry, and then woven. The hats are not made under water, but the straw must be kept very damp to avoid breaks and splits; so weavers sometimes go into damp caves. Near Pasto, Nariño, hats are made almost equal in fineness to those of Montecristi, Ecuador. The industry has a bright future unless Japan by cheaper labor drives the South American product from the market. To prevent this the export of raw straw may be forbidden.

Investments

Colombia obviously offers a wide and varied field for investments, but like the other South American Republics, on account of low wages, it presents no opportunities favorable to ordinary laborers unless in agriculture. An immigrant may receive a free grant of land of 6175 acres, which he must within ten

years cultivate over one third of the area; or if cattle lands, two thirds must be occupied.

Various forms of agriculture may be attractive to persons of moderate capital: sugar cane, bananas, coffee, cacao, cotton, fruits, etc., as also agave or other fibre material. Tagua groves in *baldíos* may be exploited.

Discoverers of mines in *baldíos*, Government lands, have a preferential right to 1250 acres of land adjoining the mines denounced. The abundance of water power is of great value to investors of every kind, being equally important for mining, factories, and agriculture.

Factories on account of high tariffs make excellent profits. Cattle and sheep raising offer good prospects. Public works including drainage, water supply, sewers, road and railway construction, bridges, and development of electric power should afford many and varied opportunities.

CHAPTER VII
VENEZUELA: AREA, HISTORY, GOVERNMENT, POPULATION, ETC.

East of Colombia is the only other Republic on the north coast of South America, Venezuela.

Area, Population, Boundary

Area. Next to Colombia in position, Venezuela is also next in size. Sixth of the South American Republics in area, her territory covers about 394,000 square miles, equal to that of California, Arizona, and New Mexico.

Population. With approximately 3,000,000 inhabitants, Venezuela is entitled to the same rank in population, for though Chile with smaller area surpasses her in this respect, Bolivia with greater extent of territory probably has fewer inhabitants. As neither country has accurate statistics to consult there is some uncertainty about the matter.

Boundary. Venezuela is irregular in outline, but in general her boundary is as follows. The Caribbean Sea is on the north, the Atlantic northeast, British Guiana east; also a part of Brazil is east of a southern projection of Venezuela; Brazil is on the south, with Colombia also south of a western projection; Colombia alone is on the west.

History

The land of Venezuela was sighted by Columbus in 1498; in 1499 it was explored to some extent by

Alonzo de Ojeda, who gave the country its name (Little Venice), the Indian dwellings on piles in Lake Maracaibo reminding him of the famous Italian city. Settlements were made early in the 16th century, the first especially for the sake of the rich pearl fisheries. On account of the bad faith and cruelty of the Spaniards and the warlike spirit of the natives, many disorders and atrocities occurred, accompanied by quarrels among the Spaniards themselves.

In 1810 the citizens of Caracas deposed the Governor; the following year independence was declared, but it was not secured until the Royalists were defeated in the battle of Boyacá in 1819. The Great Colombian Republic was then formed by General Bolívar, though the last royalist adherents did not give up until 1823. Venezuela withdrew from the Union in 1830; the hero and patriot Bolívar died the same year. Many internal difficulties and changes of government have characterized the period of independence, though comparative quiet has succeeded the exit of Castro in 1909.

Government

In contrast with Colombia, the Republic is a federal and not a centralized union. It has the usual three branches: a President with his Cabinet forms the Executive Department; there are two Houses of Congress; also a Supreme Court.

The twenty States have each a President and a Legislature, a Supreme and other Courts. The two Territories and the Federal District are administered by Governors appointed by the President, who is elected for seven years.

The names of the States and of their capitals

follow, with their populations estimated, as until recently no census had been taken since 1897. The new figures (December, 1921) are received only for the Territories. The Coastal States beginning at the northwest are Zulia, Falcón, Yaracuy, Carabobo, Aragua, the Federal District, Miranda, Anzoátegui, Sucre, Monagas. Anzoátegui and Monagas are also Llano States, with Guárico, Cojedes, Portuguesa, Zamora, and Apure. Táchira, Mérida, and Trujillo are Mountain States; Lara, north of Trujillo, almost comes into the coast region. Nueva Esparta is an Island State. Bolívar, south of the Orinoco, lies between the two Territories, Delta Amacuro and Amazonas.

States	**Population**	**Capitals**	**Population**	**Altitu in**
Zulia	185,000	Maracaibo	50,000	
Falcón	170,000	Coro	20,000	
Yaracuy	103,000	San Felipe	15,000	
Carabobo	200,000	Valencia	60,000	1
Aragua	115,000	Maracay	15,000	1
Federal District	137,000	Caracas	100,000	3
Miranda	173,000	Ocumare del Tuy	10,000	
Anzoátegui	162,000	Barcelona	16,000	
Sucre	117,000	Cumaná	15,000	
Monagas	90,000	Maturín	16,000	
Guárico	221,000	Calabozo	10,000	

Cojedes	75,000	San Carlos	12,000	
Portuguesa	115,000	Guanare	11,000	
Zamora	75,000	Barinas	7,000	
Apure	30,000	San Fernando	8,000	
Táchira	133,000	San Cristóbal	17,000	2
Mérida	115,000	Mérida	15,000	5
Trujillo	184,000	Trujillo	12,000	2
Lara	231,000	Barquisimeto	35,000	1
Nueva Esparta	60,000	La Ascunción	3,000	
Bolívar	70,000	Ciudad Bolívar	20,000	
TERRITORIES				
Delta Amacuro	12,258	Tucupita	1,000	
Amazonas	3,298	San Fernando de Atabapo	400	

[A] Figures for the area of the States and others omitted are unavailable.

Population

The number of inhabitants, estimated as a trifle less than 3,000,000, is about seven to a square mile. Seventy per cent of the people are called poor, hence

with a rather small purchasing power. The Federal District has about 15 persons to the mile, the density in general decreasing in proportion to the distance from the capital. The Guayana region, the Delta, and Apure, supposed to have less than half a person to a mile, are among the least populated regions of the globe.

The white population is ranked as about 10 per cent of the whole, the mestizos, those of mixed race, as 70 per cent; the rest are Africans, Indians, and foreigners. About $^{3}/_{4}$ of a million live in 48 towns; 75,000 are engaged in agriculture. In most of the cities are people accustomed to European society, with a taste for European luxuries, as well as those of simpler habits and desires. As in Colombia, the requirements of those who live high on the mountains and those on the llanos are very different. Attractive inducements are offered to immigrants for colonization.

The Indians are of many tribes, some quite distinct from the others. As a small part of the Goajira Peninsula is in Venezuela, there are Goajiros like those in Colombia. A large proportion of the aborigines became mingled with the Spaniards; in the mountainous sections of the north live few Indians of pure blood. In the region of the Delta and in the southern part of the country are many Indians of at least 16 tribes; some are dirty and stupid, others intelligent and fierce; some are good workers and boatmen, others are timid and agricultural. The Arawaks are gentle, industrious, and clean.

Education

Venezuela’s percentage of illiteracy has been high,

but since 1912 the system of education has been reorganized. The National Government has established in the principal cities primary schools with six grades. Attendance at four of these since 1919 is compulsory. The teaching of English was then ordered. In the various capitals are 22 colegios (high schools), several cities having also Commercial Schools, Schools of Fine Arts, and of Arts and Trades.

There are Universities in Caracas and in Mérida, with Schools of Law, Medicine, Philosophy and Letters, Engineering, Dentistry, Pharmacy, and Theology.

States and Municipalities make additional provision.

Press, Religion, Etc.

The Press includes official gazettes in the capitals of the States, and other periodicals devoted to scientific, literary, and other special subjects.

Religion. There is freedom in religion; the State, however, contributes to the Roman Catholic Church. Civil marriage alone is legal; the religious ceremony generally follows, although in the rural districts, where priests are scarce and the fees high, both ceremonies are often omitted. Divorce is now permissible.

Venezuela belongs to the Postal Union and has parcel post; but service to the interior is rather primitive.

The **Telegraph** service, with about 6000 miles of wire, is cheap and called efficient; the telephone lines have double their length of wire. At Caracas, Maracaibo, and Maracay there are wireless stations

communicating with Curaçao and so with the outside world. There is also cable service.

Money is in gold, silver, and nickel coins, and there are bank notes issued by four banks. The bolívar is the unit of money, equal to the French franc: 19.3 cents. A dollar passes for 5 bolívars. American money circulates near the coast, as does the English sovereign. The natives frequently use the term peso for which they employ the $ sign. As the peso equals but 4 bolívars this creates confusion and mistakes must be guarded against.

The **Metric System** is official, compulsory, and in general use.

CHAPTER VIII
VENEZUELA: PHYSICAL CHARACTERISTICS

The configuration of Venezuela is simpler than that of Colombia; the country has four distinct sections:

First, a mountain region including the Venezuelan Andes, which is a branch of the East Cordillera of Colombia; and a range called the Maritime Andes extending along the coast.

Second, lying east and south of the mountains, the great plain of the llanos occupying a large part of the Orinoco Basin.

Third, the Guiana or Guayana Highlands south of the Orinoco, extending to the eastern and southern boundaries and occupying a great extent of unexplored territory.

Fourth, the coastal plain around Lake Maracaibo.

First Section

The Andes coming in from Colombia cross the northwestern portion of Venezuela in two or more ranges, separating the great Orinoco Basin from the lowlands lying between this chain and that part of the Colombian East Cordillera called the Sierra de Perija. A number of the mountains are above 13,000 feet, the highest, La Columna, is 16,522 feet. Though none of the mountains are volcanoes, earthquakes are common. The general height of the range decreases on the south towards Colombia, and north towards the Caribbean Sea, till at one point at the

north, near where the city of Barquisimeto is located in the valley between the two ranges, the Rio Cojedes goes through to the Orinoco Basin. Beyond the Cojedes River the Maritime Andes stretch along the coast in two parallel ranges, the high valley between them being the most densely populated part of the country. The peak above Caracas, called the Silla de Caracas, one of the highest of this section, has an altitude of 8650 feet; Naiguatá passes 9000. After a considerable break at Cape Codera the mountains continue to the Gulf of Paria.

The western branch of the Venezuelan Andes, turning north, continues towards the coast in low ranges called the Segovia Highlands, with the Maracaibo district on the west.

Second Section

East and south of this mountainous country is the vast region, thinly populated and not well known, of the great Orinoco Basin, occupying three fourths of the country; first come the llanos, followed by a forested district, with hilly, mountainous country beyond. The llanos, covering 87,000 square miles on the north side of the great river, are grassy plains broken by islands of trees. Near the mountains north and west are extensive forests. The llanos are of slightly varying altitude, in parts rising imperceptibly, but often by terraces or banks a few feet high. In the western section there are large tracts in the Portuguesa Valley but 300 feet above the sea; in other places the land rises to 650 feet, and to a still greater height on the mesas which form the watershed between the Orinoco and the rivers Unare and Aragua flowing into the Caribbean Sea.

Third Section

South and east of the Orinoco River are the Guiana Highlands, said to cover 200,000 square miles, for the most part a plateau 1000 feet and upwards in elevation, from which rise several mountain chains connected by lower hills, the Parime Range separating the Orinoco and Amazon Basins. A few peaks rise 8000 feet; the highest known is Mt. Roraima, 8500 feet, at the southeast corner, where the boundaries of British Guiana, Brazil, and Venezuela come together.

Fourth Section

This region, much smaller, occupies the northwest part of the Republic, which may be considered as a coastal plain. It includes the alluvial area around Lake Maracaibo, the Coro and the Paraguana lowlands, with open sandy hills extending along the shore of the Gulf of Venezuela to the end of the Paraguana Peninsula, and some islands of the same character.

The Lake district is somewhat similar to the Orinoco Delta, with many rivers coming in at the south, and with open lagoons and swamps; it is bordered by dense forests often inundated by rains. East and west towards the north between the swamps are higher lands with some grassy plains. At the west is the Sierra de Perija on the Colombian frontier.

Rivers and Lakes

Venezuela is said to have 72 large and more or less

navigable rivers, of which the Orinoco is the chief. Its length, variously stated, may be 1570 miles and the area of its basin 370,000 square miles.

The **Orinoco**, rising near the Brazilian boundary, first flows northwest, then northerly forming the boundary line with Colombia, and from the entrance of the Meta River, northeast and east to the Atlantic Ocean. Its low forested delta covers 8500 square miles. Boca de Navios, the largest mouth, is 20 miles wide with a depth of 17 feet at the bar. Among the 400 or more tributaries the most important are the Caroni, the Caura, and the Ventuari, draining the mountainous and forested section at the south; and the Guaviare, Vichada, Meta, and Apure coming in from the west, the first three from Colombia. The Casiquiare, previously mentioned, connects the Orinoco with the Rio Negro.

Among other rivers of importance are the Catatumbo and the Escalante flowing into Lake Maracaibo and the Tocuyo into the Caribbean.

Among the 205 lakes, Maracaibo, covering 8392 square miles, is obviously the largest and most important. Other lakes are Valencia, Zulia, Laguneta, and Camaguán, but many of the 200 are mere shallow lagoons which serve as breeding places for mosquitoes.

Climate

As might be expected, the climate of the country is similar to that of Colombia, with corresponding variations for altitude: tropical to about 2000 feet; above that to 7000 temperate; still higher, cold, with mean annual temperatures ranging from 60° to zero or less on the high mountains. The hot region, *tierra*

caliente, includes the coastal plains with the Maracaibo district, the llanos, a large part of the Guayana Highlands, and a few of the lower mountain valleys. The islands are the coolest, the llanos the warmest part of the tropical region; the hottest section of the latter is south and west, the farthest from the sea. Along the coast the temperature ranges from 64°-68° to 93°-95°. The temperate region includes the most thickly settled sections at moderate elevation, while the cold mountain heights have comparatively few inhabitants. On the llanos the dry season is from November to May, or June, the rainy following to November. The coast has two rainy seasons, December and January, and April to July. The Orinoco Delta and parts of the Guiana section are the most unhealthful; the lowest death rate, rather strangely, is in the cities of the llanos, the next lowest in the regions of the Andes and the Caribbean Mountains.

CHAPTER IX
VENEZUELA: CAPITAL, STATES, TERRITORIES, CHIEF CITIES

The Capital

Caracas, the capital of the Republic, founded in 1567, is a very attractive city with a delightful climate. Only occasionally does the temperature go below 60° or above 80°. Eight miles in a straight line from its port, La Guaira, from which it is 23 miles by rail, the city is at an altitude of 3036 feet on the south side of the outer Coast Cordillera. The city is in the usual Spanish American style, with beautiful plazas and promenades. Exceptionally, the streets, which are at right angles, are numbered instead of named, but the old names are in general use. Notable buildings are the Capitol covering more than two acres, the Miraflores Palace, the Cathedral, University, National Pantheon, Masonic Temple, called the best in South America, a beautiful theatre, etc. A fine view is had from the hill Calvario, 200 feet above, the slopes of which are arranged as a public garden. Caracas is up to date in modern conveniences, water supply, street cars, etc., and has a good and cheap cab service. The city is near the west end of a rich valley 12 miles long and 3 wide, which slopes towards the southeast. The Guaire River below the city flows into the Rio Tuy.

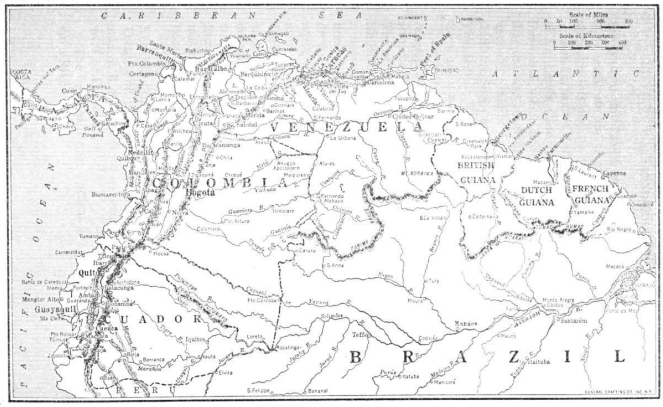
Individual States

The COASTAL STATES follow with the Island State, and Lara, which is neither coast, llano, nor

mountain, though having some hills. The coast line extends over 1800 miles.

Zulia, the large State (23,000 square miles) occupying the northwest corner of the Republic, has Colombia on the west and northwest, the Gulf of Venezuela northeast, Falcón, Lara, and Trujillo east, and Mérida with a little of Táchira south. This State, of which Maracaibo is the capital, is one of the wealthiest in the Republic, though still sparsely inhabited. The Maracaibo Plain, the most conspicuous and important section occupying the greater portion of the State, lies between the two great branches of the East Cordillera. The lake itself is a sheet of water about 150 miles long and half as wide, the water sweet in the southern half of the lake, but brackish towards the north. The precipitation in this district amounts to 70 inches annually. Thus an enormous amount of fresh water from the Cordillera is continually entering the lake through its various affluents; of these the Catatumbo with its tributary Zulia, and the Escalante, are navigable for steamboats. The lake has a depth of 30 feet and is served by several lines of steamers as well as by sailing craft. A few small towns on the lake receive agricultural products from their vicinity; along the shore cacao is cultivated with great profit. There is a fine goat farming district; fishing is carried on; there are many settlements of Indians inhabiting huts on piles in the lake in the ancient fashion. North of the city, Maracaibo, are *salinas* or salt deposits, from which several thousand tons are taken annually. Southwest of Maracaibo, a peculiar tree is found in the forest, the *arbol de vaca*, or *palo de leche*, the sap of which, though slightly thicker, may be used in every way as cow's milk. In the forests are

valuable timber, useful creepers, and trees which furnish various gums or resins. Around the lake are found outcrops of coal, also petroleum and asphalt.



COLOMBIA, VENEZUELA, GUIANA, ECUADOR, NORTH BRAZIL

The capital city, Maracaibo, is a busy place, and prosperous. With some good buildings, and other ordinary requirements, it is in need of better paving, a suitable drainage system, and a good water supply, in order to lower its high death rate and to measure up to its favorable location, although this may be called hot.

Falcón, east of Zulia, extends along the coast of the Gulf of Venezuela (also called Maracaibo) past the Paraguana Peninsula, which it includes, and around to the east, so far that the next coast State, Yaracuy, is on the south together with the State of Lara farther west; these three States include the Segovian Highlands; the first two, coast lands also. This section is the oldest part of Venezuela except for the town of Cumaná.

An immensely profitable industry here followed is the raising of goats, which feed on the cactus plains.

The extensive coal deposits and *salinas* count for little in comparison. The northern part of the State is rather barren, but the highlands at the south are forest clad, with fertile valleys raising a variety of agricultural products, chiefly for home consumption. There is one considerable river, the Tocuyo, several hundred miles long, which rises in the mountains of Lara, flows north, then east through Yaracuy and Falcón to the sea. With many affluents, the two of importance are the Carora and the Baragua on the left. The Rio Tocuyo comes down through a long valley, while many short rivers rising on the outer range descend rapidly to the sea. The situation is excellent for the cultivation of *cocuiza* and other aloes from which sacks and hammocks are now being made. Other industries are soap making and cigarettes; in some sections excellent tobacco is raised.

Coro, the capital of Falcón, the second oldest town in the Republic, contains the first cathedral in the new world. Located on the plains at the base of the Paraguana Peninsula, it is 8 miles from its seaport La Vela and 200 miles west of Caracas.

The important port Tucacas is at the mouth of the Tocuyo River.

The Dutch island, Curaçao, lies not far off the coast, with which it has close connection; some smuggling is said to be carried on.

Yaracuy, a small State with a very short coastal strip, is between Falcón on the north and Carabobo southeast, with Lara southwest. It is noted for its copper mines at Aroa.

Besides the capital, San Felipe, where a cloth factory has lately been organized, the chief towns are

Nirgua, population 3000, at the south, amid fertile plains with varied agricultural products, and Yaritagua 20 miles west, where good tobacco is raised, as well as sugar and coffee which grow everywhere.

Lara, an interior State, borders on Falcón, Yaracuy, Cojedas, Portuguesa, Trujillo, finishing with Zulia on the west. Besides the usual agricultural products, there is fibre from aloes, employed in manufacturing sacks, hammocks, and bridles, for which Barquisimeto is noted. The fertile hills and slopes, many now undeveloped, the virgin forests of valuable timber, with areas where petroleum is indicated, will receive attention now that better transportation is afforded.

Barquisimeto, the capital, 2000 feet above the sea, and 90 miles from Puerto Cabello, is the most important city of this section, a centre of traffic for the northern Andes region as well as for the State of Lara.

East of the Segovia Highlands are the States belonging to the *Centro*, the section near and including the Federal District. These are Carabobo, Aragua, and Miranda.

Carabobo, east of Yaracuy, has a considerable coast line, with Aragua east, and Guárico and Cojedes south. Carabobo, like the states following, is traversed by the Maritime Andes, having fertile valleys between the two ranges. At the south are grassy plains pasturing large herds of cattle. There is virgin territory with forest products of wild rubber, timber, and dye woods; to the east the country is

more thickly settled. The state has many agricultural and pastoral products, with marble quarries in the hills. Near Guacara 200,000 plants of sisal hemp are cultivated, here harvested in three years (usually in four), and said to be superior to the best in Mexico.

Valencia, the capital, is a pleasant city, well situated in a beautiful and fertile valley, much of which is occupied by Lake Valencia 30 miles long, with a steamboat service. Having an altitude of 1600 feet the city has a mild climate and enterprising inhabitants. The state contains the best port in the Republic, Puerto Cabello, linked by rail with the capital, which has another railway connecting it with Caracas. A small seaport, Ocumare de la Costa, is celebrated for the excellence of the cacao grown in the vicinity.

Aragua stretches from the coast down to the southeast between Carabobo and Miranda, with Guárico south. In the state is the east end of Lake Valencia, near which is the important town of Maracay, population 6000, in the midst of rich grazing land with pará grass; a splendid farming and stock raising country, its dairies produce a famous cream cheese. Goats, and excellent swine for the tropics are also raised. 15 miles south of Maracay stands Villa de Cura, in the main pass across the inner range to the llanos. Here are many big ranches, the altitude being less than 2000 feet.

La Victoria,[4] the capital, on the Aragua River and also on the Valencia-Caracas Railway, is 19 miles east of Maracay and 53 miles from Caracas. It is a prosperous town with small factories of various kinds.

[4] Very recently Maracay has been made the capital.

The Federal District comprises a long stretch of coast land with the port, La Guaira, as well as a fertile valley with fine gardens of luscious fruits, and coffee and sugar plantations. Some of the coffee trees are said to yield as much as 20 pounds annually, which seems a large story; it is probably two.

Miranda, south of the Federal District, has a long strip of coast land farther east. Anzoátegui is southeast, Guárico south, and Aragua west.

Ocumare del Tuy, the capital, about south of Caracas, is on the Rio Tuy, into which the Guaire flows at Santa Teresa. The broad Tuy valley, here and easterly towards the coast, is full of sugar cane and cacao. To Guapo farther east come hides and other animal products from the llanos as well as rich agricultural produce from the vicinity. Rio Chico, a town near the coast, is a flourishing manufacturing place.

Anzoátegui, east both of Miranda and Guárico, is a very large State with a moderate coast line, but with a deep and wider interior extending down to the Orinoco and Bolívar; the coast State of Sucre and a long stretch of Monagas are on the east. In Anzoátegui the llanos come up to the sea, though the mountains begin again in Sucre.

Barcelona, the capital, is quite a town by the sea, three miles up the Neveri River, but it makes use of the port, Guanta, 12 miles distant. Coal mines are near, owned and operated by Venezuelans, of which fact they are proud, as many of the industries are in the hands of foreigners. Coffee and animal products are exported.

Sucre, occupying the northeast corner of the Republic, is the last State on the Caribbean; having

the sea west, north, and east, and the States of Monagas and Anzoátegui south. Here again we find the double range of the Caribbean Hills extending across the State.

Cumaná, the capital, dating from 1513, is the oldest European settlement on the continent; it was the birthplace of the celebrated patriot, Antonio José de Sucre. The city is on the south side and at the entrance of the Gulf of Cariaco, an arm of the sea 50 miles long and 6-7 wide, which extends east and west, separated from the sea by the narrow peninsula, Araya. In colonial days rich and prosperous, the town, population 12,000, has now less than half as many inhabitants; twice it has been destroyed by earthquakes. The neighborhood is famous for its fine fruits, especially grapes, pineapples, and mangoes. The usual products are brought from the interior for export. The waters of the eastern, the inner end of the gulf, are covered with a variety of wild fowls, caught by the peasants for their plumage; formerly killed by drowning, the men diving with them under water. Slaughter of birds for their egrets is now prohibited, other methods for taking the plumes being practicable. On the west end of the peninsula are extensive salinas, exporting 6000 tons of salt yearly; on the south are oil springs.

In this State is the port Carúpano, a city of 11,000, half way between the peninsulas, Araya and Paria, each a long point of land, the latter together with the Island of Trinidad forming the broad Gulf of Paria. Between the Paria Peninsula and Trinidad, celebrated for its pitch lake 100 acres in area, is the Bocas del Drago (Dragon's Mouths) named by Columbus, through which ships from the north or

south pass to the Port of Spain, Trinidad, and to other points on the Gulf, though for some the way is nearer through the Serpent's Mouth, the southern entrance to the Gulf. Near the extremity of the finely wooded, mountainous Peninsula of Paria is Cristóbal Colon, the most easterly port of Venezuela, opposite the Orinoco Delta. Castro attempted to make this a rival of the Port of Spain, but the roadstead is so poor that the money was expended to little purpose. In Sucre a little north of the San Juan River and near Guanoco is the great Bermudez Asphalt Lake ten times the size of the better known Trinidad.

Nueva Esparta, the Island State, comprises the larger Margarita, 20 miles off shore, the smaller Cubagua, Coche half way between, and other smaller islands. Once famous for its pearl fisheries which are still in operation, the present production of ordinary fish, and from Coche of salt is of equal importance.

La Asunción, the capital, founded in 1524, is in a valley at the east end of Margarita, with a port, Pampatar, at which some European liners call.

Llano States

Monagas, south of Sucre and east of Anzoátegui, is a large State, having at the east a small shore on the Gulf of Paria with the Delta-Amacuro Territory below; on the south is the State of Bolívar.

Maturín, the capital, population 16,000, a cheerful, healthful place with the remarkably low death rate of 12 per 1000, is on the Rio Guarapiche, which flows into the Gulf. This, the most eastern state of the llanos, has probably the pleasantest part around Maturín, where the grassy plain is well supplied with streams having deep cut channels and

well wooded banks. The climate too is agreeable. The State, well watered and wooded, its forests near the northern hills, is chiefly a cattle country; the owners live mostly in small towns or villages near the streams, but some in single, primitive cottages or huts. A hammock must be carried by the traveler, though food may be procured.

Anzoátegui, a coast State as well as a llano, has already been described.

Guárico, a very large State west of Anzoátegui and north of Bolívar and Apure, is south of Miranda and Aragua, and has Cojedes and Zamora west.

Calabozo, population 10,000, the capital and chief city, 125 miles southwest of Caracas, is a hot place, but in a good grazing country. The neighborhood is noted for electric eels.

Cojedes, a smaller State west of Guárico, borders on Carabobo, Yaracuy, Lara, Portuguesa, and Zamora.

San Carlos, the capital, is said to be less flourishing than formerly.

Portuguesa, southwest of Cojedes, borders also on Lara, Trujillo, and Zamora.

Near Guanare, the capital, coffee and cacao are cultivated as well as the cattle industry.

Zamora, also west of Guárico, borders north, west, and south on Cojedes, Portuguesa, the mountain States of Mérida and Táchira, and Apure.

Barinas, the capital, is not very prosperous. Formerly there was here a flourishing tobacco district.

Apure, farther south than the other llano States, is

west of Bolívar; with Guárico, Cojedes, Zamora, on the north, and a bit of Táchira at the west; it has Colombia for a long distance on its southern boundary.

San Fernando, the capital, with a mean annual temperature of 91°, and Calabozo, are distinguished as the two hottest places in the country.

The Andine States

These have been called attractive and interesting, but lacking good means of locomotion have been little visited. Residents, perhaps returning from Europe, have been obliged to ride several days on muleback to reach their homes. Clean, pleasant towns, fine climate and scenery, mineral wealth, rich forest lands on the upper slopes of the mountains, people hospitable and energetic, characterize the three States, but with poor facilities for travel progress was impossible. Improvement has now begun in this direction, as the need is realized.

Táchira, the most southern of these States, has Zulia and Mérida north, Zamora and Apure east, and Colombia south and west.

San Cristóbal, the capital, at an altitude of 3000 feet is a considerable commercial town. With roads from the llanos, by which cattle are brought, and others, to San Antonio on the Colombian frontier, to Uracá, terminus of the Táchira Railway from Encontrados, and to Mérida, it is evidently quite a centre of trade.

Mérida, preëminently the Mountain State, borders on Zulia, Trujillo, Zamora, and Táchira. Here are elevated plains, deep valleys, bleak paramos or high

passes, one reaching 14,500 feet, and loftier snowclad mountains; the last are east of the capital, Mérida.

Mérida, situated on a plateau a mile above the sea, has another and lower range of mountains on the west. These mountain States have the variety of products found in some States of Colombia: tropical and temperate fruits, with coffee, cacao, cotton, wheat, wool, etc.; in Mérida, gold and silver also.

Trujillo, with lower mountains, borders on Zulia, Lara, Portuguesa, Zamora, and Mérida. The fertile valleys produce the finest cacao, there are large sugar estates; wheat grows higher, cattle and goats find suitable pasturage. Northwest are forests largely unexplored; oil springs give promise of future wealth.

Trujillo, the capital, is a busy town with roads in several directions; it is 19 miles from the railway station at Motatán. Other towns of some importance are Valera, Bocono, and Carache.

The GUAYANA HIGHLANDS have a single State and one territory.

Bolívar, a great State, with an area of 90,000 square miles, twice the size of Pennsylvania, has the Delta on the northeast; north across the Orinoco, it has a bit of Monagas, a long stretch of Anzoátegui, and a smaller extent of Guárico, to the point where the Apure enters the Orinoco and the latter river turns east. There, west of the Orinoco, is the State of Apure down to the entrance of the Meta River, below which Colombia is west for a short space. Amazonas

is south of the west part of Bolivar, and west of the southeast part, which last has Brazil on the south and British Guiana east. Bolívar, largely covered with virgin forest, includes a vast extent of unexplored territory, besides a gold region bordering on British Guiana.

Ciudad Bolívar, the capital, perhaps a trifle hotter than the coast ports, has a lower death rate. Two hundred and twenty-five miles from the mouth of the river, which during a great part of its course is two miles wide in the dry season and seven in the wet, the city is located at a point where the river is narrowed to a mile. In consequence of this, the water is liable to rise 50 feet in the wet season, flooding the lower and poorer part of the city.

While the capital is the official port of entry, there is a city farther down stream known as San Felix or Puerto Tablas, just beyond the mouth and falls of the Caroni River. These falls, famed since first seen by Sir Walter Raleigh, are an imposing spectacle: a huge mass of water descending over a wall of black granite to the Orinoco below, obviously a great source of electricity in the future. East of the Caroni, which flows from the southern boundary, are the two most populous districts of the State. This is explained by gold. Cart roads, by which merchandise is carried south and balatá and hides are brought north, extend through Upata, capital of the Piar District, to Guasipati, 125 miles; but as the time of wheel traffic may be ten days and upwards, the traveler usually hires a mule and arrives in a few days. Guasipati has been the centre of the balatá industry, but as the local operators lazily cut down the trees instead of tapping them, the main production is moving south.

The town of El Callao, 3 hours ride farther, is over

the famous mine of that name. On the border of Guiana 60 or 70 miles south, a section has been opened accessible by water only. The high cost of transport, and the scarcity, the high price, and the poor quality of labor, greatly interfere with the development of this region. With wide spread indications of gold, there is little reason to doubt the existence here of vast mineral wealth.

Besides the forest clad hills of this section there are great stretches of savannas occupied by or suitable for cattle ranches, while plantations and mills for the production of sugar and rum are also found.

Six hours east of Callao, near the forests, is the town Tumeremo, a centre of the balatá industry, where the wholesale destruction of trees still prevailing will end local production and the town as well. The uplands of the Caroni River are yet unknown, but gold, and the timber and vegetable products of the forest will doubtless one day reward the hardy explorer, as in many other regions of the country.

Above Bolívar, on the Orinoco, there is at one point a narrow gorge where the current is at times so strong as to drive back river steamers. Farther on, the Caura River comes in from the south, through savannas in the lower part and forests higher up. On a western tributary of the Caura, the Nichare, there is said to be plenty of good rubber. 130 miles up the Caura are falls or rapids descending 200 feet, a splendid source of power for future saw mills. Two days higher are more rapids in a narrow gorge. The lower part of these Orinoco tributaries are infested with mosquitoes, sand flies, etc., a torment to explorers, but decreasing upstream. Near the Cuchivero, the next considerable river, are many

cattle ranches; its upper valley is rich in forest products.

Territories

The Amazonas Territory, beginning as previously stated somewhat below the entrance of the Meta River into the Orinoco, occupies the entire region south to Brazil. It extends farther down than the State of Bolívar, having that State and Brazil on the east, Colombia west, and Bolívar also on the north. Amazonas with 101,000 square miles is larger than Bolívar and still less known, explorers having attempted little beyond the passage of a few streams.

San Fernando de Atabapo, the capital, is a village where the Atabapo flows into the Orinoco and that river begins to be the boundary with Colombia; the Atabapo being the boundary for some distance farther south. The Orinoco coming from the southeast, in its upper reaches is entirely in Amazonas. About the same point as the Atabapo, the Guaviare enters the Orinoco from Colombia, the white waters of this stream contrasting with the clear black (one writer calls it red) of the Atabapo, which latter, it will be remembered, often indicates absence of mosquitoes with more comfort and better health.

It is farther north, between the entrance of the Colombian rivers Vichada and Meta, that the two great barriers to navigation on the Orinoco occur, the Atures Rapids, the lower and the largest on the river, and 50 miles south the Maipures. In each of these sections the foaming river dashes among rocks and wooded islands in a fashion magnificent to behold from the shore, but not inviting for a sail. With the water power apparent, an electric railway

connecting the service of the lower Orinoco with that above the Maipures Rapids might not seem too difficult; a contract has been made for the work to promote the development of this region.

Amazonas contains a mountainous district with peaks 7000-8000 feet high, though the greater part is rather low land. There are tribes of Indians, some gentle and timid, others so savage as to prevent exploration, especially the Guaharibos, also called White Indians, far up the Orinoco beyond Esmeralda. The territory has grassy plains suited to cattle raising, but more forest land with rubber trees of the first class, a few of which in small sections have been tapped; there are natural cacao patches. Mineral wealth is indicated by the reports and specimens from the Indians.

Forty miles above the confluence of the Atabapo and the Guaviare, the great Ventuari tributary, 300 miles long, enters the Orinoco from the east. 150 miles higher the famed Casiquiare or Brazo leaves the Orinoco to join the Rio Negro and Amazon. An old mission station, Esmeralda, 20 miles beyond, on the Orinoco, is the last permanent settlement of the region. The watershed, here but a slight bank along the left of the river, is entirely lacking where the Casiquiare leaves it, taking a little of the water. Farther on the diverging stream unites with the Guiania River in Colombia to form the Negro, the chief northern tributary of the Amazon.

The Delta Amacuro Territory embraces the delta of the Orinoco, with some mountainous country at the south before reaching the boundary of British Guiana, which with the State of Bolívar is on the south; Monagas is on the west. The coast line runs northwest southeast from the Gulf of Paria, of which

it forms the southern limit, to Guiana; thus nearly the whole coast faces the Atlantic. Only one settlement is found on the swampy shore, Pedernales on the Gulf, a gloomy spot with unprepossessing inhabitants. Up the Caño Pedernales there is beautiful foliage in the inundated forest, with higher lands back, where live primitive wild Indians; farther on is unflooded forest, or open savannas with rich grass for thousands of cattle; on the banks a few scattered houses. One fine cacao ranch is passed before reaching Tucupita, the capital, a dismal place, but with some signs of commercial life. Soon after, the mountains of Guayana are visible, and presently the town of Barrancas in Monagas, the lowest town and port on the Orinoco proper.

CHAPTER X
VENEZUELA: PORTS AND TRANSPORTATION

La Guaira, the chief port of the *Centro*, and the best known of Venezuela, is rivaled by Puerto Cabello, which has a better natural harbor. La Guaira, population 18,000 including its suburbs, as the port of the capital, Caracas, attracts more travelers and at present more trade, much of it coming from or going to other parts of the country. The harbor, a rather open roadstead, was improved at great expense by port works. Though these facilitate the increasing traffic, ships at times are still exposed to heavy swells. The town is hot and unhealthful with a mean temperature of 84.5°, but it has good rail connection with its pleasant suburbs, cooler and more sanitary. The port has good piers, vessels lying alongside. The depth of water is 28-30 feet.

Puerto Cabello, 65 miles west, in the State of Carabobo, population 20,000, is said to have the best harbor, its depth 28 feet, on the North Coast of South America. With a slightly lower temperature than La Guaira, it has a higher death rate. To this port comes most of the produce of its own State, of Yaracuy, of the Llano States Cojedes and Portuguesa, and some from the Andes region. The enterprise of the Venezuela Meat Syndicate, with new buildings here, promotes stock farming and the traffic of the port. A floating dock receives vessels of 2000 tons; a new one will accommodate ships of 4000 tons.

Carúpano, far to the east of La Guaira, is the only other port of importance which is visited by large

ocean steamers. Although as warm as Puerto Cabello, it has a much more healthful climate. With no real harbor, merely an open roadstead, serving the State of Sucre, it is a port of call for several lines of steamers. The cargo must be transported in lighters.

Ciudad Bolívar, though far up the Orinoco River, as the official port of entry for half the country, serves an extensive region. It communicates with the outside world by weekly steamers of shallow draught to the Port of Spain, as also by coasting vessels. The steamers returning cross the Gulf of Paria, follow up the Caño Macareo to the Orinoco, and up that river to Bolívar.

Maracaibo, the fifth port with foreign trade, though called a seaport is not exactly on the sea; being located on the west shore of a broad channel 6-12 miles wide and 30 long which connects Lake Maracaibo with the Gulf of Venezuela. The city has fine wharves on a beautiful bay, a smooth roadstead with water 30 feet deep; but unfortunately the sand bar at the entrance of the channel confines the passage to ships drawing only 11 feet, with conditions growing worse. As the city is now the second port of the country with the largest export trade including some from Colombia, it has been proposed either to dredge one of the entrance channels, or to make use of the fine natural harbor of Cojoro on the Gulf, capable of accommodating the largest steamers, and to connect this port with Maracaibo by a railway about 100 miles long. At present the foreign trade is carried on by national, Dutch, and Spanish steamers, and by American boats of the Red D Line. Freight not destined for the United States is largely carried to the Dutch Island Curaçao, where transfer is made to ships of other lines. Sailing

vessels also carry much produce.

These primary ports, except Carúpano, all have docks where ships come alongside. A new freight and passenger service from New Orleans to Venezuelan ports has been installed by the W. R. Grace Company.

A number of **smaller ports** are served generally by smaller craft, steam or sailing vessels, which transfer freight to the primary ports for ocean traffic. Some of these are: La Vela (56 miles from Curaçao), the port of Coro, capital of Falcón; Tucacas, in the same State, important as serving the copper mines of Aroa; Carenero, in Miranda, east of Caracas; Guanta, long the port of Barcelona and neighboring coal mines; Cumaná in Sucre, a mile from the mouth of the Manzanares River; and Pampatar on Margarita Island. At Turiamo, a natural harbor between La Guaira and Puerto Cabello, a public bonded warehouse is to be erected, and connection will be made with the Grand Central Railway. At Ocumare de la Costa port and harbor works are to be constructed by the Government and a railway connecting the port with Maracay, 43 miles distant.

Inland Transportation

The railway development of Venezuela is small, the longest line being 111 miles in length, and the total mileage about 650. There is therefore a little over a foot of railway for each inhabitant. Most of the lines are from a port to the interior; all are of narrow gauge, but of varying widths. Most of the existing lines were laid, 1881-1893. Unfavorable legislation prevented further construction until after a change in the laws; later the Great War interfered.

Rates are very high on all the railways, yet most of them are unprofitable.

The La Guaira-Caracas Railway is exceptional, having a large amount of traffic, more of import freight than of export. The British-built Railway climbs to a height of over 3000 feet to surmount the ridge on the south side of which is Caracas, a two hours' ride, one of intense interest and beauty. While the tracks of the Harbor Corporation are of the same gauge as the railway, these cars do not go to the steamer's side, so that much freight is unnecessarily handled twice. Railways now electrified serve the suburbs on either side.

Caracas is served by two other railways, but these are of different gauge.

The **Central Railway**, the station of which is two miles across the city, runs from Caracas east and south towards Ocumare on the Tuy River; 46 miles to San Francisco de Yare are completed; the remaining 15 are in construction. Both of these roads were difficult to build, the many bridges, tunnels, and viaducts needed making them very expensive. The maximum grade is about 4 per cent. The latter road follows down the Guaire valley, passing Petare, a town of Miranda, only seven miles from Caracas.

If the River Tuy were followed down to the east and north, one would come to the **Carenero Railway** which connects the small port of that name with the towns, Higuerote, Rio Chico, a flourishing manufacturing place, and Guapo, 34 miles, on the way to the llanos of Guárico. From the llanos come hides and other animal products to the port, and from the vicinity rich agricultural products including cacao. The Railway runs a steamship line to La Guaira; small schooners also serve.

The **Great Railway of Venezuela**, built by the Germans, is the other line from Caracas, the longest and most costly in the country. It runs west to Valencia, the second city of the Republic. Though as a whole less difficult than some others, there is one stretch of 8 per cent grade requiring cog wheels and there are many loops and zigzags. The road traverses a fine farming and cattle country and passes through the important towns of Victoria and Maracay in Aragua, previously mentioned. 212 bridges and 86 tunnels in 111 miles may seem many for an easier road. A branch of $2^1/_2$ miles runs to the village of Guigüe.

The **Puerto Cabello-Valencia Railway**, 33 miles long, connects Valencia directly with the sea, passing over the north ridge of the mountains at a height of 2000 feet. Though the construction of the road as a whole was less difficult than that of the La Guaira-Caracas, to shorten it, a section 2.4 miles long has a cog rail with a maximum grade of 8 per cent.

The **Bolívar Railway**, farther west, the first in Venezuela, was built for the especial benefit of the copper mines of the State of Yaracuy. It runs from the port of Tucacas, northwest of Puerto Cabello, to Barquisimeto, 100 miles. The part built first is now a branch of the road, leading from La Hacha to the rich copper mines at Aroa eight miles distant. Both railway and mines are British properties, the latter bringing in handsome returns. A company steamer carries freight to and from Puerto Cabello, as Tucacas has no custom house. Another branch of the railway, from Palma Sola to the capital of Yaracuy, San Felipe, 25 miles, was opened in 1916. In this State are other copper mines unworked, and fertile hills and plains uncultivated. The Rio Tocuyo is

navigable as far as Siquisique for steamboats, but traffic is not sufficient to make their operation profitable.

The **La Vela-Coro Railway**, $8^{1}/_{2}$ miles long, connects Coro with its port.

In the State of Zulia are three more railways:

The **La Ceiba**, 50 miles long, runs from that port on the Lake toward the city of Trujillo as far as Motatán.

The **Great Railway of Táchira**, 75 miles long, goes from Encontrados on the Catatumbo River west of the Lake, south towards the capital of Táchira, now reaching San Felix or a little beyond. It serves the Colombian Department of Santander as well as Táchira. The many transfers of freight are a great disadvantage, while freshets on the Catatumbo threaten to destroy Encontrados.

The **Santa Barbara-El Vigia Railway**, 37 miles long, is designed to serve the city of Mérida. Santa Barbara is on the Escalante River; and the road towards Mérida, which crosses several streams, has had much trouble from the Chama River from inundations.

The **Guanta-Naricual Railway**, far to the east, leads from the port of Guanta past the city of Barcelona, capital of Anzoátegui, to the coal mines of Naricual. Guanta, though not a primary port, has an excellent natural harbor, but the opening to navigation in 1915 of the Neveri River on which Barcelona is situated has greatly diminished the traffic of Guanta.

A few **private railways** exist, constructed for business purposes:

A railway 27 miles long of the Asphalt Mines of Inciarte in Zulia.

A railway of 10 miles of the Asphalt Mines of Guanoco, Sucre.

A two mile railway of Asphalt Mines of Guanipa, Monagas.

A railway 10 miles from San Lorenzo, Zulia, to oil wells of the Caribbean Petroleum Company.

A railway 19 miles from Bobures, Zulia, to a sugar plantation.

A railway 19 miles from Rio Limón, Zulia, to coal fields 40 miles west of Maracaibo, leased by the Caribbean Coal Company.

Considerable railway construction is talked of, but the only immediate probability is of a road from the port of Castilletes on the Gulf of Venezuela to a coal property near Lake Maracaibo, belonging to the Caribbean Coal Company. A port is to be constructed admitting vessels of 35 feet draft, the present depth being 16 feet. The railway 93 miles long of standard gauge is to have a one way capacity of 10,000 tons daily, with maximum freight charges lower than any at this time on existing lines. As no port charges of any kind are to be collected, if the construction and mining development are carried out as expected, it will be a most important industrial development for Venezuela which may affect the trade of Curaçao and Maracaibo. As this port will be but 595 miles from Colon, and as the coal is said to be of the best quality, it is important for ships making use of the Canal.

The Venezuelan Government now gives generous concessions to foreign companies or individuals,

undertaking railway construction.

Other Methods of Communication

Roads. Aside from the railways, a meagre supply for a country of its size, other means of transportation are inadequate. Street railways exist in the chief cities: Caracas, Valencia, La Guaira, Puerto Cabello, Maracaibo, Bolívar, Barquisimeto, Carúpano, and Cumaná. The great water power available for electric traction and for other purposes should be largely developed in future. Some automobile and cart roads exist, 1636 miles at the end of 1919, but to a large extent transportation is over bridle paths or *caminos*.

An excellent automobile road leads from La Guaira to Caracas. From the capital such roads branch in several directions. One goes east to Guatire, two south to Ocumare del Tuy, one of these with a branch south from Cua. A good road leads through Maracay to Valencia; from midway, a branch leads south through Villa de Cura to Ortiz in Guárico, from which point construction is being continued to Calabozo, the capital, and thence to San Fernando, capital of Apure. Another road leads from Ocumare de la Costa to Maracay.

From Puerto Cabello one may go by auto to Valencia and to Guigüe, south of the lake; also from the port to San Felipe and Barquisimeto.

From the city of Maracaibo a road goes north to San Rafael near the mouth of the Channel, and one southwest to Perija, west of the centre of the Lake, passing two petroleum sites.

From the terminus of the Táchira Railway, Uracá,

a road leads to San Cristóbal, and one to Cúcuta in Colombia. From Motatán a good wagon road goes to Trujillo. Pack animals serve from El Vigia to Mérida. In the east there is the long road from San Felix on the Orinoco to El Callao and Tumeremo.

Other roads are in construction or planned for the immediate future. From Coro a road is to go south and southwest to Trujillo and beyond, and one near the coast to Altagracia on the Maracaibo Channel, northeast of that city. Several roads will branch from Barquisimeto and from Valencia, the most important, one from Valencia southwest to San Carlos, Guanare, Barinas, and San Cristóbal. Shorter local roads will serve Cumaná and Carúpano.

Considerable activity has recently been manifested in road building; and bridges, long sadly lacking over mountain torrents, have been constructed. Some deeper streams have ferries.

River communication and lake service are important in many sections. Of Venezuela's nearly 500 rivers, 74 are said to be navigable a distance of 6000 miles, 4000 in the Orinoco Basin. Especially in Bolívar and Amazonas communication is by river, but in other States also it is important. The Orinoco is a natural highway 600 miles to Pericos and the Atures Rapids. There is regular weekly service to San Fernando de Apure. There is traffic along the Apure, Arauca, and Meta Rivers, the last two in Colombia; but the affluents on the north side of the Orinoco are too variable in depth to permit regular service, and those on the south are too broken by cataracts.

On **Maracaibo Lake** are plenty of craft, both steam and sailing vessels, two main lines of the former running from Maracaibo, one along the west side of the Lake and up the Catatumbo to

Encontrados and the Táchira Railway, the other to La Ceiba and the Motatán Railway going towards Trujillo on the east side; a smaller boat runs around the south side of the Lake and up the Escalante to Santa Bárbara. From Encontrados a line of small steamers runs up the Zulia to Villamizar.

CHAPTER XI
VENEZUELA: RESOURCES AND INDUSTRIES

Agriculture

The Agricultural Zone, according to late statistics, covers the greater part of that section of the Republic which lies between the sea and the Orinoco Plains: about 100,000 square miles, only one third of which is tilled. The section has great fertility of soil, and with its varying elevation and climate it is adapted to the production of everything needful for man or beast. Twenty per cent of the population is employed in agricultural pursuits. With the introduction of new methods and modern machinery a vast development and great wealth should ensue. At present the chief products are coffee, cacao, and sugar, with tobacco, cotton, corn, wheat, vanilla, etc., and a great variety of fruits and vegetables.

Coffee, as in Colombia, is called a product of the temperate clime, growing at an altitude of 1500-6500 feet but best at 3000. A tree is said to live 50 years and to produce a quarter to a half a pound annually. About $16,000,000 are invested in the industry; there are approximately 260,000,000 trees. Venezuela claims to be second in coffee production, exporting over 100,000,000 pounds in 1919.

Cacao needs a warmer climate than coffee, and moist air; hence it grows well on slopes near the sea having a temperature of 80°. But it is found and cultivated in other parts, growing wild in Guayana and near the upper Orinoco. Where cultivated, 80 trees to the acre are approved, of course at first

shaded. After five years two crops a year, in June and December, are expected. Trees average a life of 40 years, with an annual production of 220-250 pounds an acre. About 16 seeds are enclosed in a long red and yellow pod, which turns purple when ripe. After being gathered, they are heaped in piles on the ground, left a few days to ferment and burst, when the seeds are shelled, washed, and housed. There are two grades here, the *criollo* or native, of very high grade, growing in valleys near the sea, and the *trinitario*, imported from Trinidad. The Chuao Plantation is said to produce cacao of a particularly sweet and fine quality, which is generally exported to France. Over $12,000,000 are invested in the business. In production Venezuela is third. There are more than 5000 plantations.

Sugar. The sugar industry is rapidly developing. New mills with modern machinery have been erected and more acres are planted. A mill at Maracay can crush nearly 1800 tons of cane daily, with an output of sugar of 80 tons. Four species of cane are cultivated, the indigenous, the *criolla*, most largely, as being sweeter and otherwise giving good results. The reaping is arranged so that the grinding may be constant throughout the year. The canes near Lake Valencia are longer and thicker, with more juice but less sweetness. The best quality of sugar is produced near Guatire, three hours by motor from Caracas; the largest quantity on two plantations near Lake Maracaibo, each having a daily output of 800 tons.

There are four varieties of products: sugar, brown sugar, alcohol, and rum, all of which many large plantations are equipped to produce. Of the two near Bobures, Zulia, one has 5000 acres under cultivation, the other nearly as much. The total capital invested

is above $10,000,000. An increasing foreign market is expected.

Tobacco is grown in many sections, thriving in humid fertile soil. It develops in six months, but requires great care. There is much variety in the quality, some being strong and heavy, some delicate with fine flavor and aroma. A little is exported to Havana and there mixed for making cigarettes. The annual production, above 3000 tons, might be increased.

Cotton grows wild in many parts of the country, and is cultivated in a number of States. The average crop is about 4,000,000 pounds of seeded cotton, half of which is raised in Aragua and Carabobo. Zulia produces the best cotton, with longer fibre, nearly one-fifth of the crop. Lara, Portuguesa, and the States of the East supply the rest. The cotton is sown in June or July and harvested in the dry season, December to March. It is freshly planted every year in connection with vegetables, the receipts from which cover the cost except for that of gathering; so that the industry furnishes a desirable opportunity for immigrants with small or no capital. About $200,000 are invested in cotton growing.

Coconuts are indigenous in Venezuela; and in the regions of Zulia, Carabobo, Bolívar, Barcelona, and Cumaná, there are broad plantations. Over $1,000,000 is invested.

Wheat is grown to some extent and fine crops are produced; but much more land is available in the high table-lands and valleys of Western Venezuela so that home consumption could easily be supplied. With improved methods, machinery, etc., it might even become a staple export.

Corn is cultivated everywhere in all kinds of soil from sea level up to 9000 feet, but it grows best between 1500 and 3000 feet. About 75,000 acres are devoted to its production; 150,000 tons are raised, some being exported. It is the real bread plant of the country especially in the interior.

Beans in large variety are produced, black beans being greatly in demand and some exported.

Indigo was once cultivated and in 1802 was exported to the value of $2,500,000, but its production was abandoned owing to higher returns from coffee.

Vanilla grows well in the rich lands of Falcón, Lara, Bolívar, Zamora, and Anzoátegui. Its cultivation might be developed.

Forestry

The forest resources are inexhaustible but hardly touched, the zone comprising about half of Venezuela of which 98 per cent is virgin territory. Nearly three-quarters of this area is public land, over 100,000 square miles. With more capital and labor, better means of transport, and modern implements and machinery a great development will result. The chief forest products are rubber, balatá, tonka beans, divi-divi, and various medicinal plants. There are many dyeing and tanning plants, and gums and resins abound. In the forests a great amount of timber exists including the finest varieties; but as usual these are scattered, and with present facilities, difficult to get out with a profit. Of the 600 species of wood 5-10 per cent are marketable. 145 varieties used for ornamental purposes and 20 kinds of woods

and barks suitable for dyeing and tanning were exhibited at the Chicago Exposition in 1893. The great mora tree, three feet in diameter, is excellent for ship building; mahogany, rosewood, and other trees of hard wood abound.

Rubber, chiefly of the hevea variety, is found and exported both from the Casiquiare-Amazon section and more from Yuruary in East Bolívar. It is cultivated near Ocumare del Tuy, each tree there giving 460 grams of juice, 95 per cent pure rubber. Several million people are needed to exploit the industry, in which $1,200,000 has been invested.

Balatá, procured from forest trees in a manner similar to rubber, is allied to gutta percha, and is employed with this for many purposes.

Divi-divi, one of the best and cheapest plants for tannin, grows wild throughout the country, chiefly along the coast and on the edge of the llanos at the foot of the south slope of the Coast Mountains. Hot lowlands with a minimum average of rain suit it best. It grows to a height of 20-30 feet. The brown pods three inches long contain 30-40 per cent of tannin, sometimes even 50. The seeds have little. In wet weather the tannin is liable to sudden fermentation especially in electrical storms, when the tanning is impeded, and the leather may be stained. Some trees 90 years old still produce a full crop. Near Cumaná, a tree may yield 275 pounds a year, but in the west, 25-50 pounds only. It is an extremely cheap source of tannin though not largely used. Venezuela probably has more frequent stands of this tree than any other country. 5000 men are said to leave Ciudad Bolívar yearly for its collection in the interior. As cultivated in Curaçao plantations, the pods have 20 per cent more tannin and bring 25

per cent higher price.

The Mangrove bark is another important source of tannin; the tree growing in swampy ground is useful in reclaiming land at the ocean's edge. The bark has 22-33 per cent tannin, the leaves nearly 20, the wood some. The stands are unlimited in number.

The Tonka Bean, a black almond with delicious perfume, is the fruit of the serrapia tree. The beans are used in the preparation of chewing tobacco and in making perfumes. The price varies from 50 cents to $5 a pound. This is a staple of great value in the Orinoco forests, but many gatherers die of fever or starve. A few concessions have been granted for the cultivation of tonka trees, in the public lands of the Caura district. In one year over $700,000 worth of the beans were exported.

Chicle, used to make chewing gum, comes from the sap of a tree called *pendare* which has a delicious fruit, *sapodilla*. The tree may be tapped continuously 8-15 years. The sap is boiled in the forest.

The Caoba or mahogany tree grows from sea level to about 3000 feet. It may be seen along the streets of Valencia. It grows to a height of 130 feet with a diameter of four feet at the base. It is exported to Europe and to the United States.

The Moriche Palm grows in clumps on the llanos. From the sap the Indians make wine, vinegar, oil, soap, starch; and from the leaves, hats, clothes, hammocks, baskets, mats, etc.

Fibre plants of superior quality exist in great variety and quantity. Among these are the cocuiza sisal called equal or superior to the sisal (hemp) of Yucatan; ramie, *jipijapa*, flax, and other varieties.

Plants for making paper grow in profusion, desirable for use rather than wood to save the destruction of forests. The most abundant and desirable is bamboo, but many other plants are serviceable including the residue from sugar cane. The by-product of three tons of sugar would be roughly two tons of fibre, worth about $120. Bitter cane and other rushes might be so used, either exported as pulp, or in some localities made into paper.

Cattle Industry

Goats have been spoken of as raised with great profit on the well adapted lands near Barquisimeto, comparatively high, and on lowlands in the regions of Coro and Maracaibo.

Cattle. The cattle industry has still greater possibilities. The pastoral zone extends from Barrancas to Colombia and from the Vichada River to the mountains in Carabobo. While a portion of the llanos like those in Colombia suffers from severe drought in the summer, and though in places the grass is thin, in this immense region there is room for an enormous number of cattle where the grasses are rich. Hence stock raising can be carried on to great advantage. There is some difficulty in transportation, but this is gradually improving, and with the erection of more packing and slaughter houses, and with improvements in breeding, the industry has a sure future. Some stock raisers, especially General Gomez, have made great efforts for improvement, importing full blooded cattle of different breeds to produce a better kind, perfectly adapted to the climate of Venezuela. Modern methods are being employed, and in the valley of Maracay a large

number of live stock is fattened ready to supply the 500 cattle daily killed at Puerto Cabello by the Refrigerating Company which exports them. A new packing house is to be erected at Turiamo. It is reported that a contract has been made for 200,000 acres to be colonized by Germans, who wish to control the meat packing industry. The number of cattle in Venezuela is estimated at 3,000,000.

Sheep, **horses**, **hogs** are also raised in the valley of Maracay; acclimated specimens of special breeds have been obtained for reproduction in other parts of the country. At present horses and mules are raised in comparatively small numbers.

Mining

There is hardly a precious metal or valuable mineral which does not exist in Venezuela, though little has been done to exploit them. Gold, silver, copper, iron, lead, antimony, tin, quicksilver, asphalt, petroleum, coal, sulphur, asbestos, platinum, diamonds, and other precious stones are found; 25 years ago 226 deposits had been located: 62 gold, 29 coal, 14 copper, 10 iron, etc.

Gold, the most exported metal, while found in every State, has been chiefly sought and profitably worked in Guayana, where in the Yuruary region considerable mining has been done. True alluvial belts are found, zones of shale, and quartz veins. The alluvial deposits known are mainly near the British Guiana border in the Cuyuni and El Dorado districts. Placer gold exists along the Caroni River and in smaller tributaries of the Orinoco above Ciudad Bolívar. The rock formation shows the gold to be in stingers and crystalline grains of arsenical pyrite,

from which the placers and pockets have been formed.

The quartz veins are more northerly near El Callao, where $50,000,000 are said to have been produced in thirty odd years. One mine in the Yuruari district has yielded 35,000 ounces. Metal is found in pockets 50-100 feet deep about 150 miles from the Orinoco. An English company has mining claims west of El Callao, where the ore is treated with quicksilver and cyanide, yielding 1-4 ounces per ton. Another company is working on the La Paz Bonanza, where 10,000 ounces were taken out by crude methods from rich veinlets and pockets almost at the surface. Several other companies are engaged, French and Venezuelan, one along the Cicapra River, a branch of the upper Yuruari. It is estimated that several million cubic yards with an average yield of $1.00 each are here available at a cost of 50 cents per yard. With better transportation and other facilities this section may come into the front rank of gold mining districts in South America. At present it is said to be better adapted to individual operators than to large companies. The climate is not unhealthful if suitable precautions are taken. The country is well wooded except near Callao. The average yearly production of gold is 900,000 grams.

Copper is known to exist in several States: Falcón, Carabobo, Mérida, Lara, a rich deposit in the northern part of Cojedes; but the only one vigorously and very profitably operated is that of Aroa in Yaracuy, where dividends have been 75-350 per cent. Near Nirgua in the same State other copper mines have been worked.

Coal is found in various sections. Where outcroppings occur in Táchira, Mérida, and Trujillo

small operations have been carried on. There are other deposits but the principal mines worked are in Sucre and Falcón. Naricual, 16 miles from Barcelona, has produced the most coal, but not of a very good quality. It is used on local steamers and railways, and some, with pitch from Trinidad, is made into briquettes. A little west, another mine with coal of better quality has been opened within five miles of tide water on the bank of a river. The mines of Falcón near Coro have been developed further and production is increasing. Coke ovens have been established. Coal is found in several places near Lake Maracaibo. In the deposit 60 miles northwest of Maracaibo the coal is of high grade, better than Middle West coal and equal to the Pocahontas; hard, bright, black, excellent for steaming. Some veins are 8-20 feet thick, and when the railway to Castilletes is completed the annual export is expected to reach 500,000 tons. Lignite, bituminous, and semi-anthracite varieties are found.

Iron ore deposits occur in the eastern hills or mountains south of the Delta, but in the Delta Territory at Imataca. It is 67 per cent pure and almost free from sulphur and phosphorus. In 1914 some Americans secured options. Iron is also found near Coro, Barinas, Barcelona, and Cumaná.

Salt is found on the island of Coche, on the peninsula of Araya near Cumaná, in the vicinity of Barcelona and of Maracaibo, and elsewhere.

Sulphur appears to exist in commercial quantities about 11 miles inland from Corúpano; and other minerals have been observed in various States.

Diamonds and Pearls. There are said to be diamond mines in the Orinoco region. Pearl fishing is carried on among the islands, about 1600 persons

being so engaged. Rakes are now used as diving is prohibited. Recently $600,000 worth were exported within a few months.

Asphalt, found in the Bermudez Pitch Lake five miles from Guanoco in the State of Sucre, is an important source of wealth. This lake, the largest known deposit in the world (1100 acres), has more than ten times the area of the famous Trinidad Lake, though it is not so deep. It is regarded as the residue of evaporated petroleum, the asphalt here representing the outflow of 80,000,000 barrels of oil. The flow continues, the oil spreading over the lake and replenishing it. This with active seepages near indicates enormous oil bearing formations below.

The General Asphalt Company and its subsidiaries have a 30 year lease of nearly 12,000 acres including the lake. The structure of the lake includes faulting, folding, and fracturing of strata, with formations of black shale, sandstone, and fossiliferous limestone, the last supposed to be the source of the oil, and the sandstone its reservoir, whence from pressure of gas it escapes to the surface. A narrow gauge railway is in use. From lack of transport hardly 20,000 tons of asphalt were shipped from Bermudez Lake in 1920 compared with over 40,000 in 1919; from Trinidad Lake, about 70,000 in 1919 and over 108,000 in 1920. In the Bermudez concession is a large asphalt deposit 100-200 yards across, on the Island of Capure in the Orinoco Delta.

In the Maracaibo Basin are other beds. One near the Lake at Inciarte, 27 miles from navigable water, is 94 per cent pure; but transportation is difficult.

The **Petroleum** prospects of Venezuela are excellent. The chief work accomplished is in the

Maracaibo Basin, which is regarded as one of petroleum as well as of water. Many companies are engaged in development work. After two years of preliminary examination by 35 experienced geologists, the Caribbean Petroleum Company selected 1000 areas averaging 1250 acres each for further investigation. Of these they now retain 250, covering 312,500 acres. With a lease concession for 30 years, a tax of eight cents an acre is paid annually and a royalty equal to about ten per cent on oil shipped from the country. On one section, the Mene Grande Field, ten miles east of Lake Maracaibo to which a road through swamps was built, about a dozen wells have been drilled, in all of which oil has been found. The first were capped, but with present facilities flow is permitted. The character of the oil improves with depth. Three 55,000-barrel steel tanks have been erected, and pumping stations on the field and at the port. A pipe line was laid 11 miles to the shore at San Lorenzo, where, 70 miles southeast of Maracaibo, storage tanks and a refinery were built. The latter, now in operation, will refine every grade of oil except lubricants. The capacity is 2000 barrels daily (42 gallons each). One well is said to rank in output with some of the Mexican. Much of the oil is now used by some Venezuelan railways, and by industries of the country. Part of the crude oil is carried by three barges and eight converted monitors of 450-500 tons each to a refinery at Curaçao, which has larger storage tanks, pumping station, etc. The refinery has been running 1000 tons of crude oil daily, but can take care of 4000 tons. The swift current of the Maracaibo Channel makes management of the monitors difficult. This Company has other wells at Perija, 50 miles west of the Lake. The first, which struck oil at 1227 feet, was shut in.

One in the Limón Field, drilled to 2752 feet, was abandoned.

Other companies have concessions for work near the Lake, at the east, south, and southwest. One was hampered by wild Indians, compelling the employment of armed guards, another by extremely unhealthful conditions; but both after some unsuccessful work have found promising wells. The Colon Developing Company, with a large property 100 miles west of Encontrados and near the Colombian border, has struck oil at less than 1300 feet, close to the Rio de Oro. Two thousand barrels of high grade oil were produced within 24 hours, but as no facilities for transport existed the well was capped. This oil is said to be of quality superior to that east of the Lake, which is better than the Mexican.

East of the Lake, another field, north of the Mene Grande, is owned by the Venezuelan Oil Concessions. Wells drilled here have passed through three oil bearing sands; the deeper, the better and lighter the oil. One has spouted 80 feet high; another over the top of the derrick. An area of several square miles is proved. This Company has 3000 square miles of oil bearing land near the Lake for 50 years. In Mexico wells producing 100,000 barrels a day are seen. The general manager of this Company believes the Venezuelan wells will be bigger.

The Venezuelan Falcón Oil Syndicate, which has a 50 year concession of over 2000 square miles in Falcón, expects to open up many fields. Pipe lines could converge and refineries be installed within 50 miles of the farthest point. The first well drilled is 37 miles from the seaboard. Motor tractors are employed. The British Controlled Oilfields has taken

over the Bolívar Concessions, which has the right to bore in 7,000,000 acres in Falcón.

On the Island of Trinidad 362,800 barrels of crude petroleum were produced in 1920. Near this Island, corresponding to the oil region at the northwest of Venezuela, is one at the northeast around the Gulf of Paria, especially at the south, and comprising the Orinoco Delta. Here is found the heavier form of petroleum in large quantities. Some wells have been drilled on the Peninsula of Paria with no good result. The Guanoco Field, south, is believed to cover the axis and flanks of the Guanoco anticlines, of which the southern is thought to be responsible for the great oil seepages of the Asphalt Lake. The field is believed to extend 60 miles southwest, to and beyond the San Juan River. The first well was drilled (1912) in the Lake. Heavy oil, specific gravity 1.02, was found under enormous gas pressure, making operations difficult. Production of 1000 barrels a day was secured at 615 feet, but the well was closed to avoid waste. Later it produced in three months 50,000 barrels. Other wells have been drilled in the vicinity, also on Pedernales Island in the Delta; the oil from the latter of lighter gravity. For some purposes the heavy oil is of special value. It is too heavy to pump, but the strong gas pressure makes it available. The areas are swampy, difficult to work, and unhealthful.

Manufactures

As might be expected, the manufacturing industries of Venezuela are few in number and rely in the main on a protective tariff for existence. The principal articles made are cotton goods, paper,

glass, cement, cordage, soap, candles, shoes, alpargatas, leather goods, cigars, cigarettes, etc. The five cotton factories produce 80 per cent of the ordinary cloth consumed in the country. In Mérida are woolen and hat factories. In Caracas good furniture is made, macaroni, paper, etc. There is a paper factory also at Maracay. Ten miles from Caracas the waterfall of Naiguatá, over 3000 feet, makes available 30,000 horse power, of which 9000 is used.

Investments

Among the various opportunities for the investment of foreign capital, including all of the industries mentioned, the safest are agriculture and stock raising; perhaps also small factories. Land is so cheap that little capital is needed for the agriculturist unless engaging on a very large scale. Coffee, cacao, sugar cane, castor beans, and many other articles may be raised with profit. Factories large or small may be operated to advantage. Cumaná and Puerto Cabello are good places for canning tropical fruits. Oil may be extracted for edible or industrial purposes from coconuts, peanuts, and other fruits or vegetables. Chocolate may be made, cotton mills established. A mill is suggested for Margarita, where fine cotton is grown. Rope and bag factories might employ Venezuelan *cocuiza* or henequen to make the 2,000,000 bags needed annually in the country. Saw mills at Cumaná, Maracaibo, La Ceiba, Tucacas, etc., would be extremely useful.

Large capitalists may find opportunities for the construction of public utilities such as street railways, electric light and power plants, water works, sewers; also in bridge building, railway

construction, etc. Some might be interested in mining, especially of iron, which is found favorably located for transportation within half a mile of a navigable river about 50 miles from the mouth of the Orinoco. To individuals with small capital the gold region would be more attractive. An important development of the large deposits of bauxite is attracting much attention.

CHAPTER XII
GUIANA AS A WHOLE: BRITISH GUIANA

The name Guiana has been applied to the entire country between the Orinoco and the Amazon. We have observed that in Venezuela the region south of the Orinoco is called the Guiana Highlands. We shall notice later that the section south of the dividing mountain range and north of the Amazon as far west as the Rio Negro is called Brazilian Guiana; but the country which is more strictly Guiana is east and north of these, though here, too, adjectives are applied as there are three divisions: British, Dutch, and French Guiana, the British on the west, the French farthest east.

Area

The area of them all is about 170,000 square miles, of which British Guiana has 90,000, Dutch 46,000, and French 33,000 square miles.

As these countries are colonies instead of republics their governments are naturally different.

Although sighted by Columbus in 1498 and visited not long afterward by traders, as there was a large Indian population, the country was settled later than Venezuela and Colombia. After various vicissitudes the earliest colonies were abandoned. The difficulties of the later settlements, the changes, insurrections, massacres, wars, and troubles of various kinds following are too numerous to recount, and we come immediately to conditions of the present time.

Physical Characteristics

The three divisions of Guiana are similar, having first a low marshy coast land, rising at the back very slightly for a distance of 10 to 40 miles. A broader, more elevated tract of sandy or clayey soil follows with a still higher region in the rear. Of the southern section the eastern part is almost all forest, the central and southwest portions have more grass clad savannas, which might support thousands of cattle if there were any way to get them out. There is a vast network of water ways, many rivers in their lower sections near the coast being connected by *caños*. The forest varies, being dense in river bottoms and thin on sandy soils. The longest river, the Essequibo, is about 600 miles, others a little less. At from 50 to 100 miles inland, all the rivers are blocked by rapids, but some are accessible to large vessels as far as these. There are various hills and mountains, the highest, the Pacaraima Range, marking in part the boundary with Venezuela, the Acarai Mountains with Brazil; the two form the water shed between the Amazon, the Orinoco, and the Essequibo rivers. Mt. Roraima, altitude 8635 feet, rising as a red rock 1500 feet above the forest, is said to have as its top a tableland of 12 square miles. Several other mountains are from 7000 to 8000 feet high. Ranges of hills and mountains from 2000 to 3000 feet traverse the country elsewhere. In Dutch and French Guiana are almost impenetrable forests, less explored than those of British Guiana, especially towards the south. A splendid waterfall is the Kaieteur, nearly five times as high as Niagara, 741 feet, with 81 feet of cataracts just below, in the midst of lovely tropical vegetation. Many other beautiful falls of less height, and cascades provide an immense amount of water

power.

The climate is considered good in most places though there is large rain-fall, at Georgetown averaging 93 inches a year, in some places 100; but there is no yellow fever, and other diseases except in certain localities may be guarded against.

British Guiana

Area. This colony has an area of 90,000 square miles, exceeding that of Great Britain, a sea coast of 270 miles, and a depth varying from 300 to 535 miles.

The **Population** according to the official report of 1919 is 310,000.

Boundary. British Guiana has the Atlantic Ocean on the northeast, Dutch Guiana east, the Corentyn River serving most of the way as the boundary line; Brazil is on the south, and Brazil and Venezuela are west.

The Government is practically that of a Crown Colony with a Governor who has almost absolute power. He is assisted by a legislative council which has no great influence.

The Population is mixed, East Indians and negroes forming by far the greater proportion of the total, some mestizos, Chinese, Indians, and 10,000 whites. The large majority of the people live in the coastal belt. Many negroes were brought from Africa as slaves, who, after their emancipation, in large numbers refused to work on the plantations as before. East Indians were then brought in, who though not so strong are more industrious and have better health than those of other races; for one

reason because they dress to suit the climate, draping themselves with a few yards of cotton cloth in a really artistic manner. The native Indian is useful to the traveler as boatman, wood-cutter, or huntsman, also to gold diggers, and seekers of balatá. Some of the half civilized are fairly reliable. If they become friends they are of great value. The wild Indians are disappearing, perhaps going farther back.

Education is mainly carried on by religious denominations, with missions in outlying districts; 224 schools receive government assistance; there is one government free school in Georgetown where students may be prepared for English universities or for ordinary fields of labor. Of course there is full religious liberty, but the government subsidizes the principal churches, especially the English and Scotch, in the country the parishes alternating. The Roman Catholic and the Methodist churches also receive annual grants. Other denominations are represented, but receive no assistance except in some cases for schools.

The **Post Office** is up to date with telephone (1800 miles of wire), telegraph (575 miles), and savings bank attachments, the last having over a million dollars on deposit. There is cable communication with the West Indies and wireless. British money is not in general use; dollars and cents according to the decimal system of America are the common currency. The weights and measures are naturally British like our own.

The Capital of British Guiana, Georgetown, population 54,000, located at the mouth of the Demerara River, is a tropical garden city with broad streets, interesting stores, a club, a museum, a curious market. On account of dampness the houses

are all built on pillars. The city has 50 miles of paved streets with good tramways, etc.

Ports and Transportation

The chief ports of the Guianas are the three capitals, which are connected with the outside world by the West Indies Mail Services of the three mother countries, while other steamship lines run regularly to London, Liverpool, and Glasgow. There is mail service with Canada and regular steamers from New York. Coast and river steamers ply regularly along the coast of British Guiana from the northwest extremity to the Berbice River, at the mouth of which is the city of New Amsterdam, called a smaller Georgetown, not very far from the boundary of Dutch Guiana. The country has 95 miles of railway, 450 of navigable rivers, 39 miles of canals, and 322 of good roads.

A railway 60 miles long connects Georgetown with New Amsterdam, *i.e.*, it reaches a point on the Berbice River opposite the latter city. Five miles of this road from Georgetown to Plaisance, completed and opened for traffic in 1848, is actually the oldest railway in South America. Another 19 mile line goes from Vreeden Hook opposite Georgetown on the Demerara River to Greenwich Park on the Atlantic at the mouth of the Essequibo. Another short line running through primeval forest has been laid from Wismar on the Demerara, 65 miles from its mouth, to Rockstone on the Essequibo to give access to the upper part of the latter river above extensive and dangerous rapids, and further to the Potaro and other gold fields. The Road, besides passenger and tourist traffic handles a variety of timber. Its owners, (Sprostons Ltd.), who employ over 1000 men,

maintain a coast and river service, and own a foundry, lumber yard, etc. A railway to the Brazil boundary, long planned, would open up the interior and its valuable resources. From Rockstone, launches run 90 miles up the river to Potaro Landing. A service was to be organized to the Kaieteur Falls on the Potaro River.

Ferries cross the mouths of the three principal rivers, the Essequibo, the Demerara, and the Berbice. The estuary of the Essequibo River is 15 miles wide. It contains several large islands, on some of which are plantations. Vessels drawing less than 20 feet can enter the river and go up 50 miles. The mouth of the Demerara River, two miles wide, has a sand bar prohibiting the entrance of vessels drawing more than 19 feet. To such as enter, the river is navigable for 70 miles. The Berbice River, two miles wide at its mouth, is navigable 105 miles for vessels drawing 12 feet and 175 miles for boats drawing 7 feet. The Corentyn River with an estuary 14 miles wide is navigable for 150 miles; this river is the boundary between British and Dutch Guiana. Roads good enough for automobiles and carriages, which use them, extend from the Corentyn River along the coast some miles beyond the mouth of the Essequibo and a few miles up the rivers.

Resources

At present agriculture and mining are the leading industries.

Agriculture

Sugar, the chief source of revenue for the colony,

in slavery days brought great wealth to the planters; but after the emancipation some estates were divided, the negroes refused to work steadily if at all, and production greatly declined. At length East Indians who were imported helped to revive the industry. Of 105,000 agricultural laborers 73,000 are East Indians. The plantations are mostly in the coastal lowlands where 77,000 acres are cultivated. Attention to the dams needed to keep out the sea in front and water from the morass at the side, also to the drainage ditches, necessary on account of the sudden rains, occasionally ten inches a day, adds much to the labor, as they demand incessant care. The value of the product in 1916 including sugar and rum was estimated at $15,000,000 or more. Demerara sugar has long been famous; the soil is extremely fertile.

Rice, to which 60,000 acres are devoted, and which the East Indians especially consume, is next to sugar in importance. Formerly 39,000,000 pounds were imported annually, while in 1916, about 70,000,000 pounds were produced and 30,000,000 exported. The largest producer is an American company. The value of the rice exported in 1916 was over $1,000,000. The quality is superior to the East Indian.

Coconuts. Increasing attention is paid to raising coconuts. Thirty thousand acres of the trees, which seem to enjoy the sea breeze, have been planted. In one year 2,000,000 nuts and 180,000 pounds of copra, dried coconut, were exported, also coconut oil, the value of all the products shipped being $45,000. This will be greatly increased when all the trees come into bearing.

Cacao. The culture of cacao, as yet unimportant, is

increasing. It grows well in the river bottoms of the forest region, but does not like the sea breezes. It may, however, be protected from these on the coast lands by a wind break of tall trees.

Coffee also has been neglected though about 240,000 pounds were exported in 1914. Its quality is said to be equal to that of Trinidad or Caracas.

Pará rubber is cultivated in plantations on river lands and immediately back of the coast, more than 6000 acres being planted; but as yet little has been exported.

The **plantain**, beloved by the negro, and praised for its food value, is grown in enormous quantities. The unripe fruit is usually eaten boiled, but is better fried, or roasted and buttered. Sliced, dried, and ground, it is thought by some to be superior to arrowroot or sago.

Other tropical fruits might be grown for export, oranges, limes, mangoes, pineapples, *sapodilla* called luscious, guava, *cassava* biscuit, etc. The *saouri* nut which grows in the forest one writer calls the most delicious nut in the world.

Forests

About five-sixths of the country is forest land, nearly all the property of the government. These 78,000 square miles of timber are largely inaccessible on account of the numerous waterfalls and rapids of the rivers; a railway line to the remote interior is of the utmost importance. The timber and lumber trade is slight, though the *greenheart*, a wood of great strength, weighing 75 pounds the cubic foot, is sought for its use in the construction of docks,

heavy flooring, etc. The trees which grow in clay soil near rivers and creeks supply logs 18 by 24 inches, 70 feet long. Most of it is shipped to Panamá where it was used in the locks; 40 to 60 varieties of trees are found on an acre. The export of *balatá* is important, only sugar, rum, and gold preceding it in value, nearly $1,000,000 worth in a year. It is a kind of gutta percha much used for belting. The tree is tapped the same way as a rubber tree. Licenses are granted for certain forest areas and the country is ranged over by prospectors and tappers. Over 1,000,000 pounds are produced. The milk resembles that of the cow, and is sometimes used for coffee, but it is believed to be unwholesome. A tree usually yields one gallon, which produces five pounds of balatá, but some trees five gallons. The trees must not be tapped oftener than once in four years.

In the forest are found various gums and balsams, the *copaiba*, the tonka bean, the basis of many perfumes, vanilla, nutmeg, oils from palm nuts, and most important, the *caraba* oil which is used by the Indians to lubricate their bodies and to dress the hair for the purpose of warding off noxious insects and vermin. It has a strong unpleasant odor, doubtless arising from its valuable properties. Light woods suitable for paper are found and many others of value. There is a variety of fibre plants, agave, pineapple, *pita* hemp, and others, some of which might be utilized to save the great importation of rice and sugar bags. There is an inexhaustible supply of pulp material for the manufacture of paper.

Mining

Mining is an important industry in Guiana, the mineral wealth being chiefly in gold and diamonds,

though recently *bauxite*, valuable as a source of aluminum and for other purposes, has been found in what promises to be paying quantities.

Gold mining was prosecuted in the 17th and 18th centuries, but not much in the 19th till 1857 when some activity began in the Yuruán district and later along the Cuyuni River. In the former a nugget of 180 ounces was obtained. By 1885 the industry had become important and an American prospector finding 275 pounds of gold created much excitement. Later a nugget of 333 ounces, worth over $6500, was discovered at Barima. Most of the gold has been taken, largely by Indians, from alluvial diggings; some dredging has been successful. In 25 years nearly 3,000,000 ounces were mined. In 1913 the output was from ten different river districts. A good recent find was near Pigeon Island on the Cuyuni. Most of the districts are so difficult of access that scientific mining with modern machinery is almost impossible. In 1915 about 54,000 ounces were produced and since 1890 over $40,000,000.

A new gold field discovered by American prospectors is between the head of the Takutu River and the Tucurutu Mountains.

Many diamonds are found but mostly small. In 13 years from 1900 over 1,000,000 stones weighing 85,800 carats were produced; in 1915 6200 carats valued at $51,000.

The discovery of oil in several places has been rumored, the most favorable indications being in the Waini River district. Blocks of bitumen found off the coast seem to indicate another pitch lake, and asphalt is said to have been located near the coast, though not yet worked. White quartz sand suitable for glass making and *kaolin* for pottery exist in

quantity, forming reefs and sand hills.

Other Industries

Cattle raising has great possibilities but slight development. There are 112,000 head of cattle.

The waters have several hundred species of fish, many well flavored and worth salting. Isinglass or fish glue is exported.

CHAPTER XIII
DUTCH AND FRENCH GUIANA

Dutch Guiana

This country, sometimes called Suriname, about the size of New York State, by the Peace of 1667 was conceded to the Netherlands, Great Britain taking New York in exchange. Situated between British and French Guiana it has the Atlantic Ocean on the north, and Brazil on the south.

The colony has a Governor and an executive council appointed by the Crown, a Legislature elected from the 16 districts. There are District Courts besides a Supreme Court at Paramaribo appointed by the Crown. The population is about 107,500, the vast majority colored, besides negroes and Indians in the forest.

Paramaribo, population 37,000, the capital and the only city of importance, is situated at the mouth of the Surinam River. Other settlements are on or near the coast, mostly a little east or west of the Surinam, between the Saramacca and the Commewyne rivers. Some remarkable cross channels and the various rivers make boat navigation possible, at least in the rainy season, all the way from the Maroni River, the eastern boundary, to the Corentyn on the west. Like the rivers in British Guiana those here are not navigable far up, being likewise interrupted by rapids. Back of the low coast land are savannas with low hills, some rising to 3000 feet, and impenetrable forests back to the Tumac Humac Range along the Brazilian frontier. There are a long

and a short dry season with periods of heavy and lighter rain.

Transportation. The only port of commercial importance is the capital. Internal communication, in addition to the rivers and channels, is confined to a single railway extending 109 miles from Paramaribo to Macami on the Surinam River, a gold shipping point, to which at last accounts there was a weekly train.

Resources

The natural resources of the country are practically the same as those of British Guiana.

Agriculture

Sugar was a source of great wealth in the days of slavery, but since this was abolished in 1863 the industry has declined. Where once there were 400 plantations with an export of 26,000,000 pounds in the year 1800, there are now hardly a dozen, scarcity of labor hindering industry. The soil is rich, and recently there has been some revival, so that 25,000,000 pounds were produced in 1918.

Cacao has been cultivated from the beginning, and increasingly after the abolition of slavery. From 1870 when 1,000,000 pounds were exported the production increased until 9,000,000 were exported in 1895, since when it has been declining. Some plantations were ruined by a disease which attacked the trees. Its effects have been gradually overcome, and the crop in 1918 was nearly 4,000,000 pounds.

Coffee was a large crop in the 18th century, 400

plantations producing over 12,000,000 pounds annually; later the production decreased to 500,000 pounds, but in 1918 was over 3,700,000.

Balatá for a while was first in importance, but later diminished.

Rice alone shows progress but though 7,500,000 pounds are raised, some is imported, mostly from British Guiana. Some bananas are raised, over 700,000 bunches, a few sent to Europe. The production of corn was nearly 4,000,000 pounds; of rum over 1,000,000 litres.

Mining

Gold has been mined for a long time. After a large discovery in 1876 there was a rush to the field. For ten years prior to 1914 gold production declined, but increased in 1915 when nearly $800,000 in bullion was exported to the United States. Some European countries have invested, but few attempts with machinery have been successful.

An American company is said to have spent recently $1,000,000 in prospecting, in securing land, and in construction work about 100 miles from Paramaribo. They found large areas with high grade bauxite, and gold-quartz possibilities. Some gold was procured from hand worked placers. Arrangements for placer working on the Marowijne River have been made with the Dutch and French authorities. Quicksilver and high grade iron ore are reported as existing. Great caution should be exercised by persons disposed to enter the field.

Oil is said to have been located in three places: on the Surinam River about 90 miles above Paramaribo;

on the Marowijne, 100 miles above Albina; and between the Surinam River and the railway, 48 miles above the head of deep water navigation. The second field is said to offer the best prospects, but there have been no developments.

Other Industries

Dutch Guiana is rich in undeveloped resources. There are immense untouched forests, grassy savannas capable of feeding thousands of cattle, undeveloped mineral resources; but all these await transportation facilities.

East Indian coolies and Javanese have been brought to the colony as laborers, but it is said that there are not enough laborers in the busy season and too many the rest of the time. It is hoped that the region will again prove attractive for settlement and capital.

French Guiana

This colony, the smallest of the three, has the Atlantic on the north and northeast; the Oyapock River on the east and the Tumac Humac Mountains on the south separate it from Brazil, the Marowijne River from Dutch Guiana on the west. The population is about 26,000. The country is governed by a Commissioner-General, and by a Privy Council; there is an elected Council of 16 members.

The **Capital**, Cayenne, with about one half of the population, at the mouth of the Oyack River, is the only town of importance. It is well situated on a rocky eminence with a pleasant view of the harbor. It might be made more attractive than Georgetown,

but the colony has always been a little behind the others, its use as a penal settlement being a great disadvantage.

Transportation. Steamboat communication is had with the Safety Islands, 35 miles, with the mouth of the Marowijne River, 80 miles, with the coast in both directions, and with the Island of Martinique, which has better shipping communication. Steamers of the Compagnie Générale Trans-Atlantique call at Cayenne monthly.

Resources

In physical characteristics this colony is similar to the others, but its agriculture is of slight importance. The principal crops are corn, rice, manioc, cacao, coffee, sugar, indigo, tobacco.

Mining and forest products alone are of value in export. Gold is the chief production, more than $2,000,000 a year being generally exported. Most of the 225 claims developed are being worked by paroled convicts. Those who escape or are paroled often give serious annoyance to the people in the other Guianas and are frequently a serious danger. Most of the country is still covered with dense forest, where probably much more gold will be found. Phosphate rock is shipped in small quantities.

The American Company already referred to has headquarters at St. Laurent, the site of the penal colony, a port 40 miles up the Marowijne or Maroni River. Here they have big dredges, aeroplanes, and a wireless station.

Traces of petroleum have been observed southeast of the Marowijne River, but the indications are not of

definite importance.

Forest products are second in importance, rosewood and its extract, other hard woods, and balatá being exported; also vegetable oils, cacao, and a few domestic animals.

Railways have been talked of, and it is expected that one will be constructed towards the interior in the not remote future.

Aeroplane service is reported as to be installed, both freight and passenger, from Cayenne to the gold regions of the interior.

THE WEST COAST

CHAPTER XIV
ECUADOR: AREA, HISTORY, GOVERNMENT, POPULATION, ETC.

South of Colombia, fortunate in its Atlantic and Pacific Coast lines, are three exclusively Pacific countries, unless we count a rearward communication, so to speak, with the Atlantic by the Amazon for the first two, or note that the coast line of the third runs at the south quite to that ocean. Ecuador, Peru, and Chile, in the order named, now occupy the remaining Pacific coast line for the several thousand miles from Colombia to the Horn. In the group of West Coast States, however, Bolivia may be counted, for though nearly forty years ago she lost her small strip of coast line, her communication with the outside world is chiefly by way of the Pacific, and with these Republics she has characteristics in common.

Area, Population, Boundary

Area. First of the West Coast countries from the north, Ecuador has an uncertain area on account of boundary disputes. That with Colombia is lately settled, but not the one with Peru. With approximately 116,000 square miles now in her possession, she is usually ranked as next to the smallest South American Republic, Uruguay. The

country extends from about 2° North Lat. to 6° South.

Population. As no official census of Ecuador has ever been taken, the population is variously stated. A liberal estimate places the figures at 2,000,000.

Boundary. Ecuador's boundary is uncertain as to the matter of touching Brazil. However, she has Colombia on the north and northeast, Peru on the south, and the Pacific Ocean on the west; most maps give Peru a section on the southeast as well, shutting Ecuador off from Brazil.

History

From the remote past, Ecuador has been inhabited by many tribes of Indians; one of these held sway at Quito for a thousand years before their subjugation by the Peruvian Incas. Less than a century later Pizarro arrived with the Spaniards. Hardly had these conquered Peru, when in 1534, the year following the overthrow of Atahuallpa, Pizarro dispatched Diego de Almagro and Sebastian de Benalcazar for the conquest of Ecuador, after which a few settlements were made. In 1538, Gonzalo Pizarro, brother of the conqueror, became Governor. In 1540, with Francisco de Orellana and a large expedition, he went east, descending through the forests to the Napo River. There a boat was built in which Orellana with others sailed down to the Amazon, then on to the Atlantic Ocean, thus first exploring the greatest river on the globe to which he gave its present name.

For almost three centuries Ecuador was ruled by Spain, most of the time under the authority of the Viceroy at Lima, until in 1822 occurred the decisive battle of Pichincha, which assured the independence

of Ecuador. Soon after, the country joined New Granada and Venezuela in the Colombian Federation, but in 1830 set up for itself a separate republic. Many difficulties, insurrections, and revolutions have occurred quite up to the present time, 11 changes of the constitution since 1830; but settled conditions favorable to the country's development are now hoped for.

Government

Ecuador is a centralized rather than a federal republic, with the usual three departments. The President, elected for four years by direct vote, is ineligible for the consecutive term. Congress consists of a Senate with 32 members and a Chamber of Deputies with 48. Suffrage is limited to males over 21 years of age, who can read and write. The Judiciary consists of a Supreme Court at Quito, and six others in as many large towns, municipal and civil courts, and justices of the peace. The Provinces are administered by Governors named by the Executive, the Departments or Cantons by *jefes politicos*, political chiefs, the Parishes by political lieutenants, and the municipalities by presidents.

The Republic, the capital of which is Quito, has 15 Provinces and two Territories. Of the former, five are along the coast, and ten are inland occupying the mountainous section. The coastal Provinces from the north are Esmeraldas, Manabí, Guayas, and El Oro. Los Rios, although not touching the coast, may be counted with them, as occupying a part of the lowlands, it shares most of their characteristics. The mountain Provinces, beginning at the north are Carchi, Imbabura, Pichincha, León, Tungurahua,

Chimborazo, Bolívar, Cañar, Azuay, Loja. Of the two Territories, Oriente is of course the section at the east, which belongs to the Amazon Basin, the other is the Galápagos Islands, nearly 600 miles from the main land.

These divisions, with approximate area and population, their capitals with population and altitude follow:

Population

The population of Ecuador, approximately 2,000,000, as in all of these tropical countries is in three principal classes: the whites, the pure Indians, and the mestizos, those of mixed blood, here Spanish and Indian. There are also some negroes, mulattoes, and *zambos*, the last of negro and Indian blood. Those who in these tropical countries are called white in most cases no doubt have a slight Indian strain, as few women were among the earliest settlers; but no prejudice exists on this account. Even when the Indian strain is apparent, having money and education they enjoy the same social standing and occupy the highest positions. Those of pure Spanish blood in most of the countries must be few. The whites with some of the mestizos form a cultured class with the manners and customs for the most part of such society anywhere. The sons of wealthy families are often educated abroad and many have traveled in Europe. Paris fashions in dress are followed and continental customs generally. Courtesy is a marked characteristic, possibly carried to excess.

Provinces	Area, in square miles	Population	Capitals	Populatio
Esmeraldas	5,465	20,000	Esmeraldas	6,00
Manabí	7,892	100,000	Portoviejo	8,00
Guayas	8,330	120,000	Guayaquil	94,00
Los Rios	2,296	32,800	Babahoya	7,00
El Oro	2,340	35,000	Machala	6,00
Carchi	1,495	36,000	Tulcán	8,00
Imbabura	2,415	70,000	Ibarra	10,00
Pichincha	6,217	200,000	Quito	100,00
León	2,595	110,000	Latacunga	15,00
Tungurahua	1,686	107,000	Ambato	14,00
Chimborazo	2,989	125,000	Riobamba	20,00
Bolívar	1,160	45,000	Guaranda	8,00
Cañar	1,520	74,000	Azogues	10,00
Azuay	3,874	150,000	Cuenca	40,00
Loja	3,706	100,000	Loja	15,00
TERRITORIES				
El Oriente	80,000	200,000	Archidona	1,00
Galápagos	2,868	1,000		

[5] These capitals are at or near sea level.

The bulk of the population is frankly mestizo and

Indian. The mestizos may be more than one half of the population, the Indians perhaps one quarter. The Indian population may be regarded as in three principal classes of widely different character: those of the coast, of the highlands, and of the Amazon Basin. The Indians of the coast region were of various tribes speaking different languages. Superficially christianized, most of them have become more or less amalgamated with the whites or with negroes, but in the forests of Esmeraldas where the Indians, living under similar conditions, closely resemble those of the Napo district, the Cayapas retain their language and customs, continuing to live apart from and to avoid the whites. If not molested they are hospitable and affable with strangers.

The Indians on the uplands are similar to those on the Peruvian Plateau, timid and distrustful of foreigners, including the native whites. They constitute the greater part of the laboring class and while not slaves in name they are forced to work for a pittance, and they live as a rule in extreme poverty and ignorance. Laws for their protection are generally ignored, and throughout the entire Andine region they are undoubtedly in a far lower condition than when the Spaniards invaded the country. The mestizos, instead of sympathizing with them, generally treat them worse than do the whites, some of whom recognize the abuses to which the Indians are subject and desire to improve their condition. The Indians are strong and vigorous, especially as to carrying heavy burdens for great distances. Like many other persons they have an unfortunate weakness for alcohol. The men wear short loose trousers or drawers of linen or cotton, a shirt, and most important, a woolen poncho. They go much with bare feet, but usually have sandals made of

maguey fibre or rawhide. The women wear a skirt, a cloth covering the body, and a *manta* or shawl in which the baby (there usually is one) or some other object is carried. With a little education, kind, just treatment, and decent wages, these people would be converted into a working class of far greater value than at present, highly serviceable for the development and progress of the various countries.

Totally dissimilar are the Indians of the Amazonian forest, of whom there are 46 tribes north of the Marañón, though the differences among them are ascribed to environment, rather than to diversity of race. These wear no clothing or a loin cloth. Many are fairly light colored and in general they are well formed. Their weapons are bows and arrows, and the blowpipe used also by the Cayapas. Some of the tribes are especially savage, as the Jíbaros and the Huambisa Indians. The former in early times destroyed the Spanish colonies on the Amazon affluents, while the latter in 1599 seized the Spanish women after sacking Sevilla de Oro. Both of these tribes have a considerable admixture of Spanish blood and are sometimes fair skinned. They have a reputation for treachery and cruelty, but it is said that their savage deeds are in retaliation for countless wrongs previously inflicted by white men, as in the case of recent atrocities.

The mestizos who live among the whites and intermarry with them class themselves with them whenever their economic position permits. Dwelling in remote regions and in villages among the Indians they tend to revert to the Indian type. Until they acquire wealth they form the artisan element, the traders, and the shopkeepers.

Education

Primary education is free and obligatory, but the number of schools is insufficient, and a large part of the people are indifferent. Eighty thousand pupils are in attendance, and 4500 more in the secondary schools. There are universities at Quito, Guayaquil, and Cuenca; six Schools of Arts and Trades, also Schools of Agriculture, and other institutions of a technical or professional character. The machinery of education is equal to that of its neighbors if not in advance, but too many professional men are found in all the countries.

Press, Religion, etc.

Press. Excellent newspapers exist, notably in Guayaquil and Quito, influencing civic progress.

Religion. In 1904 the Church was placed under the control of the State, and all religions were made equal before the law. The women are devoted to the Catholic Church, as in all the South American countries, but the educated men are largely materialists. Civil marriage and divorce were established in 1904.

Telegraph. There are several thousand telephones, mostly in Guayaquil, and about 6000 miles of telegraph wire. The rates are 10 cents for 10 words, and 5 cents for 10 words additional. Cable connection is made at Santa Elena on the Pacific, which has also a wireless station.

Money. A condor is a gold coin equal to an English pound, and to 10 sucres. A sucre is therefore 48.6 cents. The sucre equals 100 centavos. The sucres and some smaller coins are silver. The coinage

of Peru is similar. It is easy to remember that a sucre or a Peruvian sol is about half a dollar, a centavo half a cent.

The **Metric System** is legal, but the old Spanish weights and measures, as in Colombia, are much used.

CHAPTER XV
ECUADOR: PHYSICAL CHARACTERISTICS

Ecuador, like Peru, has three longitudinal sections: the Coastal zone, the Inter Andine region, including the mountain ranges with the plateau or valleys between, and the Trans Andine, a part of the Amazon basin.

The Coastal Zone

The coastal zone in Ecuador is much wider than at the north or south. We have seen that in Colombia the mountain ranges are so close to the shore as to leave little space for cities or agriculture, while in Peru and Chile for the most part the mountains are visible from the sea. Further, a good portion of Ecuador's coastal zone resembles in some respects the Amazon section, while in Peru the two are utterly different. Ecuador is the only country favored on the Pacific side with rivers navigable to any considerable extent, and the dense tropical vegetation of much of the coast is in striking contrast to the Peruvian deserts. Remembering that the equator crosses this country, it is easy to understand that where there is much rain the lowlands have a humid tropical climate. The coast curves slightly outward from the north to Capes San Lorenzo and Santa Elena, the latter lacking but a few miles of being the most western point of South America, which distinction falls to Peru. Near these capes the waters of the cold Antarctic current turn west towards the Galápagos Islands, the tropical waters above and the colder current below affecting the

climate of the two sections. Just south of Cape Santa Elena begins the Gulf of Guayaquil, the only considerable arm of the sea indenting the West Coast between Panamá and the Island of Chiloé in Chile, a stretch of 3000 miles. Considering the gulf as the broad triangle between Capes Santa Elena, Ecuador, and Blanco in Peru, with the island, Puná, as inner limit, the width is 140 miles. The boundary line of Ecuador, a little north of the Tumbes River, leaves most of the Gulf line in that country. The Gulf penetrates east and slightly north about 100 miles to the Guayas River or estuary. Along the southern shore are occasional estuaries with small river openings and mangrove swamps.

The Mountain Section

The central mountainous region belongs of course to the great chain of the Andes. As in the countries previously studied, this section of Ecuador differs greatly from the lowlands. Happily the formation is simpler than in Colombia. Extending from a rather confused mass near the boundary of Peru to another jumble of peaks at the Colombian border, a distance of 300 miles, are two parallel ranges, the East and the West Cordillera, from 20 to 30 miles apart. The plateau region between, which is higher at the north, is separated by two lower transverse ridges called *páramos* into three shallow basins or plains: those of Quito, Ambato, and Cuenca; the first basin with an altitude of 9500 feet, the second, 8500 feet, the third, 7800 feet. Some of the water from these flows into the Pacific and some into the Atlantic. East and west are the two rows of mountains in a remarkably symmetrical arrangement, sometimes exactly opposite each other. Nowhere else in the world are

there two such rows of giants or such a collection of snow crowned volcanoes. Of the 22 great peaks, several are active volcanoes and more are extinct. The main range or Cordillera Real is the eastern, with the larger number of lofty peaks; but the highest of all is in the West Cordillera, Chimborazo, altitude 20,498 feet. This mountain, first ascended by Edward Whymper, a celebrated English climber, in 1880, was formerly supposed by many to be the loftiest of the Andes; but farther south at least a dozen peaks are higher, probably two or three times as many.

The volcanic section, as we have seen, extends into Colombia; but not into Peru. Especially noteworthy are Cotopaxi of the East Cordillera, the highest active volcano in the world, 19,613 feet, and Pichincha, the only one historically eruptive in the West Cordillera. The latter, situated very near Quito, has been the source of highly destructive eruptions. Sangay, east of the Ambato Basin, the most southern and among the most active on the globe, does little harm as no settlements are near. The Cuenca Basin, with no erupting volcanoes, contains volcanic material. In the most southern province, Loja, no such signs appear, nor in Peru for some degrees south.

Oriente

The country of the Oriente, with no llanos, is similar to forested southeastern Colombia. The mountains slope down into the forests, which cover their lower eastern declivities and the plain beyond. This inclines toward the region of the Amazon, with slight undulations well away from the mountains; but the nearer sections are broken by lateral spurs from the main chain, or by low isolated ranges

separating the basins of the larger Amazon affluents.

Rivers, Amazon Tributaries

North of the *nudo* or knot in the Loja province, spurs and ravines lead off from the high mountain range. Here swift flowing streams descend in a region called wild and savage. Those rising farthest north reach the Amazon at a more eastern point than the streams rising nearer, at the south; so the mention of the principal rivers of the eastern slope will begin with the most southern and western tributary. It may be remembered that the Amazon is formed by the union of the Marañón and the Ucayali Rivers, both flowing northwest in Peru, the former, the one nearer the Pacific coast. Above 6° S. Lat. the Marañón turns sharply east, flowing with northerly and southerly deviations, receiving in its course many tributaries before and after breaking through the East Cordillera of Peru at the Pongo de Manseriche. Here the waters of the previously broad river pass through an extraordinary chasm 3 miles long and 100 feet wide. The walls are not 2000 feet high as often stated; in one or two places they may rise 40 feet perpendicularly, but usually they are wooded slopes, rising in a single locality perhaps 2000 feet.[6] The principal rivers flowing from Ecuador into the Marañón or Amazon are the Chinchipe, Santiago, Morona, Pastaza, Tigre, Nanay, and Napo. These with the streams from Colombia drain the northwest part of the Amazon Basin and are capable of adding much to the economic value of the region. The few white settlements existing are as nothing in this vast wilderness.

[6] See Geographical Journal, October, 1920

The Chinchipe River rises in southern Loja and after receiving many tributaries flows into the Marañón a little below where that river runs northeast. The lower part of the Chinchipe is navigable.

The Santiago River rises near the town of Loja between the two Cordilleras. Several of its important tributaries rise in Loja, or in the Cuenca basin farther north. One of these, the Pauta, has a branch rising only 30 miles from the Gulf of Guayaquil, a source nearer the Pacific than that of any other river flowing into the Atlantic unless it be in the very south of Chile. The Santiago enters the Marañón a little above the rapids of the Pongo Manseriche. At the mouth of the stream was once a town, Santiago, which like Borja below the Pongo was destroyed by savages.

The Morona River. Two of the many tributaries of the Morona rise in the East Cordillera at heights above 13,000 and 14,000 feet north of the Apuay knot. At high water the Morona is navigable for 300 miles, at low water for 200, for steamers drawing from 2 to 4 feet, and also two of its tributaries; but due to the tortuous course of the river the 300 miles equals but 120 in a straight line. Earlier many flourishing missions existed in this section, but in the last century the Huambisa Indians inhabiting the upper reaches of the Santiago and the Morona almost exterminated the Indians who had been civilized. So recently as February, 1913, members of the same tribe massacred the soldiers of a Peruvian outpost. This, notwithstanding, was later re-established by Peru.

The Pastaza River, rising in the basin of Riobamba at a height of nearly 15,000 feet, flows

through a little known district receiving many tributaries. The lower part is navigable for steamers at high water to the Huasaga branch, 120 miles, and 200 miles farther by canoe. This fluvial system drains the basins of Latacunga, Ambato, and Riobamba, the snows of Chimborazo, Cotopaxi, and other peaks contributing to its waters. A spot where the unified river at an altitude of about 6000 feet in one leap makes a splendid fall of 190 feet is said to be one of the most picturesque scenes in the Andes.

The River Tigre belongs to the region of the plains, though some of its affluents rise in the East Cordillera. Although in volume not to be compared to the Pastaza or the Napo it is quite as important, being navigable for steamers of 4 to 8 feet draught at high water for over 400 miles, and in low water for steamers drawing 2 to 4 feet; 100 miles more on the Corriente branch and 40 on the Pucasuro, with an additional 1260 miles by canoe on its various tributaries. The region traversed is rich in natural products and with over 100 tributaries the river deserves remembrance. It enters the Marañón 40 miles above the Ucayali.

The Nanay, a much smaller plains river with a slow current, yet with a high bank and a healthful climate, may be ascended for 105 miles and has some importance.

The Napo River, formerly part of the boundary line between Colombia and Ecuador but now given over to Ecuador, has sources among the Ecuadorian volcanoes, Cotopaxi, Antisana, and others. At first the descent is rapid. At the foot of the Cordillera 100 miles from the source, and but 1500 feet above the sea, canoe navigation begins at the village of Napo. Sixty miles below, the Coca River comes in. This

section includes the Napo missions, a beautiful region long known and visited by botanists and geologists. Here ends the influence of the Roman Church and the land of the *salvajes* or *infieles* begins. It was down the Coca valley that Gonzales Pizarro and Orellana came in 1540. From this point the Napo runs in forested plains, receiving many more tributaries, the large Aguarico, and the Curaray. The Napo is called navigable in high water for steamers from the Amazon about 200 miles up to the Curaray, some say to the Aguarico, 560 miles, and little less at low water. At one point the Napo is but 50 or 60 miles from the Putumayo, with which communication by canoe is possible, and often made. The route from the Putumayo to Iquitos by way of the Napo is much shorter for the rubber gatherers, as the Napo flows into the Amazon not far below that city, while the Putumayo enters it several hundred miles farther down.

Rivers of the Coast

The Rivers of the Coast are with one exception of comparatively slight importance.

The Santiago River (not to be confounded with the Amazon tributary of that name), a short distance from the Colombian border, is formed by several large streams, and has many tributaries, receiving its waters from high in the West Cordillera. Some of the lower reaches are navigable for canoes and steam launches.

The Esmeraldas River, second in importance to the Guayas, rises a few miles north of Quito in the high plateau region, from which, breaking through the West Cordillera, it descends to the coast. While

not navigable for steamers because of the swift current, it may be ascended by canoes for more than 60 miles. With a great number of tributaries it drains a very large mountain area as well as a slightly smaller region of lowland.

The **Guayas** is undoubtedly the most important river system on the entire west coast, and the only one admitting much navigation. It drains and irrigates a large region, 14,000 square miles, between the great Andes and the low coastal hills. This section has been called the most fertile belt of tropical America. Below the Island of Puná, the river is lost in the Gulf; above, it has much the character of an estuary up to the city of Guayaquil, 33 miles, where it has a width of more than a mile. Not far above the city, the river loses its name at the confluence of the Daule and Bodegas. These two have other names, as do their tributaries also. The principal branches of the Bodegas, which is known also as the Babahoyo, are the Yaguachi or Chimbo, the Vinces or Quevado, and the Calamara or Sapotal; the Daule farther west, also called the Balzar, is about 130 miles long, not counting its windings. In its upper part it receives the Grande and Peripe Rivers, and lower down a number of streams and *esteros* or canals.

Climate

The climate of the several sections, as in Colombia and Venezuela, varies chiefly on account of the altitude, though in places affected also by other causes obvious or hidden. The coastal region is warm with a mean temperature of 82.4°, but with variation in humidity and rainfall. South of the equator the coast is arid with little rain, except in the vicinity of

the Gulf of Guayaquil; but farther north in the Province of Esmeraldas there is rain and luxuriant vegetation, as along the Colombian littoral. Towards the mountains, the climate though warmer is agreeable in the dry season.

The mountains which approach the shore of the Gulf of Guayaquil condense the moisture of the trade winds from the east, causing plenty of rain, sometimes too much; the humidity is excessive. Guayaquil, average temperature 80°, has been notoriously unhealthful. The condition, however, was due more to lack of sanitation than to the climate itself. We know of the wonderful change at Panamá; but at Guayaquil, partly no doubt because of several revolutions and financial difficulties, yellow fever and other diseases have long been prevalent. Happily yellow fever was eradicated under the supervision of General Gorgas, but bubonica and small pox may still exist. Recently contracts have been placed for sanitation, sewers, paving, and other improvements, and something is already accomplished.

In some sections there are two rainy and two dry seasons a year, in others it is liable to rain at any time. At Guayaquil the rainy season is from December to April inclusive, or longer, the remainder of the year being dry. In Ecuador the dry season though the cooler is called *verano* or summer, while the warmer rainy months are called *invierno* or winter.

The climate of the Ecuadorian Highlands may be called healthful, with varying temperatures according to the altitude and exposure to the wind. On the east side of the mountains the precipitation is greater than on the west side, as along the entire

Cordilleras, except in southern Chile. The snow line varies from 14,000 feet to 15,650 and more, the difference depending chiefly upon the amount of precipitation in the various localities. As the dwellings in these regions have no artificial heat they are uncomfortable much of the time for Americans, accustomed to warm houses. A similar condition prevails in all the cooler sections of South America, the natives being indifferent to a temperature that would be discomfort to most of us. When it is really too cold for them they put on overcoats, furs, ponchos, and even hats in the house. In general in the Inter-Andine region between 6000 and 11,000 feet altitude the annual temperature is from 64° to 68° with frequent variations. At any season rain in the afternoon is common, and in the summer high winds make the *paramos* often dangerous. The high death rate among the working people and Indians is due more to bad living conditions than to the climate. Leprosy is fairly common; there is a good deal of malaria and typhoid fever. Tuberculosis is unknown but catarrhal complaints are prevalent. Persons coming up from the lowlands frequently suffer from mountain sickness, *soroche*, though less than where the railroads reach a higher elevation.

In the Trans-Andine section the lower region has two wet and two dry seasons, the most rain being from the end of February to the middle of June, another period is from the middle of October to January; but there is rain in every month. On the mountain slopes the dry season is from November to April.

CHAPTER XVI
ECUADOR: CAPITAL, PROVINCES, CHIEF CITIES

The Capital

Quito, capital of Ecuador, population 100,000, altitude 9348 feet, has a world wide reputation as the city on or under the equator. It is within a quarter of a degree. Interesting historically and on account of its unusual and beautiful location, it is backward in many ways. There are fine Government buildings and churches, hotels said to be fair, cultured people, many Indians, recently a tramway. Lately sewers and paving have been authorized. The climate is considered good with a temperature of from 40° to 70°; a half day's journey will bring one to a sultry valley with tropical vegetation; hence every kind of fruit and vegetable is in the market.

Provinces

Esmeraldas, the most northern of the coastal Provinces of Ecuador, thus bordering on Colombia, has at the east Carchi, Imbabura, and Pichincha. Although its natural riches have hitherto received less attention than they deserve, it has excellent prospects for the future. The region is well watered and the vegetation rich. Near the boundary, the large bay, Ancon de Sardinas, with its estuaries is navigable for small steamers and launches. Now difficult of access for large vessels on account of shoals and sand banks it might with dredging afford them safe anchorage.

Farther south at the mouth of the Esmeraldas River, Esmeraldas, capital of the Province, population about 6000, is a port of call for some of the steamers from Panamá to Guayaquil. A sand bar at the mouth of the river compels them to anchor well outside. Besides coast settlements, there are villages at the junction of the affluents with the larger streams, and occasional *haciendas* along the banks. The Province extends far back into the Andean foothills.

Manabí on the south is more hilly than Esmeraldas, but has smaller rivers and less humidity and rain. Part of the long stretch of sea coast is rather dry. The lowland Province of Guayas at the south runs up also on the east with Pichincha farther north. The Bay of Caráquez, on which is a port of the same name, with dredging would become an excellent harbor. A fertile country lies at the back. Just north of Cape San Lorenzo is the Bay of Manta; the city at the south end, Manta, is the chief port of the Province.

Portoviejo, the capital, a city of some 10,000, is 15 miles up the Portoviejo River. At the foot of a hill 1500 feet high is Montecristi, a village, the name of which is familiar to those conversant with the Panamá hat industry; Jipijapa, of like reputation, is near. When a hat purchased at Paita was called by a dealer a Montecristi, it was a high but well merited compliment. Ivory nuts, rubber, and agriculture are other industries.

Guayas, the largest of all the Provinces, borders on the Pacific south of Manabí, as well as on the Gulf of Guayaquil. El Oro is at the south; Azuay, Cañar, and Los Rios are east. The Province includes the most western point of Ecuador, Santa Elena, with the bay

at the north; Ballenita on this bay, port of the town Santa Elena, is the landing place of the West Coast cables. In this vicinity petroleum wells have been attempted on a small scale. More important industries at present are the agricultural, pastoral, and forestal. Panamá hats are made and fishing is important. Plantations of cacao, coffee, and sugar cane, and many varieties of fruit trees are found along the rivers, and some cattle are raised. The Island Puná is included in the Province. It is well wooded; timber and cattle raising are the chief industries of the 200 inhabitants.

Guayaquil, the capital of the Province, is the chief commercial city of the Republic.

Los Rios, north and east of Guayas, and west of Bolívar, partakes of the characteristics of the former; a lowland region with fertile cacao lands, many rivers, and several towns busy with interior commerce. Cattle breeding, and timber extraction are important.

El Oro, the most southern of the coastal provinces, thus bordering on Tumbes, Peru, with Loja also on the south and east, and Azuay northeast, extends into the sierra region, as here the range in Ecuador comes nearest to the Pacific; one peak is over 13,000 feet high. Along the shore are mangrove swamps and salt plains.

Machala, the capital, a little farther back, is near one of the famous cacao sections. Along the many streams and *esteros* back of the mangrove swamps are sabanas 1-3 miles wide, excellent for cattle; then come the cultivated lands, sandy soil overlaid by rich earth where cacao grows wild, and where other plants like bananas and coffee flourish. The lower slopes of the Cordillera up to 3300 feet are also

favorable to tropical culture. Fisheries are important and in the Zaruma *Hoya* or Basin is gold mining.

Loja on the east, and extending farther south, has Peru on both south and west, the precise boundary line still uncertain; the Oriente is on the east. Traversed by the Cordillera Real, it has hot and cold regions, with pleasing towns and bleak spots. The capital, Loja, altitude 7300 feet, is quite a city with 14,000 population.

The Andean Provinces farther north are largely similar to each other in production and characteristics.

Azuay, where there are gold washings and hat making, has the ordinary agriculture and cattle raising of the highlands.

The important town of Cuenca, altitude 8465 feet, is the capital, with a population of 40,000, the third city in Ecuador. Seventy miles southeast of Guayaquil, it is south of the present railway system, carrying on its traffic with the outside world over mountain ranges by means of bridle paths only. It has a few factories for the making of sugar, woolen goods, pottery, hats, and cheese.

Cañar follows, between Guayas west and Oriente east. It includes the great knot of Azuay and its once famous quicksilver mines, now apparently exhausted. From these, the chief town, Azogues, near by, population 9000, took its name.

Chimborazo, as might be supposed, contains Ecuador's greatest mountain of that name. The Province is followed at the north by Tungurahua, Leon, Pichincha, Imbabura, and Carchi, all quite similar, with their rows of mountains, their cattle, textile industries, growing of cereals, and in the

valleys, sugar cane and cotton.

Tulcán in Carchi, and Ibarra in Imbabura are mountain towns, which have some commercial intercourse along the plateau with Pasto, Colombia; with this city they will some day have rail connection.

Bolívar, the smallest Province, is off the line, like Los Rios, being between that Province and Chimborazo. It has the mountainous character and resources of the latter.

Territories

The **Galápagos Islands**, though of little importance at present, may become valuable as a commercial focus or as a coaling station, since the group lies almost in the path of vessels from the Panama Canal to Australia. Thirteen in number, the Islands on or near the equator have an area of nearly 3000 miles. Except Chaves Island they are privately owned. The inhabitants are few: a small colony on Charles or Santa Maria Island, others on Chatham or San Cristóbal, and on Albemarle. On Chatham is a sugar plantation with a factory for refining sugar and distilling alcohol. Three million pounds of sugar are produced, and if there were a market 40,000 gallons of alcohol might be, instead of the 3500 at present. A coffee plantation of 320,000 trees yields about 300,000 pounds of coffee yearly. Water has been piped five miles and a Decauville railway built. Henequen plants have been set out to furnish material for the needed bags and twine. The cattle industry and fishing are of importance; codfish and lobsters are abundant.

The Islands are especially distinguished for the

giant tortoises which are said to live 500 years and sometimes weigh 600 pounds. None such are on the main land. They yield excellent oil, have good flesh and eggs, but are diminishing in numbers and should receive protection. A proposition to lease the Islands to the United States Government in 1911 was rejected by Ecuador.

The **Oriente** embraces a large forest region, which contains the varieties of trees and other conditions such as are found in the forests of Peru and Colombia; but up to this time there has been little exploitation of its resources. Quite recently the possibilities of petroleum development have been investigated. A concession for exploration and for the drilling of wells in an area of nearly 10,000 square miles has been granted to the Leonard Exploration Company, American.

CHAPTER XVII
ECUADOR: PORTS AND INTERIOR TRANSPORTATION

Ports

Guayaquil. The most important and frequently visited place in Ecuador is the coast city of Guayaquil, the chief port of entry through which communication is had with most of the interior districts. The entrance to the port from the Gulf is by way of the Jambeli Channel south of the island, Puná, on which the quarantine station is located, and where a pilot is taken for the 30 mile journey up the river. Guayaquil is accessible by ordinary ocean steamers drawing no more than 22 feet of water. Larger vessels may anchor at Puná and there transfer passengers or cargo to boats or lighters. It is now proposed to dredge the river as far as Guayaquil. Ships do not come to the docks, which for a mile and a half line the water front of Guayaquil. As in general along the entire coast, goods are transferred to lighters and passengers to rowboats or launches in order to reach the city.

Founded in 1535, Santiago de Guayaquil has suffered many calamities: sacked by buccaneers, more or less destroyed by conflagrations, and shaken by earthquakes. From the water the town has a pleasing appearance, which is constantly improving. The buildings of wood and plaster, which appear quite massive, present the usual variety; many contain first class shops where almost everything is purchasable. The water supply, which is to be largely increased, coming from the Cordillera, 53 miles,

passes under the river to a reservoir on the northern hills. There are electric lights and tramways, cable communication by telegraph from Santa Elena, also wireless, several manufacturing plants for local needs, such as gas, ice, chocolate, etc., and a shipyard where vessels are built or repaired. The tide here is swift and strong (8 knots an hour), both up and down, so that all boats take advantage of it in going either way; the flat boats manned by natives bring down provisions, vegetables, and fruit, or go below to fish, without exertion on their part, and with little if any returning. The city is on a low plain with a salt estuary at the back. This could easily be made into an excellent quiet harbor, with docks approachable by steamers, an advantage which would doubtless expedite the gradual increase of commerce.

Minor Ports are Esmeraldas, Bahia, Manta, Cayo, Machalilla, Manglar Alto, Ballenita.

Railways

Guayaquil-Quito Railway. The American built railway to Quito, 290 miles long, opened in June, 1908, begins on the opposite side of the river at a place called Durán, to which passengers are ferried by the company. Here are the railway offices, repair shops, and warehouses. The railway traverses a fine country where sugar cane, coffee, cacao, bananas, and plantains are cultivated, to Bucay, nearly 1000 feet above the sea, at the foot of the Cordillera, 57 miles from Durán. A steep climb here begins with at times a $4^1/_2$ per cent grade. Above Huigra at 4000 feet, where the upland Indian in poncho appears, is a section where land-slides and washouts are common. Here is a famous switchback where the train backs

up the face of a precipice on a ledge cut in the rock. At the Alausi Loop, besides a fine view of a splendid river gorge, the system of terrace cultivation is well seen, every available foot being thus employed up to 12,000 feet.

There is a slight descent to Riobamba, altitude 9200, where the night is spent. On this healthful plateau wheat is cultivated, in increasing quantity since the coming of the railway. Beyond Riobamba, which is noted for its market, made picturesque by hundreds of Indians from the surrounding country, the highest point of the railway is reached, the Chimborazo Pass, 11,841 feet. A descent follows to Ambato, altitude 8550 feet. The climate is more equable than most of the other basins enjoy, and the "Fair" held here is the most famous in Ecuador. In the Latacunga Valley are good pasture lands with cattle, and irrigated fields where fruits and vegetables of the temperate zone are raised. At a height almost equal to that of the Chimborazo Pass, the road crosses the base of Cotopaxi, from whose crest the smoke is ever curling. The fertile valley of Machachi beyond, with its rows on right and left of famous volcanoes, often covered with green up to the eternal snows, presents a picture unique in all the world. The Chillo Valley near, contains cotton and woolen mills run by water power, manufacturing cheap cloth for the use of the natives. Quito has for some time been the terminus of the railway. Owing to engineering difficulties its cost was so great that it has not been a paying proposition; with settled conditions good returns are hoped for. Wood has been used as fuel but a change to oil is expected.

Additional railways are planned, and construction work is going on at several points. The

line is being prolonged from Quito to Ibarra, 105 miles, another link in the Pan American chain. Several other roads are expected to climb to Quito from the coast. The first of these to be completed is the Esmeraldas Railway from the port San Lorenzo 125 miles to Ibarra. Construction is well advanced.

Another railroad of 186 miles planned from Bahia de Caráquez is now operated to Chone, 20 miles only. Its completion may follow that of Esmeraldas. One more is talked of from Ancon de Sardinas, all to extend to Quito. To the east connection is planned with the Amazon Basin by means of a railway from Ambato to San Antonio on the Curaray River, from which steam navigation would be made by the Curaray and the Napo to the Amazon. From Ambato 20 miles have been constructed. From Sibambe, a little below Alausi, a railway is begun to Cuenca, 125 miles. A railway 94 miles long from Guayaquil to Santa Elena is half finished, 1921. The Government of Ecuador is said to have authorized a concession for the construction of a railway from Puerto Bolívar on the Pacific to Borja, just below the Pongo de Manseriche on the Marañón.

Other Means of Communication

Aside from the few railways, water ways and mule trails are the means of communication. The rivers, and the estuaries, tide water channels, are of great importance, even streams practicable only for canoes. On the Ecuador littoral 600 miles altogether are deemed navigable, these at present of greater use than the Amazon tributaries, which in the future will have a development of assured value.

On the water ways of the Pacific system the

steamboat, the flat boat or *chata*, the raft, and the canoe, all have their place. Steamboats of from 25 to 125 tons serve the Guayas River System above Guayaquil, this including nearly a dozen streams or estuaries, in winter penetrating to the foot of the Cordilleras. If the natural water ways were properly developed and a few artificial canals were opened, a much larger field of the richest territory would be accessible. The *chatas*, boats without sails carrying from 4 to 50 tons, are of lighter draught, the rafts too are important. Made of bamboo and *balsa* wood they are very light, a single log 40 feet long being able to support 2 tons. Rafts of 20 or 30 logs, in part roofed over, carry the entire family as well as heavy freight. Thanks to the strong tide on the rivers they float down stream very rapidly, returning with a load up stream at turn of tide, more slowly, but without additional propulsion, far above Guayaquil. In this way 48 miles a day may be covered. Canoes of course have the same advantage and steamboats also, these being often delayed at Puná or Guayaquil to have the benefit of the tide which runs 8 miles an hour. The canoes, which are able to carry from 500 to 50,000 pounds of freight, bring from remote places valuable cargoes of cacao or other stuff and return laden with supplies. Few roads or trails exist in this section, but there are some, available in the dry season, especially in the better populated districts of Guayas. A trail through the jungle called a *trocha*, made with axe and machete, is soon overgrown again.

In the Andine section there is one good cart road leading from Quito 115 miles south. The trails to the east are five in number; the most frequented, the one from the Pichincha Province (Quito) to the *pueblos* or villages of the Napo (a high road is now being

constructed), one from Tungurahua farther south through Baños to Canelas; one from Chimborazo to Macas; one from Azuay to Gualaquiza; one from Loja to Zumba and Chita, and on to Jaen in Peru.

Between the plateau region and the coast, at the north, practically no communication exists, but farther down there are a number of trails. Thus there are roads to Latacunga and Ambato from the lower valleys west, several extend to points above from Babahoya or Bodegas, the capital of Los Rios and the chief port of the interior on the river which also enjoys the two names. Bodegas is 36 miles up from Guayaquil and is reached by a strong tide so that river steamers come up on the flood in 8 hours and even go higher in winter when the rivers are full. It is from Bodegas that interior traffic begins to points not easily accessible from the railway.

From Naranjal and Machala, coastal towns of El Oro at the extreme south, roads lead to Cuenca and other interior towns; other roads farther south go to Loja, and to Tumbes in Peru. All of these roads are merely mule or bridle trails, no wagon roads existing. In the Andine region there are naturally additional trails from one point to another, many reaching altitudes of 13,000 or 14,000 feet, crossing chasms or rivers on swinging bridges three feet wide, with no more guard than a single wire if any, and passing along slippery dangerous slopes, where the meeting of a loaded mule train may well excite terror; a rock wall on one side and a precipice on the other, often leaving small space for passage. Scenes of beauty may repay some persons for the discomforts and risks endured, but not the average tourist, nor will sufficient business reward the commercial traveler.

The Leonard Exploration Company is to make caminos and later cart roads into the Oriente, where its oil wells may be located.

CHAPTER XVIII
ECUADOR: RESOURCES AND INDUSTRIES

Agriculture

The chief productions, industries, and exports of Ecuador are, as might be expected, agricultural or forestal in character.

Cacao. The cultivation of cacao is by far the most important industry of Ecuador, the amount exported in 1910 having nearly ten times the value of any other commodity. The shrub grows wild in many tracts where it is necessary merely to cut out other growth, leaving such tall trees as may be desirable to shade the cacao shrubs. It remains only to weed the land once a year, to give occasional prunings, and to harvest the fruit. Besides these natural and irregular plantations many have been prepared by clearing a suitable tract except for the required shade trees. In holes two or three yards apart the fresh cacao seeds are sowed; they sprout and grow rapidly. The plants must be sheltered from the sun, maize or yucca serving this purpose for two years, or if the banana plant is used it will suffice for 6 or 7 years till the cacao comes into bearing. By this time other shade trees which may have been planted will be large enough to serve, and the banana plants are cut down. The plantation will then last indefinitely, for when the old trees die at the age of 60 or 80 years a new growth will have appeared to continue the work. The principal harvest is in March and April, but the fruit may be gathered during the entire year. The pod containing the seeds is left on the ground a day or two after cutting, then the seeds are taken out

and put in the sweating house for fermentation, which gives a superior color, flavor, and aroma. Drying follows. The cacao is rich in fats, albuminoids, caffeine, and theobromine. In preparation for cocoa the fat is removed and used for cocoa butter; it is retained for chocolate, which is therefore richer than cocoa and for many persons is less digestible. A large area is now under cultivation but more land is available. The best plantations are at an altitude of 650-2600 feet. Twelve per cent is an ordinary return on an investment, and at 1918 prices from 15 to 25 per cent. It is the safest and easiest crop of the country, and foreign investors have engaged in the industry. The districts south of Guayaquil yield especially fine crops, though cacao flourishes on any of the hot humid lowlands. With more scientific culture the quality might probably be improved, as it is said to be hardly equal to the best raised elsewhere.

Other products are cotton, sugar, maize, tobacco, coffee, tagua, rice, yucca (known also as cassava and mandioca), bananas, indigo, rubber, quinine, bread fruit, etc., all growing up to 3000 feet and some much higher, but of these tagua, rubber, 1,000,000 pounds, and coffee, crop 7,000,000 pounds, in the order named, are the only important exports.

Sugar cane grows rapidly and many sections are suited to it, as also to rice, but not enough of either is produced to supply the home market, though the sugar output amounts to 16,000,000 pounds and much cane is turned into *aguardiente* or rum. Suitable land is open in Esmeraldas and Manabí. In the Guayas Valley large possibilities exist for extending the rice industry.

Tobacco is cultivated in low lying river lands and

plains; that of the Daule River with culture might rival the Havana; that of Esmeraldas is noted for its agreeable aroma.

For the poor people along the shore the **plantain** is the staff of life, being eaten green, half ripe or ripe, cooked or raw. For the Indians above, maize is the staple article of food, chiefly eaten dry and toasted, and much used by others as a green vegetable.

Coffee, which grows up to 5000 feet, is raised for export on the large plantations in the lower zone. It is said to be of quality superior to the Brazilian and brings a high price. Tropical fruits abound such as pomegranates, *paltas*, *chirimoias*, *granadillas*, oranges, grape-fruit, etc., some of which are exported to Peru and elsewhere.

On the higher lands wheat and barley are cultivated, also maize in sheltered places as well as in the lowlands. Potatoes thrive in the sierra, and other temperate zone fruits and vegetables. Alfalfa is extensively raised wherever possible as fodder for traffic animals.

Forestry

Tagua and **rubber** are more forest than cultivated products, though a few plantations of each have been set out. In Western Ecuador rubber is produced by the *caucho* tree, and in consequence of the destruction of these by cutting down, they are now to be found in remote districts only. The rubber of the finer class, the *hevea*, is obtained from the Amazon Basin only. The forests contain many valuable plants and trees of which little use is made save by the Indians for their huts and for other necessities.

Stock Raising and Fisheries

The **cattle** industry is in a backward state, and the wool of the highland sheep is poor. It is used locally, a little exported; also hides. The quality of these is called very good. Goat and alligator skins are also exported. The llama, so much employed as a beast of burden farther south, is little used in Ecuador, in one or two Provinces only. A few horses and mules are exported.

A great variety of **fish** is found along the coast including oysters and lobsters. The industry is important, fish forming a material part of the food supply for this region. Some pearls are found near the island La Plata, off the coast of Manabí; the industry near Manta was suspended on account of the ferocious sharks which infest these waters.

Mining

Ecuador, so far as is known, is the poorest in minerals of any of the Pacific Coast countries. Copper, iron, lead, quicksilver and platinum exist, but apparently not in commercial quantities. In the province of Loja are copper deposits, but limited operation has been unsuccessful.

Petroleum has better prospects. Bituminous seams with fair quantities of oil have been located in the north, but more favorable developments would naturally be expected in the same line with the rich oil fields of Peru. In El Oro near the town of Santa Rosa there is said to be an oil field with good prospects, but the principal deposits so far discovered are more nearly in line with the Zorritos and Lobitos districts. The field, extending about 6

miles north and south and 20 miles inland, is close to the coast, 90 miles west of Guayaquil, in desert country near the port of Santa Elena and 750 miles from Panamá. A small oil fountain with considerable gas indicates that deep drilling would bring results. The 25,000 barrels now secured annually are obtained by digging small holes down 50 feet to a layer of impermeable sandstone which is impregnated with oil. The life of these wells is from 3 months to 3 years. A deep well bored by an Anglo-French Company contains oil of a high quality. There is connection with Guayaquil by a fairly good automobile road and by telephone and telegraph. A railway to Santa Elena and Ballenita is in construction. Petroleum claims have recently been denounced in the Canton of Quito, Province of Pichincha. Indications of petroleum in the Oriente have been sufficient to warrant the Leonard Exploration Company in securing a concession of nearly 10,000 square miles east of the Andes from Tulcán to Riobamba in which to explore and drill for oil.

Gold. Of metals, gold mines only have up to the present been profitably worked; those of Zaruma in Southern Ecuador have long been known and operated. In 1549 the towns Zaruma and Zamora were founded and mining was established. Other discoveries followed attended by a gold mining rush from Peru; but owing to the greed of the Governor of Macas, residing at Sevilla, the Jívaros Indians rebelled, destroyed several towns, and murdered many inhabitants, so that in later times the mining has been limited to the placers of Esmeraldas and the lodes of Zaruma. In recent years there have been examinations and working at Zaruma with some mismanagement, but the values are considered

proved and shipments have been regularly made, to the extent of $250,000 in 1910. Placers have been found on the west slope of the East Cordillera in Loja and Azuay with gravel from 3 to 6 feet deep. The Collay, anciently worked by Indians, has alluvium 20-35 feet thick, with gold in grains and dust but in small quantities. The placers of the small streams are believed to be paying only as worked individually by the patient Indian. In Esmeraldas there is platinum with the gold but in too small quantities to be worth while. The mountain sections have good lodes which might develop into paying propositions, but appearances are judged less favorable than in some other quarters.

Coal. Beds of coal are found in several places among the mountains, but none have yet been successfully worked. The Southern Railway has recently consumed eucalyptus wood, well dried, in their locomotives.

Manganese. Deposits are said to exist near Pomasqui, from which it is expected to ship 200 tons of ore monthly to the United States. Near San Antonio in Pichincha a deposit from 3 to 9 feet thick covers 21,000 square feet. The ore runs from 46 to 53 per cent manganese.

Industries

Panamá Hats. As might be supposed the manufactures of Ecuador are slightly developed, with no articles save Panamá hats made for export. In this they rank third, following cacao and tagua. The demand for the hats has increased in recent years. They are due to the patient labor of the natives. Made from two different kinds of plants, the *paja*

toquilla, and the *macora*, the finest hats are from the first, those of average quality from the second, from which material fine hammocks are also made. Both plants grow wild 6-10 feet high; but the *toquilla* is transplanted, placed four feet apart, and kept free of weeds. The fan shaped leaves of the *toquilla* rise directly from the ground. Conditions are especially favorable to the plant in Manglar Alto in Manabí, but it grows elsewhere along the coast. The portions used for hats are separated before the leaves open, and picked only in certain weather conditions. The *macora* grass grows wild on the hills and is had for the gathering.

In Peru similar hats are made from Ecuador straw. In order to prevent this a tax of one sucre a kilogram was placed on the export of the straw, but without killing the Peruvian industry. The finest Ecuadorian hats, which come from Montecristi and Jipijapa in Manabí, are sold in Guayaquil at high prices, but far less than in New York.

A shoe factory, cotton and woolen mills, breweries, ice plants, tanneries, flour mills, saw mills, etc., not forgetting chocolate, are locally important. Along the coast are many maguey plants, from the fibre of which to make bags and twine a profitable industry might be created. For the establishment of a paper factory, the Government proposes, it is reported, to grant valuable concessions to British capitalists.

Investments

From the list of Ecuador's productions and exports, agriculture, especially cacao, might seem to offer favorable opportunities; to some gold mining might appeal or the possibilities of petroleum. For many

years engineering and construction work of various kinds, including sanitation, must present openings for capitalists, and for experts in such matters. With forests so near the coast saw mills and lumbering would undoubtedly be profitable. Stock raising for local requirements is a fair possibility.

CHAPTER XIX
PERU: AREA, HISTORY, GOVERNMENT, POPULATION, ETC.

More than a century ago, the distinguished scientist, Alexander von Humboldt, declared that the country of Peru would one day become the centre of the World's colonization. It has been called the richest in natural resources of any country upon the globe, containing within its borders every variety of climate and of natural or possible production, together with wonderful fertility of soil and marvelous wealth in minerals. Other countries make a similar claim. To decide the question is impossible. Without intimate acquaintance with all, even to express an opinion would seem an impertinence.

Area, Population, Boundary

Area. Pending the decision of certain boundary disputes, the area of this Republic can hardly be stated with even approximate accuracy, for figures given vary over 200,000 square miles. The territory claimed by the Government, including Tacna and Arica, with a vast domain over which Ecuador and Colombia have asserted a right, covers 700,000 square miles. Had all claims been decided against her, Peru would have fifth place in area among the South American Republics; but as the arbitrators of her boundaries with Brazil and Bolivia gave judgment largely in her favor, she is likely to remain fourth with at least 540,000 square miles. With this figure Peru is ten times the size of New York State, and approximates the area of the entire Atlantic

slope of the United States.

Population. As no census of Peru has been taken for many years the population is merely estimated and a variety of figures is given. The estimate of 5,800,000 appears probable; this number would place Peru in the third or fourth rank according to the figures assigned to Colombia.

Boundary. The boundary of the country may be slightly affected by the decision of arbitrators; as usually given, Peru has Ecuador and a little of Colombia on the north, Brazil and Bolivia east, Chile south, and the Pacific Ocean on the west.

History

The name of Peru is always a reminder of the Incas, and all but the utterly ignorant have heard the amazing tale of the conquest of Peru by Pizarro. A few dates may here be recalled. As early as 1527, Francisco Pizarro, incited by rumors of prodigious wealth of gold in a country south of Panamá, made a voyage of exploration in which he landed at Tumbes and proceeded as far as Trujillo. Satisfied with his discoveries he returned to Spain, to procure a royal warrant for an invasion. In 1531, with Diego de Almagro, Hernando de Luque, a priest, and subordinates, he set out on his career of conquest. With 180 men, 67 of whom were cavalry, in 1532 he crossed the desert and the first mountain range, then descending to Cajamarca. How he treacherously seized and later slew the Inca Prince, Atahuallpa, in spite of the enormous gold ransom which had been furnished, afterwards captured Cuzco, the Inca capital, and in 1535 founded Lima on the banks of the Rimac is a Twice Told Tale.

Quarrels developed soon after the conquest. Subsequently to his return from Chile the nobler Almagro was executed by order of his associate, Pizarro, who himself was assassinated in 1541 by former adherents of Almagro. For centuries Lima was the seat of Spanish government in South America and the residence of the Viceroy. Great wealth of gold and silver had been extorted from the Incas in addition to the ransom paid for Atahuallpa, and further riches were later obtained from mines by forced labor of the Indians. Severe exactions and cruelties excited one or two insurrections, but in spite of vicissitudes of various kinds the city of Lima was the continental centre of wealth and culture for generations.

When in 1810 the spirit of independence began to manifest itself in the colonies, it had less opportunity for development in Peru. Not until San Martín came with an army from Chile in 1820 did revolutionary activity become general. Received with great enthusiasm, he was proclaimed Protector of Peru. Her independence was declared July 28, 1821, which is the day they celebrate. General Bolívar, coming from the north with an army, was met by San Martín. A disagreement evidently occurred, which caused San Martín to retire to Argentina; subsequently he withdrew to Europe. A hero of the highest patriotism, courage, skill, unselfish devotion, and sterling character, the name of San Martín should be honored among us as is that of Washington in South America. The year following Bolívar's arrival in Lima in 1823, a battle between royalists and patriots occurred on the plateau of Junín, altitude 13,000 feet, when the patriots gained a complete victory. In December of the same year, 1824, General Sucre gained the hard-fought battle of

Apurimac, which ended Spanish dominion in South America.

More or less troublous times with brief intervals of harmony followed the securing of independence, until the War of the Pacific broke out in 1879. In accordance with a secret treaty, Peru went to the assistance of Bolivia after the Chilians had seized Antofagasta on account of a quarrel over a nitrate tax. Following some successes, the Peruvian fleet was destroyed; the coast was exposed to the enemy. In 1881 Lima was captured, and held until the signing of the treaty of Ancón in 1883. In accordance with this treaty the Province of Tarapacá was ceded to Chile. Tacna and Arica were yielded for ten years, at the end of which time the residents were to vote whether they desired to remain with Chile or return to their former allegiance. The fact that no vote has yet been taken, while Chile retains possession, has for years caused much ill feeling and friction between the two countries, which several times have been on the verge of war.

Within the last ten years there have been several internal disturbances in Peru and one revolution; these, however, are short lived and do not affect the people generally or interfere with business for more than a day or two; nor do the revolutions derange concessions or the investments of foreign capital.

Government

The government is a centralized republic, based on the constitution of 1860, revised in 1920. The President is now elected for five years; he is ineligible for immediate reëlection. The other two branches of government are of the usual form.

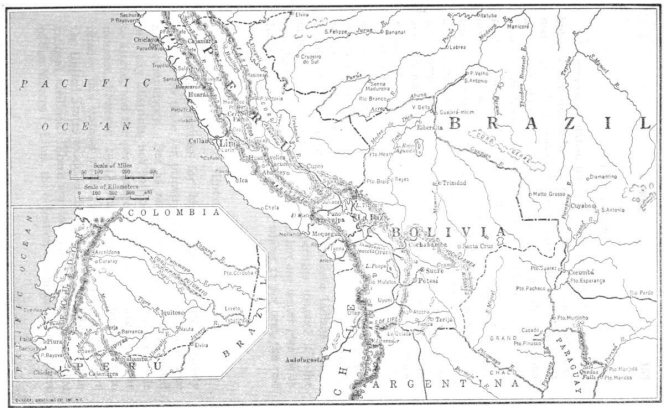
Congress has two Chambers, a Senate of 35 members and Deputies 110, both elected by direct vote. Alternates are chosen to assume office in case of vacancy. There are also three local legislatures. The President appoints the Prefects of Departments and the Sub-prefects of Provinces; the Prefects name the *Gobernadores* of the Districts. The President controls the police of the country; the supervision of education is centralized. The Judiciary has a Supreme Court at Lima, nine Superior Courts in the chief cities, and Lower Courts in smaller places.

Peruvian male citizens over 21 may vote, if a master employer, a real estate owner, a tax payer, or able to read and write.

Peru has 22 separate divisions aside from Tacna, of which three are littoral Provinces and the rest Departments; the latter are divided into 118 Provinces, and these into 800 or more Districts. The Departments and unattached Provinces, with approximate area and population, their capitals, population, and altitude are as follows:

Departments	**Area, in square miles**	**Population**	**Population**	**Capit**
Coastal Divisions				
Tumbes (Province)	2,000	8,000	Tumbes	3,0
Piura	17,000	155,000	Piura	15,0
Lambayeque	4,600	93,000	Chiclayo	5,0
Libertad	10,000	188,000	Trujillo	15,0

Ancash	16,500	317,000	Huarás	12,0
Lima	13,000	250,000	Lima	175,0
Callao (Province)	15	35,000	Callao	35,0
Ica	8,700	68,200	Ica	10,0
Arequipa	22,000	172,000	Arequipa	50,0
Moquegua (Province)	1,255	32,000	Moquegua	5,0
Sierra Departments				
Cajamarca	125,000	333,000	Cajamarca	12,0
Huánuco	14,000	110,000	Huánuco	6,0
Junín	23,000	305,000	Cerro de Pasco	15,0
Huancavelica	9,000	167,000	Huancavelica	8,0
Ayacucho	18,000	227,000	Ayacucho	20,0
Apurimac	8,100	133,000	Abancay	6,5
Cuzco	90,000	300,000	Cuzco	30,0
Puno	28,000	270,000	Puno	13,0
Montaña Departments				
Amazonas	14,000	53,000	Chachapoyas	4,5
San Martín	30,000	33,000	Moyabamba	5,0
Loreto	172,000	120,000	Iquitos	18,0
Madre de Dios	25,500	16,000	Maldonado	5



ECUADOR, PERU, BOLIVIA, SOUTHWEST BRAZIL

Population

As previously stated, the population is largely an estimate, but probably approaches 6,000,000. From the above approximate figures it is evident that it is very unevenly distributed, as it is in fact in all of the Republics. There are three principal classes aside from the wild or uncivilized Indians of the *montaña*: the whites, the real governing class, chiefly of Spanish origin, some with a slight admixture of Indian blood; the mestizos, more nearly half and half, white and Indian, largely the artisan and tradesman class; the Indians, most numerous in the sierra, much as in Inca days, but probably poorer in mental and physical condition and in creature comforts than in the earlier period. The population of the *montaña* in the lower forest section beyond the mountains is wild Indian except for a very small percentage of white and Indian gold diggers or rubber gatherers. Even now, in spite of exploration for several centuries, there are probably thousands who have never seen a white man. The entire

number of *montaña* Indians is estimated (it can only be a guess) at perhaps 300,000. Of the rest the proportion is very uncertain, but one writer gives it as Indians 50 per cent, mestizos 35, whites 11 per cent, the rest negroes, *zambos*, and Asiatics.

Education

The opportunities for higher education are relatively superior to those for primary, though this by law is free and compulsory. But as no schools have been provided in many Districts, not half of the children have been able to attend, and the percentage of illiteracy is large. At the moment, however, 1921, plans have been inaugurated to remedy this state of affairs, and teachers have sailed from the United States to aid in the further development of educational facilities. There are four universities in Peru, that of San Marcos in Lima, the oldest on this hemisphere; others of lesser scope and merit in Arequipa, Cuzco, and Trujillo. Lima has also a School of Mines; one of Engineering, Mechanical, Electrical, Industrial, and Architectural; one of Arts and Trades; a Normal School, a Naval School at Callao, and a Military Academy at Chorillos, a suburb of Lima. There are secondary schools called *colegios* in the principal cities, and private schools of high grade.

Press, Religion, Etc.

Press. Aside from official publications, the Press includes newspapers and periodicals of considerable variety. Lima has several good newspapers which have a wide circulation, owing to the fact that they are carried free of charge inside the Republic, as are

literary and scientific journals also. Some of the smaller towns have their own newspapers.

Religion. The religion of the country is Roman Catholic, but other forms of worship are permitted. Provision is made for the civil marriage of foreigners.

Postal and Telegraph Service. Foreign letters and parcels for most of the montaña region enter by way of the Amazon River and Iquitos.

Telegraph service is much employed locally, as the cost is only 40 centavos, 20 cents, for ten words to any part of the country. The address and signature are counted, as in all of the Republics. Additional words are at the same rate. There are about 8000 miles of wire. The United States has cable connection with Peru by three lines. Lima has wireless connection with Iquitos, a distance of 650 miles in a straight line, over a mountain wall more than three miles high. Other wireless stations are at Callao, Pisco, Chala, Ilo, Leticia, El Canto, Orellana.

There are many telephone systems with nearly 200,000 miles of wire.

Money is of gold, silver, and copper. The gold Peruvian *libra* is the equivalent of the English sovereign, and in general they circulate interchangeably. The *libra* is divided into ten *soles*; a *sol*, about 50 cents (48.6), into 100 *centavos*.

The **Metric System**, legal for weights and measures, must be employed in the Custom Houses and in other Government offices. Old Spanish standards are also used in Lima and quite generally in the country: the *vara*, $33^1/_3$ inches, the *libra*, a trifle over a pound, *arroba*, *25 libras*, *quintal*, *100 libras*, *fanegada*, a little over 7 acres, etc.

CHAPTER XX
PERU: PHYSICAL CHARACTERISTICS

The country of Peru has three distinct sections longitudinally: the Coast region, the Sierra, and the *Montaña*—the first well known and fairly settled, the second with the greater population, the third having much the largest area, but thinly peopled chiefly by wild Indians, and not thoroughly explored. The term *montaña*, one of the Spanish words for mountain, in Peru is generally applied to the forest region on the eastern slope of the Andes and the plains beyond; the plateau and mountain section with the narrow valleys included form the sierra.

The Coastal Region

The coast of Peru is a strange one, presenting to the uninformed traveler a series of surprises. One expects to find it hot in the tropics, at least at sea level; but on ship-board sailing south when 3° below the equator, at least in the winter season, which it must be remembered is during our summer, warm clothing if not heavy underwear is necessary with blankets at night. One is amazed too to find at Paita (for some steamers the first port of call), a real desert, in striking contrast to the rich vegetation near the Guayas River.

The chief reason for the comparatively cool temperatures experienced on the entire coast of Peru is found in the Humboldt or Antarctic current which flows from the icy realms far south, with chilling effect, close along the shore to the region of the equator, where near the most western points of the

continent it turns west across the Pacific.

The high mountains too, here quite near the shore, have some cooling influence and are a prime cause of the existing desert. The hot moist winds, which in the equatorial regions blow west from the Atlantic dropping more or less of their vapor on the way, on reaching the highest Andes lose all the rest, as every bit of the moisture is condensed by the freezing mountain sides; the average height of the range in Peru is above 17,000 feet. After passing the mountains the winds descend cool and dry to the plains. The damp chilly winds which come north with the Antarctic current, as they blow over the shore, find this warmer than the ocean, so the moisture is not condensed.

Thus it is that the coast of Peru with that of northern Chile, being practically rainless, is called a desert, though in Peru it is not wholly barren. From her mountains 58 streams come down toward the Pacific, though not all reach the ocean or last throughout the year. In these valleys there is green, a beautiful and welcome contrast to the desert; in most of them are irrigation and agriculture. Because the nitrates have not been washed out of the soil by rain, where a suitable water supply can be provided, the land constitutes one of the finest agricultural regions on the globe.

In proportion to its length the area of the coast line is small, as the Andes here run closer to the shore than in Ecuador, especially in the central portion, where spurs from the main range sometimes end in bold bluffs rising 500 feet from the sea. In general the width of the coast land varies from 20 to 50 miles, in places reaching to 100. Unfortunately the coast is slightly indented by gulfs and bays and

therefore has few good harbors.

The Sierra

In the sierra country we find the greatest development of the mountain system of the Andes attained in its entire course. For the most part it here consists of three ranges, the Maritime, the Central, and the East Cordillera. The first two, near together, are regarded as of similar origin, separated during ages by the action of water. They include volcanoes and mineral springs; and in some parts of the lofty region between the two, cold alpine lakes, sources of coast rivers and also of Amazon tributaries.

The Maritime Cordillera is not connected with the coast ranges of Chile, but is a continuation of that cordillera which forms the eastern limit of the coastal Chilian desert and the western boundary of the great Bolivian plateau. In Bolivia and Southern Peru it is a volcanic chain with some peaks of great height, over 20,000 feet. Though generally quiescent, one volcano in Peru south of Arequipa in the year 1700 erupted continuously for two weeks. El Misti, altitude 19,200 feet, above Arequipa is well known. From the summit a little smoke may be seen in the depths of the crater. The volcanoes seem to have some connection with earthquakes, with which this region is often affected. Though the quakes are mostly slight tremors, severe shocks occur; 70 of a destructive nature have been reported since 1570. The worst, which in 1746 completely destroyed Callao, was followed by 220 shocks within 24 hours. The city was overwhelmed by a tidal wave 80 feet high from which not half a dozen inhabitants escaped. The earthquake of 1868, which was felt over most of South America, half destroyed

Arequipa, and tidal waves swept over Arica and Iquique. In 1877 nearly half of the southern ports were submerged; in 1906 a good portion of Valparaiso, Chile, was laid in ruins, a fate within a period of 12 months shared by San Francisco and by Kingston, Jamaica. At about 10° S. Lat. the Maritime Cordillera separates into two ranges for a distance of 100 miles, the Cordillera Negra, and the Cordillera Blanca, the two enclosing the Huailas Valley; north of where the Santa River breaks through toward the coast, the Black Range begins to subside, the Maritime continuing to Ecuador in a single chain.

The Central Cordillera is the true divide, forming the continental watershed. A single river, the Marañon, breaks through in its lower northern part, while 20 coast streams rising in the Central cut the Maritime range; the East Cordillera is fractured by six Peruvian rivers, the Marañon, Huallaga, Perené, Mantaro, Apurimac, Vilcamayu, and Paucartambo, all but the first being affluents of the Ucayali, which some authorities call a tributary of the Marañon. Oftener these two are said to unite to form the Amazon.

The East Cordillera. While the Central Cordillera is volcanic in part, the East is of Silurian formation, older and non-volcanic except at the edge of Lake Titicaca. The last, in Bolivia a splendid range, is lower in Peru. It has the high plateau region on the west; east is the Amazon Basin into which its spurs extend for varying distances. The Central and Eastern Andes are connected by a transverse mountain knot at Vilcanota, or Cuzco, while a similar knot occurs at Cerro de Pasco. Farther north the Central Cordillera separates the valleys of the Marañon and the Huallaga, while the eastern Andes is between the

latter and the Ucayali. The three ranges are clearly defined much of the way in Peru, and back of Chimbote in the section including the Huailas Valley there are four.

The Montaña

The third longitudinal division in Peru, the Trans-Andine, usually referred to as the *montaña*, is the region of subtropical and tropical forest. It is traversed by great rivers, largely navigable. Partly in the sierra country are the Marañon, 600, and the Huallaga, 400 miles long, before their union; 150 miles beyond they are joined by the Ucayali, a great river with a course of 600 miles, more navigable than the other two. These three rivers with their affluents drain the northern and the central part of Peru. The streams of the southern portion are tributary to the Madre de Dios which flows into the Beni, the latter uniting with the Mamoré to form the Madeira. The *montaña* section, 800 miles from north to south, has a sub-tropical region on the lower slopes of the Andes, the branches of which run out 60 or 80 miles towards the lowlands, and the tropical forests of the latter. In the northern section a considerable district between the Huallaga and the Ucayali rivers, traversed by the Andes, is composed of grassy plains called the Pampa del Sacramento. Some of this northern region is called the *montaña*, having its characteristics, although not east of the East Cordillera.

Climate

The climate of Peru, a country like those preceding entirely within the tropics, has similar though

greater variations from altitude, as its mountains are higher, its table-lands more lofty and extensive. With a larger area of temperate climate on its highlands, it has also, in wide contrast to the others, a fairly temperate region along its entire coast. This last, however, differs from the ordinary climate of the temperate zone, as does that at an altitude of 6000 or 8000 feet, in having weather which is never so hot as often in almost all parts of the United States, and at the same time is never so cold. At Lima, eight miles from the sea, the mean temperature is 66°; in the warm season, December to March, the mercury occasionally climbs a little above 80°, and in winter, June to September, it rarely falls below 50°. It is a little warmer farther north, and on the broad desert in the sun it is hot, hotter, hottest; as I once found to my sorrow. But comparatively few persons have occasion to travel there, and when they do they are likely to journey in the late afternoon and night; a more agreeable season for such cross country riding. On the deserts, too, it is colder at night as happens the world over.

The winter season at Lima is damp and cloudy, the atmosphere raw and chilly; with the mercury below 60° a fire would be most acceptable, but they never have one. On account of the dampness and the evaporation from the heat of the body, the cold is felt more than the temperature warrants, so that overcoats and warm wraps may be donned for sitting in the house. Conditions vary on other parts of the coast; in general there is less fog and greater heat farther north and more fog and mist towards the south. Mollendo is particularly damp and disagreeable. Some shore places near Lima have much more sunshine than that city, and 20 miles from the sea one gets beyond the fog belt into a

region of perpetual spring. Although the climate of Lima is said to be rather enervating to permanent residents, many dwellers in the temperate zone would prefer it to that of any other coast city within the tropics.

On the highlands the climate is widely diverse. The seasons are opposite, as there it is the dry season from May to October, when it is damp on the coast, while the chief precipitation above occurs during their summer, the dry months below. At an altitude of 7000 or 8000 feet the climate is considered agreeable, at Arequipa averaging 57°, at Cajamarca 52°. At 12,000 to 15,000 feet it is generally cool, perhaps bracing to those accustomed thereto, but often trying to the visitor, who is likely to suffer from *soroche*, the name applied to mountain sickness.

In the *montaña* there is variation due to altitude, as in the sierra, as this region includes the forested district from an altitude of nearly 10,000 feet down to 1000 or less in the basin of the large Amazon tributaries. From 3000 to 7000 feet the climate is delightful to those who do not enjoy greater contrasts. Huánuco, altitude 6270 feet, has an annual temperature of 74°, other places a lower temperature, and far down, as at Iquitos, a higher. Most of the region is healthful, as is also the sierra, for persons of sound constitution under suitable living conditions and employing intelligent care. In some parts of the lowlands malaria is occasional or permanent, in other parts it is unknown.

CHAPTER XXI
PERU: CAPITAL, DEPARTMENTS, AND CHIEF CITIES

The Capital

Lima, the capital of Peru, on the banks of the Rimac eight miles from the port, Callao, is a city of picturesque charm. Its population, with its suburbs 200,000, is no indication of its commercial importance or of its elegance as a social centre. One of the three cities of the world where the best Spanish is spoken, some impartial critics say that in this respect it is unrivalled in the New World. Social amenities, everywhere important, are here peculiarly requisite for agreeable and successful business relations. Parisian elegance is seen on the narrow streets, and in one story dwellings as well as in larger mansions. The great cathedral is called the finest in South America.

The city takes pride in its numerous churches, its plazas, the excellent shops on the narrow streets, its University, founded in 1551, its museum, its new theatres, perhaps even in its bull-ring, the second largest in the world. As in the other West Coast cities, the hotels are inadequate (a new one is contracted for), but the old Maury long had the reputation of being the best on the Coast, and the excellence of its meals once rejoiced the heart even of a New York club man and his East Indian valet. Of course the city has modern conveniences, sky-scrapers happily excepted.

Individual Departments

The COASTAL DIVISIONS follow beginning at the north.

Tumbes, the Province farthest north, is distinguished from the rest of the coast by the fact that, bordering on Ecuador and the edge of the Gulf of Guayaquil, it partakes of the nature of that region, its north shore being covered with vegetation. (The adjoining Department of Piura, because of its proximity to the Ecuador forests and moisture, receives a rare torrential shower.) Rivers crossing Tumbes permit of irrigation where needed. The agricultural products are sugar, tobacco, coffee, and cacao. The oil wells are of great importance. Coal and other minerals are found.

Tumbes, the capital, on the Tumbes River, is connected by a narrow gauge railway with its port, Pizarro, seven miles distant, where steamers on their way to Guayaquil call every week or two.

Piura, the first Department south of Tumbes, is mainly desert, with some fertile irrigated valleys. The culture of a native cotton resembling wool is a leading industry. Other exports are Panamá hats and hides. Near the coast are important oil wells. Paita, with one of the best harbors on the coast, is the first port of call for some of the express steamers from Panamá.

Piura, capital of the Department, mean temperature 78°, is in an irrigated valley 60 miles from the desert port Paita, with which it is connected by rail. A line of narrower gauge goes on to Catacaos, population 20,000, six miles distant but nearer the sea, where 300,000 Panamá hats are made yearly. They may be bought at Paita for one fourth, perhaps for one eighth of the price commonly asked for the finer ones in New York. The main

railway is to be prolonged from Piura to the town of Moropón. Farther south, from Bayovar, a small port on the Bay of Sechura, a railroad leads 30 miles to the sulphur mines of Reventazón; but the sulphur, an important export, must be cleared from the custom house at Paita.

Lambayeque, south of Piura, contains large estates of sugar and rice, the chief exports. It has one of the primary coast ports, Etén (population 3000), but a poor one, merely an open roadstead where there is always a swell, at times so severe that debarking passengers must be lowered in a sort of hogshead by windlass, chain, and pulley to the launch or small boat alongside. Freight lowered to lighters is likely here to get a particularly hard bump. An iron pier 2000 feet long is for the use of the lighters.

Chiclayo, the capital, is 41 miles by rail from Etén. By this railway and its branches, Ferreñafe, Lambayeque, and Patapó may also be reached. From Pimentel, a minor port, a shorter railway runs to Chiclayo. From the Lobos Islands off the coast much guano was formerly taken.

La Libertad, the larger Department following, has two primary ports, the first, Pacasmayo, a short sail from Etén. From Pacasmayo 85 miles of railway lead up country to the towns Guadalupe and Chilete. From Chilete the road should be carried over the Cordillera to the important city of Cajamarca, 50 miles beyond, whither Pizarro marched nearly 400 years ago; but the grades would be difficult and the road awaits the supply of more pressing needs. Another long pier serves the port of Pacasmayo, from which are shipped sugar, rice, fruit, etc. Sixty-six miles farther is the primary port of Salaverry,

population 5000.

Trujillo, the capital of the Department, is eight miles distant; beyond is the Chicama Valley, noted for its splendid sugar estates. A railway 75 miles long going up the valley to Ascope, does a large business. An extension planned to the plateau above, 12,900 feet, will pass extensive coal fields at Huanday, and reach copper and silver mines at Queruvilca. A maximum grade of $6^1/_2$ per cent would make the construction expensive. Another road from the sugar lands is being constructed to the better port, Malabrigo. A little north of Salaverry is the minor port of Huanchaco, which also exports much sugar, though the chief shipment is from Salaverry.

Ancash, the next Department, which is still larger, has five minor ports, one of which, Chimbote, should soon become a primary. For this expectation there are several reasons: first, the harbor, land locked by a long peninsula and several islands, is called the finest on the entire West Coast below Panamá. It has an area of 36 square miles without a rock below its placid surface. Though now with but an ordinary iron pier for lighters, docks approachable by the largest ships could be arranged on an island, which a bridge over a 200 yard channel would easily connect with the main land. There are two other entrances, one half a mile across.

The American capitalist, Henry Meiggs, the prime mover in the construction of the South and Central Peruvian Railways, had the foresight in the early seventies to perceive the great commercial possibilities of this harbor. He planned a city on the shore and began a railway to extend up the Santa River Valley to Huarás, 167 miles. The road bed had been constructed 80 miles, the rails laid 60, when

the Chilian war broke out. The invaders, after capturing Chimbote, carried off the rolling stock and supplies and destroyed what else they could. Subsequently the project remained long in abeyance, the road being operated for 35 miles only; but after several recent concessions and delays with little work accomplished, the Government has taken over the line and is pushing forward the extension from the point already attained, La Limeña, 65 miles from Chimbote. Work was begun July, 1919, on a branch line to coal fields near Ancos, $15^{1}/_{2}$ miles, which later will pass near two copper deposits and through Huamachuco and Cajabamba. After the first few miles the main road follows the Santa River, which enters the ocean a few miles north of the harbor.

The Santa has the distinction of being the largest river in Peru flowing into the Pacific Ocean. Rising among the heavily snow covered peaks of the White Cordillera, though nowhere navigable it has a large water supply for irrigation, made use of by the Incas. It could easily be made available for a large district back of Chimbote. At present the railway serves only a few sugar plantations on the lower part of the river's course, but its further construction will open up immense coal fields, and farther on in the Huailas Valley great mineral deposits of gold, silver, etc., and a fine though limited agricultural district which already has a large population.

The Huailas Valley has on the east the Cordillera Blanca, whose splendid snow capped summits rise to an altitude of 20,000 to 22,000 feet; on the west the Cordillera Negra reaches a height of 17,000 to 18,000 feet; the passes into the valley are above 14,000. The floor of the valley rises from 3000 feet at the north to 10,000 at Huarás and 11,000 at

Recuay. Along the way are the considerable towns of Caráz, Yungay, Carhuaz, and Huaráz, capital of the Department, each with populations of from 5000 to 10,000, besides the people at *haciendas* and at mining centers on either hand. This has been called the richest and most thickly settled portion of Peru. All sub-tropical and temperate productions flourish here at various elevations; the mineral riches may rival the Klondike as the scenic splendor surpasses that of Chamonix. East of Yungay rises the magnificent twin-peaked Huascarán, the first and only ascent of which was made by the author with two Swiss guides, September 2, 1908; the north peak, altitude 21,812 feet, is still, 1921, the highest point in all America yet attained by any North or South American.

The only difficulty in the construction of the railway is where the Santa River breaks through the Black Cordillera to turn towards the coast, the narrow gorge being impracticable even for pedestrians. In this region and beyond are immense coal fields. These, chiefly anthracite and semi-anthracite, therefore non-coking, some people believed worthless, being ignorant that for many purposes hard coal is more valuable than soft. However there are also beds of bituminous. The coal deposits continue in the lateral valleys, where the owners use them merely for their own households. Samples run over 82 per cent carbon. A quarter of a mile from Caráz (population 8000) coal may be mined and put on trucks at $1.50 a ton. The Chuquisaca River from the north joins the Santa just before that breaks through the Cordillera. This Department is very mountainous. Besides the Santa, four rivers descend to the sea, *i.e.*, they do sometimes; for, rising on the west of the Black

Range, obviously so called because it has little snow on it, these rivers are often dry, yet they serve to irrigate many sugar plantations. At the mouth of the Santa River north of Chimbote is the village Santa, an occasional port of call for the *caletero* (not express) boats, which regularly visit several ports below: Samanco, 27 miles of desert from Chimbote, Casma, after 50 miles more, and Huarmey, 55 beyond. Back of Samanco is the Nepeña River Valley with two large sugar plantations; and high in the Black Range, Colquipocro, one of the richest silver mines worked in Peru. Some of the selected ore ran as high as $2000 a ton, and large quantities averaged $200 when silver was 50 cents an ounce. Samanco and Casma are the usual ports for entering the Huailas Valley; Chimbote also serves.

Lima. The Departments of Lima and Ica follow, in which the mountains come closer to the shore than in the greater part of the country, and the rivers except at the extreme south are nearer together. Thus the Departments exhibit much verdure, a larger proportion of the country being devoted to agriculture. A minor port of Lima is Supe, followed by Huacho, of more importance and connected with the capital by rail, 150 miles, passing Ancón, a frequented summer seashore resort.

Callao, the port of Lima and the chief port of Peru, is with its suburbs a little Province all by itself, surrounded by the Department of Lima except on the ocean side.

Cerro Azul is a more southern port in the Department of Lima, serving a very mountainous section, with fertile valleys producing sugar, cotton, vegetables, etc., and in the mountains many minerals.

Ica is an extremely fertile Department, raising very fine grapes and other fruits, sugar cane and cotton; also corn, alfalfa, divi-divi, and ají, a kind of pepper much used in Peru and other countries. Wine making is a very important industry. Minerals exist, but are not much worked except a silver mine.

Ica, the capital, centre of the finest grape country in the Republic, is 46 miles by rail from Pisco, the chief port, and the most important one between Callao and Mollendo. Lomas is a smaller port in the Department. Ica has some good land uncultivated, but needing irrigation.

Arequipa, the last littoral Department, has five minor ports besides the primary port, Mollendo, second in importance in Peru; but the port is a very poor one, no real harbor at all. Chala is a port of call for some steamers, but the rest are very minor: Camaná, at the mouth of the Majes River which comes down from Mt. Coropuna, Quilca, Matarani, and Islay, the last two not far north of Mollendo, and with better harbors. Along here the mountains are farther back and some have much snow, so that several rivers present good possibilities for additional irrigation. Cotton, sugar, and grapes grow in the valleys; corn, potatoes, and cereals higher up. There is a variety of mineral products: the most important, silver from Cailloma; but gold, copper, lead, coal, borax, sulphur, manganese, alum, gypsum, are found, and some of them are exported.

The Southern Railway of Peru, leading up from Mollendo, is an important line which will be referred to later. Back of the coastal bluffs, which rise on irregular slopes 3000 feet or more, is a desert plateau of especial interest, on account of the sand dunes 10-12 feet high which move slowly over it.

Moquegua, a Province south, the last district held by Peru, has a primary port, Ilo, from which a railway 62 miles long extends to its capital, Moquegua. The soil of the Province is especially adapted to grapes and olives, which with wine and oil are the chief exports. Many varieties of minerals are known to exist here in quantity.

The Sierra Region

This, perhaps the best populated of the three sections, comprises seven Departments, some of which run over or down into the montaña, as most of the Coast Departments run up into the sierra.

Cajamarca, bordering on Ecuador, is the first Department at the north, a rather long one, running south back of Piura, Lambayeque, and part of Libertad, which last is also on the south, as in its southern part it extends over the West Cordillera and beyond the Marañon. Cajamarca has that river on the east separating it from Amazonas. Communication with the outside world is poor, the best by way of Pacasmayo. An extension of the railway from this port is hoped for. The highlands favor cattle and sheep breeding; the valleys produce cereals, coffee, and sugar. Of course there are minerals.

Cajamarca, the capital, famed for the seizure and murder of Atahuallpa by Pizarro and the slaughter or dispersion of his army, is an important town and distributing centre, with many industries; leather goods, mining, cotton and woolen cloth, etc.

Huánuco, the next Sierra Department, does not touch Cajamarca. East of Ancash, it has Junín on the south, and Loreto east and north. Traversed by the Central and the East Cordilleras, by the Marañon,

Huallaga, and Pachítea Rivers, it has the Ucayali as its eastern boundary. At the northeast corner the Pachítea flows into the Ucayali, both rivers being navigable. The central route from Lima to Iquitos goes down the Pachítea. All kinds of riches are here, but communication is too difficult to make them very valuable at the moment. Quicksilver, coal, iron, and copper are found, gold and silver as a matter of course, agricultural products of great variety.

Huánuco, the capital, with a good climate, is 68 miles from Cerro de Pasco, on the Huallaga River. It is an important place with varied industries including sugar mills.

Junín, south of Huánuco, a very large and rich Department, is east of Ancash and Lima, has Huancavelica south, and Cuzco and Loreto east. It has three important districts, better known than those in the Departments farther north: the mountain knot and range at the west, the plateau, and the montaña section running down to the Ucayali River, which separates it from Loreto. Lake Junín, 36 miles long and 7 wide, altitude 13,322 feet, is the second largest Andean Lake. Near by, occurred the battle of August 6, 1824.

In Junín are the head waters of important rivers: in the northwest corner the lakes which are the source of the Marañon, Santa Ana and others; the Jauja or Mantaro flows south from Lake Junín, uniting with the Apurimac later to form the Ené; the Perené, rising on the montaña side of the mountain far down unites with the Ené to form the Tambo, which soon joins the Urubamba then becoming the Ucayali. The smaller Pichis and Palcazu unite to form the Pachítea of the Department of Huánuco. Junín contains immense mineral wealth; among other

mines the famous ones of Cerro de Pasco; large stocks of cattle and more sheep. Cereals, corn, potatoes, and other vegetables and fruits grow in the valleys of the plateau, which has an altitude of 13,000 to 14,000 feet, with a temperature of 22°-65°. In the tropical east are plantations of coca, coffee, cacao, sugar, and fruit.

Cerro de Pasco, the capital, will be referred to later.

Huancavelica, a smaller Department directly south, touches Lima on the west, has Ica west and south, and Ayacucho east. This is a Sierra Department exclusively, all high mountains, plateau, a few alpine lakes, but with several deep cañons in which flow the rivers, at the north the Mantaro. Minerals are the chief wealth. Famous since they were opened in 1566 are the quicksilver mines; but since they were buried years ago by a cave-in not much quicksilver has been extracted till a very recent resumption of activity.

Huancavelica, the capital, is an important mining centre though reached with some difficulty from Huancayo or Ica. Here above 12,000 feet the production of wool might be expected; there are cotton mills also.

Ayacucho, a peculiarly shaped Department twice the size of the preceding, runs to a point on the north between the Mantaro and Apurimac Rivers. It has Huancavelica and Ica on the west, Arequipa on the south and southeast, and Apurimac and Cuzco east. This also is mostly highland, with temperate zone agriculture, cattle and sheep, and with varied mineral riches.

Ayacucho, the capital, is a considerable and

important city, but a long way to go from anywhere. Mining and other industries are engaged in.

Apurimac, much smaller, has Ayacucho northwest and southwest, a bit of Arequipa south, and Cuzco southeast and northeast. The Department is highland, but lower than at the north, with great grazing ground and forests, with fertile soil raising temperate and sub-tropical products, and with the inevitable minerals.

Abancay, the capital, is most accessible from Cuzco or from the port of Chala. It is a small city, of some interest.

Cuzco, the largest Sierra Department, with a little of Junín has Ayacucho and Apurimac west, Arequipa south, Puno southeast and east, with Madre de Dios, Loreto, and Brazil on the north. The Apurimac River to which the Urubamba is nearly parallel, forms most of its western boundary, both rivers flowing a little west of north. The upper waters of the Purús, and Madre de Dios flow north, south, and east. Stock raising is carried on and there are minerals, but agriculture is the chief industry. Cuzco is famed for the excellence of its cacao, also for its cocoa and coffee; it has large sugar plantations as well. Though with mountainous highlands, it has much territory lower.

Cuzco, the capital, world famed since its conquest by Pizarro, is beautifully situated at the head of the side-valley of the Huatanay River. Interesting from its historic associations, its massive ruins, and its picturesque charm, it is also of commercial importance.

Puno, the last Department of the sierra, has Madre de Dios on the north, Cuzco, Arequipa, and

Moquegua west, Chile and Bolivia south, and Bolivia east. The Department, mostly highland, includes the western part of Lake Titicaca. It contains many minerals, and has a large output of gold. The production of wool, including the alpaca and vicuña, is highly important. Potatoes, barley, etc., are grown.

Puno, the capital, a centre of mineral and woolen activities, is the head of Peruvian navigation on Lake Titicaca and a meeting place of the two tribes or races, the Quichuas and the Aymarás, the latter, residents of northern Bolivia. The town is an important centre of traffic.

The Montaña Region

This region comprising nearly two thirds of Peru embraces the eastern forest country, the eastern slopes of the East Cordillera and at the north the lower slopes of the other ranges. The region has much rain, many large navigable rivers, and dense tropical forests rich in useful plants, fine hard woods, and rubber trees. It has some settlements on the river banks and on higher lands, and in the forests, Indians, some of whom are peaceable and friendly, others who might have been so had they not been badly treated by whites of various nationalities, others still who have never seen the white man and do not wish to. Three of these Departments border on Ecuador, the most western, Amazonas, with Cajamarca on the west, La Libertad south, and San Martín east. The last Department, more than twice the size of Amazonas, has Loreto on the east and south. It is traversed by the Central Cordillera and by the Huallaga River, navigable to the important port of Yurimaguas, but for steamers not much farther. The immense Department Loreto, touching Huánuco

and Cuzco on the south, with Brazil on the east, is with Madre de Dios naturally the least known and least populated portion of Peru. It is traversed by the Ucayali, and by the Amazon both above and for some distance below Iquitos, to which port ocean steamers regularly ascend. Madre de Dios, east of Cuzco and north of Puno, has been little explored. A few rubber and mining concessions have been slightly worked. Its future will come with transportation.

CHAPTER XXII
PERU: PORTS AND INTERIOR TRANSPORTATION

From the physical character of Peru, it is evident that inland communication and traffic is of extraordinary difficulty. The countries previously mentioned and most of those to follow have rivers by which access to the interior may be gained. In Colombia the Pacific coast barrier is not half so high, and another way is open from the Caribbean. Venezuela presents several doorways, Ecuador also; but in Peru, entrance by navigable rivers would be to journey over 2000 miles from Pará in Brazil at the mouth of the Amazon, then arriving only at the back door, remote indeed from the busy civilized life at the front. Some few do come in and go out that way, but not many.

Peru's front is happily 1200-1300 miles long, but then a wall! and in places not one only; back of that another and another; between each two a deep, deep hollow; climbs, up and down, up and down, to gain the fertile *montaña*; or, in the central section, where it might seem easy going after having surmounted the high wall to the lofty plateau, there are hills if not dales, with few level spots. Do not imagine that a table-land is like a table! The country is rolling where not mountainous; nor is that all. The various rivers that wind about flowing now south now north, southeast and northwest, with branches from any direction, these are not simple little rivers, a few or many feet deep, which require merely an ordinary bridge; but whether deep or shallow they are liable to be and generally are at the bottom of a cañon 300 or 3000 feet deep, the top of which may be a mile or

two across. For a railway to descend to such depths and climb up the other side, not once but the many times needful for a road traversing the length of Peru is for a sparsely inhabited country, governmentally poor, quite impossible. Hence the slowness of Peru's development despite its wonderful riches.

When some years ago the Pan American Railway from New York to Buenos Aires was projected, investigation was made of practicable routes by the United States Government. The way in Ecuador is plain and in Colombia there is little choice; but in Peru the question of highland, low coast, or far interior was to be solved. The coast seemed less desirable as along here one could go by water. Moreover, the Maritime Cordillera for a long distance is so near the sea with so many spurs coming down to the coast, or as in Southern Peru a bluff several hundred or thousand feet high with its feet in the sea is so cut every little way by one of those 58 streams in a very deep cañon, that it was not more inviting than the plateau region above, where the road would be much more serviceable. Plateau was the decision; but for the Great War, money might soon be forthcoming; as it is, long delay is probable before the road is completed. As for inland transportation therefore, it may be said that it is carried on mainly by sea, which is no joke but stern reality; accordingly coast service is well provided.

Coast Service

British, Chilian, Peruvian, formerly German, and now American steamers sail along the coast, some express from Panamá, calling at Callao and Mollendo only; others, express also, call at the other primary

ports, Paita, Etén, Pacasmayo, Salaverry, Pisco, and Ilo; still others, *caletero*, call at the 20 minor ports also. From many of these ports, as we have seen, railways extend some distance into the interior, generally as far as they can go without taking a stiff grade. Beyond the termini and in some cases directly from the ports, freight is carried by mules, burros, or llamas, though in but few places do the latter come down to the sea, their use being confined chiefly to the region of the sierra. In the old Inca days the fleet footed Indians sped over the narrow trails, often carrying heavy burdens. Horses were introduced by the Spaniards; riding is universal, as almost everywhere it is the only means of travel, from the coast to the mountain region and within that section; roads aside from bridle trails are almost non existent. Even in the thickly settled and rich Huailas Valley there was not a wheeled vehicle in 1908; there is no way by which they could be carried in except in pieces. The iron horse, however, within the last half century has begun to make its way.

Chief Port

Callao. Although Peru has other primary ports which should be visited by commercial men, Callao and Lima are the chief centre of commerce for the greater part of the country. Both cities are of course provided with good electric car service, lights, and telephones; they are connected by an electric and a steam railway, the latter, a part of the Central Railway of Peru, which climbs to the interior heights. The double track electric road on a broad boulevard, the most popular connection between the two cities, makes the ride in 28 minutes. The site of the port, Callao, population 35,000, was chosen with

discretion, as except for Chimbote it has the best harbor below Panamá. It ranks in traffic as the fourth American port on the entire Pacific, following Seattle, San Francisco, and Valparaiso. Callao has been distinguished as the only port south of Panamá with docks accessible to large ships, though, as the accommodations are inadequate, passing coastal steamers usually anchor half a mile away, employing lighters for cargo; recently, steam launches serve passengers, heavy baggage going in row boats. A floating dry dock receives ships of 8000 tons.

Railways to the Interior

The Central Railway. In spite of the enormous difficulties of making a roadbed up a steep cañon or on the face of a bluff, bridging torrents, and tunneling side buttresses and mountain ranges, two railroads, both monuments of skill and perseverance, climb from the coast to the plateau, the Central, and the Southern Railways of Peru. The first, a standard gauge line from Callao begun in 1870 by the American financier, Henry Meiggs, was in 1876 completed as far as Chicla, 88 miles. On account of troubles resulting from the Chilian war, it did not reach Oroya, long the terminus, till 1893. The road follows up the Rimac Valley, which, however, is so steep and narrow that detours into side valleys are necessary, as into the Verrugas, which is crossed by a bridge 225 feet high, one of 67 bridges on the journey. Many curves, tunnels, and V's are also needed to gain in $7^1/_2$ hours, with no more than a 4 per cent grade, an elevation of 15,665 feet at a distance from the sea in a straight line of less than 100 miles. Frequently the floor of the cañon has room only for the rushing stream, and the road

passes high up on the slope or cliff, at one point, 575 feet, or through one of the 57 tunnels. Some of the cliffs are more than one third of a mile in perpendicular height. The road is considered in some respects the most wonderful of the world's railways. A branch 10 miles long from Ticlio to Morococha, reaching an altitude of 15,865 feet, a trifle above that of Mont Blanc, is absolutely the highest railway in the world. At Ticlio, the highest point of the main line, is entered the Galera tunnel, three quarters of a mile long, which cuts through the continental divide. The road then descends to Oroya, altitude 12,178 feet. In taking the trip for pleasure or business one not absolutely sure of the soundness of his heart should have it examined, or at least should stop over two days at Matucana, 7788 feet, where there is a fairly comfortable hotel. Any one is liable to suffer somewhat from *soroche*, which may be avoided by the stop-over. In general persons of good constitution, not too full blooded, will be troubled only by a headache, perhaps accompanied by nausea, and those who are careful to avoid rapid walking or over exertion of any kind for a day or two after arrival above, and who do not overeat before setting out on the journey or afterwards may suffer no inconvenience whatever. No liquor of any kind should be used except in collapse from heart failure. Ammonia is desirable in case of headache.

From Oroya, terminus of the direct line, there are branches to the north and south over the plateau. To reach the *montaña* interior, which is more accessible here than from any other point in Peru, one may go by automobile over another range a thousand feet above, and beyond this, down, down, down into the *montaña*. Tarma at 10,000 feet has a delightful climate, and here are trees, perhaps the first seen in

Peru, growing as it were of their own accord. The picturesque cañon below is lined with verdure, here and there are entrances to side valleys. Tunnels and romantic swinging bridges formerly lent variety to the ride. The new automobile road opens up a rich and delightfully attractive country. La Merced, altitude 3000 feet, is quite a little town with a pleasant summer climate.

A short distance farther is the Perené, a coffee plantation, at 2500 feet, belonging to the Peruvian Corporation. The estate of 5,000,000 acres is not half cultivated, though $1^1/_2$ million coffee trees had been planted in 1903. At this altitude the country is still in the foothills of the Andes with steep slopes on every hand, a narrow way only extending along the river bank. The Perené is a considerable stream easily navigable, an affluent of the Tambo, which flows into the Ucayali; but the stream goes south a long distance around, and through a region inhabited by savage Indians. It is therefore not used. The Chunchi Indians living close by are fine looking people and friendly, sometimes working on the plantation. This plantation is on the main and mail route from Lima to Iquitos, capital of Loreto, to which with good luck a journey may be made in 15 days. Seven days are spent between Oroya and Puerto Jessup, then one in canoe to Puerto Bermudez, and 5 or 6 in steam launch to Iquitos, where a steamer may be taken to Manaos, Pará, or New York.

A branch railway line, American owned, built by the Cerro de Pasco Copper Company, extends north from Oroya to Cerro de Pasco, about 90 miles over a hilly country, past Lake Junín. Along the way many Quichua Indians are seen, the chief population of the plateau region. Cerro de Pasco, the terminus of the

road from Oroya, is a town of 15,000 population at an altitude of 14,300 feet. A branch railway leads to Goyllarisquisga, 26 miles, another to Quishuarcancha, 11 miles, to their coal properties.

Another branch or a continuation of the Central Railway runs south on the plateau in the valley of the Jauja River past a city of that name, population 3000, altitude 11,050 feet, a resort for consumptives for whom the coast is too damp. Seventy-eight miles from Oroya at Huancayo, population 6000, the road halted some years, but lately building has recommenced and the road is probably open some miles farther. Construction is proceeding in the direction of Ayacucho to continue from there to Cuzco. By the time this is accomplished a long stretch of the Pan American Road will be completed, probably from the Callejón de Huailas to Lake Titicaca, but the crossing of three cañons, one 3000 feet deep, makes this an expensive job.

The Southern Railway of Peru, also planned and partly constructed by Henry Meiggs before he commenced the Central, begins at the port of Mollendo; after a few miles along the beach it climbs the high bluff on the side of projecting buttresses, winding about till it reaches the edge of the desert plateau 3000 feet above. Then it proceeds on the almost imperceptibly inclined desert, presently along the edge of the Vitor Valley, 107 miles, to the beautifully situated Arequipa, population 50,000, altitude 7550 feet.

The city is on the lower slope of El Misti, partly in the valley of the Chili River which flows between Misti, 19,200 feet, and Chachani a little higher. Arequipa has a fine cathedral, and cultured society, but poor hotels. A good one, opened prematurely

some years ago, unfortunately failed; it would be a great success now. In the crater of Misti are pure sulphur crystals, with some of which I once filled my pocket; but other sources are more accessible. Much business is transacted in the city, this being the centre of commerce for Southern Peru, an immense district with many towns and mining centres on and off the railroad. At least one night must be spent here on the way up, and several days are desirable both for business and to become proof against *soroche*. The city is the site of the machine shops for the railway, which with 526 miles of track is the longest in the Republic. From Vitor between Mollendo and Arequipa an automobile road is to be constructed to the Majes Valley and Chuquibamba.

From Arequipa there are semi- or tri-weekly trains to Cuzco and Puno. The road winds around the desert slopes of Chachani to the higher land beyond. From the divide, 14,688 feet, the descent is gradual to Puno on the shore of Lake Titicaca, 219 miles from Arequipa.

At Juliaca, 30 miles before Puno, the line branches north towards Cuzco, 210 miles, a journey of a day and a half. Sleeping cars run from Arequipa. The highest point on the north division is 14,153 feet. Cuzco itself is at an altitude of 11,445 feet. The place, almost surrounded by hills, has a more genial climate than might be expected at this altitude. The appearance of the country is very different from that near Cerro de Pasco with more green and a milder atmosphere. Cuzco is said once to have had a population of 400,000, instead of the present 30,000. Some progress has been made since railway connection was established in 1908; a decent hotel, the Pullman, has superseded the apologies for one

then available. The population is chiefly Indian, and many come in from the surrounding country to the markets. The Department, a very rich but undeveloped section, is on the border where Quichuas and Aymarás mingle.

From the port of Puno, on the shore of Lake Titicaca, altitude 12,500 feet, there is, in connection with the railway, steamboat service (an all night journey) to Guaqui, at the south end of the lake. Here is railroad connection for La Paz, a three hours ride, all under the management of the Peruvian Corporation, a British company which controls also the Central Railway and most of the short lines from the various ports; the Corporation has further among other concessions one for the export of guano.

Proposed Railway Extension

It is evident that the railways of this great country which nowhere touch the vast *montaña* region and which leave destitute most of the towns of the sierra district, are totally inadequate for its development. However delightful the climate or rich the country in agricultural or mineral resources, few persons in the present age will settle in regions remote from cities in time if not in distance, and where the interchange of products is almost impossible for lack of means of transportation. The leaders of the Government are well aware of this fact and are doing their utmost to promote railway development, both through their own initiative and by their willingness to grant favorable terms and, to some extent, guaranteed concessions to foreign capitalists. The importance of connecting the coast and sierra cities, and these with the Amazon Basin and river transportation to the Atlantic is perfectly apparent. The ideal is for three

or four railways serving different sections to extend from coast ports up over the mountains down to the navigable waters of the Amazon affluents, and that such roads should be connected by a north and south line in the sierra country as a part of the great Pan American system long ago planned. Branches would diverge from all of these lines, thus opening up large mineral deposits for operation, and the rich agricultural lands of the *montaña* for settlement and commerce.

For a long time several routes have been under discussion and some concessions have been granted, which mismanagement or the difficulty of getting capitalists to invest in so remote a field have rendered abortive. Therefore there is still discussion; and opportunities for construction are open.

Beginning at the north the first cross line proposed is that in the Department Piura, continuing the road from the good port of Paita to Puerto Molendez, Calantura, or Limón, on the Marañon River below the Pongo de Manserriche. This plan has the great advantage of crossing the Andes at its lowest point, 6600 feet. An important consideration is that it would make practicable the export from Paita of rubber which is now carried from Iquitos by way of the Amazon and Pará; the far shorter journey by sea from Paita to New York, easily made within ten days, would more than counterbalance the rail freight from the river port 400 miles to Paita. It would surely be a better route for business men and offers other advantages; among these access to coal and iron mines en route.

Another transcontinental route proposed is from some point connected with the Central Railway which has already surmounted the divide. A route on

which much money has been spent for engineering investigation, surveys, and otherwise is from Cerro de Pasco or Goyllarisquisga to Pucalpa or some other point on the Ucayali. This central road for political reasons seems extremely desirable. It would open up the fine grazing lands of the Pampa Sacramento, and rich alluvial gold deposits in or on several streams, as well as the forest and rubber country. Another suggestion is to continue the road directly east from Oroya down to the Perené River and to Puerto Wertheman; a better may be to build 175 miles from Matahuasi, a station on the Oroya-Huancayo Railway, to Jesus Marie on the Ené River near the mouth of the Pangoa, where 12 feet of water would permit of commerce by large steamers by way of the Tambo and Ucayali.

One important cross route would naturally be by the Southern Railway, from a point on the Cuzco branch, Tirapata, Urcos, or Cuzco, the earlier plans looking to a connection with the Madre de Dios River. But as this route would necessitate a long roundabout journey, as well as a passage through Bolivia and freightage on the Madeira-Mamoré Railway, the Government has recently undertaken for itself a line from Cuzco to Santa Ana on the Urubamba, by which the journey is greatly shortened and will be wholly within the Republic as far as Brazil, following down the Urubamba and Ucayali to the Amazon and Iquitos. The drawback to this route is that only very light draught steamers can come up to Santa Ana at any season of the year.

Lines quoted as under construction by the Peruvian Government in 1919 are that from Chimbote up the Huailas Valley to Recuay, already referred to, which when completed will be

immediately profitable, the continuation of the road from Huancayo to Cuzco, now open 30 miles from the former city; and the Cuzco to Santa Ana just mentioned. A short line recently opened from Lima to Lurín, crossing the Pachacamac River, brings two fertile valleys with their fruit and vegetables into close connection with the capital. Lurín is but 16 miles from the suburb Chorillos, which for some years has had railway service. The ancient pre-Inca ruins at Pachacamac are now easily accessible.

The Longitudinal or Pan American Railway, crossing all the others, would come in at the north from Cuenca and Loja in Ecuador, continuing to Huancabamba, Jaen, and Cajamarca in that Department, thence down the valley to the Santa River, there joining the railway to Recuay, which will be prolonged to Goyllarisquisga. By this time the connection will be complete to Cuzco, and so to La Paz, La Quiaca, and Buenos Aires.

CHAPTER XXIII
PERU: RESOURCES AND INDUSTRIES

Agriculture

While for centuries Peru has been celebrated as a land of marvelous mineral riches, especially of gold and silver, nevertheless, in spite of her desert shore, her bleak table-land, and her undeveloped montaña, like California, her chief wealth is in her agriculture. What the figures say about the exports is easily ascertainable; but though corroborating this statement they do not tell all the story, since most of the mineral production is exported, while the greater part of the agricultural stays at home. Of the latter, sugar is the leading product.

Sugar grows along the coast and, where opportunity offers, up to a height of 4500 feet; in the montaña to a height of 6000 feet. At present most of it is raised near the coast. The Chicama Valley, famed for its splendid estates, produces more sugar than the entire Island of Porto Rico, and this of the finest quality. In the temperate, equable climate, the cane matures early and may be cut all the year around. It is unusually rich in sucrose. Some estates are 15-20 miles square, producing 15,000-30,000 tons each; 50-60 tons of cane to the acre is quite usual. The cane is cut and ground from 18 to 24 months after planting, and being cut throughout the year instead of during four or five months only, the same amount of work may be done with far less machinery and fewer laborers. In places a two months suspension is made, when the river is full, to attend to irrigation and to clean or repair machinery,

etc.

The cane has more than 14 per cent sucrose, often 16 or 17 per cent. The returns have nowhere been surpassed; the production to the acre is double that of Cuba, where the average is 23-24 tons, in Peru 45-50 tons. At Cartavio, an estate of 29,000 acres in the Chicama Valley, they once cut 79.8 long tons of cane per acre from a field of 85 acres. This had 15.24 per cent sucrose and gave 12 tons of sugar an acre, a probable record. The grinding capacity is 1000 metric tons in 23 hours. In 1917 they ground 240,000 tons making 34,000 tons of sugar, mostly white granulated. The Casa Grande in the same valley, said to be the largest estate in the world, has a population of 11,000. Churches, schools, hospitals, and “movies” are provided for the work people, and the luxuries of modern life for owners and superintendents. In the montaña sugar cane is said to grow to a height of 30 feet and once planted to persist for a century. One writer speaks of two or three crops from one planting, but nine years without replanting is not unusual on the coast.

In the year 1915-16, 100,000 tons were exported from Salaverry, more the year following; half as much from the smaller port of Huanchaco near by. Production in Peru reached 400,000 tons in 1918. The plantation Tambo Real, on the Santa River near Chimbote, was recently sold for $1,750,000. Just back of the port is plenty of good sugar land, now desert but easily irrigable. As the nitrates have never been washed out of the land by rain, the soil is of extraordinary fertility; with irrigation the cane receives the precise amount of water required and at the right season. Back of Samanco are two large sugar estates, one belonging to the British Sugar

Company, which has a larger at Cañete in the south, producing long ago 30,000 tons a year. One estate had years ago 22 miles of tramway which was to be increased. In some places small farmers owning or renting land sell their cane to sugar mills. Most of the estates have the best of machinery. In 1911 $100,000 worth of sugar machinery was imported into one Department, Lambayeque. Labor is cheaper than in Cuba, formerly 60 cents a day, but with housing and other perquisites. Much sugar has been exported to Chile; recently to Europe and the United States. Some years ago sugar could be sold at a port at a profit for 1.5 cents a pound, more recently at 2.5 cents. There is still a field for investment in desert land, suitable for those with sufficient capital to arrange for irrigation. About 600,000 acres are now devoted to sugar.

Cotton. Native to the country is cotton, and Peru has its own special variety, *Gossypium Peruvianum*. It is so soft and fine that it is called vegetable wool, and it is much used for weaving underwear, stockings, etc., with wool, which it even improves, as the cloth is less liable to shrinkage than all wool. This variety grows to a height of 10-16 feet, giving a first small crop in eight months, but not reaching its best until the sixth year. It holds out well through drought, requiring but one irrigation yearly. The trees are planted 15 feet apart, the interspace being occupied with vegetables and corn. No ploughing is necessary and two crops a year are obtained. With the names full rough and moderate rough it is mixed with wool for textile manufacture. Piura is its special habitat, but it grows well in Ica at the south.

The Egyptian, the Sea Island, or the ordinary American are preferred by some growers on account

of their earlier development. The Egyptian is cultivated in Ica from the shore to 60 miles inland, also in Lima; the Sea Island and the Peruvian Mitafifi, similar to the Egyptian, near Huacho and Supe; the smooth cotton from ordinary American seed anywhere. The Egyptian, also called Upland, grows to about four feet, yielding two or three years, beginning six months after sowing. It needs several waterings, but has an advantage in being free from weevil blight. This and the ordinary American are the most popular varieties. Peru is twelfth among world producers, needing only more irrigated land for greatly increased production. There is water enough but labor and capital have been wanting. All conditions are favorable as in Egypt. The length of the various cotton fibres is given as: Sea Island, 1.61 inches; Egyptian, 1.41; Peruvian, 1.30; Brazilian, 1.17; American upland, 1.02; Indian, 0.8.

Coffee. An important product is coffee, the best said to be grown in the sierra region; but the finest I ever drank was raised on a small plantation back of Samanco, where it was roasted, ground, and made within the hour, of course pulverized and dripped as universally in South America. In the deep valleys at the east also, excellent coffee is grown: in Puno, in the Chanchamayo and the Perené valleys, called the *montaña* by the sierra people, in Huánuco farther north, in the Paucartambo valley of Cuzco south, as well as in the Pacasmayo and other coast sections. Five hundred plants are set to the acre, 800 in the Perené, which produce each 2 pounds annually. Even with a low price for coffee its production is profitable there, in spite of the one time $60 a ton freight rate to Callao; large profits are made at good prices. After supplying home consumption there is a considerable export.

Cacao. The production of cacao, which grows wild in the *montaña*, should be greatly increased. The Department of Cuzco produces a particularly fine article with exquisite taste and aroma, which brings a higher price than that of Brazil or Ecuador, though little known outside of the country. In the Perené Valley a plantation of 200,000 trees has been set out. Vast tracts in the Departments of Amazonas and San Martín and in the Province of Jaen are also suited to its growth.

Coca. The culture of coca is important, but more limited as to future development since its medicinal use should not be greatly increased and its general use not at all. The plant is a shrub, usually six feet high, cultivated in the districts of Otuzco (the most important) and Huamachuco (Libertad), Huanta (Ayacucho), Cuzco, and Huánuco. It grows best in valleys of 3000 to 7000 feet altitude, where the temperature varies from 60° to 85°, in clayey but not marshy ground, with iron but no salt. It needs frequent rains and humidity. Three or four crops may be picked annually, the first in 18 months; the yield continues 40 years. Care is needed in picking the leaves and in drying. A great quantity is consumed by the Indians, and some is exported to Europe and the United States, both as dried leaves for making wines, tonics, etc., and for the extraction of alkaloid; also as cocaine for the making of which over 20 small factories exist in Peru. Chewing coca leaves is of great service on the plateau for necessary and unusual exertion, but injurious and stupefying when its use is continuous.

Rice is grown in the north in Lambayeque and in the Pacasmayo Valley of Libertad. With one flooding and little ploughing the crops are produced annually,

46,000 tons in 1917. A little is exported but more is imported. The two varieties grown are Carolina and Jamaica. The straw is not utilized.

Fruits of various kinds may be grown in all the coast valleys, but south of Lima the culture, especially of grapes, is more advanced. Even in poor years it is said that the grape crop is superior to the European average; but too little attention has been paid to improving and extending the industry. The vineyards are small and combined with the other interests of a *hacienda*. The grapes are grown on stocks about eight feet apart, supported first by canes, later by trellises on adobe columns. Nine hundred gallons of wine an acre is an average yield. Italia and Abilla are cultivated for white wines, Quebranta, Moscatel, and others for red; the former of these two being most prolific and generally grown. A pink Italia is a fine table fruit. Wines cheap and good are manufactured to the amount of 2,200,000 gallons yearly, and 770,000 gallons of *pisco*, made from white grapes, also quantities of alcohol. The sugar of the *montaña* is used to make *aguardiente* or rum; in several coast districts a finer quality is made from grapes and is probably what in some sections is called *pisco*.

Peru is rich in the variety of fruit possibilities, but grapes and olives are the only ones cultivated in a large way, with a view to commercial profit. Olives grown in the south from imported trees are said to excel those of Spain or California. About 70,000 pounds are exported. The yield of oil is about 30 per cent; not enough is made for home consumption. Large possibilities exist in this direction. Other fruits grown are of course oranges, bananas, melons, pomegranates, *paltas*, or *aguacates*, or as we call

them, alligator pears, fine as properly eaten, the half fruit with salad dressing inside; *chirimoias*, when in perfection nothing better; strawberries nearly all the year around at Lima, more like the wild fruit with delicate flavor; prickly pears, peanuts, pears, cherries, etc.

Vegetables in great variety are raised, some like ours, others never before met with. Potatoes in many varieties grow up to an altitude of 13,000 feet or more. The wild bitter tuber from which the varieties were probably developed still grows wild. Enock says the yellow potato (not sweet) is unrivalled for excellence, but I saw none superior to the best of our white. Other tubers cultivated are the yam (three crops a year), *manioc*, and others.

Maize. The best maize in the world, says Vivian, is grown in Peru; but I am sure that he never ate any sweet corn in Rhode Island. Grown in all parts of the country up to 11,500 feet, it is native, like potatoes and cotton, and is one of the main stays of the country. Maize and potatoes are the chief foods of the Indians. Parched corn is much eaten on the plateau; it is most useful where bread is not to be had, and often is to be preferred. Toasted maize is called *cancha*. Three, sometimes four, crops are had annually. Food for man and beast, the stalks used for fodder, it is all consumed in the country. That grown near Cuzco is said to be of the finest quality, with grains the size of large beans, a very thin pellicle, and very farinaceous. One district in Lima produces 10,000 tons a year.

Cereals are raised, wheat, barley, and oats, from 5000 to 11,500 feet. Wheat formerly grown on the coast is now seen on the uplands, but large importations of wheat and flour are made. Barley

grows to a greater height, 12,000 feet or more and is much used for animal fodder, for mules and horses, taking the place of oats, which are not much cultivated. Alfalfa, much better for fodder than barley, is largely used, growing in sheltered places up to 12,000 feet, about the same as maize. A specialty of Peru and Bolivia is *quinua*, which is very prolific and grows freely in poor soil from 9000 up to 13,500 feet. It would be well if it were widely cultivated in other countries. Suitable conditions could be found in many places not necessarily at such altitudes. For many purposes it seems preferable to corn meal. It may be eaten raw with sugar or water or cooked as mush; it is called a tonic for *soroche*. The grains are round, about the size of mustard seed.

Tobacco is raised to a small extent, especially in Tumbes and adjoining districts. It is called of superior quality, and is preferred by some Peruvians to the imported, but it is too strong and coarse for many; the upper class Peruvians generally prefer Havanas. Perhaps 1000 tons are produced, some of which is exported to Bolivia, Chile, and Brazil. The Government has a monopoly of its sale, regulating price and profits of native and imported both, and owning the cigarette factories.

Ramie grass and haricot beans produce each four crops a year, flax and hemp, two crops; the castor oil plant is cultivated, and at the south the mulberry with the silk-worm.

Forestry

Forest products except rubber have received little attention, although the export of tagua, vegetable

ivory, has greatly increased within the last ten years. The palm grows wild in the *montaña*. The nuts are picked up by the Indians and carried to Iquitos, thence sent to Europe. They are also used in the forest for curing rubber, the only industry of much importance in this section.

Rubber for years has been exported in considerable quantities, at first collected from districts on the tributaries of the Marañon, later from those of the Ucayali. Earlier the rubber gatherers called *caucheros* cut down the *caucho* trees, a hole in the ground having been previously prepared to receive the milk, which was then coagulated by a solution of soap with the juice of a native plant called *vetilla*. This method of cutting down the trees, which still has some vogue in other countries, is now forbidden in Peru. The *caucho* here averages 100 pounds to a tree. It was exported in planks or cakes weighing 80 to 100 pounds each. The *jebe*, rubber of the finest quality passing for the best Pará fine, comes from the *hevea brasiliensis* or other species of *hevea*. These trees are found lower down than the *castilloa elastica* (from which comes the *caucho*) at an altitude of about 300 feet, where it grows to a height of 60 to 70 feet. By tapping the *hevea*, about 20 pounds yearly of rubber is obtained. Peru's rubber export 1908-12 averaged $4^1/_2$-$5^1/_2$ million pounds worth 20 to 30 million dollars; but the lowering of price due to the Ceylon plantations, and perhaps the discovery of atrocities practiced upon the Indians in some quarters greatly diminished the export for some years. It seems to be reviving. In 1916 $3,400,000 worth was exported. Better regulations have been made and the possibility of arranging a system of plantations is discussed. Nearly all the rubber is exported from Iquitos; but some from the Madre de

Dios section, the Inambari, and the Urubamba goes out by way of Mollendo. The export duty of Peru, 8 per cent, has been much less than that of Brazil.

Other forest products, which now receive little attention, include all kinds of valuable timbers, medicinal plants, dye woods, etc., usual in a tropical forest.

Stock Raising

Cattle. The cattle industry is one of large importance, pasturage beginning in the foot-hills of the coast, and going up to 13,000 feet or more. The large ranches are in the sierra, some having 20,000 cattle and 500,000 sheep. Cattle are raised in Cajamarca, Junín, Ayacucho, Cuzco, and Puno. The beef is apt to be tough, badly cut, and is better boiled than roasted. Cross breeding with Argentine or other stock would improve it greatly, and attention is being paid to the matter. The pasture lands are called excellent. Hides are quite largely exported and cattle are imported from Argentina and Chile, chiefly for slaughter, a few for stock. Mutton is largely eaten in the sierra.

Wool is an important export, likely to increase, for the plateau affords ample space, with good wild grasses. The native sheep have rather long legs and a rough scanty fleece; crossed with merinos they give more wool. Good stock was brought from Punta Arenas some years ago with an experienced manager, and near Lake Junín a big ranch has been developing on 130 square miles. There is no finer country for sheep raising than the high valleys of the plateau. Alpacas, *vicuñas* and llamas also afford wool, the first two of much greater value. The *vicuña* wool is the

finest, but there are so few of the animals that the export is small. That of alpaca, however, is greater than that of wool, at least in value. The larger part of the world's supply of the genuine article comes from the Peruvian and Bolivian plateau. The llama, the great burden bearer, has a heavy but coarse fleece, yet some of it is exported. There are more of these three animals in Bolivia. The Indians are expert in their care. The *guanaco* is a larger animal, somewhat similar, which has never been domesticated, and is hunted by the Indians for food. The chinchilla, and the *viscacha*, the Peruvian hare, are hunted for their skins. Many pigs are raised and lard is exported.

Horses. The horses are rather small, but are very fine saddle animals. Some have five distinct gaits. I found them more sure-footed than mules, going up and down veritable rock stairways with ease. They are to some extent originally of Arabian stock.

Fish of the finest quality of 40 or more varieties and in great abundance are found off the coast; large lobsters, scallops, the corbina, cod, sole, smelt, mackerel, and many others are caught.

Guano. There are seals on the islands and an enormous number of sea-birds, which have made the great deposits of guano on the islands. As there was no rain the deposits have been preserved for centuries without loss of the nitrogen of which there is 14 per cent. The islands occur singly or in groups along the coast, some far out beyond the track of the steamers. All are barren and uninhabited. The Chincha Islands had enormous deposits now exhausted. There has been much waste, and deposits have been removed so ruthlessly as to disturb the birds; but now there are careful regulations. Agreement was made some years ago with the

Peruvian Corporation (British) by which they were allotted 2,000,000 tons of the guano; of this they have had more than half; operations have recently been restricted and few shipments made.

Mining

The mine fields of Peru, once famous for their production of gold and silver, never wholly neglected, were for a time less vigorously worked. In the days of the Spanish colonists gold and silver were the chief objects of acquisition, but lately these metals have seemed less fashionable than copper. The variety in Peru's wealth in minerals is shown to some extent by a list of her production in 1917 in millions of pounds in round numbers: copper, 84; copper matte, 4.4; copper ore, 16.5; vanadium, 7; lead ore, 7.5; antimony ore, 3.75; silver ore, 1.76; tungsten, 1. Smaller quantities of other ores were produced: gold, 2000 pounds; sulphur, 120,000; metallic silver, 8000; silver concentrates, 700,000; precipitated silver, 10,000; lead bullion, 250,000; lead concentrates, 650,000; zinc ores, 640,000; lead slag, 177,000; copper cement, 145,000; molybdenum, 12,000; gold ores, 30,500. Many other minerals exist, not exported in large enough quantities to have been given in this list.

Copper. Americans were slow to become interested in mining investments in South America as in commercial trade, but when assured of the success of the pioneer enterprise inaugurated at Cerro de Pasco by New York capitalists about 1900, others followed, and large sums have now been invested in several Republics. Silver was discovered at Cerro de Pasco in 1630 and $200,000,000 were produced in one century. Four hundred and fifty million ounces

were obtained by hand labor, the ore being carried by llamas to primitive smelters. Little interest was taken in copper; only ore with 25-50 per cent of the metal was formerly exported. Here at Cerro, where is located, some say, the richest copper deposit in the world, the titanic forces of nature cast upward a wonderful mass of material, gold, silver, copper, etc. Here are great open pits several hundred feet deep, worked for centuries for silver.

The Cerro de Pasco Company has spent about $30,000,000 in acquiring properties here and at Morococha, in constructing smelters, railways, buildings for employees, and in developing the properties, from which handsome returns are now obtained. The property of the Cerro de Pasco Mining Company consists of 730 mining claims and 108 coal mining claims. The reserves exceed 3,000,000 tons of copper ore, one estimate is 75,000,000. Nearly every claim carries ore with gold, silver, copper, lead, zinc, and cobalt. High silver values exist to 100 feet deep, sometimes running to thousands of ounces a ton, deeper are silver copper ores, and lower still little silver and more copper. The old open mines are 100-300 feet deep. The mines are very wet, especially below 400 feet. A drainage canal begun by Meiggs in 1877 was completed in 1907. The new workings include five shafts and two tunnels of two miles each. The shafts have openings at four levels, the bottom 410 feet. Waste is used for filling, as timber is dear. The smelter has five blast furnaces, each running 300 tons daily. A converter is in another building. A hydro-electric plant completed in 1913 cost $1,000,000. There is a 10 mile ditch and pipe line with one 750 foot fall and a second of 200 feet. The transmission line, 70 miles, serves Morococha and Pasco. There is a coke plant near the

smelter and a brick plant of great value. The coal mines are at Goyllarisquisga and Quishuarcancha, 21 and 11 miles respectively. The coal is not very good, averaging 35 per cent carbon, but answers the purpose.

The Corporation owns 12 mines at Morococha and rents others. The deepest shaft is 750 feet. Several drainage tunnels are required. The production, 12,000 tons a month, was expected to be increased to 16,000. The ore of the several mines runs 5, 14, 15, and in one mine 20 per cent copper continuously, the 14 per cent with 14-70 ounces of silver per ton. The ore averages 7 per cent copper and 10 ounces silver. The mines have produced 20,000,000 pounds of copper a year, one third of the de Pasco Company's output. Morococha is ten miles from Ticlio, the highest point on the main line of the Central Railway; the ore is sent to a smelter at Casapalca, altitude 13,600 feet, ten miles farther down.

The property at Casapalca also is controlled by the Cerro de Pasco Company. In one mine there, a 5000 foot adit cuts the vein 2500 feet below the outcrop; other adits are higher. The ore is sent to the smelter by an aerial tram. The output is 2500 tons a month, two per cent copper, and 40 ounces silver. The Casapalca smelter has three blast furnaces and four barrel type converters. The flue dust is briquetted and returned. It does custom work for independent miners, and in 1916 treated 175,000 dry tons, producing nearly 20,000,000 pounds of fine copper, 3,000,000 ounces of silver, and 3587 of gold; the capacity is now increased 50 per cent. A new smelter has been erected at Yauli by the Company. The Cerro de Pasco property is said to be the most costly ever

developed; the ores are refractory. With the cost production eight cents a pound on an output of over 70,000,000 tons a year, $4.20 a share is earned on 14 cent copper, double on 20 cent copper. The Corporation's income in 1916 was $3,676,000, about 12 per cent on the investment; about 8 per cent was paid in dividends, not an undue amount on what was considered by many a very large risk.

Another great copper property, also owned by Americans, is at Yauricocha, about 50 miles south of Yauli, and west of the Oroya-Huancayo Railway. Four hundred and fifty thousand tons averaging 16 per cent copper and $2^1/_2$ ounces of silver per ton, five per cent of the probable ore in sight, are now ready for stoping. The smelter and blast furnace have an output of 15-18 tons of blister copper daily. Native labor of fair quality may be obtained at one fifth of the cost in the United States, while the ore is said to be six times as rich as most of that in the West. Considerable water power is available. An automobile road has been constructed from the station Pachacayo 60 miles to the mine.

There are other rich copper deposits in Peru, in Huancavelica, Cuzco, Arequipa, Ica, Apurimac, Junín, Ancash, Cajamarca; but as yet none of them is in full production. Ferrobamba in the Department of Cuzco, 45 miles west of the city, at an altitude of 13,000 feet, is one of the largest properties, with 207 claims over 225 acres. The concession includes water rights; 120,000 horse power is available. The ore can be worked by steam shovels. One field is estimated to contain 12,000,000 tons of ore, 6 per cent copper, 3 ounces silver and 9 grams gold. Its inaccessibility has so far prevented extensive operations. The Anaconda Copper Company owns a copper property

in the Department of Arequipa. Copper matte is exported from Queruvilca, Otuzco, Santiago de Chuco, and Cajabamba.

Coal, contrary to earlier supposition, is now known to be widespread in Peru. The astonishing figures of $6^1/_4$ billion tons have recently been given as the estimated supply, over 4 billion of these in Tumbes, a quantity hitherto unsuspected, perhaps unverified. However, coal deposits are certainly scattered along the great Andes Range and in the foothills, mainly in the central and northern sections. Within 100 miles of the coast are millions of tons of anthracite coal near Cupisnique and Huayday; millions more back of Chimbote and along the Huailas Valley, anthracite, semi-anthracite, and bituminous with many veins $4^1/_2$-13 feet thick. Higher in the plateau region are deposits of soft coal near Oyón, Cerro de Pasco, and at Jatunhuasi. The de Pasco coal, 35 per cent carbon, must be washed before coking in the smelter. Forty per cent of the material is rejected. The best coal is used on the Railway. It costs $2.92 at the mine. The Company has no more than is needed for their smelters and railway. Better coal is found at Jatunhuasi 30 miles from Pachacayo, on the road to the copper mines at Yauricocha, the same company owning both. This coal, 45 per cent carbon, makes better coke which now sells at $25 a ton at Pachacayo, previously at $40. This deposit, estimated at 40,000,000 tons, is said to be the largest known in Peru of high grade coking coal, and the only one capable of large scale mining without pumping.

At Paracas in the Department of Ica are veins near the sea. Capital for working the coal mines has not hitherto been available; and land transport a few

miles by llamas has been more expensive than carriage by sea a few thousand. The need is imperative; and foreign capitalists should and no doubt soon will aid in the development of these rich resources. The annual production is now estimated as 400,000 tons.

Gold and silver are always interesting, and there is still plenty in Peru. In 1916 about $1,200,000 worth of gold was mined, though accurate statistics are impossible, on account of the difficulty of estimating the quantity got out by the Indians. A Peruvian engineer estimates the product from the Inambari River through their primitive methods as $100,000 yearly. They build a floor in the river, and the next season wash out the gold sand in the crevices. There are auriferous deposits in Puno and Cuzco; both veins and placers at Sandia and Carabaya, and at Quispicanchis and Paucartambo. Gold coinage in 1918 amounted to nearly $3,000,000. The Aporama Goldfields property near the Hauri Hauri River at Sandia, Puno, has placer deposits covering 1277 acres. It was just reaching production stage when the War opened and interfered. The New Chuquitambo Company has 142 acres in the Cerro de Pasco Province. The Inca Mining Company, American, has the Santo Domingo Mines on the Inambari River, now in the Madre de Dios Department. From Tirapata on the Juliaca-Cuzco Railway, there is a wagon road for some miles, then a mule trail over the Aricoma Pass, 16,500 feet, and down to an altitude of 7000 feet. Even with the difficulties attending the transportation of machinery and supplies $8,000,000 have been produced without exhausting the deposit. The Cochasayhuas mine in Cotabambas yields $20,000 a month. Seventy per

cent of the gold production is said to come from Puno.

Silver. Of silver mines the most important is reported to be that of the Anglo-French Company near the port of Huarmey. Dividends have averaged from 20 to 25 per cent per annum. Possibly rivalling this, are mines farther south at an altitude up to 16,500 feet, the reduction works at 15,200 feet in the Cerro Quespesisa, 120 miles back of Pisco. Less favorably located, but one of the most productive districts in Peru, in the last 50 years it has yielded 6,000,000 ounces of silver with crude processes and a loss of over 25 per cent. The fuel used is *taquia* (llama dung) of which 1500 tons a year are burned. The temperature in the middle of the day is 45°. At that altitude there is no great difference in the seasons in the torrid zone. Supplies are brought from Pisco, a four and a half days' journey.

The Morococha mines produced in 1916 (estimated) 1,500,000 ounces. The selected ore sent from Colquipocro to a Liverpool smelter averaged for some years $200 a ton, while the thousands of tons on the dump run $80 a ton. Silver is usually found with either copper or lead, in Peru oftener with the latter, while gold is in veins of ferruginous quartz, generally with other metals as silver and copper, as well as in sand, alluvial deposits, and in nuggets. Other silver mines operated are in Cajamarca, Ancash, at Yauli near Oroya, at Cailloma in Arequipa 100 miles north of Sumbay, and elsewhere.

Vanadium is found near Cerro de Pasco, the property of Americans. From 70 to 80 per cent of the world's supply is believed to be in Peru, the second largest stock in Colorado. It is of great value for certain purposes in steel construction. The Peruvian

ore, roasted before shipping, contains 25 per cent of vanadium. Three thousand five hundred tons were exported in 1918.

Quicksilver. In the old mines of Huancavelica there is resumption of work through the activity of Señor Fernandini, a prominent Peruvian mine owner who has a smelter near that of Cerro de Pasco. He has been clearing out old tunnels, and driving new ones across, to cut the ores 700 feet below the old surface workings. A hydro-electric plant is on trial for the furnaces. The mines are high on the mountain above the town Huancavelica. The ore is a bright red cinnabar, mercury sulphide, impregnating clean sandstone uniformly, or along planes or fractures.

Other minerals exported are tungsten, in 1917 1500 tons with a 60 per cent basis; a deposit at Yauli gives 14 per cent zinc with silver; a large borax lake near the city of Arequipa is likely soon to be developed; salt, a government monopoly, is found in many places but mainly worked in the *salinas* of Huacho near Lima. Bismuth, molybdenum, and antimony are found.

Petroleum is a very important product of Peru, the total area of oil territory being 5000 square miles, not all proved but with possibilities. The chief field is in Tumbes and Piura in the north, the Titicaca so far having made slight production. The latter field is 300 miles from the sea and eight from Lake Titicaca, near the Bolivian frontier and extending toward Cuzco. Deposits have been found in several provinces but the chief work was not far from the Juliaca station where 10 wells were sunk, in 1912 producing an average of 50 barrels a day, the oil with the paraffin base. At last accounts the work had been discontinued. In 1915 there were 524

wells in the country.

The field at the north extends 180 miles south from the town of Tumbes to some distance beyond Paita, running east to the mountains and perhaps including the Islands of Lobos. The field is 30 miles wide, though some believe it may extend 150 miles. Here is practically no rain, no vegetation, and no water, except that of the sea which is used for all purposes. The temperature is called ideal. The wells range from 250 to over 3000 feet deep. At the north there is a slight plateau 160-500 feet high, running down towards the south.

The Zorritos field farthest north and the oldest in Peru is 24 miles south of Tumbes, with wells four miles along the coast, drilled mostly at the water's edge and some in the ocean. The deepest is 3000 feet but most are 600-2000 feet. Some wells produce 500-600 barrels a day, but one third of those dug were failures.

The Lobitos field in Piura, 60 miles north of Paita, with a proved area of 725 square miles the second largest in Peru, has all its wells over 2000 feet deep. One sunk to 3435 feet was a failure. A well around 3000 feet deep costs $10 per foot average, against $1.50 or $2.00 for wells under 1500 feet. The shallower wells here are short lived. In 1915 a new pool was opened 12 miles north.

The Negritos field is the richest, 40 miles north of Paita, with an area of 650 square miles. The average depth of the wells is 2500-3000 feet and the most important oil deposits are below 1500 feet. Eleven miles east is an asphalt seepage called La Brea. The oil from Negritos is piped 16 miles north to Talara, the port where the refinery and the wharves are situated. Besides the 6-inch pipe line there is a

narrow gauge railway. The modern refinery has a capacity of 6000 barrels a day. With pressure stills employed the oil will give 75 per cent benzine. The Talara port permits vessels of 28-foot draught to approach the wharves. The International Petroleum Company, said to be controlled by Standard Oil interests, now operates this property and has taken over the smaller property of the Lagunitos Oil Company 11 miles from Talara. The amount of oil production in Peru has in ten years increased from 756,226 barrels of 42 gallons to 2,550,000 barrels in 1916, two thirds of the last amount coming from Negritos and Lagunitos.

Industries

While Peru does not support large manufacturing industries she has more than some other South American countries and ample means for increase. Scattered along the coast are more than 50 streams which, though small, falling 10,000 feet, are capable of providing an immense amount of electric power. The use of electricity is already widespread, electric lights and telephones are found in many towns, in several, electric cars; the development of this source of power is progressing.

Of factories, sugar mills take the lead, 50 *haciendas* near the coast having their own mills. In some of these 75 per cent of the sucrose is extracted with the use of the best machinery. Alcohol and *aguardiente* are made from both sugar cane and grapes, as well as wine from the latter. There are rice mills, and factories for making soap, tallow, lard, matches, chocolate, paper, and other ordinary articles; tobacco, cigar and cigarette factories, flour mills, etc. Panamá hats, though made by hand, must not be

forgotten.

Of great importance is the manufacture of textiles, in which the Indians were so proficient in Inca days that their work is said never to have been surpassed. Now there are seven cotton factories, five of these at Lima, making 24,000,000 yards of cloth for the home market. Three thousand operatives are employed. Also there are five woolen factories, at Lima, Cuzco, and Arequipa. Although the Indians are illiterate and lacking in initiative they have a taste for mechanics as well as for agriculture and pastoral pursuits. They still weave and spin, making excellent ponchos and blankets. Education will be a developer. The Indian's patience and skill should be utilized, his ambition roused, so that he may desire to live more comfortably. Higher wages and more varied wants for these people will produce more business and prosperity in all lines.

Investments

Peru obviously offers very favorable opportunities in many lines: railway construction and varied works of engineering, irrigation, sanitation, development of electric power; agriculture, especially the raising of sugar and cotton along the coast, and of a variety of additional products in the montaña; mining of all kinds, especially coal; stock raising; all of these in many sections with a very desirable climate. Of stock, the raising of sheep for the export of wool would doubtless be most profitable. The grasses of the table-land are excellent fodder; the climate is cold enough to ensure heavy fleece but not so extreme as to be injurious in snow storms or in fair weather. By importing a few rams an expert in the business would be able to conduct it with large

profit.

The farmer may purchase land in the montaña at $1.00 an acre and up, according to location, or secure it on other terms arranged for immigrants. Rubber and timber lands are leased under special regulations. Fruit raising and poultry might be profitable in some places. There is an excellent chance for small factories, perhaps for large ones. In many cities of the North and West Coasts American hotels or boarding houses, if properly conducted, would have great success.

CHAPTER XXIV
BOLIVIA: AREA, HISTORY, GOVERNMENT, POPULATION, ETC.

One of the two inland Republics of South America, Bolivia has an enormous area, a section of which is still unexplored in detail. Its chief towns situated on the lofty Andean plateau or a little over its eastern edge, it seems wonderful indeed that here in the 16th century, prior to the existence of New York or Boston, were populous, wealthy cities, hundreds of miles from the coast and from the seat of the Viceroy at Lima. In the present day, such a horseback ride across country as was then and till within a half century common, would by most persons be considered quite a feat, while a similar descent to the Atlantic port of Buenos Aires, then not unusual, is an expedition that would commend itself to few; though this crossing were to the Paraguay River only, where a steamboat would be available for the remainder of the journey.

Area, Population, Boundary

Area. Bolivia, with an area variously given as 515,000 to 708,000 square miles, is generally counted third in size of the Republics. Pending the settlement of the boundary dispute with Paraguay and more accurate surveys, probably at least 600,000 may be conceded, a larger territory than the entire Atlantic slope of the United States. Once possessing a small coast line which included the port of Antofagasta, Bolivia was deprived of this in 1883 at the close of the war with Chile.

Population. The number of inhabitants, mainly an estimate, has been recently given as nearly 3,000,000. With about four persons to a square mile, it is the most sparsely peopled of American Republics.

Boundary. At the north and east the country borders on Brazil. Paraguay is at the southeast, Argentina directly south, and Chile and Peru west.

History

Known by the name of Alto Peru, the country was ruled for nearly three centuries by the Viceroy at Lima, and by a Royal Audience of four men at Chuquisaca, now Sucre, the nominal capital of the Republic. La Paz is noted as the seat of the earliest effort (July, 1809) in South America for democratic government. Though abortive, it was the inspiration of later struggles. The battle of Ayacucho in 1824, which ended Spanish dominion over the continent, was followed by the entrance into La Paz of General Sucre with his victorious army, February 7, 1825. The Act of Independence is dated August 6, 1825. The Republic was named for Bolívar, who was elected President, while Chuquisaca was made the capital with the name of Sucre. General Bolívar, inaugurated in November, resigned in January, 1826, and was succeeded by General Sucre, the first President who really served. More or less troublous times followed until a war with Chile broke out in 1879 over the export nitrate tax. At the conclusion of peace Bolivia lost the small coast section of nitrate land, Antofagasta, which she previously possessed. Since that time several revolutions have occurred, one in 1920, but none affecting her credit, her foreign contracts, or the lives of the people generally.

Government

Bolivia is in form a centralized republic and has the usual three branches. The President, who with two Vice Presidents is elected for four years, and is ineligible for a consecutive term, exercises almost absolute authority, although Congress meets annually on the sixth of August. The President's Cabinet is composed of six Ministers: of Foreign Relations and Worship, Interior and Justice, Treasury, Promotion (Internal Improvements), Public Instruction and Agriculture, and War and Colonization.

The Senate has 16 members, the Chamber of Deputies 72. The administrators of the Departments and of the 63 Provinces, the Prefects and the Sub-prefects respectively, are appointed by the President. Municipal Councils regulate the local affairs of the cities. Suffrage is enjoyed by male citizens over 21 (not domestics) who can read and write, who have a fixed income of 200 bolivians, and whose names are registered. The Supreme Court alone of the three branches of government is located at the nominal capital Sucre. The Judiciary has a Supreme Court with seven Judges, a Superior Court in each Department, and Provincial and Parochial Courts.

The Republic comprises eight Departments and three Territories as follows:

Departments	Area, in square miles	Population	Capitals	Popul
La Paz	73,000	734,000	La Paz	10

Oruro	27,000	137,000	Oruro	3
Potosí	57,000	515,000	Potosí	3
Cochabamba	36,000	512,600	Cochabamba	3
Chuquisaca	37,000	320,000	Sucre	3
Tarija	31,000	160,000	Tarija	1
Santa Cruz	140,000	327,000	Santa Cruz	2
El Beni	95,000	50,000	Trinidad	
TERRITORIES				
Colonias del Noroeste	81,000	50,000	Riberalta	
Colonias del Gran Chaco	60,000	23,000	Villa Montes	
Delegación Nacional en el Oriente			Puerto Suarez	

Population

The population of Bolivia, about 2,800,000, as in Peru is in three classes: the whites, numbering possibly 500,000, Indians and mestizos most of the rest, the Indians largely in the majority, though there are more than half a million mestizos. A few thousand are negroes. Since the coming of the Spaniards centuries ago, there has been no real immigration, the mass of the people thus continuing Indian. The whites, many of whom have some admixture of Indian blood, are of course the ruling class. An aristocratic society exists, the members of

which follow French fashions and customs and in considerable number have visited Europe. A few persons have inherited or acquired by mining or otherwise very large fortunes. Some persons of obviously mixed race or mainly of Indian blood become educated, and acquiring wealth take part in politics, hold office, and obtain social position; more such than in Peru. There is a really cultured society in all towns of moderate size.

The plateau Indians are chiefly Aymarás or Quichuas, the former living around Lake Titicaca and throughout the northern part of the plateau; while the Quichuas, strange to say, are at the south, farther from their kindred in Peru. The Aymarás are less prepossessing than the Quichuas, more churlish, rather darker, similar in mode of life, though a trifle more backward. They till the soil to some extent, act as herdsmen, work in mines, and perform heavy labor of any kind, carrying loads of 60-80 pounds, 20, 30, even 50 miles a day. The women are said to be stronger than the men; both do spinning and weaving. The men are inveterate chewers of coca, and men and women both are much given to drunkenness. Of melancholy aspect, they seem devoid of ambition. Generally submissive, if aroused they are revengeful and murderous. Having received little attention from the Government they are probably in poorer case than when ruled by the Incas; they are believed to be diminishing in numbers. Plans have been formed for improving their condition.

The mestizos, also called cholos, feminine cholas, are the industrial class of the nation, artisans, shopkeepers to some extent, etc. The men dress in second class European style; the cholas, one might

say, half and half. As a rule the cholos treat the Indians more harshly than do the real whites, while to the latter they are rather servile. Some cholos have distinguished themselves as writers and statesmen. Two thirds of the population are said to live at or above 12,000 feet. Several mining camps are at 15,000 to 16,000 feet.

Education

Education is public, official, free, or private. Primary education is called free and compulsory. The provision, formerly inadequate, has recently been improved in accordance with a well planned programme. There are about 900 primary schools with 53,000 pupils, including private and kindergarten. Fourteen *colegios nacionales* provide for secondary education besides private schools under government supervision; in La Paz and Cochabamba, two under Methodist auspices have accomplished excellent work. Teachers are trained in four normal schools, while professional or higher education is afforded by Universities in La Paz, Sucre, and Cochabamba, Law Schools at Oruro, Potosí, Santa Cruz, and Tarija, a School of Theology at Santa Cruz. There are further a Mining School, Institutes of Agronomy, Commerce, Modern Languages, and Music; and four Schools of Arts and Trades, the one at Cochabamba giving excellent results from instruction in weaving wool, and in the use of native dyes. With a view to extending and modernizing the education of women coeducation is practised in most institutions and there are two *liceos* for girls. Students of especial ability are sometimes sent abroad for study, and foreign instructors are engaged.

Press, Religion, Etc.

Press. The press, while important, is said to have less influence than in the neighboring Republics, and it contains less news of the world.

Religion. The religion of the State is Roman Catholic, but freedom is now granted to other forms of worship. Civil marriage alone is legal, but is frequently neglected by the Indians.

Telegraphic Communication. The Capital is in telegraphic communication with the rest of the world and with the capitals of all the Departments. The country has over 200 offices, and 4350 miles of wire. A powerful wireless station at Viacha, on the plateau 15 miles from La Paz, communicates with the Pacific Coast and with passing ships. Other stations are at Villa Bella, Cobija, Trinidad, Santa Cruz, Ballivián, D'Orbigny, Esteros, Riberalta, Puerto Suarez, and Yacuiba. Telephone service exists in La Paz and Oruro.

Money. The unit of Bolivian money is the *boliviano*, equal to about 40 cents (.389) of our money. English and Peruvian gold pounds are legal tender, equal to 12.50 *bolivianos*. The latter are divided into 100 centavos. Silver coins are of 20 and 50 centavos. Bank bills of one and five *bolivianos* and of higher denominations are in general use.

Weights and Measures are of the metric system, but in the interior the old Castilian system is chiefly employed.

Physical Characteristics

The topography of Bolivia in general is similar to

that of Peru save for the absence of a coast section. The Sierra or plateau region and the Trans-Andine continue those at the north, though the latter differs from the Peruvian in that its rivers reach the Atlantic Ocean, some by way of the Amazon, others by the Paraná and La Plata, while the *montaña* of Peru is wholly in the Amazon Basin.

The **Plateau Region** of Bolivia, 90 miles from the Pacific, extends from northwest to southeast about 460 miles, with an average width of 100 miles and an altitude of 12,500 feet. It is bordered on the west by the Cordillera Occidental, containing snowclad peaks, several of which are volcanoes, many dormant or extinct, and on the east by the Cordillera Oriental, the northern part of which is the Real or Royal, a name eminently deserved. The two ranges come together at the Knot of Cuzco or Vilcanota. Northeast of Lake Titicaca is another confused mass or knot, the *Nudo* of Apolobamba, where are said to be some of the highest peaks of the Andes. The central plateau, once an inland sea, and now including Lake Titicaca, slopes slightly from the north, where it has a height above 13,000 feet. It is broken in places by ridges and peaks, one over 17,000 feet high, and is cut by a few cañons. In the West Cordillera a number of peaks reach an elevation of 19,000, 20,000, or 21,000 feet; on the east the Cordillera Real contains several above 21,000. Farther south in the lower ranges are some peaks of volcanic character. A transverse ridge, the Serranía de Lipez, terminates the Bolivian Plateau.

East of the southern part of the Cordillera Oriental is a mountainous section of which the Sierra de Cochabamba on the northeast and the Sierra de Misiones on the east form the limit. Considerably

farther east in the region of the lowlands is the Sierra de Chiquitos between the Mamoré and Guaporé Rivers, mere hills in comparison, with one almost attaining 4000 feet. The highland or plateau section, the only part visited by ordinary tourists or commercial men, occupies hardly two fifths of the territory, the less known lowlands three fifths.

The **Lowlands**, extending farther north than the Bolivian plateau, comprise low alluvial plains, swamps, and lands often flooded, including great forests and llanos. The great forests are at the north in the Amazon Basin, the open plains in that of the Plata.

Rivers. The only rivers of consequence are those which flow towards the Atlantic, with the exception of the Desaguadero, about 200 miles long, the outlet of Lake Titicaca. This river flows into Lake Pampa Aullagas or Poopo, which has no outlet unless it be by an underground stream to the Pacific, of which there are some indications. The principal rivers of the Plata system, the Pilcomayo and the Bermejo, flow southeast into the Paraguay River. More numerous and important are the streams flowing northeast belonging to the Amazon Basin, the chief of these, the Beni, and the Mamoré, which form the Madera River. They have many tributaries, the Beni having the Madre de Dios, the Madidi, the Cochabamba, and others; the Mamoré receiving the great boundary river, the Guaporé or Itenez, and many more.

Climate

Bolivia, still within the tropics, has the same variety of climate as the countries previously

described, the difference in altitude causing the variation. The portion of the table-land where the altitude is 12,000 to 13,000 feet, called the *puna* by the natives, has two seasons which resemble autumn and winter, the summer is so short and cool. The summer, the season of snows, is from October or November to May; the winter usually has slight precipitation. Little will grow here except potatoes, barley, and *quinua*. The higher land up to the snow line, perhaps 17,000 feet, called the *puna brava*, is still colder, supporting grass only, where herders alone are found with native flocks and rare mining settlements. Higher still is eternal snow with almost Arctic temperature, -20° I found it at night on a glacier on Mt. Sorata. A professor once told me that at 16,000 feet he was unable to keep warm at night however much clothing and blankets he used, but the Indians, moderately clad and with bare feet, endure the cold with apparent indifference.

The valleys as high as 12,000 feet, as in the case of La Paz, are comparatively comfortable, being shielded from the bleak winds of the plateau. From 9500 feet to 11,000 the climate is sufficiently temperate for the raising of vegetables and cereals. In what is called the Valley Zone, 5,000 to 9,000 feet, there is slight variation throughout the year, perpetual summer and subtropical vegetation. Below are the *yungas*, deep valleys with semitropical climate, and further the tropical lowlands. Except for the last section the country as a whole may be called healthful, diseases arising from bad habits, poverty, ignorance, and unsanitary conditions, rather than as a necessary result of the climate. In the lowlands, however, tropical fevers and malaria are likely to exist, while many persons are more or less affected

by *soroche* on ascending to the plateau from the sea. In La Paz the weather in winter is cool, with a temperature occasionally below freezing and ranging from 40° to 50° in the house. Snow though not uncommon soon vanishes in the sun, and flowers like geraniums blossom all the year in the open. In summer, with much more precipitation, it usually rains in the valley, with snow often on the *puna* and always on the mountains above.

CHAPTER XXV
BOLIVIA: CAPITAL, DEPARTMENTS, CHIEF CITIES

The Capital

La Paz, the de facto capital, population 107,000, is by far the largest and most important city commercially. It is the highest capital and large city in the world, also one of the most picturesque, both on account of its location at the bottom of a cañon, 1000 feet deep, and of its street scenes with the strangely garbed Indians and cholos, and the droves of llamas. The city has better sanitary arrangements than Quito, the narrow streets are remarkably clean, but some conveniences are lacking. There are electric lights and cars, but a meagre water supply, and too few opportunities for a bath. Good hotels are needed, the new "Paris" and some older houses being wholly inadequate for present necessities. The business of the city is largely in the hands of foreigners, i.e., the best shops, and some of the banks and importing houses. La Paz is the chief centre of trade of the country, the Custom House here transacting by far the most business, but supplemented by several others at the east and south.

Departments

La Paz is the most northern Department of the plateau region, the third largest, the first in population and importance. It has Colonias north, El Beni and Cochabamba east, Oruro south, and Chile and Peru west. La Paz has an extremely varied landscape with a range in altitude from 640 to

21,750 feet at the top of Mt. Sorata, though some Bolivians give the altitude of this mountain as 24,000 feet. Besides the Cordillera Real the Department includes Lake Titicaca, or as much of it as does not belong to Peru. The lake is remarkable as being the highest in the world on which steamers regularly ply, 12,500 feet is an accepted figure; 12,545 is also given. The lake has an area of 3200 square miles; it is about 120 miles long, 34-44 wide, and 330 feet deep, in places nearly 1000. Other figures are 145 miles long and 69 broad, average depth 492 feet; temperature of water 48°; annual rainfall about 78 inches. Besides the bleak table-land west of the Cordillera Real, the Department comprises many beautiful valleys east of the mountains. It contains, with the capital La Paz, several important though not large cities: Corocoro, a famed copper centre; Sorata, north, a delightful spot, at an altitude of 8000 feet, a centre for the rubber industry and for mining; Achacachi, a big Indian town near the Lake; Copacabana, a very sacred religious shrine, also on the Lake; Coroicas, east in the Yungas Valley. Actual or potential wealth of almost every kind may be found here: large flocks of llamas, alpacas, and some vicuñas; sheep and goats, herds of cattle and horses; vegetable products, coca, cotton, coffee, cereals, etc.; great riches in minerals, gold, silver, tin, copper, rock crystal, berenguela, a fine native marble, all these in fine quality and immense quantity. The wonderfully grand and varied scenery of this Department can be duplicated or rivalled in few quarters of the globe.

Oruro, directly south of La Paz, between Potosí and Chile, is the smallest of the Departments, entirely on the plateau, thus having a much smaller range of altitude and of climate. Its wealth is in

minerals, especially silver and tin, though gold, bismuth, borax, and sulphur are found. Alpaca, chinchilla, and wool are other products.

The capital, Oruro, 127 miles south of La Paz, while for years the terminus of the railway from Antofagasta, became an important commercial and industrial centre; in addition it is one of the busiest mining districts. Half of the mining men are foreigners; a large proportion of the ordinary population is Indian. There is also agreeable society, with people quite up to date in Paris fashions. The only other city in the Department is Challapata.

Cochabamba, south of El Beni, east of La Paz and west of Santa Cruz, is sometimes called the granary of the Republic. It is a particularly delightful region, half temperate and half semitropical, with altitude ranging from 973 to 16,777 feet. It possesses immense plains with innumerable herds of cattle, magnificent fertile valleys, rich forests, and minerals.

Cochabamba, the capital, is the city next in size to La Paz, 276 miles distant; with an altitude of 8387 feet it enjoys a delightful climate, an average temperature of 66°, and abundant rain. It has a good club, an American Institute (a school for boys), and the least illiteracy. The recent arrival of the railroad insures its rapid growth.

Potosí is another plateau Department, both east and south of Oruro, bordering also on Chuquisaca and Tarija, and with Argentina south and Chile west. It has for the most part a rather cold, disagreeable climate, the altitude ranging from above 20,000 to a little over 6000 feet.

The name Potosí, for centuries famous as almost a synonym for silver, belongs also to the capital city, at

a height of 13,388 feet. In 1650, when New York was a small village, it had 160,000 inhabitants. The city has an excellent mint, built in 1562, also a superb old cathedral, a good library, and a museum. Above the town 32 artificial lakes were constructed of which 22 are still good. The temperature varies from 9° to 59°; it is said that they have the four seasons in one day. Even here potatoes, barley, and beans will grow, but living is very dear. The town has foundries, engineering shops, and 28 smelters. The Department still contains enormous quantities of silver and tin in almost every variety of combination, and more towns that are rich mining centres than any other Department except La Paz. Uyuni is a town of 6000 inhabitants, Colquechaca has a population of 8000 miners; Tupiza, soon to be reached by the railway, is a pretty city in a pleasant valley, 66 miles from the Argentine border.

Chuquisaca, east of Potosí and south of Cochabamba and Santa Cruz, is much warmer, the altitude ranging from 255 to 13,450 feet. Here also are mines of the usual varieties and petroleum too, tropical fruits and vegetables of course, and plains with vast herds and flocks.

Sucre, the legal capital of the Republic, altitude 9328 feet, is situated on an arm of the Pilcomayo River. Social distinctions are here more marked, and there is an exclusive circle agreeable to those of the right type. Sucre, Cochabamba, and La Paz are called the most cultured cities. More than 300 miles from La Paz in a straight line and, as it is on the east side of the Cordillera, much farther on horseback, which until lately was the only way to journey thither, except for some miles of staging, Sucre is now more accessible, as will be indicated later.

Tarija, south of Chuquisaca and southwest of Potosí, is with Potosí the most southern of the Departments, now smaller than formerly, since the Gran Chaco has been made a separate Territory. Like Chuquisaca it is on the east side of the Cordillera, the greatest altitude being 12,874 feet. The climate obviously varies from temperate on the west to hot in the lowlands, the productions varying similarly. There are possibilities for all varieties of grain and fruit, as well as for stock raising; the western part lies in the silver region, having gold and copper as well.

The capital, Tarija, 80 miles east of Tupiza, is 250 miles from Sucre and 600 by rail from La Paz, but a few days must still be spent in stage or on horseback. Prospects for speedy rail connection are good when rapid development will follow.

Santa Cruz, north of Chuquisaca and east of Cochabamba is the largest Department of all, and the richest in wild animals and vegetation. This Department, altitude 377-9754 feet, does not reach the great mountains, but far to the east it has a little range of its own, the highest summits of which are just below 4000 feet. Here are forests and prairies, cattle, tropical fruit and vegetables; cotton grows profusely, rice, *manioc*, coffee, *copal*, rubber, what you will. Here too is petroleum, iron, quicksilver. The white population is said to be of purer Spanish blood than in most of the Departments, comparatively unmixed; but as the climate is hot the people are naturally indolent.

The capital, Santa Cruz, altitude 1400 feet, 550 miles from La Paz by way of Cochabamba, and 330 from Sucre, was founded, only think! in 1545. It is on two of the main routes running from Bolivia to

Argentina and Paraguay. With a population of 20,000, it is quite a city, having a variety of local industries, and being on a favored route for the export of rubber, sugar, and coffee to Europe; but the enormous cost and difficulty of transportation retards its progress. Three hundred and ninety miles east near the Paraguay River is Puerto Suarez, two hours or 11 miles by cart road from Corumbá, Brazil, to which point steamers come from Buenos Aires. A railway too practically reaches Corumbá from São Paulo.

El Beni, the last of the Departments, occupies the northeast portion of Bolivia, being divided from La Paz by the Beni River. With an area of 100,000 square miles the variation in altitude is slight, 465-2800 feet; hence everywhere a hot climate. It has hardly 40,000 inhabitants, mostly Indians. Nearly all the whites are engaged in the rubber industry, though stock raising and agriculture are slightly practised in the higher sections.

The capital, Trinidad, 400 miles from La Paz, with a population of 5000, is the least important of the various Department capitals, though containing many stores and trading concerns for the sale of imported products. Some smaller places are of greater commercial consequence and better known, on account of their location.

Colonias. Of the Territories of Bolivia Colonias of the Northwest is west of El Beni, and north of La Paz. Since the settlement of the boundary dispute between Peru and Bolivia, the area of the territory is given as 81,600 miles. It is similar in character to El Beni, a great wilderness, full of water courses and forests, a land of wonderful vegetation; population 40,000, besides 15,000-20,000 wild Indians, not to

mention animals, mostly wild, gorgeous birds, snakes and insects. The swamp fevers, it is said, may be avoided by healthy persons who use proper precautions and live on the highlands where forest clearings permit the free course of the wind. Rain falls from December to May, but May, June, and July are agreeable, with night temperatures 60°-70°. In the warmest months the range is 76°-90° in the hottest part of the day. In September cool south winds bring sudden changes often producing colds.

The capital, Riberalta, 920 miles from La Paz, at the confluence of the Madre de Dios and the Beni, stands on a high bank 65 feet above the water, which the main street faces, an unusually desirable location. Its population, perhaps 4000, is increasing rapidly with the number of trading houses and rubber exporters who own small steamers for river traffic.

Villa Bella, 125 miles below Riberalta, at the junction of the Beni and Mamoré, is on comparatively high land, facing the Brazilian town, Villa Murtinho on the other side of the Mamoré. On account of the favorable location for export, rubber and timber property in the vicinity is especially valuable. The climate is better than in many other sections of the tropical lowlands.

El Oriente. This Territory, uncertain as to area and boundary, is lowland southeast of Santa Cruz, extending to the Paraguay River, north of the region claimed by Paraguay.

The capital, Puerto Suarez, is a small place on a bayou of the Paraguay River facing Corumbá.

Gran Chaco. South of Santa Cruz and southeast of Tarija, of which it was formerly a part, is the

Territory of Gran Chaco, where the boundary with Paraguay is still undetermined. Fifty-seven thousand square miles is given as the area. Here are low lying plains, some covered with water in the rainy season (December to March), one or two feet deep; also open forests with palms, willows, cedar, carobs, and quebracho; and hilly sections occupied by wild Indians.

Yacuiba, formerly the capital, which is now transferred north to Villa Montes, is a town 200 miles southeast of Tarija, and still the most important place in the territory. In addition to forest riches, are those of the plains, now harboring wild cattle, and undoubtedly suitable for stock raising.

CHAPTER XXVI
BOLIVIA: PORTS AND TRANSPORTATION

La Paz. Bolivia unhappily has no seaport, but lake and river ports are better than none; of these she has several. Nevertheless La Paz is the chief port of entry with the principal Custom House, the terminus of the three railways leading from the Pacific.

Railways

Route from Mollendo. In 1903 not a single railway reached La Paz, but not long after, the road, which then left one on the great plateau, arrived at the edge of the *alto*, whence by electric power the cars are brought down the steep walls of the cañon to the picturesque city. This route is the conclusion of the road from Mollendo, by all means the most desirable for the traveler coming from the north. The inconvenience suffered by many persons going from the coast directly to the high table-land, and the real danger to those with weak hearts, may be lessened or entirely obviated by pausing two or three days in the pleasant city of Arequipa. Even the compulsory stay of a single night may render the journey to Puno innocuous to the person in good condition. Having crossed the divide, altitude 14,688 feet, one arrives at nightfall at Puno, on the shore of Lake Titicaca, altitude 12,500 feet. The boat is there taken for the night journey of 130 miles to Guaqui, the Bolivian port at the south end of the lake, a 14 hour sail which no one should miss; for in the morning an inspiring vision may be had, hardly equalled on the globe, of the magnificent Cordillera Real, a hundred

mile stretch of rugged snowclad peaks from Illampu to Illimani with Huaina Potosí halfway. A splendid view of Illampu is had on the left, during the three hours' ride, 56 miles, over the almost desert plateau, and after passing its edge a matchless view of the cañon, the city, 1000 feet below, and Illimani towering far above.

Arica-La Paz Railway. The second route is from the port of Arica, formerly in Peru, but now in the possession of Chile, which country in accordance with the peace terms with Bolivia of 1883 constructed the Arica-La Paz Railway as far as the frontier, the most difficult portion, while Bolivia laid the rails for 145 miles within her own boundaries. A branch 5 miles long leads to the important mining town of Corocoro. This is by far the shortest route from the coast, only 281 miles, but as we have seen, this is a disadvantage to travelers rather than a benefit; nor is there a gain in time to one coming from the north, as the steamer arrives at Arica, a day later than at Mollendo. As one may come up from Mollendo, including the night at Arequipa, in 48 hours, one thus arrives in La Paz a few hours before one who travels in 22 hours from Arica. The journey from Mollendo is 534 miles. For the more rapid climb from Arica there are 28 miles of rack railway with a maximum grade of six per cent. The equipment of the road has been inadequate for the business, but more has been ordered; larger port works at Arica are needed and expected. The highest point on the railway is 13,986 feet near the Bolivian boundary, nearly 700 feet lower than on the road from Mollendo; but being reached in less than half as many hours, and also at night when the effect of the altitude is always greater, even the most robust are likely to suffer from a headache if not worse, as is

the case with persons coming up from Antofagasta. Going down by either route there is usually no trouble, except for those who have been a long time at the higher altitude.

Bolivia-Antofagasta Railway. The journey to La Paz from Antofagasta, on the Chilian coast 400 miles below Arica, occupies two days for the 718 miles. This, the earliest of Bolivian railways, with Oruro for years as the terminus, in 1911 was continued to La Paz, *i.e.*, to Viacha (15 miles from La Paz), where it meets the road from Guaqui, the two forming a long link in the Pan American chain. The later road now has its own line into the city. At Uyuni, where there is a Custom House and a change of cars, the road turns off towards Chile. From Ollague on the Chilian border, a 58-mile branch runs to the Collahuasi copper mines, among the richest in the world. A Bolivian extension is now being made along the plateau to connect with the Argentine road from La Quiaca to Buenos Aires. Already Atocha has been reached; 60 miles remain to Tupiza, and 66 more to La Quiaca, the terminus of the Argentine railway to the border. An automobile service is operated in the dry or winter season from Atocha to La Quiaca, making the journey in eight hours. The rest of the year one goes on muleback. Thus by the weekly train from La Quiaca to Buenos Aires in 48 hours, the entire journey, 2000 miles, may be made from La Paz much more quickly than by way of Chile, in case one does not wish to go there. This route also serves when the Trans-Andine is blocked by the winter snow.

Other Argentine connections are planned. A branch railway is to be built from La Quiaca or possibly from Orán to Tarija, about 82 miles;

meanwhile it is expected to construct an automobile road for the service. A railway extension from the Argentine boundary farther east, hoped for in the near future, is from Embarcación to Yacuiba, thence to Santa Cruz, thus opening the cattle region of the Chaco, of Chuquisaca, and Santa Cruz for the export of cattle through Buenos Aires.

Several Branches. Farther north important branches to the interior are already in operation. The first, opened in 1912, was from the station, Rio Mulato, 130 miles south of Oruro, to far famed Potosí. This section, 108 miles long, climbs to a height of 15,814 feet, the second highest altitude reached by rail, following the Morococha branch of the Central Peruvian. The cost was over $8,000,000, the maximum grade three per cent. The trip occupies eight hours; there is weekly service. The Oruro-Cochabamba Line was completed in 1917; its length 132 miles, its cost above $10,000,000. It crosses the Cordillera at about 14,000 feet. This road is equally important, opening up a fine agricultural and well populated district. Its fine scenic attractions should allure the tourist. Food is very expensive on the plateau, but with improved access to the warmer sections, lower prices and greater variety of fruits and vegetables may be expected above.

A branch on the plateau long in operation is a 24 mile line from Uyuni to the Huanchaca silver mines, the road owned by the Mining Company. Another branch is now under construction from Machacamarca to Uncia, 57 miles, built by Simon Patiño, the wealthy owner of extremely rich tin mines at Uncia. Thirty-eight miles are in operation.

New Lines. Under construction are two very important lines: one the Potosí-Sucre Railway, 105

miles, with 40 in operation; the other, the La Paz-Yungas Line of very difficult construction, passing over the mountain range near La Paz at an altitude of 15,338 feet and going down into the deep valley. One hundred and thirty-seven miles have been surveyed. The passage has been accomplished, the road opened to Unduavi, 16 miles, from which point it will be continued down the valley to Coroico, later to Rurenabaque, and some time to Puerto Brais on the Beni, the latter port being open to navigation all the year. Already a delightful road for tourist travel and useful for bringing fruit, vegetables, and other products to the La Paz market, has been constructed. With the completion of the road to Puerto Brais, a more speedy route for travel and freight to Europe will be attained. On account of the scarcity and high cost of coal this road is operated by electricity, for which the great fall of small streams gives ample power. On account of transportation difficulties and increased cost the completion of the Potosí-Sucre Railway has been delayed, but when this is realized the road will probably be continued northeast to Santa Cruz. From this city a road to Puerto Suarez on the Paraguay, now talked of, will come later. Bolivia has about 1400 miles of railway in service. A road to Santa Cruz from Cochabamba instead of Sucre is advocated by many.

Other Forms of Transportation

Roads. Automobile roads are planned and being constructed to fill as far as possible present requirements, but in the rainy months, December to May, traffic is generally suspended. From Cochabamba to Sucre there is motor service for freight and passenger traffic, a more direct route

than that from Potosí for persons in La Paz. From Potosí to Sucre a motor bus makes the journey in 12 hours. Another motor car road soon to be available is from Riberalta to Villa Church (65 miles), opposite Guajará-Mirím in Brazil, the terminus of the Madeira-Mamoré Railway. From Cochabamba autos run to Totora, also from La Paz to Achacachi, and over a spur of Illampu down to Sorata.

Aside from railways land transportation is chiefly confined to burros, mules, and llamas; in some places there are mule wagons or ox-carts, mules generally carrying the traveler. The cart roads, constructed and maintained by the Government or the Municipality, are mostly very poor; yet such as they are they extend 2000 miles. They are often if not usually impassable in the wet season. Llamas are more extensively employed than in any other country. In the plateau region with their 100 pound burden they wander leisurely along, cropping the coarse grass, tended by their Indian owners or drivers, who are in no more of a hurry than they. Along difficult mountain slopes are paths constructed by the Indians, skirting precipices and climbing steep inclines, where llamas, mules, and burros bear loads of minerals, coca, coffee, or other products or imports, from one section to another. About 5000 mules and burros pass over the La Paz-Yungas road daily. Except in the dry season, May to October, travel either by mule or by stage may anywhere be difficult or impossible on account of rivers becoming impassable by reason of freshets or roads because of mud. The importance of proper packing according to directions of goods which may be shipped to the interior, or indeed to any destination, cannot be overestimated.

Lake Transport. Aside from the railways transportation in Bolivia cannot be called excellent either on land or water, though there is fair steamboat service on Lake Titicaca. This with Lake Aullagas (Poopo) and the Desaguadero River are the only waterways of the table-land where navigation exists. On the larger lake the Railway Company has steamers of 1500 tons or less, five in all, connecting with the trains, and some touching at small ports on the islands and around the Lake. Other boats are used, among them Indian balsas, built entirely of reeds, sails and all. In the use of these the Indians are very expert. The Desaguadero River is navigable to Lake Poopo for steamers of 500 tons. Poopo is navigable for boats of shallow draft.

River Transport. Of great and increasing importance are the rivers of the eastern slope, both those of the Amazon Basin, and to a less degree those of the Paraguay, which river for some distance is practically the eastern boundary of Bolivia. Its chief tributaries are the Pilcomayo and the Bermejo. Bolivian statistics give the total length of all their navigable rivers as nearly 12,000 miles, but these figures include sections not conceded as within the boundaries of the Republic as well as rivers on the boundary. Half of the distance mentioned, 6000 miles, is said to be navigable by steamers of 4-6 feet draft.

In the Amazon Basin steamboat navigation is possible on the Acre from the Upper Purús, the Abuna, Orton, Madre de Dios, Beni, Madidi, Mamoré, Itenez or Guaporé Rivers, with some of their tributaries. Of the above, the Beni and the Mamoré are the most important. On the latter, regular steam service has recently been inaugurated from Cuatro

Ojos in Santa Cruz to Guajará-Mirím (a distance of nearly 1000 miles), the terminus of the Madeira-Mamoré Railway. From the Department Cochabamba, boats descend on the rivers Chaparé, Chimoré, and Iabaro to the Mamoré. The Guaporé, though easily navigable for 1000 miles, flowing through an uninhabited region, is little used.

Although most of the streams are more or less obstructed by rapids, rocks, and masses of tree trunks, which last might easily be cleared away, they are nevertheless useful for navigation. In spite of difficulties and dangers much transport with canoes and rafts is effected by the Indians, who are expert boatmen. On the Beni, rafts are used from Puerto Pando 155 miles to Rurenabaque; from there steamboats serve 573 miles to Riberalta; the Esperanza Rapids below the town making their further passage impracticable. Hence the journey to Villa Bella opposite Villa Murtinho on the Madeira-Mamoré Railway or to Villa Church, higher up, opposite Guajará-Mirím must be made by land; therefore the motor road is being constructed.

In high water the Madre de Dios is navigable by steamers far up its tributaries, at other times by *callapos* which consist of two or three *balsas* fastened side by side. The *balsa* here is a small raft made of several logs. It is usually 22 to 26 feet long, 5-6 wide, carries 750 pounds, and is managed by three boatmen. A *callapo* or *monteria* may carry 3400 pounds with a crew of from 3 to 15 highly skilful men. They make 9 or 10 miles daily, navigating 10-12 hours. With the return of normal conditions the development of this region will be hastened, and greater benefits will be realized from the opening of the Madeira-Mamoré Railway which occurred in

1912.

CHAPTER XXVII
BOLIVIA: RESOURCES AND INDUSTRIES

Mining

The mining industry, at present the most important in Bolivia, is likely to continue the leader for an indefinite period, although with easy communication and large population in the lower districts it may ultimately have a rival in forestal and agricultural products, or in cattle, certain to be at least a very valuable adjunct. The mineral riches of Bolivia may equal if they do not surpass those of Peru, though except for silver and tin they are probably less known. They include almost every variety of the precious metals, with others not so classed. To mention a few of these, there are gold, silver, tin, copper, bismuth, lead, antimony, tungsten, platinum, zinc, petroleum, with fine marbles, alabaster, malachite, opals, emeralds, jasper, borax, salt, etc. There are thousands of known lodes, but comparatively few are worked. The statement of the scientist, Raimondi, that the plateau of Bolivia is a table of silver supported on columns of gold is declared by Walle to be no exaggeration. A few of the mining belts where some work has been carried on will be mentioned.

Gold. At the present time little is done in the way of gold mining, tin and copper being more fashionable. Another reason for inactivity in this line is that the Bolivians possess the majority of the more favorably situated holdings, which they refuse to part with except at prohibitive prices or possibly at all, hoping some day themselves to be able to

operate them. It is true that in the early colonial days enormous quantities of gold and silver both were produced and exported, although obtained by crude mining methods. It is thought that with modern machinery excellent if not better results may yet be obtained. In the 210 years previous to 1750 more than 12 billion dollars worth of gold was produced in the country. There has been a falling off since then, but one family in the last century obtained over $3,000,000 from their property. Between 1868 and 1900 over $120,000,000 is believed to have been produced. In many sections gold is known to exist in abundance and with further exploration it will doubtless be discovered in others. It is found in alluvial deposits, also in veins or lodes of quartz, from which the deposits are the washings. Veins of antimony which are common in Bolivia contain gold in chemical or mechanical mixture.

There are three regions where gold is found, all of considerable extent: the first and best known crosses the provinces of the Department of La Paz, chiefly on the east slopes of the Cordillera Real, continues through that of Cochabamba and runs out in Santa Cruz towards the Rio Paraguay. In La Paz are the well known deposits of the Tipuani River, of Chuquiaguillo, and many others. The second region begins in the southwest corner of the country, and passing south of Tupiza turns north through Potosí towards Santa Cruz. The third is in the northwest part of the Republic, joining the similar section in Peru. Although said to be the richest of all, it is practically unexploited and unexplored.

While the opinion is held that the lack of means of communication is all that prevents a large production of gold in Bolivia, I believe that to

Americans this is a smaller drawback than the distance of the whole country from the United States; this objection will have less weight in the future. Certainly the hardships of those regions and the difficulty in reaching many of them is slight indeed in comparison with the trials experienced by early Alaskan miners. The Tipuani, for instance, is within a day's horseback ride from the pretty town of Sorata, population 8000. Chuquiaguillo, now owned by an American company, is within easy walking distance of La Paz. Others are more remote, most of them on the eastern slope of the Cordillera Real, to be reached over passes of 15,000 feet or more, yet within a few days' ride of civilization. The single region of the Tipuani is 120 miles long.

Besides the opportunities for placer mining there are strata formed of sand, clay, and stones, from 50 to 330 feet deep. Sometimes in these there are veins with gold in thin flakes 98 per cent pure. Some workings are open, others in shafts and galleries like an ordinary mine. However, difficulty is experienced in taking machinery over the poor trails, and also in obtaining labor. In May, 1904, a nugget was found at Chuquiaguillo containing 47 ounces of pure gold, nearly $1000 worth. One hundred miners are employed here at 50 cents to $1.50 a day. In the Province of Velasco, Department of Santa Cruz, is a region considered by Walle more accessible than others, to which one would come from the Atlantic to Corumbá on the Paraguay River or perhaps by rail from São Paulo, and enter Bolivia across the plains. It is thought that Bolivia may become one of the leading gold producers of the world.

Silver. The silver mines are better known and are now worked on a larger scale than the gold, although

10,000 lodes are practically abandoned or operated slightly. The suspension was not because of a scarcity of silver but for lack of capital, means of transport, and suitable machinery; also its lower price. A few of the largest mines have continued to be regularly worked. With the recently higher price of silver, greater activity has prevailed than a few years earlier. The richest of the ores contain from 10 to 50 per cent of silver and even 80; more has from 1 to 10 per cent.

The Department of Potosí is world renowned for its silver. In the first 40 years of colonial production more than $70,000,000 was taken from the Cerro Potosí, a sugar loaf 16,000 feet above the sea, in which 5000 mines have been opened. Up to the present time a billion dollars, one writer says four billion, have been realized from the silver of Bolivia. In neighboring Provinces of the same Department, Potosí, are many other mines, most of which now produce tin as well. The ores of Potosí which originally contained 60 per cent or more of silver are now poorer with more iron pyrites. The present queen of South American silver mines, the Huanchaca-Pulacayo, east of Uyuni, consists of a dozen groups over 8500 acres, a bed of fabulous richness. In the 28 years before 1901 it produced 4250 tons of silver. The majority of the stock is held in France. Some years ago the Pulacayo mines were flooded with hot water, but they have now been drained and are again operated. On the property is a town of 10,000 people, hundreds of whom are employed in the works, including women who first try out the ore. In 1918 $2,622,000 worth of silver was produced.

Oruro is next to Potosí in production of silver, and

in tin it stands first. The richest silver ores, as at Huanchaca, are so exported, the poorer are treated on the spot. Other rich mines are well known.

Tin mining is a more recent industry, dating from 1895. Already it has become the leading export of the country, which now provides more than one-third of the world's supply. It was well known to the Spanish colonists as much of it was mingled with the silver, but they rejected it as rubbish, using it to fill in depressions. Large profits have been recovered from these fillings and from the dumps. While tin is produced in many other parts of the world, the Bolivian lodes are of unusual extent and richness. Their production is now exceeded only by that of the Straits Settlements. Since the development of the tin plate industry and its use in other ways the demand for tin and the price have enormously increased; from $350 a ton in 1898 to $900 before the war. In 1912 tin was produced, barilla, 60 per cent pure, 37,700 tons, worth $18,000,000; in 1918 the value of tin exported was $45,364,000.

All along the eastern part of the plateau from Lake Titicaca to the southern boundary, tin is found in thick unbroken lodes. The three principal districts are La Paz, Oruro, Potosí. In La Paz the best known mines are on the slopes of the splendid mountain, Huaina Potosí in the Cordillera Real, though many other mines are worked. Those in the Department of Oruro are more important, producing one-third of the output. The lodes vary in thickness from a few inches to 10, 15, or 20 feet. Rich pockets are found 30-60 feet in diameter, and veins with stannic oxide fragments, running from 50 to 100 per cent. Cassiterite, tin stone, or tin with stannic oxide, is frequent with 55-60 per cent tin; this is sent to

Europe as extracted. The percentage of tin in a lode is very variable, often 6-8 per cent, sometimes 15. Veins of tin on the Cerro Potosí penetrate the hill parallel to veins of silver; some are united; in others tin, silver, and copper alternate or are in union. The tin is generally in the upper part nearer the surface. Sulphides are found at Oruro, but oxides are more frequent. All are at an altitude of about 10,000-17,000 feet. The large Socavón Company employs 1000 hands, has a concentrating plant, and puts out six tons of silver and 250 tons of tin yearly. Many other mines export barilla, some of it with 70 per cent of tin. A Bolivian, Simon J. Patiño, from being an ordinary laborer has risen to be the Tin King, both banker and mine owner, working his mines by modern methods and electric machinery. His mines at Uncia are among the richest in the world, producing about 30 per cent of the Bolivian total. The Llallagua mines, the richest of all, have still greater production.

On Huaina Potosí are placers containing with tin, gold in flakes, bismuth, and oxide of iron; more in other locations. The Company owning the Chlorolque Mountain and other properties, with tin as the principal product, mines also silver, bismuth, copper, and wolfram; it paid a 30 per cent dividend in 1917. Capital only is needed to exploit on a much larger scale these rich and available deposits. Three hundred to four hundred dollars a ton hardly paid the cost of production, but with prices three times as much it is a highly profitable business. The Guggenheims have recently purchased three tin mines located at Caracoles on the Quimsa Cruz Range, south of Illimani, to which they have built an automobile road 150 miles from Eucalyptus, a station on the main line between La Paz and Oruro.

The mines are at an altitude of 16,000 to 18,000 feet, the quarters at 15,000 to 16,000. The tin runs to 10-15 per cent. It is thought that the property will rival the Uncia. The International Mining Company has a tin property in the Yungas Province 52 miles from La Paz at a height of 8000 feet, a rather more comfortable altitude.

Copper. Of late the copper deposits in Peru and Chile have received more attention than those of Bolivia, but this country also has extensive formations from Lipez at the south where white copper is found, along the East Cordillera, past Potosí and Oruro to Corocoro in the West, ending in the Nudo of Apolobamba. Veins occur in all the buttresses of the Andes.

Copper is found chiefly in its native state, the deposits of Corocoro being especially famous. The copper here occurs in powder, plates, or nodules, in beds of reddish sandstone. One veta, or mineralized bed, is 1000 yards deep, extending several miles; another, a branch formation above this surrounds it on the southwest and east, occupying a great part of the Desaguadero Valley. Both formations are arseniates. One branch 2000 yards thick extends 6 miles; in another direction a branch runs 35 miles from Corocoro to Chacarilla, then branching south and east. Copper generally occurs in small irregular grains with from 70 to 92 per cent copper. The native copper, the great wealth of the mines, here ranges from microscopic grains to plates and arborescent forms called charquis. At La Charcarilla large plates are found $3^1/_2$ inches thick. Ores with 15-20 per cent copper are usually neglected. As there are no good kilns, barilla is exported 80 per cent pure, a quintal, 220 pounds, costing $3-4 for

production. Except from Corocoro the present output is insignificant. For a time these mines were abandoned owing to the low price of copper and the difficulty of transport. It was formerly necessary to send the barilla by carts, mules, or llamas to the port of Arica, or else to the Desaguadero River, to be carried in boats to Lake Titicaca and Puno, thence by rail to Mollendo. With the great increase in the price of copper and the opening of the Arica-La Paz Railway with a 5 mile branch to Corocoro, these difficulties were removed and active work progressed with a broad field for enlargement. Copper formation here is said to resemble greatly those in Northern Michigan, such as the Copper Range, and the Calumet and Hecla. In 1917 over 82,000,000 pounds were exported, worth above $4,000,000.

Lead is found in the region of La Quiaca and some is exported by way of Argentina. Galena, an ore of lead and silver, is widespread.

Bismuth. Of less used minerals bismuth may be mentioned, in the production of which Bolivia leads the world and controls the supply. At present, chiefly used as a drug on account of its high price, it might be more largely employed in alloys. Bismuth ore, as carbonates, oxides, and arsenical sulphates, is so abundant in many parts of Bolivia that if bismuth sold at 20 cents a pound a fair profit would be realized. With the price for years $3500 a ton, it would seem a profitable business to engage in. Over one million pounds were exported in 1918 worth one and a half million dollars.

Antimony also is found in large quantities. Nearly 18,000 tons were exported in 1916, worth approximately $5,000,000, but with high prices and abnormal demand due to the war. Less than one per

cent of the quantity was exported in 1912. The ores are rich, often running 70 per cent pure metal.

Zinc in the form of sulphides or blends is abundant, largely in connection with silver. Such ores are sent to Europe, there to be separated, the scarcity and almost prohibitive price of coal rendering such a course desirable for various products, to avoid the excessive cost of smelting; at the same time the high cost of transportation limits the export.

Wolfram, an iron-manganese tungstate, is found near veins of tin and much is exported, the production being especially in the Santa Cruz district, at the northeast of Cochabamba. Some lodes contain no less than 50 per cent of tungstic acid, the ores concentrated for export running higher. About $7^1/_2$ million pounds were exported in 1918 valued at nearly $3,708,000.

Coal. The lack of good coal is the chief fault in nature's economy in Bolivia. Its usual cost in La Paz is $40-$50 a ton, at times $75. It is therefore used as little as possible, although some is imported. While Bolivia has been said to possess no coal at all, a lignite of fair quality has been discovered in the peninsula of Copacabana, Lake Titicaca, some of which has been used by the Guaqui-La Paz Railway to develop electric power; but not in serious fashion, experimental merely. Other seams are found near the Ayoapó station, which a company has been organized to exploit. Good samples have come from Tacora on the Arica Railway near the frontier, the coal said to be equal to that of Coronel in Chile, the seams rich and thick. If so their exploitation will immensely advance the industries of the country. Good coal is reported across the mountains from

Sorata and lignite is found near Cochabamba.

On account of the enormous cost of coal, various substitutes are in use. On the plateau there is practically no wood. For heating, foreigners generally employ oil stoves, the natives nothing at all, though the mercury may range from 40° to 50° in the house on a winter's day. In La Paz for cooking purposes a substance called *taquia* is employed. It looks like pecan nuts, but is the dung of llamas, which is collected by Indians on the plateau or elsewhere. It sells generally at about $4 a ton, but has lately risen to $7. It is the principal fuel used at the mines of Corocoro. In some places as at Potosí, *yareta* is used, a vegetable or shrub which grows in a dense mass to a height of several feet with a greater diameter. The green mass has a woody fibre, is highly resinous, and burns like peat, giving a good amount of heat. It grows at altitudes between 13,000 and 16,000 feet. Another woody shrub, a species of broom called *tola*, is used, with another, *quenua*, which like charcoal gives much heat with little ash. Extensive peat beds exist near La Paz, estimated to yield 30,000,000 tons of briquettes with a fuel value about half that of coal. The discovery and wide exploitation of coal and petroleum would be an immense boon both to industry and to the householders.

Petroleum is now believed to exist in large quantities, sufficient to solve the fuel problem. The best known fields are in the southeast where seepages occur and a belt is indicated extending northwest and southeast 150 miles from the Argentine border. Concessions covering millions of acres have been granted to American companies. The zone traverses the Provinces of Santa Cruz,

Chuquisaca, and Tarija. Geological investigations indicate that a petroleum belt or basin exists along the foothills of the east side of the East Cordillera. There are indications in the Beni district a considerable distance north of La Paz, and beyond the Madidi in Colonias. A probable thickness of overlying strata in southeast Bolivia is 160-660 feet. If so development costs will be diminished. The great difficulty is the inaccessibility of the locations. On this account few wells have yet been sunk. To pipe the oil up to the plateau would be an expensive, some say an impracticable, proposition. At present approached only by cart roads or caminos, the fields will be rendered more accessible by the railways planned from Puerto Suarez or Pacheco and from Argentina to Santa Cruz. The oils vary in quality, some having an asphalt base with 4 per cent of gasoline, up to .81 specific gravity with 40 per cent of gasoline. The heavier is in the lower sands. Along the eastern base of the Andes the petroleum is of high grade. Samples of oil from Espejos Spring, 12 leagues from Santa Cruz, indicate the quality expected north to the Madre de Dios. This has 78 per cent kerosene, 17 lubricating oil, and 4 per cent coke. From indications it is believed that gushers would come by boring to proper depth. It is said that deposits of good quality are indicated at Calacoto on the Arica Railway, a continuation of the Titicaca fields of Peru. These are obviously much more accessible but less assured.

Mining properties of various kinds may be acquired and worked to good advantage, some with a moderate outlay of capital; with larger returns, naturally, from greater expenditure for the best equipment and more extensive properties. There is work for centuries.

Industries

Other than mining industries are slightly developed, being local in character for lack of proper transportation. There is therefore opportunity for their introduction, the needs meanwhile being supplied by importation.

Weaving. The weaving industry is one for which the natives are peculiarly adapted; the Indians and the mestizos now produce with crude equipment goods of excellent quality for strength and often for color. In certain Provinces good strong cotton cloth is made which, used for sheeting, clothing, etc., lasts indefinitely. The natives make also heavy woolen stuff from llama wool, and fine soft material from vicuña, alpaca, and silk. But not half enough is woven to supply the demand, so that much coarse cotton cloth and a woolen called *bayeta* are imported for the use of the Indians, as well as fine goods for the white population. The llamas, estimated as numbering 500,000, are worth from $4 to $10 each; the alpacas, about half as many, are valued at $50-75 each. There are also 500,000 goats.

Rugs and skins are exported in small quantities, the animals from which these are taken growing rarer and liable to become extinct. Rugs of *vicuña* skin have at least doubled in price since 1906 (their export is forbidden), as is the case also with the chinchilla. Of the latter there are two varieties, the blue and the white. They are hunted by the Indians as are also the vicuñas. The former are now crossed with the *viscacha*, a rodent resembling a hare, the resulting animal being capable of domestication. Though the skins are inferior to genuine chinchilla they serve the purpose.

It would be a most valuable enterprise if the vicuña could be domesticated. At present the animals are wild like the *guanaco*, but the breeding of herds ought to be possible if the greatest care were exercised. The *vicuña* wool is probably the finest existing, and if the animals could be saved from destruction and their numbers increased, a highly profitable business would result. These animals, like the *guanacos*, wander in small groups in remote places at high altitudes, 14,000 to 16,000 feet, often difficult of access among the mountains. These with the llamas and alpacas are ruminants, the two latter domesticated and living in large herds.

The alpaca wool is much superior to that of the llama and better than that of the sheep; if the animals were rationally bred on a large scale the business should be extremely profitable. The animal has shorter legs than the llama which it resembles; it is never used as a burden bearer. The alpaca flourishes on the Titicaca Plateau and in higher, cold and solitary mountain sections, among seed bearing grasses where snow falls instead of rain. It requires better forage than the llama. Pure water is an absolute essential. Their long fleece, sheared once in two years, is always in great demand; a fleece weighs 10-15 pounds. The alpacas, numbering probably 200,000, are tended by Indians whose patient endurance qualify them in a measure, but who need instruction to supervise them with more intelligent care. There are vast lands suitable for their breeding and culture, and regions where sheep, donkeys, goats, and cattle may be raised. None of these industries is practised except in a small way, though land, suitable fodder, and climate are all of the best.

Stock raising is carried on to a limited extent

only, though conditions for raising horned cattle are said to be ideal on the llanos of the southeast, where vast natural prairies alternate with forests, and many wild cattle exist. The large possibilities of this region will undoubtedly be utilized before many years. Difficulty in reaching markets is the great present drawback, but Argentine capitalists have looked over the eastern lowlands and may find early means for their exploitation. On the higher lands also are sections where the business may be carried on to advantage. As at present only ordinary stock is raised with no care in breeding, merely to supply local needs for meat, there is need of imported cattle and better methods, as is the case with sheep. Figures given for cattle are 800,000 head, of sheep $1^1/_2$ million. Many more of the latter should be raised in some sections of the plateau region. Mutton is more of a staple food, largely used, dried and salted, by the Indians. Thus prepared it is called *chalona*; dried-beef is called *charque*. The cultivation of Siberian grasses on the plateau is suggested. Few hogs are raised, although many districts are well adapted to them.

Agriculture

In agriculture Bolivia has enormous possibilities, but at present small production. About 5,000,000 acres are under cultivation. With the varying altitude and climate the vegetable products are similar to those of the preceding countries, many of these spontaneous, a few cultivated. The latter are almost solely for internal consumption. On the plateau grow barley, *quinua*, and potatoes, the last, when frozen called *chuño*, are the basis of the Indians' diet; barley is much used for fodder; *quinua*, a very nutritious

millet, easy to cultivate and hardy, in the form of meal among the plateau Indians takes the place of wheat and corn, which do not grow at this altitude. In the valleys below there is plenty of corn, from which is made the Indians' favorite drink, *chicha*, though they will readily drink plain alcohol of poor quality when they can get it. Wheat and rice are raised in eastern Cochabamba, admirable coffee in the *yungas*, cacao, and coca; none in sufficient quantity to supply the home market except coca. Some coffee is exported but more is imported from Brazil and Peru. All needful supplies could be provided in one or another part of the country if population and means of transport existed.

Other Products. Cacao is less cultivated than coffee, though raised in two departments. Trees are growing untended in the Rio Madidi and Madre de Dios sections. Sugar cane is cultivated in Santa Cruz and elsewhere, but most of it is used for making *aguardiente*, and molasses or other syrup. More than 200,000 gallons of alcohol come annually from Santa Cruz. Rice also is grown in this Department giving two harvests a year. It might be cultivated in other sections. Tobacco of excellent quality thrives in many places, but not enough is raised for home consumption. Viticulture is slightly practised with primitive methods. Fruits of many varieties as in Peru are raised, including especially fine oranges. Various vegetables are grown but in these lines the development is slight and poor.

Coca alone is exported among agricultural products, chiefly to Chile and Argentina. Cultivated also in Cochabamba and Santa Cruz, the chief centre is in the *yungas* of La Paz. The leaf is richer in alkaloid than the Peruvian, as I myself noted, but as

yet it has not been so much exported to Europe on account of its higher price. The plantations are in terraces on the mountain slopes between 5000 and 7000 feet altitude. In the *yungas* the bushes are usually three or four feet high, but may grow to seven or eight. A small crop may be gathered 18 months after planting, but only in four or five years are they in full leaf. Three times a year the leaves are gathered, and with good care the plantations will last half a century. The leaves are picked by hand, dried, and stored in a dry place, later packed in bales and pressed. Properly used the chewing of coca in the highlands may be a blessing. Carried to the excess usual among the Indians it is a curse, as it is where here used in drinks sold at the soda counter, creating a habit as vicious as that of alcohol or opium. For the cultivation of cotton on the lowlands there is much suitable soil and climate.

Forestry

Of forestal products Bolivia contains all those found in the other sections of the Amazon basin, varieties of timber, medicinal plants, etc.; but none at present is of commercial value for export except quinine, manufactured from *cinchona* bark, and rubber.

Rubber. The rubber industry of Bolivia is second to that of minerals. In amount of this export the country is believed to be second in South America to Brazil, though little has been touched of the vast territory capable of its production. Sir Martin Conway estimated the rubber trees of the Beni district as 50,000,000. There are four zones of rubber producing country, one in the extreme north near the Acre Territory of Brazil, with outlet from the port

and custom house of Cobija; second, the greater part of Colonias exporting through the national custom house of Villa Bella, by Villa Rica at the confluence of the Abuna and the Madeira, or by lesser ports; third, the Department of La Paz, the rubber going out by Lake Titicaca and Mollendo; fourth, Beni, Santa Cruz, and Cochabamba, the rubber from the north going out by Guajará Merím or Villa Bella, that farther south by Puerto Suarez on the Paraguay or by Yacuiba, and from the west by Oruro and Antofagasta. The rubber of the region is chiefly that called fine *Pará*, most of it exported through that port and being of the best quality. The latex of the *hevea* is the source; *sernamby* is second quality made of the residue of the finer quality mixed with bark. The *caucho* from the *castilloa elastica* is little exploited on account of few laborers and expensive transport. With the opening of the Madeira-Mamoré Railway in 1912 better facilities were secured, this railway having been built a distance of 207 miles along the Brazilian shore to avoid the bad rapids on the two rivers. The flooding of the market with Malay and Ceylon rubber seriously affected Bolivian production and export, but these have recently increased. With the forming of plantations in this section, a work which an American company has undertaken, the rubber should be better able to compete with that of Ceylon, as its superior quality is known. The fact that the Bolivian export tax is lower than that of Brazil gives the former an advantage.

In the Department of Cochabamba are great quantities of *maniçoba* trees producing rubber known as *ceará*, of good quality but not the best. It might be cultivated in hilly regions and on banks of streams of the Yungas and other valleys in the Department of La Paz. The lot of the *seringueiros*, the rubber workers, is

bad; it may and must be bettered if the industry is to continue. The establishing of plantations will be a great improvement, but some amenities of life might be made available even in the ordinary forest.

Investments

From the description of Bolivia, it is apparent that mining presents the most attractive field for the large capitalist. Mining experts with less money may be tempted to investigate gold prospects or to search for rich veins of other metals, later organizing companies for their development or selling at a handsome profit their acquired claims, as some persons have done hitherto. However sales are not always easily made. Petroleum is numbered among the mining possibilities, although the most favorably located fields may be preempted already, chiefly by American Companies, the Braden and the Richmond Levering, in spite of the difficulties of access and development. The petroleum procured would find its market in Bolivia and in the neighboring countries of the East and West Coasts where it is greatly needed. The oil with a paraffin base is of high grade running to 45.8 Baumé.

Stock raising of various kinds would be profitable in certain localities, and some forms of agriculture and small industries. Railway construction, the development of electric power, the installation of sanitary and other public works will afford many openings for engineers.

CHAPTER XXVIII
CHILE: AREA, HISTORY, GOVERNMENT, POPULATION, ETC.

The country of Chile, the seventh in size of the South American Republics, is frequently ranked with the two largest, Brazil and Argentina, owing to the enterprise of its inhabitants: a natural result of their location in the temperate zone, from 17° 57′ to 55° 59′ South Latitude; increased perhaps by their long struggle with the Araucanian Indians.

Area, Population, Boundary

Area. Chile, with an extent of 290,000 square miles, is ribbon like in shape, having a length of nearly 2700 miles, a trifle more than Argentina; in a direct line 2140 miles, with a width of 70-248, miles averaging about 85.

Population. The country with approximately 4,000,000 inhabitants is fifth in this respect.

Boundary. The boundary of Chile is simple. At the north is Peru, on the east are Bolivia and Argentina, at the south and west the Pacific Ocean.

History

The bold Spanish invaders of Peru might reasonably have been contented for a time with the conquest of that vast territory. But Diego de Almagro, incited by the grant of 200 leagues south of those bestowed upon Pizarro, and enticed by the tales of a region richer still in gold and silver, set

forth to gain possession of the allotted lands, not long after the founding of Lima in 1535. Over the great Bolivian Plateau and a high mountain pass into Chile, Almagro marched with his followers, only to return disappointed after enduring untold hardships and suffering.

A few years later a second expedition was undertaken by Pedro de Valdivia, this one along the shore. From Arica proceeding by sea, having landed at the mouth of the Rio Maipo, in February, 1541, Valdivia founded the city of Santiago. Still unsatisfied he continued south, in spite of much opposition, making settlements at Concepción, Imperial, Villa Rica, and Valdivia; but in 1553 he was himself slain by the warlike Araucanians, who long disputed with the invaders the occupation of their country. For 250 years the contest continued intermittently, with some diminution and amalgamation of the Indians, till the Chilians rose against Spain, when a more friendly feeling was established.

The Chilians, who convoked a national congress in 1810, regard this event as the inauguration of their independence; though not until 1818 was it secured with the aid of San Martín and his army from Argentina. Chile subsequently experienced many internal difficulties, but after 1861 the Government became more liberal, and since that period, except for the revolution against Balmaceda in 1890, the country has been free from serious internal strife.

Government

The government is that of a centralized republic with the usual three branches. The President, elected

for a term of five years and not eligible at once for a second term, appoints the *Intendentes* and *Gobernadores* who respectively administer the 23 Provinces, and their subdivisions, the 82 Departments. There is one Territory, Magallanes, which includes the southern mainland and the coastal islands. The police force is national in organization. In the Provinces no legislative bodies exist save municipal councils with certain local duties. The franchise is so restricted (the voters must have property and be able to read and write) that as 25 per cent of the population is illiterate and most of the laboring class landless, the Government is said to be practically in the hands of a few leading families. Senators, 37 in number, must have an income of $2000 and Deputies, 118, one of $500. The President must not leave the country while in office.

Chile has 23 Provinces, all but five of which border on the Pacific, and one Territory. Beginning at the north the names of the Provinces follow with their approximate areas and population, and with the names and population of their capitals:

Provinces	**Area, in square miles**	**Population**	**Capitals**	**Populatio**
Tacna	9,000	40,000	Tacna	8,00
Tarapacá	17,000	134,000	Iquique	45,00
Antofagasta	46,500	220,000	Antofagasta	66,00
Atacama	31,000	67,000	Copiapó	13,00
Coquimbo	14,000	191,000	La Serena	16,00

Aconcagua	5,400	140,000	San Felipe	12,00
Valparaiso	1,775	347,000	Valparaiso	212,00
Santiago	5,900	627,000	Santiago	450,00
O'Higgins	2,168	125,000	Rancagua	13,00
Colchagua	3,900	163,000	San Fernando	10,00
Curicó	3,045	115,000	Curicó	23,00
Talca	3,900	135,000	Talca	42,00
Maule	2,800	125,000	Cauquenes	12,00
Linares	4,000	120,000	Linares	3,00
Nuble	3,500	199,000	Chillán	40,00
Concepción	3,300	271,000	Concepción	72,70
Arauco	2,200	74,000	Arauco	3,50
Bio-Bio	5,400	106,000	Los Angeles	14,00
Malleco	3,300	136,000	Angol	10,00
Cautín	6,400	175,000	Temuco	31,00
Valdivia	9,000	187,000	Valdivia	26,00
Llanquihue	35,000	150,000	Puerto Montt	8,00
Chiloé	7,000	100,000	Ancud	4,00
TERRITORY				
Magallanes	65,000	32,000	Punta Arenas	20,00

Population

The population of Chile is little if any below 4,000,000, which gives it an average of 12 or more to the square mile, the highest rate of all the North and West Coast countries. There is considerable variation in the different Provinces, but less than in the other Republics, if the Territory is omitted. The most thickly inhabited region is from Valparaiso south to Valdivia; the Province of Santiago having the largest population and that of Valparaiso the densest. As to the character of the population it is estimated that 40 per cent are of white extraction, with at least 50-60 per cent mestizos; probably 50,000 Indians, including possibly 5000 in the far south, uncivilized and dying out. The educated class as in other countries forms a small minority of the inhabitants, but in recent years greater attention has been paid to the diffusion of knowledge among the common people.

Education

The middle and upper classes pay much attention to education. In Santiago there are two universities, the larger the University of Chile, open also to women, and the Catholic University, each with various departments; a National Institute or high school, a School of Mines, a Normal School, a School of Arts and Trades. In La Serena and Copiapó at the north are other Mining Schools, and in cities at the south Schools of Agriculture; also Normal Schools. An Industrial College is to be opened in Valparaiso. All towns have elementary schools; in all State schools including universities education is free, and in primary grades from 1921 compulsory. There are

various private schools, in Santiago a large and excellent one for boys (managed for years by American Methodists), where the sons of many prominent families have been educated, as in La Paz, Bolivia.

Press, Religion, etc.

Press. The Press is free, influential, and of high character, the *Mercurio* of Valparaiso and Santiago having a world wide reputation, and ranking with the best of any country. There are about 700 newspapers and journals.

Religion. The Roman Catholic religion is recognized as that of the State, but freedom is permitted to others. The women generally are very devout, though as in the other countries the men of the governing classes are inclined to agnosticism.

Telegraph. Chile possesses 30,000 miles of telegraph lines and 46,000 of telephone. There are 32 wireless stations at intervals from Arica down to Punta Arenas, with one on Juan Fernandez Island.

Money. A gold peso (there are no such coins) may be regarded as worth 36 cents, but the paper money which is in general use fluctuates in value, a peso varying from 14 to 25 cents, usually 18-22. There are silver coins of 10, 20, 40 centavos, and copper of smaller value.

The **Metric System** of weights and measures is obligatory, all others being excluded by law.

CHAPTER XXIX
CHILE: PHYSICAL CHARACTERISTICS

The country of Chile has an extraordinary shape, very long and narrow. Unlike the other Republics of the West Coast, Chile has no trans-Andine region, as the watershed of the Andes constitutes the eastern boundary line. Thus confined between the sea and the mountain tops, while the coast line of the country is nearly 2700 miles, as far as from Labrador to Guiana, the width is scanty, mostly varying from 100 to 225 miles, though at one point in the south the western boundary of Argentina is but 26 miles from the Pacific Ocean.

Although so narrow for most of the distance, Chile has three sections longitudinally: a very narrow coastal strip, a plateau, or a central valley, and the mountain region. Its remarkable length from 18° S. Lat., several degrees in the torrid zone, to 56°, well towards the Antarctic Circle, gives it a wide range in climate arising from the latitude, as well as the variation from the altitude which it shares with the countries previously mentioned. From north to south also, the Republic has three zones: the hot arid land at the north, 18°-32°, followed by the temperate agricultural section in the centre to 42°, and the cool, rainy, forested lands at the south; sometimes four sections are spoken of, in which case the first is regarded as two, dividing at 27° into the nitrate section north and a mineral, south. Of these two the former has a plateau section between the Andes and the sea, the latter some transverse ridges. The country has 25 per cent in woods and forests, $7^1/_2$ per cent in pastures, 5 irrigable land and $12^1/_2$ per

cent arable.

As already noted, the Pacific Coast south of Ecuador is a practically rainless desert for a distance of 1600 miles along the shore of Peru and Chile, about as far as Coquimbo. Here begins the agricultural centre of Chile, including the rich longitudinal valley (with soil 330 feet deep), in which the capital, Santiago, is situated; the valley extends from the Aconcagua River to the Gulf of Ancud, 620 miles. Many populous towns and ports are in this section, among them Valparaiso. The forest country farther south is but sparsely settled.

Mountains. The Cordillera of the Andes, which extends throughout the entire length of the country, and is continued at the north by the Cordillera of Peru, is recognized from its geological formation as belonging to a recent epoch. It contains many volcanoes, mostly extinct or inactive except in the south. Aconcagua, of volcanic origin, the highest peak of the Andes and of all America so far as is yet known, is a little north of the centre. Its summit is just over the border in Argentina, as the watershed forming the boundary here runs west of the line of greatest altitude. The height of Aconcagua is variously stated, but 22,817 feet has perhaps the best authority. Other lofty peaks are near, Mercedario and Tupungato, each over 22,000 feet. There are 24 passes across the range at a height of 10,000 feet more or less. Farther south the mountains diminish rapidly in height with few summits above 10,000 feet. The range ends in Tierra del Fuego with Mt. Sarmiento, 7000 feet.

A cordillera of the coast, geologically older, is much lower, disappearing altogether at the north. In general quite steep towards the sea, it slopes

gradually towards the central valley or plateau. This range continues at the south in islands, which in great numbers fringe the coast. Here the shore is much indented with straits and bays, resembling the fjords of Norway. Nearly all of the narrowing point of the continent, the entire Strait of Magellan, and most of Tierra del Fuego belong to Chile.

Rivers

The rivers of the country are numerous except in the north, where but two reach the ocean. Farther south to 35° they are torrential in character, but important both for irrigation and as a potential source of hydro-electric power; their descent from so great a height indicating large future possibilities. Beyond 35° a number of streams are navigable for some distance for boats of light draught, 500 miles in all, the Bio-Bio for 100 miles, the Maule for 75. South of these rivers are many picturesque and important lakes close to the Cordillera where they serve as great reservoirs for the excessive precipitation of rain and snow on the west side of the mountains. The largest are Lakes Rauco and Llanquihue, with estimated areas respectively of 200 and 250 square miles. Lake Todos los Santos, 40 square miles, described as of marvelous beauty, is northeast of Puerto Montt among the Andean foothills, at a height of 500 feet.

The seaboard at the north, with few indentations, has in consequence poor harbors, where landing in small boats may occasionally be dangerous or impossible. In the far south are sheltered harbors, but few cities requiring them.

Climate

The climate of the country naturally is extremely varied. In the northern section the immediate coast like that of Peru is preserved from intense heat by the Antarctic current. A little way back on the arid plateau the temperature is excessive by day but cool at night. Going south from the arid section the rainfall gradually increases until in the far south there is too much. The central regions have a fair supply with an excellent climate, mean annual temperatures of 50°-60°. Farther south with rain 150-170 days in the year, in some places 80-100 inches, the climate is less agreeable. The winds are generally west, either a little north or south. While the mean temperatures are fairly low, the extremes are much less than at the same latitudes in most parts of North America or on the East Coast of Argentina. Even at the farthest south, at Punta Arenas, the most southern city of the globe, the weather is never so cold as often in the usual winters of New York or Boston. Until recently suitable sanitation has been lacking in many cities and the death rate has been high. Now the authorities are alive to these matters and with the installation of proper sewerage, already accomplished in Santiago and in progress in other cities, the death rate is lower. In no cities from Guayaquil south need any tourist be apprehensive of danger.

CHAPTER XXX
CHILE: CAPITAL, INDIVIDUAL PROVINCES, CITIES

Capital

Santiago, the capital, with 450,000 inhabitants, is the fourth in population of the cities of South America, the first three being Buenos Aires, Rio de Janeiro, and São Paulo. The city is finely located in the fertile Central Valley, on the Mapocho River. Important as the Government and social centre, it has much commercial activity. A little off the direct Trans-Andine line between Valparaiso and Buenos Aires, it is equally a terminus, as special cars run to each city from Los Andes where they connect with the narrower mountain railway. Santiago is the centre of the north and south railway systems which traverse the country almost from end to end.

A lack of first class hotels has been partially remedied by the construction of a large one on modern lines, but it may be said that in all of the capital cities and chief ports of the West Coast additional accommodations of a higher class are desirable. In Santiago important improvements recently accomplished include the installment of a sewerage system and the repavement of the principal streets. Electric lights have long been enjoyed and an excellent system of electric cars, one feature of which New York might imitate to advantage, the numbering of the cars to indicate the various routes. Santiago in addition to its delightful location may well boast of its fine buildings, especially its Capitol, the handsome opera house, and many fine residences; still more of its parks, the far famed Santa

Lucía, Parque Cousiño, and the Quinta Normal; also of the Palace of Fine Arts, and the Cemetery, especially beautiful in rose time. Most of the streets are narrow, but there is one splendid broad avenue, the Alameda or Avenida de Delicias with a central parkway ornamented with statuary.



CHILE, ARGENTINA, PARAGUAY, URUGUAY

Provinces

A brief review of the Provinces follows, beginning at the north. Unless otherwise stated, the Provinces extend from the coast back to the mountains, bordering at the east on Bolivia or Argentina.

Tacna, formerly a part of Peru, is still claimed by that country, though in the possession of Chile. It is separated by the Sama River from the Peruvian Province, Moquegua. Largely mountainous, Tacna has many peaks above 18,000 feet; the two passes to Bolivia are about 14,000 feet. Of 500,000 acres of possible agricultural land about one tenth is irrigated, the rest is desert. Alfalfa is the chief production; beans and maize are important with other vegetables and fruit. The leading export is sulphur.

The capital, Tacna, is a pleasant town, connected by rail with the port of Arica, though it is not on the road to La Paz. Arica, with a better harbor than most of the others, is an important primary port where all steamers call, as it is the terminus of the Arica-La Paz Railway; one of the three Pacific outlets for Bolivia. New docks are to be constructed.

Tarapacá follows on the south, this Province containing with other minerals, extensive, hot, arid plains with nitrate fields. The sloping coastal section has two important ports, Pisagua and Iquique, besides smaller ones exclusively for the export of nitrates, in which the two named are chiefly engaged.

Iquique, the capital and principal port, is of great commercial importance for such export, and has very large imports from the fact that these include all eatables as formerly all drinkables, even water. Now the water comes in pipes 150 miles from the mountains. The soil too was imported for the few

plazas and gardens existing, as nothing will grow in the native soil. It is an enterprising community with a good proportion of pleasant British homes, clubs, theatres, etc.

Antofagasta comes next, separated from Tarapacá by the River Loa. On the east it has both Bolivia and a piece of northern Argentina. The surface descends from the Andes in a series of plateaus. Vegetation is scanty. This Province, with Atacama on the south, shares in the activities of the nitrate industry.

The capital city, Antofagasta, is 200 miles south of Iquique, both ports having very poor harbors, though with enormous commerce for places of their size. Antofagasta, the terminus of a third railway from La Paz, the second in Chile, has much Bolivian trade besides export of nitrates, and lately from Chuquicamata of copper. The Province contains other ports and cities of consequence, Taltal, Tocopilla, Mejillones, etc.

Atacama on the south borders exclusively at the east on Argentina, which from here down forms the eastern boundary of Chile. The surface of the Province is uneven, with mountains, plateaus, and ravines; in the valleys of Huasco and Copiapó there is some agriculture. Minerals, as gold, silver, and copper receive attention.

Copiapó, the capital, is an important railway junction.

Coquimbo, following, is a narrower Province, the mountains and the Argentine boundary coming nearer the shore. There are many lofty peaks at the east; and between spurs running down to the coast are fertile, well watered valleys, as we now come to the central section where with a mild climate there is

moderate rainfall. Cereals, fruit, wine, and livestock are exported.

La Serena, the capital, is a pretty town, which has tramway connection with Coquimbo, a first class port, and a busy city.

Aconcagua is next, with the great peak of that name in the range at the east. Some 15 miles south of the peak is the Uspallata Pass, for many years the main commercial highway between Chile and Argentina. By this Pass came Almagro, and later a division of the army of San Martín; another division by the pass of Los Patos, a little lower and farther north, by which cattle are often driven into Chile. The Province is chiefly agricultural and pastoral, with crops of cereals, fruits, hemp, and tobacco. The finest wine is produced; there are large herds of cattle; and copper has some exploitation.

Valparaiso, one of the two Provinces bordering on Aconcagua at the south, is next to the smallest in the Republic, and the first coming from the north which does not extend across the country. With Aconcagua on the north it has Santiago on the east and south. The surface is mountainous with extensive valleys, the Coast Range here reaching a height of 7000 feet. Several rivers and a number of bays are among its favorable features. With a mild climate and sufficient rain agriculture is the principal industry aside from the commercial interests of the chief port of the West Coast, Valparaiso.

Santiago, south of Aconcagua and east of Valparaiso, extends from Argentina on the east, south of Valparaiso to the sea, and has the two Provinces of O'Higgins and Colchagua on the south. The Central Valley, which occupies a great part of its area, is here a broad plain, part of which is well

watered and fertile but with some sections arid; the foothills and valleys are well wooded. The Central Valley slopes towards the west, having an altitude of nearly 3000 feet at the foot of the Andes, and about 1000 feet near the hills of the Coast Range. The highest point of the Andes, here south of Mt. Aconcagua, is less than 20,000 feet while the Coast Range approaches 8000. Cereals, vegetables, fruit, and wine are the chief products. Among other towns in the Province is the port of San Antonio.

O'Higgins, a very small Province, occupies what may be called a jog at the southeast corner of Santiago, which is therefore on the west and north, while Argentina is east and Colchagua south. Although a rugged district, irrigation is developed and large crops of cereals and fruit are grown. Rich in mineral deposits, copper alone is exploited.

Colchagua, south of Santiago and O'Higgins, extends across the country from the sea to the mountains, which have three easy passes into Argentina. The plains of the Central Valley have a rich soil and good rainfall, but as the summers are dry, as in Santiago, irrigation is needful. Crops of wheat, beans, alfalfa, etc., are important, and also the cattle industry.

Curicó follows across the south with similar features and productions.

Talca is next, also extending from the coast to Argentina. With a temperate climate, there are greater extremes of heat and cold on the plain. Besides the agricultural and cattle industries, the dense forests here afford opportunity for exploitation. Two Provinces are on the south.

Linares, the more eastern, has Argentina on the

east, Nuble south, and Maule west. With considerable agricultural land, along the lower slopes of the Andes it has dense woods.

Maule, the coast Province south of Talca, has both Linares and Nuble on the east, and Concepción south. The valleys of the Coast Cordillera, which are fertile, afford opportunity for increased agriculture, but unwise deforestation has been injurious.

Nuble, again an Andean Province, between Argentina and Maule, is south of Linares and north of Concepción. Easy passes lead into Argentina, forests are extensive, and vines and cereals are grown on a large scale.

Concepción, south of Maule and Nuble, extends from the Pacific to Argentina. Mountainous at the east, it is rather arid in the centre, but extremely fertile near the coast. The fine crops include grapes and excellent wine. Large forests and extensive coal deposits are a source of wealth.

Arauco and Bio-Bio are on the south; Arauco along the coast, with important agriculture and large herds of cattle, has also extensive forests and mineral deposits, coal mines actively worked, and gold, both alluvial and quartz.

Bio-Bio at the east is mountainous and well watered, as is this region in general. Cereals are largely grown and viticulture is practised. The cattle industry is important and the forests are exploited.

Malleco, south of Bio-Bio, is peculiar in the fact that it alone of the Provinces touches neither the Pacific nor Argentina, having a strip of Bio-Bio and Cautín on the east and Arauco on the west. The mountainous eastern section is heavily wooded and

the fertile central plain with a mild damp climate is celebrated for its crops of wheat.

Cautín, extending all the way across the country, touches three Provinces on the north, Arauco, Malleco, and Bio-Bio. Here are plains, mountains, and valleys, with much rainfall and luxuriant vegetation of forest, grass, and agriculture. Excellent timber and tannin extracts, fruit and cattle, produce wealth, and coal and gold await exploitation.

Valdivia, south of Cautín, also extends across the country. Here are lower mountains, many passes into Argentina, extensive forests, several lakes, much rain; but a healthful climate, luxuriant vegetation, with profitable agriculture, forest products, and cattle breeding.

Llanquihue follows, extending south to the Gulf of Ancud and beyond. The present southern terminus of the Longitudinal Railway is the capital, Puerto Montt, at the head of the Gulf. This is largely a forest region, though in the valley of the lakes are fertile lands suited to grazing and agriculture, both of which industries are increasingly followed. The climate is rather cool but equable.

Chiloé, the last of the Provinces, consists of the large island of that name covering about 560 square miles, other islands much smaller, and a long archipelago called Chonos extending to the peninsula of Taitao. The island, Chiloé, is largely covered with forests which, strange to say, have a somewhat tropical character, with fine timber, dense undergrowth, and trailing vines; for the climate, with excessive rainfall, is extremely mild for the latitude, which corresponds to that of Massachusetts. Cereals, potatoes, and fruit are grown, and many pigs are raised; though forestry, and fishing are of greater

importance.

The Territory of Magallanes extends from the 47th parallel south including the mainland and islands, with mountains, rivers, forest, and plains. On the coast the climate is not severe; in the interior it is more rigorous. Cattle and sheep raising are the most profitable industries; whaling and forestry are important.

CHAPTER XXXI
CHILE: PORTS AND TRANSPORTATION

Ports

Although Chile cannot boast of many excellent harbors, with her extended coast line her ports are naturally numerous; 59 is the official number, of which 15 are primary ports with custom houses, while the rest are dependent, save Punta Arenas, which is proudly apart as a free port, the only one in this part of the world. The primary ports are not necessarily those with the best harbors, but were made such on account of the demands of commerce.

The service along the coast is similar to that of Peru except that the boats of the Peruvian Steamship Line do not go beyond their own shores, while there is additional service by Chilian steamers. Before the War 40 per cent of the engaged shipping was British. Service to and from Europe, formerly by way of the Straits, long ended at Valparaiso, later extending to Callao, and for one or two sailings to Panamá. The exigencies of war interfered with the execution of plans which are now being carried out or modified. European express service below Panamá is likely to be confined to the ports of Callao, Mollendo, Arica, Iquique, Antofagasta, Valparaiso, and Punta Arenas, with a possible call for coal at Coronel. Other express service may include Coquimbo and Talcahuano. Aside from the leading coastal lines a few companies operate smaller ships locally; on the sea, and 843 miles on the several navigable rivers at the south. There is also service among the southern islands and to Juan Fernandez, 400 miles to the west.

Valparaiso, as the most important Pacific port south of Panama, deserves especial attention. This rapidly growing city, population about 200,000, to one coming from the north seems quite European, with an atmosphere more crisp and businesslike than that of courtly Lima or picturesque La Paz. The semicircular bay is called a good harbor except when the north winds blow, as they are liable to do in winter. Some years ago a British steamer lying at anchor, in an unusually strong blow was sunk with all on board. A breakwater expected to avert such danger, has for some time been in construction; but the depth of water off shore has made the work difficult. Freight was formerly discharged into lighters and people into rowboats, the steamers anchoring at some distance from shore. Now, however, a fiscal mole 100 feet long, one half with a depth of water of 43 feet, the rest of 36 feet, provides all facilities. Valparaiso has fair hotels, providing insufficient accommodation for the rapidly increasing travel and business. In many respects the city is quite up to date, but unhappily here and in Santiago Americans in winter suffer more with the cold when sitting indoors than in La Paz and Lima, though for walking outside it is comfortable enough with the temperature near freezing. As a rule dwelling houses have no heating apparatus, no stoves, but in some hotel dining rooms electric heaters are employed, and oil stoves may be provided for Americans in their rooms. While Chile has coal mines, their production is insufficient for the use of shipping and of their varied industries, and the people are not accustomed to use either the native or the imported article for heating purposes.

The business section of Valparaiso is on a narrow

strip of shore between the bay and the amphitheatre of hills, the level sector varying in width from two blocks to half a mile. Climbing up the slopes and crowning the hill tops is most of the residential district. The business section, largely destroyed by an earthquake in 1906, has been rebuilt in a more substantial manner, and it well compares with other cities of its size. Ascensors run by cable on inclined planes are in general use for the ascent of the bluffs, though paths and a few carriage roads wind steeply upward in the cañons here and there separating the hills, some of which rise to a height of 1000 feet. The suburb of Viña del Mar, population 34,000, a fashionable summer resort with a fine beach and club house, distant a half hour by rail, is much frequented by the foreign devotees of golf, tennis, and other athletic sports.

Other Ports. Of the other principal ports we have observed that Arica is the terminus of the Arica-La Paz Railway, that Iquique is important for nitrates, Antofagasta for nitrates, copper, and as the medium of commerce with Bolivia by the old railway to Oruro and now to La Paz; Coquimbo as the port of a province with both mineral and agricultural wealth. Below Valparaiso are better harbors. Concepción, the largest city south of Santiago, 350 miles distant, is spoken of as the outlet of the rich Province of that name, but being 12 miles from the mouth of the Bio-Bio River it is not a real seaport and is served by Talcahuano, 9 miles away, which has one of the best harbors on the coast. For this reason, though a much smaller city, population 24,000, it was selected as a military port and for the Government dry docks. A little farther south on Arauco Bay are Coronel and Lota, both important coaling stations, at one of which all steamers call; Lota, the larger city, has all

conveniences for shipping. At the tip of the mainland in the Straits is Punta Arenas, not visited by the regular coasting steamers, but a port where every passing ship is likely to make a brief call.

Railways

While the Chilians have always cultivated a taste for the sea, for strategical more than commercial reasons railway construction has of late been strongly favored. In this medium of traffic Chile in proportion to her area is far ahead of the other West Coast countries. It is true that the difficulties of topography are less. The oldest existing line in Latin America was here constructed in 1849 by a Bostonian, William Wheelright, who later founded the Pacific Steam Navigation Company, the earliest giving regular steamship service to Europe from the West Coast. This first railway line was from the port Caldera to the mining town Copiapó. The line from Valparaiso to Santiago, also constructed by Americans, was finished in 1863. Government ownership is popular in Chile, and of the 8000 miles of road in operation the State owns over 5000, with considerable extensions planned. Unfortunately six different gauges have been used, varying from 2 feet 6 inches on the Antofagasta Bolivia Line to 5 feet 6 inches on the Central Railway.

The Central Railway. This is a Government Line connecting Valparaiso with the capital Santiago, express trains with American parlor cars making the run of 117 miles in four hours. The road is now to be electrified. South along the rich Central Valley, the same Railway runs through sleeping cars to Valdivia and to Puerto Montt, the latter city 750 miles from Santiago. This section is well worth a visit, whether

from a scenic or a business point of view. A bridge 1400 feet long and 300 above the bed of the Malleco River cost over $1,000,000.

There are many branches from the main line, some of these privately owned; most of them to coast ports, a few towards the Cordillera. Valdivia is the most southern ocean port to which a branch extends. Farther north, the third city of Chile, Concepción, is favored, and Talcahuano near by. From Concepción a coast road leads south to Lota, Coronel, and beyond. From Talca a line goes to Constitución, of some importance for agriculture, shipyards, and gold mining. Another branch goes to the port Pichilemu; from Santiago one extends 72 miles to the port San Antonio, nearer the capital than is Valparaiso but a secondary port to be improved by the building of docks. The Central Railway obviously forms a very important part of the real longitudinal railway, but the section which has the name Longitudinal begins farther north.

The **South Longitudinal**. From Calera on the Valparaiso-Santiago Railway a branch leads 45 miles to Cabildo, where begins the Longitudinal proper. This because of construction difficulties is of narrow gauge, one metre. On account of poor equipment and service, and the competition of steamship lines along the coast, its traffic is at present small; but with better facilities and increase of population it will be of much value. At last accounts there was weekly service to Antofagasta with two changes of cars, not counting the one from Valparaiso or Santiago in order to reach Cabildo. Here, three hours from Santiago, the South Longitudinal is taken to the city of Copiapó; for the Longitudinal has two sections. The ride is through a fairly pleasant country with

varied scenery, the region being partly agricultural and partly mineral. In this section are heavy grades, rising to 6 per cent, requiring 28 miles of the rack system. Branches or other connecting lines here and there reach the sea. The road passes through the important port Coquimbo, and the adjoining Serena, at which point, 200 miles from Valparaiso, the desert land begins; though in river valleys there is still some verdure. From Vallenar on the main line a branch runs 31 miles to the port Huasco. A private line from the port Carrizal, 92 miles north of Huasco and 73 south of Caldera, crosses the Longitudinal. At Copiapó we come to the old line from Caldera, a fairly good port, shipping copper and doing considerable other business, though not a port of the first class. A branch in the other direction extends to San Antonio.

The **North Longitudinal**. At Copiapó we change to the North Longitudinal from which there is a branch to Chañaral, about 50 miles north of Caldera, on a large but exposed bay in one of the richest mineral districts of Atacama, with large smelting works, and exporting gold, silver, and copper. A private (British) railway system of 184 miles, crossing the Longitudinal, serves a nitrate district and the port of Taltal, 100 miles south of Antofagasta; a primary port on a well protected bay, with piers fitted with steam cranes, a centre of the nitrate and copper industries. Taltal is a modern town with important business houses. Besides gold, silver, and copper, the Province has some undeveloped nitrate land.

Farther on at Aguas Blancas, a railway belonging to the Bolivia-Antofagasta Company runs to Caleta Coloso, a port six miles south of Antofagasta and

connected by rail with that city as well as with various nitrate properties. Farther still the Longitudinal crosses the Antofagasta-Bolivia Railway at Baquedano, where some traffic is exchanged. It is the intention of the Government to construct its own line to Antofagasta and to the port of Mejillones some miles north. Beyond this crossing, from Toco on the Longitudinal, the Anglo-Chilian Nitrate and Railway Company's Line branches to the port of Tocopilla. At last Pintados, the one time terminus is reached, where connection is made with the Nitrate Railways, which go on to Iquique and Pisagua. But in spite of this the Government Line is now being prolonged to the former city. It is intended ultimately to extend the main line to Arica, 175 miles farther, a section likely to be unprofitable commercially but desired for other reasons. From Arica there is a railway to Tacna, near the Peruvian border, hence on completion of this section there would be through rail service from near the northern border to Puerto Montt in the far south, a primary port on the Gulf of Reloncavi. The length of the road from Puerto Montt to Jazpampa the present terminus, east of Pisagua, is 1902 miles; to Taratá, the most northern town in the mountains, the distance is 207 miles more.

The **Antofagasta-Bolivia Railway**. The Bolivian section of the important Antofagasta Railway has already been referred to. That in Chile deserves further consideration. British owned, like most of the Chilian railways not belonging to the State, it is the longest and most important of these. Although uncommonly narrow with a 2 foot 6 inch gauge, the sleeping cars are more comfortable than some with double the width. The road operates 835 miles of main track to La Paz, 518 of these in Chile. There is

semi-weekly service to La Paz in practically two days, besides local trains. One thousand, two hundred and fifty miles of track are controlled by the Company. The climb begins at once, the road in 18 miles getting 1800 feet above the sea. At km. 36 a branch 70 miles long goes to the Boquete Nitrate Fields, altitude 5622 feet. At Prat, km. 59, a branch goes down to Mejillones, a new port, opened by the Company in 1906, called the finest harbor on the coast, capable of holding the fleets of the world (it was said when these were smaller) and so protected that shipping suffers no inconvenience from bad weather. Tocopilla, 37 miles north of Antofagasta, has direct rail connection with that city by a line 43 miles long. The main Antofagasta line, crossing the Longitudinal at km. 96, at km. 116 enters the principal nitrate district of this region and leaves it 35 miles beyond. In this section are 24 *oficinas*, as the nitrate plants are called, some of them models of their kind.

Going in either direction this part is traversed at night; otherwise one might be refreshed by the sight of a little green at Calama, 149 miles from Antofagasta, at six A.M. This was a copper mining centre in Inca days and a smelter is here now. At this altitude some persons stop a day, a good plan if one is not sure of his heart; though oxygen is now carried for use in emergency. At km. 254 is a short branch, 6 miles, to Chuquicamata, to be referred to later. Just beyond the Conchi station is a graceful viaduct with six lattice girder spans of 80 feet each, supported on steel trestle towers. This, called the highest viaduct in the world, is 336 feet above the water of the Rio Loa, at an altitude of nearly 10,000 feet. Here a branch line runs to the copper mines of Conchi Viejo. At San Pedro station, 195 miles, at 10,600 feet

altitude, are reservoirs blasted from the solid rock, on which the Company spent $6,000,000 to supply Antofagasta, the nitrate fields, and the railway with water. The water comes from three different places, one of them 37 miles northeast and 14,500 feet above the sea: this source capable of supplying 6000 tons of water daily through 11-inch pipes.

The road now passes two snow capped volcanoes, from one of which smoke may be rising, and crosses a stream of lava one-third of a mile wide and several miles long, to the summit of the main line, 13,000 feet. Soon after, a borax lake belonging to a British company may be seen; 24 miles long, it is the largest single deposit in the world and the chief source of the world's supply. At Ollague, where snow storms occasionally impede traffic, is a branch to the rich copper mines at Collahuasi. The Bolivian frontier is soon afterward crossed, and at Uyuni a change is made to the broader gauge line to La Paz.

The **Trans-Andine Railway**. Of all the railroads of Chile, the Trans-Andine is naturally the most famous, as a part of the only trans-continental railway south of Panama; but financially, as yet it is hardly a success. With post-war increase of traffic, there will doubtless be an improvement. The Trans-Andine section of metre gauge begins at Los Andes, altitude 2723 feet, 88 miles from Valparaiso. A change is here made from the State Line, 5.5-foot gauge. It is a distance of 43 miles to the tunnel, a steep climb up the Aconcagua River Valley, with a maximum grade of 8 per cent; 20 miles of rack railway are employed. There are 25 tunnels, and on the Aconcagua River or its branches, 118 bridges. The scenery is wild and the journey delightful. Sheds have been erected against snow and land slides. Up to 1916 the road

was closed for several months each winter; but with an increase of sheds and with a force of men continually digging, the road was kept open through the years 1916, ’17 and ’18; it was seriously blocked in July, 1919. While previously passenger traffic was the more remunerative, in 1916 unusual efforts were made for the benefit of important freight which it was impossible to ship by sea.

The tunnel is at a height of 10,486 feet, its length is 10,385 feet, each practically two miles. The boundary line is near the middle, each country building to that point; but the whole is operated as one line from Los Andes to Mendoza. The line was opened in the Centennial year, April 16, 1910, in time for the Exposition at Buenos Aires. The cost of the Chilian section was about $15,000,000. Operation is at a loss, interest being paid by the Government. The capitalization is $317,000 a mile. Fifteen Trans-Andine projects have been put forward, most of them for the south, one from near Puerto Montt. One in construction is from Talcahuano to Bahia Blanca by way of Temuco. A road from Punta Arenas to the Loreto coal fields is the most southern railway in the world, as that is the most southern city. The early construction is expected of an important road at the north from Salta in Argentina by Huaytiquina on the border to Antofagasta. Of wagon roads there are said to be 20,000 miles.

The Arica-La Paz Railway is described on page 222.

CHAPTER XXXII
CHILE: RESOURCES AND INDUSTRIES

Although Chile is often compared to California, to which State it has some but not a close resemblance in length, partial dryness, earthquakes, and fruit, the specialty of Chile is not shared by California. Chile and nitrates are almost synonymous terms. A thought of one suggests the other. The greater part of the nitrate country earlier belonged to Peru, some also to Bolivia; and both countries still bewail their loss.

Mining

The **Nitrate Fields** we know are in the north, chiefly in the Provinces of Tarapacá, Antofagasta, and Atacama. If this desert land does not blossom as the rose, it produces the wherewithal to make other fields blossom, and the wealth to purchase the roses. The richest deposits are mainly along a stretch of 300 miles from Pisagua in Tarapacá, to Coquimbo. With an average width of $2^1/_2$ miles, the fields are at a distance of from 10 to 80 miles back from the coast, and at a height of 2000-5000 feet. The deposits, which are not in continuous fields, are sometimes on the surface, but oftener overlaid with strata of earth several feet thick. The raw material called *caliche* contains from 20 to 65 per cent nitrate of soda. After pickling in tanks 8-12 hours, the liquid, *caldo*, is run off, the sand and refuse dropping to the bottom. When ready for export the article carries 15-16 per cent nitrogen and 36 per cent sodium. Commercial nitrate is a white cheese-like substance, which is used in manufacturing the

highest grade of gunpowder, also to produce nitric and sulphuric acid; but the bulk of it in ordinary times is employed as a fertilizer, doubling and tripling the harvest. Within recent years the demand and in consequence the production has greatly varied, the partial recovery in 1920 being soon followed by a depression.

A by-product is a yellow liquid, which being chemically treated leaves a blue crystal, iodine, which costs as much an ounce as saltpetre per 100 pounds. Being worth $700-$800 a cask it is shipped in treasure vaults with bullion. The nitrate establishments called *oficinas* provide good salaries, and the best possible quarters for their officials, and they are interesting to visit. As a mineral, the nitrate is distinguished from guano although believed by some to have the same origin. British companies have long been engaged in this industry. American interests have more recently acquired holdings. The Du Ponts have three properties covering 14,000 acres.

The chief ports of this region are Iquique and Antofagasta, Pisagua being a smaller port visited only by the *caletero* or the strictly freight boats. Iquique is a more agreeable city than in former days, when water was sometimes $2 a gallon, and people drank champagne, they said, because water was too expensive. Now the dust of the streets is laid by sprinklers, some people have bath rooms, a few even fountains in patios. Antofagasta is also a desert place, unattractive to look at, but with good shops, business houses, and fair hotels. The water comes a distance of nearly 200 miles, the source more than two miles above the sea.

Potash. In addition to nitrates Chile possesses

extensive beds of useful potash one of which is estimated to contain nearly 7,000,000 tons easy of exploitation.

Copper. The property of the Chile Copper Company (one of the Guggenheim interests) at Chuquicamata is said to be the largest copper deposit known in the world. About 2000 of the 9600 acres of the claim are mineralized. The outcrop of copper is one and a half miles in length. It has been proved below to a width of 1800 feet and a length of 7500 feet. Ten of the 2080 shafts are over 1000 feet in depth, and at 1500 feet the ore is of commercial value. Over 700,000,000 tons of positive and probable ore have been developed, carrying an average value of 2.12 per cent copper. The reduction plant has a capacity of 15,000 tons a day, the refinery of 180,000,000 pounds a year. With a 90 per cent extraction the yield is 96 pounds of copper per ton. At the port of Tocopilla, north of Antofagasta, the Company has a power station where oil from California is used to generate a power of 24,000-27,000 kilowatts needed at Chuquicamata. This is transported by wire across country a distance of 100 miles. At normal prices the cost of copper production with delivery in New York or Europe is $121 a ton, or about 6 cents a pound; higher with war time conditions which still obtain (1921). From the 15,000 ton plant in full service 175,000,000 pounds of copper would be produced annually. In 1920, 55,617,000 pounds were produced, the largest amount from any mine in Chile. In 1916 important mines belonging to the Calama Mining Company were added to the Chile Company's holdings.

The Braden Copper Company, another Guggenheim interest, owns about 2300 acres in the

Province of O'Higgins. They have a concentrator, a smelting and converting plant, a hydro-electric power plant with 800 kilowatt capacity and an electric and a steam railway; the latter, 43 miles long, connecting the property with Rancagua, which is on the Central Railway 43 miles southeast of Santiago. The ore is of concentrating copper, a sulphide in brecciated andesite, around an extinct volcano. It runs about 2.5 per cent, with an earlier production cost in New York of 6.5 cents a pound, but now higher. In 1916, 1500-1800 men were employed. The plant, recently enlarged, is not working to capacity. In 1917, 64,000,000 pounds were produced, over 77,000,000 in 1918, with diminishing demand, 40,000,000 in 1920.

Another American syndicate has acquired the Tamaya Copper Mines in the Province of Coquimbo between Ovalle and Tongoy, the latter, a minor port 27 miles south of Coquimbo, sheltered from north winds, with smelting works in the place. With an efficient pumping plant and other improvements installed, the mines are expected to yield large production. Other companies, native, British, and French are engaged in copper mining at Carrizal and elsewhere.

Iron. Coquimbo, a Province with local importance for agriculture, is notable for its deposits of iron ore, said to amount to a billion tons. Only one of these has been worked, a deposit located at Tofo, about four miles east of Cruz Grande, and 30 north of the city of Coquimbo. This property was leased in 1913 by the Bethlehem Steel Company from a French Company which had developed the mine to some extent and produced ore. The ore appearing as the top of a large hill will be mined by electric shovels

and transported by an electric railway to docks at Cruz Grande. The amount of ore is very large though with exact tonnage undetermined. The Company is still exploring the deposit at depth.

The mines and railway are completely equipped. At Cruz Grande a basin dock has been constructed with large storage pockets into which the ore will be discharged from the railway cars, and from which it will go directly into the vessels. The Steel Company is constructing steamers of 20,000 tons to carry the ore to the United States for use in their furnaces. The ore is very pure averaging about 67.50 per cent iron. It is a dense ore reddish black in color, a mixture of magnetite and hematite.

The French Company formerly controlling Tofo had erected a steel plant at Corral intending to transport the ore thither. There is no iron ore near there and the plant is not operating.

Of the other deposits in Coquimbo and farther north some are of considerable size, but none is located so near the coast as Tofo and none has been developed.

Other metals existing in Chile are at present of less importance and slight operation. A moderate gold output accompanies the production of copper, and there is some placer mining, especially in the south. Deposits are known to exist in many Provinces from Tacna to Tierra del Fuego. Silver too exists, but its production is chiefly as a by-product. Lead, zinc, molybdenum, and tungsten are exported in limited quantities.

Coal, following nitrates, is of the first importance among ordinary minerals, a source of large wealth though the production, about 1,700,000 tons yearly,

is insufficient for the needs of the country. Little is therefore exported and a good deal is normally imported from Great Britain and Australia; until recently a little only from the United States. Most of the mines in operation, owned by ten companies, are near the ports of Talcahuano, Coronel, and Lota. The coal is not equal in quality to the British, but it has been used by steamships, railways, and mines with fair results. Coronel or Lota, five miles apart on Arauco Bay, one or the other, is a regular port of call for steamships. The Cousiño property at Lota was purchased in 1852 and later was conducted by the son's widow, under her administration the greatest financial enterprise carried on by a Chilian. At her death she was called the richest woman in the world, leaving a property of $70,000,000. The capital of the company is $20,000,000. The mines are one-fourth of a mile deep and extend under the sea, where there is good rock and no drip. Here are streets, restaurants, offices, stalls for horses, blacksmith shops, etc.

A British Company, the Arauco, in addition to coal properties operates its own railway with 62 miles of main line and branches, besides mining spurs. It has four daily trains from Concepción to Lota, Coronel, and beyond, passing over the Bio-Bio River by a bridge of $1^1/_4$ miles, the longest in South America. Of coal about $1^1/_2$ million tons are produced and as much more is imported.

Petroleum is believed by Chilians to exist in large quantities, but the present development is infantile. It has been found in southern Chile, on the Island of Chiloé and in the Patagonas district, as well as in the north near the Bolivian frontier. Large quantities are imported principally from Peru, normally about

400,000 tons a year. Oil recently found in the Magallanes Territory is stated by experts to be equal in quality to that found in Argentina. The extent of the deposits seems to rival that of the famous fields of Comodoro Rivadavia. Legislation to regulate the well drilling is proposed to prevent inundation of deposits by subterranean streams, to restrict the ownership to native Chilians or foreigners with Chilian families, and to secure to the Government a 10 per cent royalty. A strong flow of petroleum of great purity from a well about 300 feet deep has recently been reported from Chiloé.

Sulphur comes from a largely producing mine at the foot of Mt. Ollague, and from one of growing importance at Tacora on the Arica-La Paz Railway. The deposits of Tacora are believed to contain 10 to 45 million tons of sulphur. In 1915 about 10,000 tons were produced in Chile.

Salt. From various salt deposits, the salinas of Punta de Lobos and several mountain lagoons, about $300,000 worth of salt was produced, supplying the domestic market.

Borax is important, Chile furnishing about half of the world supply.

Agriculture

Of large importance and value are the agricultural interests including fruit, although the imports of such products are nearly double the exports in value. About one eighth of the area of Chile consists of arable land. The production should be greatly increased. Twenty million acres are still available, and with better methods excellent results might be secured. In 1914-15 about 25,000,000 bushels of

wheat were raised, half as many potatoes, and more than half as much hay; besides barley, oats, beans, corn, etc. Considerable wheat is exported with some barley, oats, rye, and legumes. Of 15,000,000 acres suitable for wheat, only one fifth is in cultivation. It grows well from Aconcagua to Cautín inclusive, but farther south the crops are uncertain. They average 15-20 bushels an acre. Six hundred thousand acres are devoted to alfalfa, which in favorable places gives three crops a year and has roots ten feet long, a distinctive variety being formed here. In irrigated valleys from Coquimbo north, corn gives two fine crops annually. Potatoes flourish from Concepción south, in Chiloé yielding 250-350 bushels to the acre. Flax and sugar beets might be raised. Some agricultural machines are now employed, in the neighborhood of 30,000.

Fruit. Delicious fruits of all temperate zone varieties and some of the subtropical are raised, chiefly for home consumption, but with export possibilities. Drying and canning of these is practised to some extent, but might be done on a much larger and more profitable scale. Excellent table grapes are raised; many vineyards devote their product to wine making, the industry being especially developed in the Provinces of Santiago, O'Higgins, and Colchagua. In the north, wine is made of the port and sherry classes; in the central section light wines of excellent quality, some of which are exported to the neighboring countries. More wine however is imported of expensive varieties. The vineyards are in general owned by natives, and according to location are worth $200-$1000 an acre. Raisins are produced in quantity.

Forestry

This might become a more important industry, though now practised to a considerable extent. It has been customary to burn a section of forest at the close of summer, February, to get rid of the underbrush, and later to cut down the trees, which must have suffered some injury. The forest area is below the Bio-Bio River. On a tract of 100 square miles extending from near Valdivia north to Temuco, the timber averages about 9000 feet to the acre. Farther south the woods are denser, as on the Island of Chiloé. The greatest extent of forest is in Valdivia, the next in Llanquihue and in Chiloé. On this Island a 60 mile railway was constructed by the Government from Ancud at the northwest to Castro south, on the east side, making a part of the forest accessible. Oak, Chilian mahogany, laurel, ash, pine, and other hard and soft woods are available. There are in Chile 3000 saw-mills and some pulp and shingle mills. The first and second grades of wood, used for floors and finished boards, bring $12-$18 per 1000 feet, ash $25; the third grade is worth $8. Shingles are $3 per thousand. From the forests comes the *quillay* bark with a soapy substance for cleaning silk and fine linen, of which $200,000 worth is annually exported to France, after being prepared by two Chilian factories. Tannin, of which 15,000 tons are annually used, is derived from bark of several kinds. With additional railways planned and Government data furnished, there is opportunity for good investments with moderate capital.

Stock Raising

Stock raising of various kinds is carried on quite

extensively by some large companies under British, German, or Chilian control, often paying 20 per cent dividends. Sheep are in the lead, numbering probably 6,000,000, cattle 3,000,000, horses 725,000, half as many goats, a third as many pigs, fewer donkeys, mules, alpacas, and llamas. The horses are good, larger than those in Peru, and noted for their excellent trotting, some making this as easy as a good pace or canter. In 1916, 20,000,000 pounds of wool were produced, half of this in Magallanes Territory not far from Punta Arenas, where there are more than 3,000,000 sheep. The meat is of the finest quality; the farther south the better the wool in thickness and length of staple.

The cattle are improving with the introduction of Shorthorns and Herefords; there is some export, especially to Bolivia. The 3,000,000 at present might be increased ten fold. A British company is constructing a frigorifico at Puerto Montt. The dairy industry is important, with good cheese, bottled milk, and some condensed. Goats are numerous in the mountains. Apiculture is practised and fine honey is made. Fisheries are of great importance and value, at Juan Fernandez, as also along the coast.

Manufacturing

Such industries are more developed in Chile than in any of the countries previously considered. The 6200 manufactories with 80,000 operatives and an investment of $250,000,000 show great diversity. There are saw mills, flour mills, breweries, sugar refineries, some coarse sugar being imported from Peru, tanneries, furniture, and shoe factories, with others commonly found. A cement factory pays a quarterly dividend of 5 per cent, a brewery gave a

semi-annual dividend of 15 per cent. A new one is planned for Arica. More than $12,000,000 are invested in the leather industries, with an output worth $20,000,000. Twenty-two or more shoe factories are scattered in various cities. Clothing and textiles are next in value of production, followed by $10,000,000 worth of furniture and woodwork. Ship building is important.

Investments

Activities in Chile in the immediate future for which about $15,000,000 have been appropriated by the Government include work or equipment on railways, roads, bridges, barracks, waterworks, sewer systems, building construction, and port works. These furnish opportunities to which many others may be added. The possibilities in agriculture, fruit raising and canning are obvious; those in fisheries, saw mills and lumber, development of water power, in factories of various kinds may be noted, as well as for large capitalists in mining. A $10,000,000 contract for the electrification and equipment of four zones of the Government railways has been concluded with a combination of several American interests.

THE EAST COAST

CHAPTER XXXIII
ARGENTINA: AREA, HISTORY, GOVERNMENT, POPULATION, ETC.

Argentina, from the south the first country on the Atlantic coast, the second largest in South America, has been called not only the most progressive on that continent but the richest per capita on the globe.

Area, Population, Boundary

Area. Occupying the greater part of the southern extremity of the continent, Argentina is nearly 2300 miles long, with an extreme width just south of Paraguay of 930 miles. Nearly as broad in the centre, the country below the Province of Buenos Aires narrows rapidly towards the south. Extending from 22° to 56° S. Lat., it has an area of 1,154,000 square miles, equal to about one-third of Europe and more than one-third of the United States: approximately that of the part east of the Mississippi River with Texas in addition.

Population. In 1919 the inhabitants were reckoned as over 8,000,000. In 1921 there may be 9,000,000, at least 8,500,000; more than seven to a square mile. Ninety per cent of the population is found in 40 per cent of the territory, although the rest may be the richest.

Boundary. While boundary disputes have

occurred with her neighbors as in the case of the other South American countries, all of Argentina's have been amicably settled by arbitration or agreement. Bolivia and Paraguay, a trifle of Brazil and of Uruguay are on her northern border, the last three are on the east; a long stretch of the Atlantic Ocean is at the southeast; at the south is a bit of Chile, which country extends along the entire western boundary.

History

While a few settlements were made in Argentina (the country was discovered in 1508) from a half to a whole century earlier than those of our own coast cities, the country was so hampered by restrictions of immigration and commerce, exceeding those placed on the West Coast, that its growth was stifled. After proclaiming independence it suffered for years from internal disorders, but during the last half century its development has been phenomenal. In 1535, the same year that Pizarro founded Lima, Pedro de Mendoza landed on the south shore of La Plata River and made at Buenos Aires the first settlement on this part of the continent. But the Indians of the East Coast were more savage than most of those on the West, and a few years later, after many colonists had been killed, the little town was abandoned. In 1580 it was re-established by Juan de Garay, after a number of settlements had been made in other districts, as at Mendoza, Santiago, Tucumán, and Córdoba. Previously attached to the great dominion ruled from Peru, in 1776 a Viceroyalty was established at Buenos Aires.

In 1806-07, during a European war, the city was attacked by British forces which were ultimately

obliged to retreat. By reason of this success the colonists became more self reliant, and May 25th, 1810, they formed a junta of citizens who took from the Viceroy the control of the Government. While this was done in the name of Ferdinand VII, the date is regarded as the birth of their independence. July 9th, the date of the Proclamation of Independence by an Argentine Congress in 1816, is alike celebrated. Not being at first obliged to fight a Spanish army in Argentina, some of the colonists under General San Martín kindly assisted in liberating Chile and later Peru from the Spanish yoke. Meanwhile Congress having declared independence had made Buenos Aires the seat of government. Yet during civil strife which for many years continued, the Province of Buenos Aires was at one time an independent State, separated from the Argentine Federation. In 1861 matters were finally settled and reunion was established. In the latter part of that decade occurred the Paraguayan War, which was followed by some internal difficulties; but with many able leaders, growth and prosperity for the most part have since prevailed.

Government

The Government of Argentina is that of a Federal rather than a Centralized Republic, although in fact the President has a preponderating influence, with certain rights of intervention in the affairs of any Province. The constitution following quite closely that of the United States, there are the three usual branches. The President of the Republic, elected for a term of six years, is not immediately eligible for reëlection. Congress has a Senate of 30 members and a Chamber of Deputies of 158.

The Provinces have each a Governor and a Legislative Assembly of its own choosing. The Governors of Territories are appointed by the President. A Territory has the privilege of becoming a Province when it has 50,000 inhabitants, but for some reason this right has not been exercised. The Federal District, the City of Buenos Aires, is governed by a Mayor and a Council elected by tax paying residents.

Male citizens have the right of suffrage at the age of 18. The passage of a law, at the initiative of President Dr. Roque Saenz Peña, made the exercise of the franchise obligatory upon all native born citizens, and on foreigners after two years of residence, thus inaugurating a great change. At the first election under the new law in 1916, Dr. Hipolito Irigoyen of the Radical Party was chosen President by the Electoral College, the first person outside of the previously governing class to be elected.

There are 14 Provinces corresponding to our States, and 10 Territories, besides the Federal District, Buenos Aires. The best obtainable figures of the area and population of the Provinces and Territories with those of the population and altitude of their capitals follow. The Provinces are named in order from the north across from west to east in four rows, thus beginning at the northwest:

Provinces	Area, in square miles	Population	Capitals	Population
Jujuy	15,800	78,000	Jujuy	25,000

Salta	62,160	160,000	Salta	40,000
Catamarca	37,000	110,000	Catamarca	15,000
Tucumán	10,400	350,000	Tucumán	100,000
Santiago del Estero	75,000	265,000	Santiago	35,000
San Juan	38,000	130,000	San Juan	20,000
La Rioja	38,000	85,000	La Rioja	13,000
Córdoba	67,000	750,000	Córdoba	135,000
Santa Fé	50,000	1,000,000	Santa Fé	80,000
Corrientes	33,000	400,000	Corrientes	40,000
Entre Rios	30,000	450,000	Paraná	80,000
Mendoza	55,370	300,000	Mendoza	65,000
San Luis	30,000	127,000	San Luis	25,000
Buenos Aires	117,800	2,200,000	La Plata	135,000
Federal District	72	1,800,000	Buenos Aires	1,800,000
TERRITORIES				
Los Andes	35,000	2,600	San Antonio	1,000
Formosa	44,000	52,000	Formosa	4,200
Chaco	386,000	65,000	Resistencia	12,000
Misiones	11,880	52,000	Posadas	10,000

Pampa Central	58,000	110,000	Sta. Rosa de Toay	5,400
Neuquen	42,470	31,500	Neuquen	4,500
Rio Negro	77,220	42,000	Viedma	7,500
Chubut	946,000	23,000	Rawson	8,000
Santa Cruz	111,000	10,000	Puerto Gallegos	3,000
Tierra del Fuego	8,300	2,500	Ushuaiá	1,600

The Territories are four at the extreme north, and the remaining six south of a line from Mendoza to the City of Buenos Aires.

Population

With an estimated population of at least 8,600,000, Argentina suffered a large decrease in its previously great immigration, as well as a considerable emigration, during the Great War, which in other ways at first gravely interrupted its prosperity. In the 50 years preceding 1912, over 4,000,000 immigrants had entered the country, more than 3,000,000 remaining. Of those entering, the Italians numbered over 2,000,000, Spanish over 1,000,000; those of any other nationality except 200,000 French were each fewer than 100,000. The Negroes and the Indians of earlier days, except perhaps 100,000 of the latter in remote sections, have become assimilated or killed. The Chaco Indians, it is said, are not difficult to domesticate, especially the Tobas living near the Bermejo River. The people are generally considered the most

homogeneous of any of the South American countries except Uruguay, as nearly all are of European descent. Here as in Chile we observe the effect of location in the temperate zone, all of the country being so situated except a small section at the north.

A great preponderance of population is in the cities, one fifth of the whole in the city of Buenos Aires. While the people are proud of its greatness they have begun to realize that this concentration is not for the general welfare. Forty-three per cent of the urban and 25 per cent of the entire population is said to be foreign born. Aside from the Capital of the Republic, there are in the Province of Buenos Aires five cities with a population above 50,000 and a dozen more with over 30,000. In Buenos Aires there is a large social circle of wealth and culture, as well as a laboring class with strong radical elements.

Education

Education receives much attention and $25,000,000 are annually devoted to this purpose. Primary education is free and called compulsory. There are primary and secondary schools, Universities, Normal Schools, Technical Colleges, Schools Agrarian and Veterinary, of Viticulture, Mines, Arts, and Music. The Universities are at Buenos Aires, La Plata, Córdoba, Tucumán, and Santa Fé; there are three Schools of Commerce at Buenos Aires, and one each at Rosario and Concordia. In various towns are private schools, some English and American. The schools generally are of high grade, and it was said by a former Argentine Ambassador, corroborated by other persons familiar with Buenos Aires, that their school

children knew more about the United States than most of our business men and Members of Congress knew about Argentina. Many of their school buildings, though usually smaller than ours, are superior in architectural beauty.

Press, Religion, etc.

Press. As to the Press, Buenos Aires can boast of two of the wealthiest and best newspapers in the world, the *Prensa* and the *Nación*. Not many years ago, the *Prensa* contained as many pages of telegraphic and cable dispatches as any New York paper had columns, and articles superior in literary and intellectual ability. It was pronounced by some Europeans the best newspaper in the world. Buenos Aires has other papers of almost equal merit, besides several in English and in other foreign languages.

Religion. In Religion there is entire freedom, but the President must be of the Roman Catholic Church. One in Buenos Aires no longer sees women with *manta* or lace veil over their heads for church going as on the West Coast.

Telegraph. Argentina has about 45,000 miles of telegraph lines, ample cable connections, and a dozen or more wireless stations. Telephones are in general use in all the large cities and in many smaller places.

Money current in Argentina is paper, with coins for small change. A paper peso is equal to .44 of a gold peso, which is a little less than an American dollar, 96.48 cents; but for practical purposes except in large transactions a paper peso may be reckoned as 44 cents.

CHAPTER XXXIV
ARGENTINA: PHYSICAL CHARACTERISTICS

Argentina is oftenest thought of as a country of broad plains, but while a large portion of the country is of this character there are three distinct sections: the Mountains, the Plateau, and the Plains, with several subdivisions.

Mountains

We know that the Andes form the western boundary of the country for the entire distance from north to south, and that some of the loftiest summits including the highest, Aconcagua, are in Argentine territory; but east of the great Cordillera, which as already noted is less steep on this than on the Chilian side, are other ranges of the same and other systems. Two or three extend from the Bolivian plateau, and farther down spurs run out from the main chain. In Córdoba are three ranges separate from the Andes, with one peak above 9000 feet; a peak in San Luis is over 7000. Near the sea in the Province of Buenos Aires, are low mountains, mere hills in comparison, one reaching a height of 4000 feet; and in Misiones are spurs from the Brazilian Coast Range, the highest a hill about 1300 feet.

Plateaus

There are plateaus in the north among the mountains, but the distinctive Plateau Region is in what used to be called Patagonia, a name not so much employed in Argentina as formerly. This

section is arranged in terraces, falling from the Andes to the east, the western part called the Plateau, having an altitude of 2000-500 feet; near the sea it goes from the latter figure to sea level. The Plateau has many sterile plains, some strewn with boulders, others with dunes of sand; also good grazing and forest land, and some suitable for farming.

Lakes. The Andine lakes in the Patagonia section are of glacial origin, with much scenic beauty. One of these, Nahuel-Huapi, 40 miles long, is said to be 1000 feet deep. Lake Buenos Aires, partly in Chile, is 75 miles long. The lakes number more than 400; at the north are many swampy lagoons.

Plains

The plains, once under the sea, and now for the most part less than 500 feet above it with a very gradual rise from the ocean to the Andes, extend from the Pilcomayo River, the boundary line with Western Paraguay, on the north, to the Rio Negro on the south. The northern part belongs to the Gran Chaco, swampy and partly wooded, with so slight a southeastward slope that large spaces are regularly flooded in the rainy season. South of the Bermejo River which is parallel with the Pilcomayo, the land is higher, some of it 800 feet above the sea, and the forests are heavier; but there are still marshy lagoons. Then come open grassy plains with occasional salt pans. The section between the Paraná and Uruguay Rivers, called the Argentine Mesopotamia, in Corrientes at the north is of somewhat similar character, but has higher land in Entre Rios at the south. The remainder of the plain is the real Pampa, the part west of the Paraná River and below that extending to the ocean, mainly,

treeless and grassy. It includes the Provinces of Buenos Aires, Santa Fé, Córdoba, San Luis, Mendoza, and the Territory Pampa Central. In the far west is a depressed region containing some lakes and swamps with no outlet, but with too little rain.

Rivers

The rivers of Argentina are of great importance, being navigable for immense distances. Chief among them are those of the System of La Plata, this river being formed by the union of the Paraná and the Uruguay: a great river indeed, the outflow of water being 80 per cent more than that of the Mississippi, and the drainage basin covering 1,500,000 square miles. The Paraguay, Pilcomayo, Bermejo, Salado del Norte, Iguassú, and many others belong to this basin. The Iguassú, though not navigable except for a mile from the Paraná, is world famed for its magnificent waterfall, surpassing Niagara in height, width, and most of the year in volume of water; while it is rendered altogether incomparable by the extraordinary beauty of its setting.

The **Plata River**, 250 miles long, is much like a gulf, having a width of over 100 miles at its mouth between Capes Santa Maria in Uruguay and San Antonio in the Province of Buenos Aires. The Paraná River with many tributaries has two principal sources well up in Brazil and a total length of 2600 miles, about one half in or on the border of Argentine territory. At first flowing south it turns west between Argentina and Paraguay, and after receiving the Paraguay River again flows south in Argentina. From January to September, nine months, it is open to trans-Atlantic steamers to Rosario; for

6000 ton vessels, 12 foot draft, to Paraná or Colastiné, the port of Santa Fé; for smaller steamers up the Alto Paraná nearly to the Falls of La Guayra, a little above the northeast extremity of Argentina. Steamers of 7 foot draft go up the Paraguay to Asunción and smaller steamers to Corumbá in Matto Grosso, Brazil, 2000 miles from Buenos Aires, and beyond to Cuyabá. Forty-two miles up stream from Buenos Aires is Ibicuy, a port where a steam ferry operates, carrying trains to and from Zarate on the Buenos Aires side.

A few small streams flow into lagoons with no outlet; a number in the Buenos Aires Province flow into the Atlantic. Farther south are rivers of more importance, among these the Rio Negro and the Colorado, the only ones of this section easily and regularly navigable.

Climate

The climate of Argentina naturally varies on account of its wide range of latitude, as well as from increasing altitude in the mountainous section. The prevailing winds, the mountain barriers, and the sea also modify the climate in restricted locations. The conditions of temperature and rainfall are different from those in the northern hemisphere. Thus Tierra del Fuego and the south main land are more habitable than corresponding latitudes in Labrador, partly by reason of a southern equatorial current; it is an excellent region for sheep raising. At the same time it is colder than at similar latitudes of Western Europe, as the prevailing west winds are chilled by the mountains.

In the Provinces of Buenos Aires, Mesopotamia,

and Santa Fé the average temperature in January is 72°, the maximum 97°-107°; the annual at the Capital city is 62.6°, farther south 42°. In Buenos Aires it may rain at any time, but the greatest precipitation is in the summer and fall. In summer there is a land breeze by day and a sea breeze at night. The north winds are hot and unhealthful, ending in violent storms. Southwest winds, the *pamperos*, which are gales, sometimes hurricanes, are invigorating. The central region has greater extremes of daily heat and of annual temperature, the widest at Córdoba; Santiago is the warmest of the Provinces. In the city of Buenos Aires the mercury in summer may reach 107°; in winter it goes below freezing only a few times, but there is a peculiar chill in the atmosphere which causes strong men, who never did so in New York or Boston, to wear heavy woolen underwear. The country has 200 meteorological stations.

CHAPTER XXXV
ARGENTINA: THE CAPITAL, INDIVIDUAL PROVINCES AND TERRITORIES

The Capital

Buenos Aires, the metropolis of South America, the largest city on that continent, and fourth in all America, has also a wide reputation as the second Latin city in the world. Its population is well towards 2,000,000, its area is more than double that of Paris. All its splendors may not here be rehearsed. The attractions of its 74 beautiful parks and plazas, its fine avenues, its magnificent Capitol and other public buildings, its beautiful opera house, almost the finest in the world, the many artistic and sumptuous residences, the excellent hotels, with many other admirable features make it a city delightsome to tourist and resident. The city is spoken of as a very expensive place to live, but in ordinary times, some things were cheaper than in New York while others were much dearer. Rents were high, the prices of fruit and vegetables, etc. In general, in other places in Argentina prices were higher for poor accommodations than in Europe before the War for far better. As a business centre, Buenos Aires naturally is of prime importance for the southern part of the continent. From here it is easy to visit Uruguay, Paraguay, and since the opening of the Trans-Continental, Chile also; while in every direction railways radiate to the chief cities of Argentina, even to those that are accessible by boat.

Provinces and Territories

We may perhaps get the geography of the Republic most accurately if we begin near the countries with which we are familiar at the northwest, and come from the outskirts to the commercial and political centre of the Republic.

Jujuy in the northwest corner naturally has on the north Bolivia, which comes down a little on the west, where it is followed by a bit of Chile, then by the Argentine Territory of Los Andes. The last is also on the south with a longer stretch of the Province of Salta, which extends along the entire east border as well. Here in Jujuy we are again among the mountains, for three ranges come from Bolivia, passing on through Salta at the south. The *puna* at the northwest is nearly 12,000 feet high; on this arid plateau are two salt lakes. The mountains reach an altitude of 15,000-20,000 feet. There are low valleys too, where there is mixed farming, not many cattle. Above are the wild vicuñas, guanacos, and chinchillas, as in Bolivia, and various minerals including gold, silver, petroleum, etc., not much worked. Sugar refining and wine making are important.

The capital, Jujuy, is in a rich and picturesque valley as low as 3675 feet, from which the railway climbs rapidly to La Quiaca, on the border of Bolivia.

Salta extends along the southern border of Bolivia from Jujuy to Formosa and Gran Chaco on the east; on the south are Santiago, Tucumán, and Catamarca; on the west Los Andes with Jujuy. The north and west sections are mountainous and cold, with high table-lands and fertile valleys; in the east the terrain comes down to the tropical country, where in places there are forests though some sections are hot and dry. Temperate and tropical products are found here;

in the mountains are many varieties of minerals. Cattle are raised, some being driven over the mountains into Chile; hence the proposed railway to Antofagasta.

Salta, the capital, with an agreeable climate, is a considerable town, important as a railway centre and with trade of various kinds.

Los Andes, a Territory at the west, is a bleak mountain region, once belonging to Chile, and a part of the Puna de Atacama. It is but slightly explored, dry and sandy, with salt marshes; it appears to be rich in minerals.

San Antonio, the capital, is a place of small importance not on a railway.

Formosa and Gran Chaco, Territories east of Salta, are precisely opposite to Los Andes in character. Formosa has Bolivia on the northwest; on the long northeast boundary the Pilcomayo River separates it from Paraguay, which is also at the southeast, there separated by the Paraguay River. On the southwest the Bermejo divides it from the Chaco, while Salta is west.

The **Chaco** of similar shape has at the southeast a bit of the Paraguay River and country, and below a little of Corrientes across the Paraná. Santa Fé and Santiago del Estero are on the south, the latter with Salta west. These two Territories are truly semi-tropical, flat or undulating, sloping to the southeast, partly covered with dense forests, not thoroughly explored; partly with open plains, lakes and marshes, many rivers, much very fertile land suited to tropical products, some of which are grown, and excellent pasturage where herds of cattle are bred, horses, sheep, and goats. The quebracho industry for tannin,

and the production of sugar are important, with some cotton plantations and castor oil factories.

Formosa, capital of that Territory, is important as a port, shipping a variety of products down the river, and as the terminus of a railway to go to Embarcación, opening up this rich Territory.

Resistencia, capital of the Chaco, on the Paraná River, is of equal and growing importance. It has railway connection with Santa Fé.

Misiones, at the extreme northeast of Argentina, is a Territory of some similarity to the two just mentioned, but with greater attractions and merit. Long and narrow, it extends up between Paraguay and Brazil, separated from the former country by the Paraná River on the west, from the latter by the Iguassú on the north and by the Uruguay on the southeast, Brazil enclosing it on the north, east, and south. Misiones joins the rest of Argentina only by a small strip along the Province Corrientes on the southwest. Misiones is a subtropical garden largely covered with beautiful forests where the picking of *mate* leaves is a leading industry; there is some timber extraction, and saw mills. It is an undulating plain with ranges of low mountains and hills. There are various minerals, and in open spaces some cattle.

Posadas, the capital, is a pleasant town, important as a railway and steamboat junction.

Catamarca, a Province again at the west, we find bordering on Chile, south of Los Andes and Salta, with Tucumán and Santiago east, and Córdoba and La Rioja south. The Province is largely mountainous, one peak in the eastern range, Aconquija, being over 15,000 feet. Some short torrential streams, formerly disappearing in salt marshes, are now utilized for

irrigation. Cereals and other agricultural products, also cattle are raised. The Province is rich in minerals, with workings in gold, silver, copper, iron, lead, and salt.

Catamarca, the capital, on the Catamarca River, is of some importance as the centre of a rich agricultural district.

Tucumán, east of Catamarca, south of Salta, with Santiago east and south, is the smallest of the Provinces, but more varied in character than most. It has snow-capped mountains, and well watered valleys and plains, some quite tropical; with agriculture, or with dense forests of quebracho, oak, pine, etc. There is activity in sugar refining and tanning, with steam saw mills, and with cereals and fruit.

Tucumán, the capital, is a large city, especially important, as the center of the sugar industry, and with many varied interests.

Santiago del Estero, more than seven times the size of Tucumán, is south of Salta and the Chaco, with Chaco and Santa Fé east, Córdoba south, and Catamarca and Tucumán west. Mostly in the lowlands, it is in places covered with forest; in other parts is a salt, clayey, partial desert which is now being crossed by railways. Here woodmen cut out quebracho trees, though in this section it does not rain for 11 months in the year, nor can wells, they say, be dug to get water unless they are over 3000 feet deep, as water obtained higher is salt. The summer temperature by day runs nearly to 120° F., while in winter it falls to 50°, with cool nights always. Water difficulties are obviously great, worse than formerly at Iquique. To cross these partly

forested deserts by rail is a 40-hour journey. Between the two rivers, the Salado and Dulce, both used for irrigation, the soil is fertile, producing sugar cane, vines, wheat, alfalfa, for which the soil is favorable, coffee, and tobacco. Some quarrying of marble and gypsum goes on; but timber is the main industry.

The capital is a small town of the same name on the Rio Dulce.

La Rioja is a long, irregularly shaped Province south of Catamarca, with that and Córdoba east, San Luis and San Juan south, the latter running nearly all the way up on the west, leaving a small space of Rioja bordering on Chile. Among high mountains at the west are fertile irrigated valleys with varied agriculture; there are forests with quebracho, *carob*, and acacia; but much of the eastern part is low, sandy, and barren. Great mineral wealth of many varieties exists, but silver and copper are chiefly exploited.

La Rioja, the capital, is the centre of a rich fruit growing district, with some mining.

San Juan, with an extended border on Chile, has Rioja north and east, San Luis and Mendoza on the south, on the west are lofty mountains and well watered valleys; in the east barren sand hills and marshes. Wine making is the most important industry; varied minerals give promise for the future. The Province has been called rather slow, but it is now said to be waking up; irrigation is beginning and other improvements will follow.

Córdoba, an important Province, much larger, is the fourth in population and the second in wheat production. It has Santiago north, Santa Fé east, Buenos Aires and La Pampa south, and San Luis, La

Rioja, and Catamarca west. Although mostly rather flat, there are mountains in the northwest of an altitude of 8000-9000 feet among which are deep broad valleys. The country is chiefly agricultural and pastoral.

Córdoba, the old capital, founded in 1573, in a charming location among the hills, preserves some rather mediaeval characteristics, its university dating from 1613. A wonderful reservoir is near, the Dique San Roque, called one of the largest semi-natural reservoirs in the world. A wall of masonry was built across a gorge among the mountains forming a lake which holds 825,000,000 cubic feet of water. Fifteen miles lower is a basin from which lead two primary canals carrying water for irrigation, which extends over 300,000 acres.

Mendoza, the third largest Province and the most southern of the Andean, with a long border on Chile, is just below San Juan; has San Luis on the east, and on the south the Territories of La Pampa Central and Neuquen. The surface is much diversified, containing the highest peaks of the Andes including Aconcagua at the west, and eight passes across the Andes, among them, the famous Uspallata, at the summit of which is the celebrated statue, the Christ of the Andes, at a height of 12,796 feet above the sea. More than 2000 feet below, the Trans-Andine tunnel pierces the range. The Province has many rivers from which there is extensive irrigation; for the climate and the soil are dry, though the latter is fertile when irrigated. It is a great section for grapes.

Mendoza, the capital, is headquarters for the wine industry. Grapes are brought thither from the regions north and south. Raisins and alcohol are also produced. Excellent livestock, cattle, horses, mules,

donkeys, sheep, goats, and pigs are raised; in the San Rafael section, Durhams and Herefords, many of which are sent over to Chile.

San Luis, east both of Mendoza and San Juan, lies south of La Rioja and Córdoba, has the latter and La Pampa east, and La Pampa south. The Province has mountains of the Córdoba system, some rising to a height of 7000 feet, with fertile well watered valleys; at the west are swamps, while the south is flat and arid. There are a number of rivers and much attention is paid to agriculture, to cattle raising, and horse breeding. The minerals, of great variety, are hardly noticed.

Santa Fé, the last of the Provinces west of the Paraná River, extends along its right bank from the Chaco on the north a distance of nearly 500 miles to the Province of Buenos Aires on the south, with Corrientes and Entre Rios on the other side of the river, and Córdoba and Santiago on the west. This State, second in population to Buenos Aires, though fifth in area, is a great plain with slight elevations, having dense forests at the north, at the south the fertile prairie, and along the great river many islands, covered with luxuriant vegetation. It is an agricultural, cattle raising country, with mills and factories also; and with extensive commerce in cereals, meat, hides, quebracho extract, and timber, from the many fluvial ports. The chief of these, Rosario, is the second largest city of the Republic with a population of 317,000. The Province contains 3000 miles of railway.

Corrientes, east and south of the Paraná River, therefore south of Paraguay, has Misiones at the northeast, Brazil east, across the Uruguay River, Entre Rios south, and Santa Fé and the Gran Chaco

west across the Paraná. The Province has temperate uplands and warmer lowlands, and is well watered by rivers and some lakes and marshes. Corrientes is prominent as a cattle-raising State and has also large flocks of sheep.

The capital, Corrientes, is an important river-port visited during most of the year by vessels drawing 12 or 13 feet. Goya, farther south, is famed for its excellent cheese.

Entre Rios, south of Corrientes, has Uruguay east beyond the Uruguay River, Buenos Aires south across the Paraná, and Santa Fé beyond the same river on the west. It is in general a fertile, well-watered plain, with a forest region at the northwest running over into Corrientes, containing much valuable timber. It is a stock-raising and an agricultural region, largely devoted to cereals, with grain of the finest quality. It has also many industrial establishments.

Paraná, the capital, is a growing centre with some fine buildings, electric lights, and other facilities. Concordia, on the Uruguay River, is an important commercial town.

Buenos Aires, the last, largest, and most important of the Provinces, with the greatest population, is the only one with an ocean front. Buenos Aires has on the north Córdoba and Santa Fé; northeast, on the other side of the Paraná and La Plata, Entre Rios and Uruguay; the Atlantic is on the east and south with a bit of Rio Negro, which with La Pampa is on the west, with a little also of Córdoba. The land is flat, but with two ranges of hills; the highest in one range is 1200, in the other about 3000 feet. Several useful, some navigable rivers flow towards the ocean. The country is agricultural and pastoral, especially devoted to cattle

and wheat, but in the numerous towns, industries and manufactories are developing. Many great railway systems converge at the Federal Capital. There are good roads near most of the towns, which is not the case in the other Provinces, and good auto roads lead from Buenos Aires to Tigre and to La Plata.

South of the Provinces, at least below Buenos Aires, is what was once called Patagonia, now divided into Territories.

La Pampa Central, a Territory which extends farther north, is already from its population entitled to be a Province. Lying south of Mendoza, San Luis, and Córdoba, it has Buenos Aires on the east, Rio Negro Territory south, with the Colorado River as the dividing line; and west, Neuquen and Mendoza. The Territory is undulating, with hills, valleys, prairie, and lakes; the soil is generally fertile, yielding fine crops; wheat, corn, barley, linseed, alfalfa, vines, fruits. Large herds of cattle roam over the pastures but are usually sent out for fattening.

Neuquen, south of Mendoza, borders on Chile, has Rio Negro south, and also with La Pampa, east. The north and east parts are arid, but the west mountain section has fine fertile valleys and forests, with many rivers and lakes. A railway now making this section accessible, it will be more attractive to settlers.

Rio Negro, first of the divisions of Argentina to stretch across the country, has Neuquen and La Pampa on the north, Buenos Aires and the Atlantic east, Chubut south, and Chile and Neuquen west. The section between the Negro and Colorado Rivers is fertile, also patches near other streams; wherever irrigated, good crops of wheat, corn, oats, and alfalfa are certain. Fruits and vines do well in the Negro

Valley. Excellent timber is exported in beams and planks. There are some towns and many agricultural colonies; trade goes on with Chile in cattle and sheep. Several rivers are navigable and a railway has been constructed from the port San Antonio to Lake Nahuel-Huapi.

Chubut, south of Rio Negro, also extends across from the Atlantic to Chile, with Santa Cruz on the south. The central part has little vegetation but in the west are fertile valleys, and good grazing for cattle and sheep. There are millions of each, and many horses. Cereals and alfalfa are also raised in the east, with temperate zone fruits and berries. Near the oil fields of Comodoro Rivadavia is excellent farming land under cultivation. In this section there is now great activity on account of the petroleum development; some railways have been constructed and one is expected soon to cross the country. There is trade in wool and hides; gold, copper, and salt exist.

Santa Cruz, the largest division next to Buenos Aires, south of Chubut, has the Atlantic on the east and Chile on the south and west. The northwest is rather barren and rocky, with dense forests farther south; but near the coast and south of the Santa Cruz River are fine pastures supporting great flocks of sheep. There are many rivers and lakes, several, like the Buenos Aires, on or near the Chilian boundary. Wool, frozen mutton, and timber are exported.

Tierra del Fuego has the Atlantic Ocean on the north, east, and south, with the Chilian part of the island on the west. This triangular part of the island is mountainous, but has sheltered valleys, good pasturage, and vast forests with excellent timber, to some extent exploited. There are large flocks of

sheep; the gold and copper deposits are unworked except for washing the sands. The capital, Ushuaiá, on the Beagle Channel, is a small penal colony.

CHAPTER XXXVI
ARGENTINA: SEAPORTS AND INTERIOR TRANSPORTATION

Argentina has a long sea coast, about 1300 miles, with a number of gulfs and good harbors. The ports of Buenos Aires and Ensenada, both constructed at great expense, on the wide La Plata River, may be regarded as seaports. The best natural harbor is 500 miles by sea south of Buenos Aires, Bahia Blanca, where the Government has built a port and naval station, and the harbor is accessible to large ocean vessels. Farther south are other ports, not greatly frequented on account of lack of population, but of growing importance. North of Buenos Aires are river ports, some of these visited by ocean steamers, others by river boats only, a few of the latter 1000 miles from the sea. The river ports above Buenos Aires with facilities for ocean liners besides Rosario, are Campana, Zarate, Ibicuy, San Nicolas, and Santa Fé (Colastiné).

Seaports

Buenos Aires has port facilities of the first order, though insufficient for its great commerce. These are in two divisions: one, the natural port, is on the Riachuelo, a small river south of the city, which probably determined the precise location of its site. The river admits vessels of 18-foot draft. Capable of an annual traffic of 1,200,000 tons, it is of great value in national commerce. There are wooden quays on the north side of the river, now to be rebuilt at a cost of $400,000, and on the south, concrete docks

and quays constructed by the Southern Railway. On that side are some of the noted *frigorificos* and the famous *Mercado de Frutos*, the Central Produce Market, with 180,000 square yards of floor space.

The main port, receiving the ocean steamers, is on the city front, extending two miles directly along the Plata River. Constructed at great expense, and expected to supply the needs of the city for years, it was completed in 1897; but the growth of the city soon outran its capacity, so that in 1911 provision was made for its enlargement, which, however, has not yet been accomplished. About $35,000,000 have been spent altogether. The port consists of two basins, *darsenas*, the north and south, with four docks between having a depth of 23 feet and a total area of 164 acres. The length of the quays which may be used for loading and discharging freight is about ten miles. Along the docks are 33 warehouses with 30,000,000 tons capacity, and four sheds. Grain elevators have a total capacity of 300,000 tons of cereals, and granaries of 55,000 tons in sacks. Loading under cover, the work goes on in bad weather, each elevator loading 20,000 tons a day. Two dry docks accommodate ships 400 feet long; 874 electric lights, 100 feet apart, serve the harbor entrance. Sixty-four thousand ships with 22,000,000 tonnage have entered the harbor in a year, bringing 85 per cent of the imports and carrying out 50 per cent of the exports of the country.

Ensenada, the port of the made-to-order city of La Plata, more noteworthy for its university and museum than for its commercial affairs, has been constructed for the relief of Buenos Aires, and because, 35 miles lower down, the water naturally has greater depth. The port has 8000 feet of quays,

warehouses, and other necessary appliances. Two American packing houses are here located.

Mar del Plata, the Newport of South America, 250 miles by rail south of Buenos Aires, is being developed also as a commercial port, with quays, warehouses, etc.

Bahia Blanca, with a population of 80,000 in the city and its several ports, is about 700 miles south of Buenos Aires. It is of such importance that the Southern Railway has four different routes for the journey. The city also has direct connection with Mendoza and with other parts of the country. Being situated on a large well protected bay of the ocean, it has a naturally better harbor than Buenos Aires and may be compared to Liverpool as Buenos Aires to London. Since 1882 its development has been rapid. With more than ordinary advantages for business for a city of its size, including factories, warehouses, and good hotels, it is a railway centre for lines spreading over the agricultural and stock-raising districts of southern Buenos Aires, La Pampa, San Luis, Mendoza, and San Juan, and is the natural port for these regions. Belgrano, said to belong to the Compagnie Française, is the real harbor of the city. Near is the port Ingeniero White with a T-shaped pier, accommodating 16 ships in 30 feet of water. Electrical elevators handle 6000 tons of grain in eight hours, while extensive shops and foundries are a part of the equipment. Puerto Galvan, $1^1/_4$ miles west, belongs to the Buenos Aires and Pacific Railway. Eight ocean steamers of 25-foot draft and one of 30 may be accommodated here. The basins and warehouses are of reinforced concrete; elevators with storage capacity of 18,000 tons and other facilities exist. Besides the commercial ports, Bahia

Blanca has also the naval port of the Republic, 25 miles southwest of the city on the Southern Railway. The channel entrance is 25 feet deep at high tide; there are various quays, also a dry dock, 730 feet long and 33 deep; a new one of larger size is in preparation. Other facilities are provided, machinery, workshops, hospital, electric lighting, etc. There are various fortifications, strategic railway, telegraph, semaphores, and light-houses. Hotels for immigrants have been built in the city nearby for the benefit of those who will go to work in the south. Sanitary works, costing nearly $2,000,000, are to be installed.

Smaller Ports. A number of small ports on the ocean are served by the Mihanovich Line, formerly also by German lines, while various ocean steamers call at individual ports. Viedma on the Negro River is the chief port for the Rio Negro Province, with a fine harbor. San Antonio is on the same Gulf. On the large Gulf Nuevo are the ports Pirámides on the north side and Madryn on the south, the latter a small place, but with over-seas and coasting trade; a railway 45 miles long goes to Trelew, and to the capital of Chubut, Rawson. On Camerones Bay several British companies have large sheep ranches which many years ago counted 250,000 sheep, 2500 cattle, and 4000 horses.

Comodoro Rivadavia, the famous oil port, is on the Gulf of St. George, with Visser and other ports in the vicinity. Deseado is a small port with anchorage for ships six miles in. San Julian has a harbor with seven fathoms of water. Puerto Gallegos affords good anchorage ten miles up stream for ships of 10-20-foot draft. Sheep and cattle are near. This port, the capital of Santa Cruz, has weekly service to Punta Arenas. Santa Cruz, on a river of that name, is the most

important town, with a fish cultural establishment. Ushuaiá receives monthly calls, the voyage from Buenos Aires occupying 45-50 days according to the number of calls en route.

Inland Transportation

The rivers of Argentina are of great importance for inland traffic, with many ports of local service for the export of grain and other products, and for varied imports; the chief towns so engaged deserve mention. On the Paraná River, the principal artery of river travel, excellent steamers run up to Corrientes, and on the Paraguay as far as Formosa and Asunción; larger ones go to Rosario only, a night journey of 240 miles, passing a number of small ports on the way.

Rosario's importance as a commercial city is due to General Urquiza, who in 1859 made it a port of entry. Ocean steamers drawing 28 feet come to its docks. Situated in the great cereal section, as a grain port it now surpasses Buenos Aires. The city located in the Province of Santa Fé is on a bluff above the Paraná River, along which an expensive system of docks has been arranged, the new port extending over two miles with a minimum depth at the wharves of 25 feet. Separate wharves for ocean and for coasting steamers are provided, elevators, depots under the wharves for 30,000 tons of cereals, chutes from warehouses on the bank, all kinds of needed machinery, depots for general goods, flour mills, a sugar refinery, and railway connection with all of the different lines. Port extensions costing $3,000,000 include a sea wall 1640 feet long, warehouses, railway lines, and loading apparatus. The production of $75,000,000 worth of sugar is evidence of

prosperity. In other parts of the city are factories of various kinds. Four railroads centering here afford direct communication with other Provinces. Of course the second city of Argentina has all the conveniences of a place of its size, population 317,000, in the way of fine buildings, hotels, clubs, parks, theatres, banks, etc.

Paraná, capital of Entre Rios, 310 miles from Buenos Aires on the east bank of the Paraná River, is the next considerable city; its port, Bajada Grande, a little below, has some local industries and trade in agricultural and pastoral products.

Santa Fé, capital of that Province, though far smaller and less commercial than Rosario, was founded before Buenos Aires by Juan de Garay, seven miles up the small stream Quiloaza, at a time when a quieter port for their small vessels seemed more desirable than the great river, which at Rosario is 20 miles wide. An important railway centre, its port is Colastiné, opposite to Paraná, and accessible to ocean steamers.

Corrientes, population 30,000, is a rather old fashioned quiet town in a sheep raising district, with some cattle; the last port on its left bank before the turn of the river, which beyond is called the Alto Paraná. Sailing straight north one is on the Paraguay, up which the larger steamers go to Asunción. The upper Paraná though broad is much shallower, accordingly at Corrientes smaller steamers are taken for Posadas 36 hours distant. The Aripe Rapids, 145 miles up, also make these necessary. Above Posadas, boats of still lighter draft are used for the three days' sail to the Iguassú, where a landing for the Falls is made at Puerto Aiguirre, a mile up the river. The boats continue up the Paraná beyond the northern

extremity of Argentina to the Falls of La Guayra.

Continuing north from Corrientes up the Paraguay, the mouth of the Bermejo is soon passed and at Asunción the mouth of the Pilcomayo is reached, the northern boundary of this part of Argentina, the Territory of Formosa. The lower large tributary, the Bermejo, separating Formosa from the Chaco, has recently been made navigable by clearing the banks and cleaning the river bed, so that with one transshipment traffic may be carried on for 450 miles. The journey requires three weeks; but Villa Embarcación, an important centre of trade on the border of Bolivia was thus made accessible by water, the town already having rail connection with Jujuy and Salta, and being but 15 miles from Orán, another important terminus. Tropical products, as sugar, cotton, and fruit, are of value, and oil from Bolivia. The native population of El Chaco is estimated at 25,000 Indians of various tribes; as many more in Formosa. The forest covered plains are not thoroughly explored, some persons having lost their lives in the attempt; several are known to have been murdered in 1900 and 1902. Aside from these rivers there is little steamboat service in the interior.

The Plata Basin, in size and flow of water second in the world, and now in economic importance surpassing the Amazon, includes also the Uruguay River which separates the two Republics, serving both for a considerable distance. The Uruguay, formed by several streams which rise in the Serra do Mar of Brazil, has a length of 800 miles. It is navigable for ocean steamers 100 miles to the falls at Concordia and Salta, above these for smaller craft. Steamers of the Mihanovich Line from Buenos Aires, after crossing the Plata enter the rather muddy

Uruguay. Passing on the right the town of Fray Bentos in Uruguay, the first port of consequence in Argentina is Concepción del Uruguay, a stock raising centre near which are large estancias, some devoted to pure blooded, others to crossed stock. Nine of these estates cover 370,000 acres, with hardly 1200 devoted to agriculture. Concordia, population 25,000, a little below the Falls, is an important railway junction with good harbor accommodations, flour mills, elevators, etc., exporting wheat, cattle, hides, wool, linseed, *mate*, and quebracho.

Railways

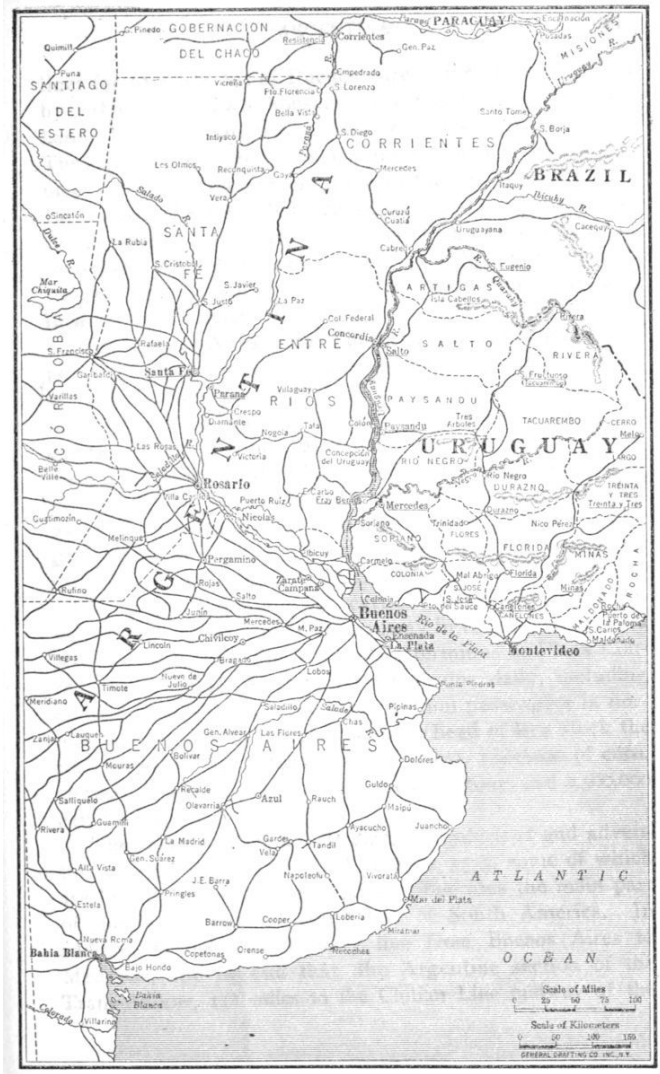
The railway system of Argentina is developed to a greater extent than that of any other South American country, largely due to the opportunity for easy construction presented by its great plains. The land transportation is complicated, as there is a real network of railways centering at Buenos Aires besides smaller centres at Bahia Blanca, Rosario, and Santa Fé; other cities are at points of junction of several lines; the most important of these will be mentioned. The railways have an extension of 22,720 miles, about 4000 of which are Government owned, 18,000 of private capital, 670 provincial, and 600 of industrial railways.

The first railway line in Argentina, six miles long, was constructed in 1857. The first of importance, 246 miles, from Rosario to Córdoba, was built by Wm. Wheelwright in the 60's. January 1st, 1918, about 22,500 miles of railway were open to traffic, with other mileage in construction. The careful policy pursued in Argentina during this development has prevented the great evils experienced in the United States of local land booms and town lot

speculations. Large investments in railways have been made by European countries, especially by Great Britain, which has about $1,000,000,000 so placed, and France the next smaller sum. The value of the privately owned lines is $1,220,000,000, while that of the Government owned is $150,000,000. In 1915 the equipment included 7000 locomotives, 6300 passenger cars, 160,000 freight and service cars. The density of traffic in Buenos Aires is shown from the fact that 500 passenger trains daily leave the city. Instead of taxes the railways pay the Government 3 per cent of the net receipts, which is spent on making roads to the railway stations and bridges; 60 per cent is allowed for expenses. If above 17 per cent profit is made by a company in three successive years the Government has a right to lower the rates. The railways may build branch lines 47 miles long without special permission, if they do not run within $12^1/_2$ miles of another road. Several roads have constructed irrigation works along their lines, for which they receive Government 5 per cent bonds at par. In 1917 an increase of rates of 22 per cent was allowed by the Government to cover extra operation costs.

The Central Argentina is one of the most important of the railways, serving the chief cities of north and central Argentina, Buenos Aires, Rosario, Córdoba, Santa Fé, Tucumán, etc., and some of the best agricultural lands of the country. It has the finest railway station and terminal in South America, the Retiro, and a mileage of 3300. The main line, extending 720 miles to Tucumán, crosses the Provinces of Buenos Aires, Santa Fé, Santiago del Estero, and Tucumán; there are branches in these Provinces and in Córdoba. Elaborate extensions planned, but suspended on account of the outbreak

of the War, will doubtless be carried out before long. On account of heavy suburban traffic the lines for 17 miles out of Buenos Aires have been electrified by a third rail. Two thousand passenger trains a week are handled at the station and 9,000,000 passengers annually. Through express service is maintained, and connection is made with the Government Line to the Bolivia frontier at La Quiaca. In 1913 about 22,000,000 passengers were carried; 9,000,000 tons of freight are handled, 2,000,000 head of cattle, and other live stock. Aside from the stock the chief freight is cereals, but sugar, timber, wool, hides, hay, and lime are also carried.



EASTERN ARGENTINA, URUGUAY

The Buenos Aires Great Southern Railway, equally important, with the longest mileage, operates about 3800 miles of road. Ninety per cent of the mileage is in the province of Buenos Aires, serving

the important cities of La Plata, capital of the province, Mar del Plata, the famous shore resort, the port, Bahia Blanca, etc. The freight station is the largest in South America with storage capacity for 230,000 bags of grain and 2000 tons of other freight. A line goes west from Bahia Blanca through northern Patagonia to Neuquen and Senilossa, 480 miles, which is handling excellent traffic especially in cattle. Important irrigation works have been made by the railway in the Rio Negro and Neuquen Valleys. The road has a terminus in Plaza Constitución, Buenos Aires, where 35 trains daily, including express and de luxe, serve 25-30 million passengers in normal years. In 1913 besides 6,500,000 head of live stock the road transported 1,800,000 tons of wheat, 1,000,000 of corn, 227,000 of potatoes, 920,000 of lime and stone, and 2,500,000 general freight.

The Buenos Aires and Pacific, an ambitious and adventurous road, has nearly equal mileage, 3535, some of which are leased. As its name implies, it operates the main part of the only transcontinental line of South America. In addition to the cross country line from Buenos Aires to Mendoza, and beyond that, the Argentine section of the Trans-Andine, 111 miles to the Chilian Line midway of the tunnel, amounting with branches to 1000 miles, the Company has acquired by lease and construction the Bahia Blanca and North Western Railway, now extended to Mendoza, with branches, a length of 900 miles. From Bahia Blanca a line called the Patagonas Extension has been constructed 167 miles to Carmen de Patagonas at the mouth of the Negro, giving access to northern Patagonia. Land is being irrigated with water from the Colorado River in the effort to attract colonists. It is a property which has been

extended too rapidly to pay dividends at the moment, but of an assured future. On the North Western Railway wheat, barley, oats, wine, maize, cattle, sheep, and general merchandise are the freight; the passenger business is small in comparison.

The Buenos Aires Western Railway is fourth in importance, with 1870 miles of track extending from the Once Station, on the Buenos Aires subway in the heart of the city, to sections of La Pampa and San Luis; primarily a freight road, it now carries many passengers. Electricity is used for suburban traffic. By tunnel from the Once station, freight is carried to the port, being by so much ahead of New York. With the Great Southern, the Western has leased the Midland Railway from Buenos Aires to Carhue, 320 miles. In 1912-13 the road carried over 7,000,000 head of live stock, nearly 3,000,000 tons of freight, and 1,000,000 passengers. Wheat, maize, hay, and other agricultural products are the bulk of the freight.

The Córdoba Central, operating 1200 miles, is an amalgamation of several lines extending from that city, one now reaching Buenos Aires, one to San Francisco connecting with Santa Fé and Rosario lines, and another to Tucumán, there connecting with the Government owned road, the Central Northern Railway, to the frontier. It is hoped that the small mileage lacking in Bolivia will soon be completed, when, as the gauge is the same, it will be possible to operate through cars from La Paz to Buenos Aires. The sugar lands of the north are now traversed by this road, sugar and cereals being important freight.

The Entre Rios Railway is a part of the through rail route to Asunción, Paraguay, beginning at Ibicuy

on the Paraná River where it is connected with the Buenos Aires Central by ferry, that road bringing the trains from Buenos Aires. The road, about 800 miles long, has the standard gauge, 4 feet $8^1/_2$ inches.

The Argentina North East Railway, in which the preceding is largely interested, extends through Entre Rios, Corrientes, and a bit of Misiones to Posadas, forming another part of the road to Asunción. It has 750 miles of the same gauge. On account of the war and decrease in traffic, difficulties were experienced; but in 1917-18 there was great improvement, the cattle transport breaking all records, and oranges becoming an important item. By means of a ferry across the Alto Paraná River from Posadas to Encarnación there is through service with sleeping and dining cars from Buenos Aires to Asunción, on account of which travel has greatly increased as well as shipment of freight.

The last three railways with several French roads were in 1912 incorporated under the name of the Argentine Railway, a Maine corporation, but on account of difficulties from the War, receivers were afterward appointed. All of the railways mentioned are British owned, mostly of broad gauge, $5^1/_2$ feet. One more is the Central Railway of the Chubut Company from Port Madryn to Trelaw, about 50 miles, a section settled chiefly by the Welsh. They plan to carry the road across to the Andean foothills.

While the investments of the British are far larger, the French also saw here an opportunity and financed several railways.

The Province of Santa Fé Railway is the most important, with 1200 miles of line and extensions planned to Asunción;

The Province of Buenos Aires Railway with 800 miles has a line to Rosario, and one to the coal docks and wharves of the port of La Plata; and

The Rosario to Puerto Belgrano, on Bahia Blanca, 500 miles long, is of broad gauge with the idea of exchanging freight with the British lines; the other two lines are of one metre.

The Buenos Aires Central is a locally controlled road operating 250 miles including an important section from Buenos Aires to Zarate, where ferry connection is made with lines already spoken of to Asunción.

The War greatly affected conditions in Argentina, but previously the British-owned roads had made good returns besides giving work to many British both in Argentina and at home; as the rails, rolling stock, and coal are all British. Trade has naturally followed the invested dollar.

The Government Railways have been constructed under a comprehensive plan chiefly to promote settlement in outlying districts and to develop fertile territory. Deficits have resulted, but recently improvements have been shown in decreasing expenses and increase of gross receipts.

The Central Northern is an important road for tourists and business men, a metre gauge running from Santa Fé by Tucumán, Jujuy, and Negra Muerta to La Quiaca on the frontier. It has branches extending to Resistencia, capital of El Chaco, on the west side of the Paraná; and to Santiago del Estero, to Salta, and to Embarcación, the last, it is hoped, to be extended to Yacuiba and ultimately to Santa Cruz of the Bolivian Oriente. The road to La Quiaca passes a height of 12,000 feet, the terminus being above

11,000. Salta, the terminus of another branch, is 6000 feet lower; Embarcación is lower still, on a navigable stream, the Bermejo. To this point the Government is building a road from Formosa on the Paraguay River to open up that Territory; 186 of the 437 miles are already completed. This rich country now occupied by savages will then be a source of wealth. A road running northeast from Diamante, Entre Rios, when finished will open a rich territory; 106 miles are now in operation.

The Patagonian Railways will make accessible a large region which is well worth while. Plans call for over 1200 miles of road, 560 of which are now open and showing increase of earnings. One line from San Antonio on the Gulf of San Matias to Lake Nahuel Huapi at San Carlos de Bariloche is just completed, nearly 300 miles. From the Lake it may be carried over the mountains to connect with the Chilian Railways at Osorno. Another road is building from Comodoro Rivadavia on the Gulf of St. George to Lake Buenos Aires, now complete to Colonia Sarmiento, 122 miles. An important line running more north and south has been begun and opened 176 miles from Port Deseado in Santa Cruz to Colonia Las Heras, following up the Deseado River, later crossing the railway from Comodoro Rivadavia and going on towards Nahuel Huapi, to the terminus of these lines. A road is planned from Puerto Gallegos to Chile, 84 miles towards Punta Arenas with a branch north to the Puerto Deseado Railway. A narrow gauge is talked of from San Julian, half way up the coast toward Puerto Deseado, to the Chilian boundary with one branch to Lake Argentina, the other to Lake Buenos Aires.

Other lines are proposed in the north: one from

Salta to Huaytiquina on the Chilian border, 190 miles, to cost 20,000,000 pesos (if paper, $8,800,000); this Chile is expected to continue to Antofagasta; one on the other side of the country, from Candelaria in Misiones, where a port is to be made on the Alto Paraná, will go northeast to ports on the Uruguay, connecting the two rivers with 625 miles of light railway. An industrial railway is expected from Goya or Reconquista through the quebracho forest to the western part of Santiago del Estero.

An aeroplane service for mail and passengers has been organized to go from Bahia Blanca to Puerto Gallegos, making ten stops en route.

CHAPTER XXXVII
ARGENTINA: RESOURCES AND INDUSTRIES

The chief sources of the wealth of Argentina are familiar to everyone with any knowledge of world affairs: cattle and agriculture. Stock raising is said to comprise about 50 per cent of the wealth. According to the census of 1914 its value of $8,000,000,000, including land, animals, and machinery, was just about that. The animals were estimated at $1^1/_2$ billion, the land and fixed installations at 6 billions. In stock of various kinds, Argentina is fifth in the world: with 6 per cent of the total number of cattle, she is third in sheep with 8 per cent, fourth in horses with 4 per cent, fifth in goats with 4 per cent, and eighth in pork with 1.2 per cent.

Live Stock

Cattle. As to be expected, the live stock industry came first, requiring less labor. The early development was a natural one, cattle roaming freely over the plains and multiplying. From these wild herds, descendants of those brought over by early colonists, one could take all he wished up to 10,000-12,000 head, or more with permission from the Governor. But within the last 40 years much blooded stock has been imported from Europe, and scientific breeding has been practised. Twenty-five years ago the stock was estimated as worth $200,000,000. Of great value to the industry was the founding of the Argentina Rural Society in 1866; further, the discovery of the preservation of meat at freezing, and the arrangements for the transport of

chilled meat. The numerous Stock Shows greatly contributed to improvements. Beginning at Palermo, Buenos Aires, in 1858, these have for many years been held there annually; others at various centres as at Rosario, Bahia Blanca, Santa Fé, Concordia, etc.

On the pampas all over the country cattle and sheep are raised, though areas are still open in less favorable or accessible districts. Further increase especially of cattle will depend to some extent on the improvement of more pasture lands by the cultivation of alfalfa and other pasturage. The utility of alfalfa, both as improving the land for wheat and as food for cattle was early recognized. Its introduction was a boon to raisers of stock including horses, the alfalfa growing on brackish lands formerly thought useless, as well as on wheat lands. On the largest *estancias* 20,000-50,000 acres are sometimes given to artificial pasturage chiefly alfalfa. This valuable forage to which 20,000,000 acres are devoted gives 3-4 crops a year, 6-8 tons to the acre.

A great advance in the quality of the stock naturally followed the importation between 1901-14 of pedigreed animals, some at fancy prices: $18,000 for a bull, several horses at $150,000 or more each; altogether 13,000 cattle, 35,000 sheep, 6000 horses, 3000 pigs, worth $14,000,000; in one year stock of various kinds worth $1,500,000. Most of these came from England. Durhams, Shorthorns, are most favored, but many Herefords are raised, Polled Angus, and other breeds. As dairy interests are developing, Durhams are preferred as good milkers as well as good meat. Of the 30,000,000 head of cattle existing before the War (recent figures are 25,900,000), the largest number was in the Province

of Buenos Aires, about 7,000,000, with Santa Fé and Córdoba following; millions more are scattered in the Provinces and Territories from the extreme north almost to the extreme south. The export of live stock to neighboring countries has in peace times amounted to $9,000,000. In some districts drought has been a drawback to stock raising, yet it has been difficult to convince the small farmers of the desirability of artesian wells. Some persons have thought that as more land is irrigated for farming the amount of stock would diminish; but Martinez, the leading authority on such matters, states that 50,000 square leagues will remain exclusively for breeding. This extent of territory will support 40,000,000 horned cattle and 200,000,000 sheep, besides the millions which would be raised in the cultivated districts on the intensive principle. Patagonia has large regions suited only for stock raising.

Sheep cannot be allowed on the high priced land, ruining the alfalfa, so they are largely relegated to the outlying districts and to Patagonia; but some high bred sheep are found on model *estancias*. In the south the sheep are generally of Falkland and Romney Marsh origin, crossed with merinos; they are large and fat, weighing about 150 pounds, some over 200. Some proprietors produce fleece of 9 pounds weight. Thick, short wool is preferred, as frost on long wool prevents the animals moving and so causes great mortality in winter. In the north Lincolns are favored. The largest numbers of sheep are in Buenos Aires, Mesopotamia, San Luis, and Patagonia. During the War wool was in great demand, and in 1916-17, 350,000 bales were exported, two-thirds to the United States; in 1917-18, 181,000 tons, one fourth of which was washed. Diseases are practically unknown, and the increase sometimes reaches 112

per cent. A mortality of 20 per cent is due to cold weather. The number of sheep in 1915 was stated as 80,000,000; recent figures are 43,300,000. Some of the sheep ranches are very large, one in Santa Cruz having 100,000 acres fenced in; others have 50,000 acres or more.

Horses number about 10,000,000; Argentine racers are of the highest quality, as might be expected from the importation of high class blooded stock. Hogs number 3,000,000, goats over 4,000,000.

Packing Houses

The *frigorificos* are famous; extremely important and prosperous. British capital was early invested in this industry, both cattle raising and packing houses. In 1907 American capital began to turn in this direction. A Swift plant it is said made a profit of 35 per cent in 1916, one of Wilson with smaller investment, 300 per cent. Some plants are for canning also; besides there is meat extract, flour, tongues, soup, dried beef, etc., and by-products such as hides, hoofs, grease, etc. In 1919, 15 *frigorificos* were in operation, three in Buenos Aires, two in La Plata, three in Zarate, two in Santa Cruz, and one each in Bahia Blanca, General Lopez, Santa Fé, Campana, and Tierra del Fuego. Of these one belongs to Armour and three to Swift; the former was expecting a daily capacity of 2500 cattle, 5000 sheep, and 3000 hogs; others were to increase production. During the War the demand for meat as we know increased. Normally three-fourths of the amount exported is frozen beef, with mutton next in quantity; but in 1917 for war purposes canned meat was nearly half in weight of the frozen beef. The

latter was valued at $77,000,000, the former at $37,000,000, the total meat export at $137,000,000. Due to millions spent on pedigreed stock, Argentine meat is of high quality.

In nine months of 1918 the export of stock products, $365,000,000, was 60 per cent of the total. Of meat export, frozen beef was more than half and canned beef a quarter. Wool both dirty and washed was a large item, also skins and fat. Cattle exported on the hoof, 143,000 head, were worth $4,200,000. Butter was a large item and cheese considerable. From 1908 to 1914 the increase had been in value 116 per cent. In four months of 1919, 1,000,000 head of cattle were slaughtered, 1,300,000 sheep, and 55,000 hogs; a larger number than in any corresponding period. The chief purchasers now are England, France, and Italy; but exports to other countries are likely to develop so that increase in stock raising is desirable and the prospect excellent. The cultivation of alfalfa has increased the capacity of different lands 3-25 times. It is the feeling on the part of some Argentines that the packing house industry now dominated by foreigners should be rather in the hands of natives; and it is hoped that by eliminating the excessive profits of the *frigorificos*, both stock raiser and consumer may receive a benefit.

Agriculture

Of late years agricultural products in ordinary times have outstripped stock raising in value, in some years of good crops being practically double. While regarded as preëminently an agriculture country, hardly more than one twelfth of the Argentine area is devoted to the industry although

over one-third is arable land, about 250,000,000 acres. Yet the cultivated land has increased rapidly, being four times as large in 1916 as in 1872. Thirty-five thousand square miles are annually offered for sale. The average area of 62,000,000 acres of cultivated land varies by 2,000,000-3,000,000 from year to year. Of such land one-third is in the Province of Buenos Aires, one-fourth in Santa Fé, one-fifth in Córdoba, with Pampa Central, Entre Rios, San Luis, and other sections following in rapidly diminishing scale. While the area of wheat and linseed doubled, that of corn quadrupled, and of oats increased 30-fold; yet wheat is a long leader. The chief products cultivated are wheat, corn, flax, oats, barley, alfalfa, sugar cane, and the vine. Others of importance are tobacco, cotton, peanuts, potatoes, vegetables, *yerba mate*, mandioca, fruits, etc. In 1916 over 2,000,000 tons of wheat, and nearly 3,000,000 of corn were exported with some linseed, oats, and barley. In 1919-20 there was a decrease in acreage sown to wheat and corn, but a slight increase in linseed. A wheat crop of 5,000,000 tons is expected for 1921 with 3,200,000 for export; of linseed 1,000,000 tons.

Wheat. Over 24,000,000 acres are devoted to its culture. Although the soil is famed for its fertility the average yield is not very high, about 11 bushels an acre. One writer gives 23 bushels as the average in Mendoza with one property producing 50 bushels. The climate is sufficiently agreeable, but in some years the rainfall is inadequate, and occasionally a visitation of locusts seriously affects the crops, destroying those in some districts; but the regions are so extensive that all cannot be affected at the same time.

Extensive farming is beginning to give way to intensive, especially near the city of Buenos Aires, where land values are now very high. Argentine authorities state that in general a great improvement in farming methods is imperative. Hundreds of large estates are owned by Argentines, while British investments in cattle and agricultural lands probably amount to $50,000,000. Only 30 per cent of the estates are cultivated by their owners. Rentals of lease holders are usually so short and uncertain that they suffer many embarrassments and lack ambition to install desirable improvements, to plant orchards, etc.; a situation which must be remedied to attain permanent prosperity. The Argentine leaders realize that instruction is needed to show the importance of varied cultivation, of rotation in crops, of including some stock raising, and on other matters. Better credit arrangements are suggested and other benefits, one of which has been noted in connection with the countries farther north, the use of fibre plants to make their own bags, thus saving a vast outlay for the importation of such needed articles.

Linseed is an important and lucrative production although the fibre is generally burned. This might be utilized for paper, and better varieties may be introduced to advantage.

Cotton, it is thought, will soon be cultivated on a large scale. Much progress has been made in the last decade, and nearly 40,000 acres are now devoted to its culture, most of them in the Chaco, a few less than 5000 in Corrientes, Misiones, and Formosa. Regions in Salta, La Rioja, Santiago del Estero, Jujuy, Tucumán, and Catamarca are also adapted to its growth, but especially sections near the Paraná River and its tributaries, altogether nearly 350,000 square

miles. Capital and labor are wanting, but as little machinery is required, less capital is needed for this industry than for most others. Most of the region is favorable for river transport. The cotton raised is of good quality, classed as Strict good, Middling, or Fully good or Middling; fine and silky, over an inch in length. Several varieties are cultivated. Land is about $20 an acre. The production in 1920-21 is expected to be 75 per cent more than in 1919-20 and nearly seven times that of four years ago. It is hoped that within a few years Argentina will provide cotton for the great manufacturing nations; also that cotton gins will be supplied, and factories for developing the by-products, oil, etc., as also for the cotton itself. Cotton gins already exist in Resistencia and several colonies, where 2000 tons have been seeded.

Sugar is an important production in the north, especially in the Province of Tucumán, which contains about 85 per cent of the 250,000 acres devoted to sugar in 1913, 9 per cent being in Jujuy. The largest amount ever produced was in 1914, about 336,000 tons. In 1913 over 3,000,000 tons of cane were ground to produce 275,000 tons of sugar, an average of 8.8 per cent, in Jujuy a trifle more. Later production fell, in 1917 to 80,000 tons, but rose in 1919 to 250,000, of which Tucumán produced 178,000 from 2,500,000 tons of cane. The average yield is under 12 tons per acre. Java cane has lately been introduced, which will undoubtedly produce more than double the cane to the acre now obtained from the native. Much more land is suited to its growth and the country might be self-sustaining in this line, as it has been one or two years and also have some to export. Of the 39 sugar mills and refineries in the country, 27 are in Tucumán, the rest in Santa Fé, Corrientes, Salta, Jujuy, Chaco, and

the Capital. Two are refineries only, these in Rosario and Buenos Aires; nine refine part of their production, the rest are sugar mills only. The greatest capacity of the mills is 417,000 tons, of the refineries 150,400 tons. About 15,000 persons are employed in the industry, at some seasons over 40,000. Several foreign companies are engaged and several local, which have paid good dividends. In the entire industry about $100,000,000 is invested, of which Americans are said to have 10 per cent. The erection of two sugar beet factories is considered.

Rice culture, like that of cotton, has been developed in the last decade, as yet in few sections although most of the country north of Buenos Aires has many marshy tracts suitable to its growth. Of 25,000 acres planted in 1918-19 Tucumán had 13,000, Misiones one-fourth as much, Salta, Jujuy, and elsewhere the remainder. In Tucumán the harvest is most plentiful, about 1250 pounds to the acre. More than three times the area should be planted to supply the country, and a superfluity could be exported.

Tobacco has long been cultivated though not largely, 40,000 acres in 1895; but there was a gradual decrease until recently, when production has been augmented almost to earlier figures. Corrientes, Salta, and Misiones seem best adapted to its growth. In 1917 over 2,000,000 pounds were exported worth $500,000. A large and good use for nicotine is for pastoral and agricultural washes.

Vineyards. The climate and soil of Catamarca, Rioja, San Juan, Mendoza, and Neuquen are excellently adapted for grape culture, and many varieties flourish of native and European grapes, but the great rise of freight rates interferes with sending

the fruit to the Buenos Aires market for consumption. As a pound of grapes in Buenos Aires costs 15 times as much as the fruit grower receives, the fruit has become a luxury for the rich. The making of wine is therefore the chief industry of Mendoza, where 1500 *bodegas* or wine cellars of varying style and capacity exist, some, models of their kind. Some 15 of these have cost about $500,000 each, but the more common type numbering 1000 have a value of $50,000-$100,000. An excellent quality of light wine is made for consumption in the country. The Province of San Juan also contains extensive vineyards and expensive *bodegas*. At least 3000 establishments are yearly in operation. About $1^1/_2$ billion pounds of grapes are used to obtain 500 million litres of wine (a 68 per cent return) of which 400,000,000 come from Mendoza. A great future for the industry is expected unless prohibition becomes world wide.

Fruit of semi-tropical and temperate zones is increasingly cultivated, all varieties in the various sections, but in insufficient quantities. In Chubut apples, pears, plums, cherries, and ordinary berries of the best quality are raised; but much fruit is imported from Chile with some from Europe and the United States.

Forestry

The development of forestry is slight and the importation of timber for building and furniture is large; yet the country contains all that is needed, and by planting under favorable conditions might have much more.

Quebracho. In the subtropical country, which is

the entire north aside from the mountains, the most valuable wood is the quebracho, of two varieties, red and white. The tree takes 90-100 years to reach maturity, with a height of 80 feet and a diameter of about $2^1/_2$ feet. Logs are exported for the extraction of tannin, though tannin is extracted locally in increasing quantities, and shipped. The wood is much employed by the railways for sleepers as it does not decay from standing in water. Lately, owing to shortage of coal much has been used in locomotives for fuel, and some for manufactories. Formerly Great Britain was the principal purchaser, but of late the United States has taken the most. In 1915 over $15,000,000 worth of extract was exported and $2,500,000 of logs. Quebracho, break-axe, is of course extremely hard, but there are other hard woods like cedar, and many varieties of valuable timber.

Yerba mate is cultivated in many places, especially in Misiones; the wild growing trees of the forest furnish a still greater supply of the leaves. From these a drink is made which outside of the large cities is in this part of the continent far more popular than tea or coffee.

The northern forests contain several varieties of rubber trees, but none are exploited. Along the Andes are forests, the principal ones from Lake Nahuel Huapi south. Those in this region are believed to be worth $10,000,000,000. The variety of native woods both hard and soft is large; and trees of other countries have been introduced. Thousands of eucalyptus trees have been planted on many *estancias*, serving a useful purpose in many ways, beside being an ornament on the level plain.

Mining

In the description of the Provinces, mention has been made of the minerals existing in various localities, but up to the present time the working of these has been slight. Tungsten, gold, copper, wolfram, borax, and petroleum have received the most attention, but few are those who have realized any considerable profits. Within ten years the exports have amounted to hardly more than $3,000,000.

Gold is mined in small quantities in various places; in southern Patagonia it is gathered from the coast sands after a heavy sea storm. In Neuquen and Catamarca are workings of fair size. The copper deposits of the Andes are difficult of access but may be developed later. Silver was mined formerly, but the ore was of moderate grade and the work was discontinued. A reverberatory smelter has recently been installed for the mines in Rioja.

Coal deposits exist in Mendoza, San Juan, Neuquen, Chubut, and Tierra del Fuego. The coal is not very good but will help in view of the shortage and high prices. Work is being done in San Juan and Mendoza. It is proposed to open mines among large deposits in Chubut, though the coal will have to be carried 180 miles to a railway.

The **tungsten** industry is active; 900 tons have been mined in one year, about one-seventh of the world production. Exploitation of marble, wolfram, and mica in Córdoba and San Luis is showing good results.

Manganese is exported in increasing quantity chiefly from the desert section of Santiago del Estero.

Large **saline** deposits exist, some in basins with no

outlet, in the central Provinces, some of volcanic type on the Puna of Atacama, others near the ocean not far from Bahia Blanca. Some of them have been exploited. Importation of salt has diminished and home production is expected shortly to suffice for local needs.

Petroleum is now exciting the greatest interest. Oil is known to exist in four regions with others reported, but only one has been thoroughly tested, that at Comodoro Rivadavia. Borings carried on here by the Government struck oil at a depth of about 1800 feet in 1907. In 1910, 12,000 acres were reserved for Government exploitation which has since been carried on. The place is near the coast about 850 miles south of Buenos Aires. Development has been rather slow, but in 1916, 25 wells had been sunk and 21 were in active production of about 14 tons each per day. There were four steel tanks and other storage space, in all about 26,000 cubic meters, one such of this oil equalling .93 metric ton. In 1917, 36 wells were in production and 19 being bored. In 1918 about 1,250,000 barrels were produced. Tank steamers are provided, and storage tanks in Buenos Aires. An oil tank is begun in Rosario. Others are to be constructed in Buenos Aires, Bahia Blanca, Puerto Militar, Santa Fé, and Mar del Plata. The oil is heavy with an asphalt base; distilled, it yields 1.5-3.5 per cent of naphtha and gasoline, 15-19 per cent of illuminating oils, and 77-85 per cent of lubricating oils, fuel, and coke. Heavier than the better grades of United States oil, it has been used almost entirely as fuel, though it is said that it will distil readily. This will undoubtedly be its chief usefulness, to serve instead of coal. It is employed by a number of factories. A new Government well, 1921, was producing 34,000 barrels a day, and prospects are of

the best. Millions have been appropriated for tank steamers, machinery, and for intensive development of the oil fields. The price rose from about $10 a ton in 1916 to $40 in December, 1917. Government control will probably continue, especially because the oil is likely to be used by the navy.

A few private companies are operating outside the restricted area, using 12-inch tubes, while the Government has used smaller. One Company with a capital of $2,000,000 has with other equipment 4.3 miles of railway connecting with the Government railway to the port, also two miles of pipe line. Many of the *frigorificos* use oil, mostly Mexican. The West India Oil Company imports from the United States or Mexico, mainly for refining.

The other fields are the Salta-Jujuy, the Cacheuta, a few miles south of Mendoza, and the Mendoza-Neuquen field, 700 miles southwest of Buenos Aires. In these fields the oil has a paraffine base, a sample from Jujuy showing 5 per cent of light oil, 30 per cent of kerosene, and 52 of lubricating oil; a grade equal to that of Pennsylvania or Ohio. One such field in Neuquen justifying immediate development is favorably located 824 miles from Buenos Aires near the Ferrocarril del Sud, which will provide special cars and tariff, so that speedy results are hoped for.

Industries including Manufactures

While Argentina is primarily an agricultural and pastoral country and is likely so to continue, a fair amount of capital is invested in manufacturing and in other commercial projects, some of the capital European. The largest sum is invested in Light and Power Companies; for all cities of any size have

electric lighting and many, electric traction. About $128,000,000 have been thus invested; in packing houses 40 millions, flour mills 7; in sugar refineries 50, wine making 78, foundries and metal works 25, dairies, etc., 43, tannin extract, etc., 33, lithographing and printing 12, breweries 14, construction companies 11, these all millions. Other companies with investments of 5-10 millions are shoes, saw mills, jute and cotton sacks, carpentry, painting and horse-shoeing together; liquors, tanneries, cotton and woolen mills, furniture, trunks and tapestries, leather goods, brick kilns, clothing, wagons and carriages, ice and aërated waters, ore smelting, grain elevators; many more with investment of 1-5 millions, besides a total of 47 million in still smaller companies.

Of other lines, in 1916 there were 71 telephone companies, capital $15,000,000; 143 banks, capital about $500,000,000, employing 10,000 persons; 85 insurance companies. The companies of all kinds generally are on a sound and paying basis, in spite of high cost of fuel and power. The two leading department stores in Buenos Aires, equal to our best in character, are both British owned; there are many other shops of every kind of the highest class.

The tramways and subway of Buenos Aires are noteworthy. The tramway system has been called the best in the world. There are 500 miles of lines, carrying about 400,000,000 passengers yearly. Packing like cattle is not allowed, the number of persons per car being strictly limited. The subway 8.7 miles long carries 2,500,000 with a splendid system and fine service including one for freight. Extensions were postponed on account of the War. The water supply, taken from the river, and the

drainage system are of the highest character. A revenue of $7,000,000 is received by the Government.

Dairy Products. The dairy industry is of quite recent development; butter formerly imported in quantity is now becoming an article of export. From 1914 to 1918 the production of cheese increased 277 per cent, of butter 162 per cent. Three thousand existing creameries, most of which are in the Provinces near the Capital, in 1918 made 50,000,000 pounds of butter, 40 million of cheese, and 15 of casein. More than half the butter and some cheese was exported.

The growth of other industries has caused a great falling off in many imports; of preserves 62 per cent, of ham 96, preserved vegetables 87, beer 98, cider 55, common wine 85. Other things as chocolate, macaroni, fruit crackers, shoes, and cloth have decreased 50 per cent. Of fideos enough is produced for home use, and to export in 1918 over 2,000,000 pounds.

Furniture. The construction of furniture has attained large proportions, a great part of what is sold in the country being made in Buenos Aires though often bearing foreign names. Wood is imported, even $25,000,000 worth in one year, while the finest woods grow in the country. Of 305 saw mills, 134, the most important, are in the City and Province of Buenos Aires far from the forests. The small mills near the woods merely chop off the branches for transport or prepare firewood. Cut wood from Buenos Aires is returned to Misiones and Corrientes for construction, a terrible waste. A change has begun; the mills near the forests are being enlarged and equipped with machinery, so an

evolution of the industry is under way.

Paper. Eight paper factories with capital of $8,000,000 employing 1500 persons produce 40,000,000 pounds of paper, 28,000,000 for packing, the rest for newspapers, books, and other things. A great quantity is still imported, formerly from Germany, lately much from the United States. The paper is made of rags, shreds of paper, and pasteboard, the consumption of pulp being small, hardly 200,000 pounds. One factory at Barranqueras, on the Paraná River in the Chaco, employs a kind of bog grass to make three tons of straw board a day.

Flour. The flour mills are of great importance, supplying in 1919, 850,000 tons of flour for home use and some for export. In 1918, 176,445 tons were exported. With fewer mills than formerly, the 400 existing are more productive. The 79 in Buenos Aires, 47 in Santa Fé, 44 in Entre Rios, and 26 in Córdoba produce 95 per cent of the total. Sixty-one per cent of the mills are Argentine owned. One hundred and fifty two are steam mills, 156 hydraulic. They have 25,000-30,000 horse power and employ 10,000 persons. About $34,000,000 are invested in the industry while the production is $100,000,000. However the farmers have trouble, as the fee for hauling grain has increased 60 per cent, and cartage 25 miles to a station is as much as the freight from Buenos Aires to New York. A flour mill in Mendoza and in other western cities of the wheat belt would undoubtedly pay handsomely, saving expensive transport. A new flour mill at La Plata to cost $500,000 is to turn out a quantity sufficient to fill 1000 bags a day.

Beer is made in 25 factories for the consumption of the entire country, a quantity of 80,000,000 litres

worth $12,000,000. To produce the 7000 horse power needed, thousands of tons of coal, wood, and petroleum are consumed.

Other Manufactures. Factories making shoes, said to be of the best quality, underwear, umbrellas, acids, perfume, and many other articles are found. Vegetable oils are extracted from peanuts, linseed, rape, cotton seed, and other articles, in establishments in Buenos Aires and Santa Fé.

Altogether there are about 50,000 industrial establishments with a capital of $800,000,000 using 678,000 horse power, employing 500,000 persons, consuming nearly $500,000,000 worth of material, and producing nearly $1,000,000,000 worth of goods. About half of these are extractive or manufacturing. One-third belong to the Argentines who supply 18.67 per cent of the capital.

Developing Industries. The Government is interested in the establishment of other factories and construction work; a cement factory in Buenos Aires to make 300,000 tons per annum is considered, the Government now using 700,000 tons a year. Ship building is encouraged; a steel ship of 1250 tons was launched at Riachuelo; yards are to be constructed at the port of Carmen de Patagones on the Rio Negro by an Argentine company with capital of 50,000,000 pesos. Some armored cement oil-tanks of 6000 tons capacity are to be made for Comodoro Rivadavia, and a depot for petroleum and naphtha at the port of Mar del Plata. Also for the former, port works, a breakwater, a mole for loading, and houses for workmen at a cost of 17,000,000 pesos. Sanitary works for 16 towns at a cost of 9,800,000 pesos are provided for, 22,000,000 pesos are to be spent in three years for machinery and tank steamers to

develop the Government oil wells, the exploitation of which will cost 45,000,000 pesos; present production is yet insufficient.

A Spanish Argentine Corporation with a capital of $10,000,000 is to build two large *frigorificos* at Buenos Aires and Santa Fé, with steamers to transport beef to Spain. Another *frigorifico* is designed for Puerto Deseado in the south to coöperate with local ranchmen.

The lack of combustibles has for many years been a great and embarrassing problem, an early solution of which is now hoped for. Importation of coal from England and of petroleum from the United States has been carried on at great cost. In five years, 1912-16, $190,000,000 was spent for such articles, while as they say petroleum ran into the sea and wood rotted at the railway stations. In 1919 coal was $26 a ton. The forests of the north have an inexhaustible supply of wood; the charcoal industry is quite well developed in the Chaco, north Santa Fé, Tucumán, and Santiago. Many woods are appropriate, but high freights have impeded their use. A large deposit of coal is recently reported in Tucumán. A new railway to the firewood region of Santiago del Estero will save a 100 mile haul. A splendid source of electric power are the Iguassú Falls with 275 cascades, the greatest with a height of 213 feet. Investigation shows that 500,000 horse power is easily available, one half each for Brazil and Argentina. Ten thousand horse power would be sent 800 miles to Buenos Aires, the rest used in Misiones, Corrientes, and Entre Rios. From the Salto Grande Falls on the Uruguay 50,000 horse power might be available for Argentina and Uruguay each.

Investments

The opportunity for investments for persons with capital is evidently large. A great deal of money is necessary for stock raising, though less in the far south. Agriculture, especially the raising of cotton, rice, or tobacco might be attractive; the sugar industry may be extended. Factories of various kind may be established by experts. Persons speaking Spanish fluently, capable of acting as foremen or superintendents of establishments of various kinds, might find employment. The minerals with the exception of petroleum are less accessible than in some other countries. An American department store in Buenos Aires is desirable, and one might succeed in Rosario.

CHAPTER XXXVIII
PARAGUAY: AREA, HISTORY, GOVERNMENT, POPULATION, ETC.

Paraguay has been called the most romantic of all the South American countries, from the point of view of nature and history both. It is a land of “dolce far niente” so far as agreeableness is concerned, a land where nature is lavish and necessities are few; on the other hand a region where the climate is not enervating, where energetic action and enterprise are not altogether lacking, and where these find ample reward. One of the two inland countries of the continent, having always been such, she has no grievance on this account. In fact, being in the heart of South America and almost surrounded by rivers, Paraguay has in many ways a most favorable location for inland commerce, which will surely bring her prosperity.

Area, Population, Boundary

Area. Paraguay, generally called eighth in size of the South American Republics, has an area of about 165,000 square miles, more or less, according to the determination of the boundary dispute with Bolivia. One hundred and ninety-six thousand miles is claimed by the Paraguay Government. The more settled part of the country east of the Paraguay River covers about 65,000 square miles; the section west, which on most maps is given to Paraguay, though claimed by Bolivia, is more uncertain in area, but may have 100,000 or more square miles. With the other neighboring countries the boundaries have

been definitely determined.

Population. As in several other countries, the population of Paraguay can be estimated only, since no exact census has ever been taken. Approximate figures given by different writers are 800,000-1,100,000.

Boundary. Paraguay has Brazil on the north and east; Argentina, too, is east, is exclusively on the south, and partly on the west; while Bolivia is west and north of the Chaco, the dividing line being uncertain.

The greater part of the way rivers form the boundary line. The Paraná separates Paraguay proper from Argentina on the south, and on the east as far as the Iguassú River; north of the latter river Brazil is on the opposite shore of the Paraná to beyond the Sete Quedas, or Falls of La Guayra (higher up the Paraná is wholly in Brazil); the boundary line then goes west and north along the watershed to the source of a branch of the Rio Apá, which with that river it follows west down to the Paraguay. Above the point of junction the Paraguay River has Brazil on the east bank and for some distance the Paraguayan Chaco on the west. Below the Apá, the Paraguay divides the country into sections, as far as the Pilcomayo River, on the southwest of which is Argentina. Below, along the Paraguay River to the Alto Paraná, Argentina is on the west. The Chaco section may be said at present to be in the practical possession of Paraguay, so far as it is occupied by any one except savages.

History

It seems extraordinary that here in the centre of the South American continent, 1000 miles from the sea, is one of the oldest cities, the capital of the Republic, Asunción, founded a full century earlier than Providence (1636), and 85 years before the landing of the Pilgrims at Plymouth. Juan de Ayolas, sent by Pedro de Mendoza after the first settlement at Buenos Aires (not long after destroyed), in 1536 established here a colony; then sailing up the river to a place he called Candelaria, with a few followers he boldly struck off through the forest towards Peru. Irala, left behind to await his return, proved faithful; but after long waiting in vain, being obliged twice to go to Asunción for provisions, he learned at last that Ayolas, after a successful journey to Alto Peru, had arrived in his absence and had then been slaughtered by savages: a tragic sequel of heroism, fitly to be compared to that of Captain Scott, his achievement of the South Pole, followed by the disastrous return journey.

Irala, later becoming Governor, was one of the few *Conquistadores*, after many vicissitudes, to die peacefully in 1557. Until 1776, Asunción was the chief Spanish city of the eastern slope of South America. Buenos Aires then became the seat of a Viceroy, in that year appointed.

In 1810, after expelling the Viceroy, the Argentines sent up a small army, expecting Paraguay also to revolt, but she declined. However, in 1811 the Paraguayans expelled the Spanish Governor; in 1814 a despotism under Dr. J. G. R. Francia came into being. At his death in 1840, his nephew, Carlos Antonio Lopez, succeeded to power, followed in 1862 by his son, Francisco Lopez. This young man, who had visited Europe, soon organized a well

drilled army with the idea of becoming a second Napoleon, in South America. His opportunity came when Uruguay appealed for his assistance against the Portuguese of Brazil. Crossing Argentine territory to invade Brazil, in spite of the refusal of Argentina to give permission, Lopez became involved in war with both of the larger countries and later with Uruguay. Although so small, Paraguay might have held her own against one of the larger Republics, but after making a desperate struggle for nearly six years, during which most of the male citizens were killed, boys of 12-15 forced to fight, women compelled to work in the fields and to act as supply bearers, with cruel persecution from the Dictator, the army was utterly wiped out, and Lopez killed in 1870. Three-fourths of the population had perished.

Not yet has the country recovered its previous condition and numbers, several revolutions having interrupted its growth; the last in 1911-12. Curiously, the people pride themselves on being one of the most homogeneous of the South American Republics and the best fighters.

Government

The Government organized in 1870 is of the usual form with three branches. The President, elected for four years, is not again eligible for eight years. There are two Houses of Congress, a Senate of 13 members and a Chamber of 26 Deputies. A Permanent Committee of Congress sits during the interval between sessions, both to provide for emergencies and to prevent usurpation by the Executive. The Judiciary has a Supreme Court, two Superior Courts of Appeal, Civil and Criminal Courts with Lower Courts and Justices.

The section west of the River is under military command; the part east has 23 electoral districts with subdivisions. As in Argentina, all persons born in the Republic are deemed citizens.

There are said to be 20 Districts, some of which along the Paraguay from the north are Concepción, San Pedro, Villeta, Pilar; farther east Caraguatay, Yhú, Paraguarí, Guaira, Guindí, Caazapá, San Ignacio, and Encarnación. All have capitals of the same name except Guaira, the capital of which is Villa Rica. Data as to area and population of these is lacking.

An unusual official is a Defender General of the Poor, of Minors, and of Absentees.

Population

The Paraguayans claim that their people are nearly pure Spanish, with slight admixture of Guaraní, this being the most numerous, intelligent, and peaceful of the Indian tribes of that region. Preserving the spirit of the invaders, they are an unusually hardy race for one on the edge of the tropics. While Spanish blood and culture largely predominate in the capital, the population of the rural districts is more primitive in character.

The number of the people is uncertain, but may reach 1,000,000, including 50,000, some say 100,000 wild Indians belonging to several tribes, chiefly in the Chaco. In the eastern section of Paraguay proper there are probably not over 25,000 persons, most of the population being east and south of the mountainous section and especially near the Paraguay River. They say that there are no idle or poor in the country, although many may be seen

barefoot in Asunción; as the simple life is popular, little clothing is needed, and food is abundant. (Of late the standard of living has been rising.) For this reason the country people generally lack energy and ambition. Most of the inhabitants are engaged in agriculture, some also in pastoral pursuits. The native women are called superior to the men. Burdens thrown upon them during their great war made them resourceful and independent. The men as a rule are peaceful unless they have been drinking *caña*, which is now forbidden by some large employers of labor. In the section east of the mountains are uncivilized Indians of the principal tribes, one timid and retiring. Some of the Cainguaes at times work in the *yerbales*. The Indians in the Chaco are of a number of different tribes of a low order of civilization, who are mostly nomads, and live by the chase and fishing. A few work at *estancias* spasmodically, never for long.

Education

Education is backward, though the percentage of illiteracy, if about 60 as is said, may be less than in some of the other Republics. With the scattered population, chiefly in the country and in small towns, to provide educational facilities for all is impossible. There is a University in Asunción with five Faculties; secondary schools in Asunción, Pilar, and Villa Rica; and six Normal Schools. A School of Commerce with night and day classes does good work in the capital, where the *Instituto Paraguayo* is of important cultural value, recently receiving a library of 2000 volumes in English from the Carnegie Peace Foundation. The *Banco Agricola* has done much for the diffusion of general education as well as more

specifically in agriculture. As in other countries, some young men go abroad to study, either on Government scholarships or with private means.

Press, Religion, etc.

Press. The capital is well supplied with newspapers and periodicals; little journalism exists elsewhere.

Religion. The religion is Roman Catholic, but there is complete toleration for other creeds. An important work has been carried on in the Chaco by W. Barbrooke Grubb and others of the English Church. Schools have been established, with an industrial and intellectual as well as a religious centre. Civil marriage alone is legal.

Telegraphic communication with the outside world is carried on by way of Posadas and Corrientes, but frequent interruptions in service have made it unsatisfactory. There are over 2000 miles of wire in the interior. Wireless is used by the Government to communicate with the garrison towns. There are stations at the Capital, Concepción, and Encarnación. In 1919 there was no Telephone service in Asunción, as the station had been destroyed by fire; but such service existed in Concepción, Villa Rica, and Paraguarí.

Money. The Money in use is paper, the standard, a gold peso equal to the Argentine, 96.5 cents. The paper peso varies in value, in 1920 being worth five cents. The value of exports and imports is declared in gold, an Exchange Bureau supplying local money at the actual rate. Thus fluctuations affecting commerce have ceased and business has improved.

The Metric System of weights and measures is usual.

CHAPTER XXXIX
PARAGUAY: PHYSICAL CHARACTERISTICS

Highlands. The physical features of the country are simple, the Paraguay River dividing it into sections: the Gran Chaco, to some extent unexplored in detail, and the Oriental. The latter, Paraguay proper, is traversed from north to south by a broad irregular belt of highlands, nowhere much above 2200 feet. The angle of the ridges is sharper on the west, the country undulating in gradual slopes from the foot. On the east, spurs run out enclosing deep valleys, and the country has more of an upland character. The streams flowing west to the Paraguay are smoother and to some extent navigable, while those flowing east and southeast to the Alto Paraná are interrupted by rapids and falls.

Plains. In the southwest section between the Paraguay and the Paraná there is considerable marshy country, part draining into the Ypoa lagoon; other marshy lowlands occur along the Paraguay River. All these could be drained at moderate expense, thus providing much rich and accessible land. The western section, containing most of the inhabitants, has an average altitude of about 600 feet. In the more settled parts of the west and south are extensive grassy and open lands, and hills covered with forests, while clumps of trees are frequent in the lowlands. The soil of the western part is rather dry and sandy except near the rivers and marshes. It is extremely rich, of a reddish color due to impregnated iron. Above is a thick layer of humus, formed by centuries of decaying vegetation. In places the soil is clayey, or has a substratum of clay

beneath. This is true of most of the forest region, and of the swampy section. Of Paraguay proper the western part is 25 per cent forest, the middle 66, the eastern 95 per cent.

The Gran Chaco, though called a plain, and flat near the rivers, is somewhat hilly. Rarely, a freshet on the Paraguay or the Pilcomayo transforms the neighboring country into great lakes, these sometimes extending 20 or 30 miles back from the river. Along the river banks is usually a narrow strip of forest, from which the soil and trees occasionally crumble into the stream, especially along the Pilcomayo, thus impeding navigation on that river. Farther back are open plains dotted with groups of palms, and some stretches of forest. The average altitude is 426 feet. Little is known of the country north of 22°.

Rivers. The country is greatly favored with rivers. The Paraguay, 1800 miles long, rises in Matto Grosso, Brazil, near the source of the Tapajós, a branch of the Amazon. From the east the Paraguay receives several important streams. Below the Apá, the northern boundary, two tributaries, the Aquidabán and the Ipané, are nearly 200 miles long. More important is the navigable Jejui (all these north of Asunción); still more the Tebicuary, entering the Paraguay far south of Asunción by two mouths, one over one-half, the other over one-third of a mile in width. The Alto Paraná is different, a more rocky and a shallower stream than the Paraguay. From that country it has many affluents, the Monday over 100 miles long with great cataracts in the lower part but navigable above. The Paraná River, 2000 miles long to the mouth of the Uruguay, rises in Goyaz, 665 miles above the Sete Quedas. It is 100 miles more to

the Iguassú, then 492 to Corrientes, and 676 beyond to the beginning of the La Plata.

The rivers of the Chaco are more sluggish. Even the Pilcomayo is untraced in its middle course where vast swamps impede passage by land or water. The river is navigable in its lower reaches for a considerable distance, and the upper part is well known. The River Confuso is a smaller stream of similar character. Paraguay has few lakes save those swampy in character, but one, Lake Ipacaraí, east of Asunción, is a popular beauty spot, with pleasure and health resorts. Lake Ypoa is larger and both are navigable by boats of slight draft.

Climate

The climate of the country is called ideal, that of course depending on one's taste. In general it is subtropical with two seasons, the summer temperature averaging 81°, the winter 71° or less. The rainfall is fairly distributed, the most in the hot months, December to February. Sudden changes of weather occur; from hot, humid north winds, or cooling south winds from the Argentine plains. In places the winter temperature may fall to 33°-42°, even with frost, but not near the Paraná River where there are fogs. In summer the maximum temperature at Asunción occasionally reaches 100° or more, and there are 60 inches of rain; more farther east, but less in the Chaco.

CHAPTER XL
PARAGUAY: THE CAPITAL AND OTHER CITIES

The Capital

Asunción, the population of which is variously given as 80, 90, 100, 120, and 125 thousand, is a quiet town on the Paraguay at a point where the bank rises to a considerable height, affording good drainage, and from the palace a pleasing view. An English writer calls the city the nicest, cleanest town above Buenos Aires. Although 1000 miles from the ocean, it has an altitude of but 203 feet above sea level. The classical building of the Custom House stands by the river side. The palace above, built by the Dictator, Francisco Lopez, as a residence, is used for the offices of the President and his Cabinet. Other important buildings are a House of Congress, a Cathedral, a Museum of Fine Arts containing a Murillo, and a National Library with many priceless documents.

The several hotels are fairly comfortable if not exactly modern in character. There are electric lights and electric car service. The streets at last accounts were poorly paved with rough cobble stones, but some automobiles are in use. The city is steadily advancing in commercial importance, 80 per cent of the imports and 40 of the exports passing through its Custom House.

Other Cities

From the meagre information available, to

describe individually the various States or Districts of Paraguay is impossible, as also unimportant, the sparse settlements having little marked variation. Mention will be made instead of the principal towns, few of which have a population of 15,000.

Villa Rica, population perhaps 30,000, 40 hours from Buenos Aires and 93 miles from Asunción, is the second city of Paraguay. Situated in a rich agricultural district, it is destined to a sound if not rapid development. It will become important later as a railway junction; for the railway designed to cross the Paraná River into Brazil just above the entrance of the Iguassú, passing the great Falls, will connect with the São Paulo-Rio Grande Railway at União de Victoria and go on to São Francisco, called the best port in Brazil south of Santos. However, the date of this road's completion is uncertain. The actual railway junction is at Borja, a little south of Villa Rica, but the latter place will receive the benefit. All of the towns are what we might call large country villages.

Villa Concepción, 130 miles up the river from Asunción, the third if not the second city of commercial importance, with a population given as 16, 25, also 30 thousand, is a port for *yerba*, cattle, quebracho, and sugar. The town of one story houses has better streets than those of the Capital, and a comfortable inn. It may now boast of 50 automobiles, instead of the one stylish turnout noted years ago by Colonel Roosevelt.

Villa Encarnación, population 15,000 or less, opposite Posadas, is another city of commercial importance, as the junction of the railway ferry and of river transportation. Here there is a change of river boats, those of lighter draft being required for

the Upper Paraná.

Other towns are Paraguarí on the railway between Asunción and Villa Rica, Carapeguá near by, San Pedro north of Asunción, half way to Concepción, Luque, nine miles south of the Capital, and Pilar, well down the river. Villa Hayes is one of several centres of commercial importance in the Chaco.

San Bernadino on Lake Ipacaraí, two hours from Asunción, is a pleasure resort favored in winter by citizens of Buenos Aires. A large modern hotel caters both to fashionables and to sufferers from tuberculosis.

Transportation

River transportation in Paraguay is of the greatest importance. Large comfortable steamers give good service three times a week between Buenos Aires and Asunción, making the trip upward in four or five days, down stream in three. Above Asunción boats of suitable size and draft give poorer service on the Paraguay. Several lines run up 765 miles to Corumbá in Brazil, a three or four days journey, calling on the way at several Paraguayan ports, Concepción, 250 miles, San Salvador, Puerto Max, and others. Fares are high, especially down stream, apparently because one is obliged to go. Some ports on the Paraguay and on a few branches above and below the capital are visited by local steamers. Barges can be floated on over 2000 miles of internal rivers. *Chatas* (which are poled along) drawing 2-4 feet of water carry 10-100 tons; such boats on the Paraguay may carry 600 tons.

On the Alto Paraná, as previously stated, there is

semi-weekly service from Corrientes to Encarnación and Posadas. Above, three times a week steamers, with many calls on both sides of the river, make a four days' journey to the Iguassú and beyond to Puerto Mendez, from which point a short railway in Brazil passes around La Guayra Falls.

Railway facilities are increasing, construction though not so easy as on the Argentine plains being less difficult than in general in the other Republics. Nearly 475 miles of track are in operation, 200 of them privately owned. The main line of the Central Paraguay, Encarnación to Asunción, 230 miles, has first class equipment with through sleepers to Buenos Aires, 966 miles from Asunción. Several short lines of very narrow gauge, about 30 inches, transport quebracho and timber from the interior to river ports, 152 miles of these in the Chaco. A railway of 40 miles serves sugar mills back of Concepción. If the cross lines proposed to Brazil and Bolivia (of one of the former some miles are in operation) are constructed within the decade, a rapid development will ensue. Cart roads are few and very poor. In wet weather six or eight oxen are required for a cart. Two-wheeled vehicles are much employed.

CHAPTER XLI
PARAGUAY: RESOURCES AND INDUSTRIES

The chief resources of Paraguay at present and for an indefinite future are pastoral pursuits, forestry, and agriculture.

Forestry

Quebracho. The exploitation of quebracho is an important source of wealth. On the estimated 27,000,000 acres of forest land in the country are valuable woods of many varieties, among which the quebracho is preëminent. The first factory in South America for the extraction of tannin from this wood was established in 1889 at Puerto Galileo in the Chaco. The Forestal Company, British owned, was a leader in the development of the industry in which one or more American companies have lately become interested. Large sums have been invested, $15,000,000 it is said by a single company. Most of the properties are located in the Chaco, which has great tracts of land distributed to individuals or companies, some of whom have never seen their holdings. One American company has 1,500,000 acres.

Unlike most other trees from which tannin is derived, the tannin is not in the bark, but it permeates the entire wood. Formerly the logs were exported, but this is now forbidden. The International Products Company has a mill at Puerto Pinasco on the west bank of the Paraguay above San Salvador, and 300 miles north of San Antonio. The wood is remarkably rich in tannin which runs 20 per

cent. The wood must be cut and then ground to extract the substance, the refuse wood running the engines. One tree weighing a ton will produce 600 pounds of extract. By means of three rotary evaporators, the extract may be solidified so as to be packed in bags, 75-100 tons of the solid in 24 hours. The Company, owning enough wood to produce 450,000 tons, is equipped to supply 30,000 tons of the extract annually. The trees are hauled by oxen to a light railway which brings them to the port, the railway being extended as the felling of the trees goes farther inland. Twenty million pounds of extract were exported from Paraguay in 1919.

Other Wood. Several other trees have bark which is used for tannin, among them the *curupay*, said to have 28 per cent in the bark, which is used in Paraguay. This is one of the strongest woods in the world, like quebracho much wanted for railway ties. The *urunday* is a wood so durable that posts of it in damp ground have lasted 200 years. Other woods resemble the hickory, the English walnut, the soft pine, etc. The *ivara-pitak* is a fine all around timber, light, tough, and hard, an unusual combination. Lignum vitae (*palo santo*), almost as hard as quebracho, cedar, and bitter orange abound, the leaves of the latter used for essential oil, chiefly exported to France. The hard woods are useful for railways, for cabinet making, and fine furniture; also for firewood on account of the enormous price of coal. From the proximity of the forests to the coalless region of Argentina and its plains, mostly treeless or supporting light woods only, like eucalyptus and poplar, forestry is certain to have in Paraguay a speedy and extensive development, in spite of the fact that there is a great variety of trees growing in a small space, as 47 different kinds among 163 trees in

a tract 100 yards square. However, in places in the Chaco the quebracho chiefly abounds.

Other woods found in the eastern forest are *ibiraro*, close grained and flexible, the best for wheels, which made of this wood last for years without tires, excellent also for boat and ship building; the *caranday* or black palm 30 feet high, used for telegraph poles and scaffolding; *palo de rosa* (rosewood), a mahogany used for cigar boxes; the *tatum*, good for clothes boxes, being obnoxious to insects; and many more, valuable but little known. Also there are fibre plants, ramie, jute, etc.

Yerba mate, although now to some extent cultivated, is chiefly a forestal product. Once known as Paraguay tea, it is a famous product of the country, and in some sections the most important.

The trees or shrubs grow wild in the forest to a height of 10-25 feet; from these the bright green leaves are gathered from which the tea is made. How to propagate the trees was for years a mystery, but it is now known that soaking the seed in hot water will promote germination. If planted in tiny wooden boxes with no bottom, 9 inches deep, the roots may be transplanted without injury. A tree comes into bearing in five years, but reaches full production only after 12 years. Some plantations have been established on the Alto Paraná, but the greater part of the *mate* comes from the virgin forest. The natural trees in the forest grow better if that is cleared of underbrush and of the larger trees. When full grown they can endure 5-6 cuttings a year without permanent harm.

The Industrial Paraguay, with a capital of $5,000,000, is said to export about 75 per cent of the total. This Company holding a property of 8400

square miles, was the first to undertake on a considerable scale the cultivation of *yerba mate* in plantations. Their largest is in the north at Nueva Germania on the River Acaray. Barthe and Company, with a property of 3000 square miles, has a plantation near Nacunday on the Paraná River with 1,400,000 trees producing, and 1,000,000 more immature. The plantations of 28,000 acres will soon supply 5,700,000 pounds a year. *Mate* sold in 1918 at 8-10 cents a pound. In that year cultivated trees produced 6,700,000 pounds, and the natural 17,200,000 pounds. *Chatas*, flat boats, carry the dried leaves down stream to river ports where they are taken by steamers to Asunción, Posadas, Corrientes, or Buenos Aires to be ground. The Industrial has two ports on the Paraná and one on the Acaray, with mills in Asunción, Corrientes, and Buenos Aires. La Matte Larangeira, a Brazilian Company, has some *yerbales* in North Paraguay, but more in Matto Grosso.

Ten to twelve million persons in South America drink *mate*, though tea and coffee are more fashionable in the large cities. Its use was spreading in Europe before the War, but few persons in the United States are acquainted with its virtues. Containing less tannin, it is more healthful than tea or coffee, is soothing to the nervous system, and beneficial to digestion unless taken to excess. When used instead of food it becomes injurious. It is much drunk on the plains of Argentina, counteracting the effects of an excessive meat diet. It may be made like tea, but in its native haunts, the powder is put into a gourd called a *mate*, boiling water is poured on, and after steeping the liquid is drunk with a *bombilla*, a tube ending in an oval ball, with small holes to admit the liquid, but supposed to keep out the *yerba*.

Agriculture

Tobacco, largely cultivated in Paraguay, is the most important agricultural product with the first place in foreign trade. Almost every one smokes large cigars, even women and girls. The leaves are divided into seven classes: the first class called *pito* containing $2^1/_2$ per cent of nicotine, the seventh class 7 per cent. The first four classes are used in Europe as fillers, the last three in Argentina as wrappers, having larger, stronger leaves. The tobacco is mainly from Havana seed introduced in 1900. The leaves are dried and fermented, and made into various types of cigars, or shipped in crude form to Europe, formerly the most to Germany, later to France and Spain. Of one crop of 7000 tons 4000 went to Europe, there sold under different names. In Argentina and Uruguay the cigars and cigarettes are popular under the name of Paraguay.

Small Farm Products. Agriculture is naturally important for home consumption, but aside from tobacco and oranges the exports are slight. As almost everything will grow in the rich soil, with increasing population agriculture will become a great source of wealth. Mandioca and corn are staple for the small farmer, the latter of two varieties, a hard white and a soft yellow, the former of especial excellence both for nutriment, and withstanding the ravages of the grain weevil. Three crops a year may be raised from one variety of sweet corn. White potatoes flourish, though not so well as sweet, no great hardship. Beans, peanuts, millet, and various European vegetables are raised for home consumption. Wheat is experimental. Coffee does fairly but is often injured by frost; alfalfa not so well as in Argentina.

Rotation of crops is unknown and few implements are employed. Life is so easy that the small farmer is rather shiftless, and practically nothing is done on a large scale.

Oranges, grown by every one, are the most noteworthy of the many varieties of fruit produced in Paraguay, but high freight rates make them less profitable than they should be. They grow freely and are exported in large numbers to Argentina and Uruguay, 200,000,000 in 1919; they have been called the best in the world. However, they do not keep well, and being carelessly packed many are spoiled in transportation. The introduction of hardier varieties is talked of.

Sugar finds excellent soil but is liable to suffer from frost or drought. It is grown mostly in the north near the rivers, railways, and factories. There are at least seven mills, two at Villa Hayes in the Chaco, one at Concepción. Some small mills make brown sugar and *caña*; 387,500 tons were produced in 1918. About 20,000 acres were cultivated in 1919, but some sugar is imported. The methods have been crude but are improving.

Cotton. Good cotton land exists especially in the southwest, and in the Chaco. An indigenous tree bears 10-12 years. The staple is of good length and quality. Not enough is produced to supply the home market, but its culture is increasing. A Belgian obtained annually 1000 pounds an acre for six years. At present the seed is not utilized.

Rice is grown on low ground between the Paraguay River and the railway. Two crops a year may be raised giving 2000 pounds to the acre, a quantity which might be nearly doubled. The coconut palm, peanut, and castor bean flourish.

The Stock Industry

Cattle raising is beginning to be very profitable in Paraguay as in the neighboring countries; and here there is a chance for the small capitalist. Formerly some live cattle were exported, but ten times as many hides; also dried meat from *saladeros*. During the Great War operations were carried on by three American companies. A plant at San Salvador, nearly three hundred miles above Asunción, for slaughtering cattle and putting up canned meat, was conducted by Morris; another by Swift 5 miles above the Capital, where over 900,000 six-pound cans of meat were put up in 1918. But with the conclusion of the War the demand fell off so rapidly that both plants are closed and dismantled.

A third establishment, however, at San Antonio, 15 miles below the Capital, is actively engaged and about to increase its output. The International Products Company has a thoroughly modern equipment, a real *frigorifico*, for the export of frozen meat, with a capacity of 175,000 head of cattle a year, to be shipped to Buenos Aires and Europe. The cattle are in part purchased from individual farmers, but the Company has a large property where its own production is increasing. Nearly 300 leagues of land are owned back of Puerto Pinasco in the Chaco: one half for cattle grazing and half quebracho lands. They have 600 miles of barbed wire and a herd of 70,000 with some blooded stock. The western section is used for young cattle which are moved east the third year for fattening. The Company besides tugs and lighters for the transport of the cattle has two refrigerating steamers to carry the frozen meat to Buenos Aires. The hides increase the value of the production.

The native cattle are far better than the Texas Longhorn, but not equal to the blooded stock of Argentina. They weigh 850-1000 pounds and afford excellent beef. The Argentine is heavier but called coarser than that of the United States. The Paraguay stock is now being improved especially with Herefords. A 50 per cent increase of the herd is general. It is estimated that the number of cattle in Paraguay is now 5,000,000, and that 40,000,000 may be easily supported. The native grasses are good, and the *jaraguá* from Brazil is used. Stock may be bought at $15 a head, perhaps less in large numbers, affording the best possible opportunity for the small capitalist. The dairy industry is slight, the native cows being poor milkers.

The Chaco land near the River is liable to floods but few cattle are lost as there is usually time to drive them back 20-30 miles to the second and higher zone beyond the danger. It has been said that cattle covered with ticks east of the Paraguay on crossing into the Chaco soon become free of them. A French company in 1919 had 150,000 head of cattle with over 500 Hereford bulls, a breeding stock of more than 100,000. One thousand miles of pasture were enclosed. The Company makes use of 130 telephones, has shops, a tannery, etc. Besides Herefords there are Durhams and Polled Angus. Two hundred men are in charge of the stock. The natives make good cowboys, better I was told than some Americans who went down from here a few years ago.

Other Stock. As to other stock, horses are comparatively few, not one tenth of the number of cattle, hardly enough for home use. They are liable to disease and do not thrive in the Chaco, better east

of the River. Mules serve well though smaller than in the United States. Horses are outnumbered by sheep, which are valuable for meat, though mutton is not favored by the natives. The climate is obviously warm for sheep and their fleece is light. New stock must be introduced. Hogs and goats thrive better.

Mining

Iron, 34 per cent pure, was produced at Ibicuy, 1863-69. Indications of it are widespread near the Alto Paraná, and near Caapacá, Quiquió, and Paraguarí.

Manganese runs 63 per cent in beds of 60,000,000 tons. Copper exists near Encarnación and Caapacá. There are large beds of good stone, talc, graphite, kaolin. Probably petroleum will be found in the Chaco.

Manufacturing

Manufacturing is non-existent, aside from the quebracho and sugar mills, save for a few necessities of life, as by many regarded. Beer comes first with the largest investment of capital, flour mills next, then boots and shoes, furniture, brick, tiles, matches, hard and soft drinks, soap, vegetable oils, etc. The opportunities are vast for the development of electric power. Labor in general is fair and loyal, undeveloped, but with good intelligence. The men lack steadiness and a feeling of responsibility. There has been less labor trouble than in Argentina and Chile, but men from Argentina have been attempting to unionize them. Strikes are common. Wages are from 50 cents to $3.00 a day, the lower with

quarters. At the *frigorificos* $1.00 is paid with free rent, for ten hours' daily work.

Investments

Perhaps no other country of South America presents to the small farmer and willing worker, with or without small capital, openings more favorable than Paraguay, if equal to these. Some stock raising for local use or for the packing houses might gradually be added to agriculture. The dairy industry ought to be profitable. Fruit raising for export or for canning is undoubtedly of excellent promise; a large proposition of this nature is now being considered by an American corporation. Saw mills and lumbering would give good returns. Small industries, well managed, might afford fair earnings. For quebracho, *yerba mate*, or large scale stock raising, much capital is required, yet a modest sum here might go farther for stock than in any other country. Thousands of acres of land suited to agriculture are available for colonists in accordance with their liberal colonization and homestead laws. The price goes from $1 to $13 an acre. Grazing land costs $2-$5, agricultural $5-$20, Chaco land $1-$2.50 an acre. Special arrangements are made for and with a party of colonists as in all of the countries.

CHAPTER XLII
URUGUAY: AREA, HISTORY, GOVERNMENT, POPULATION, PHYSICAL CHARACTERISTICS

Uruguay, still occasionally called the Banda Oriental (the land east of the Uruguay River), is the smallest Republic of South America.

Area, Population, Boundary

Area. With an area of 72,172 square miles, Uruguay is larger than New England.

Population. The country has now about 1,500,000 inhabitants.

Boundary. Uruguay is nearly surrounded by water, having the Atlantic Ocean for 120 miles on the east. The river or estuary of La Plata 235 miles on the south, and the Uruguay 270 miles on the west, both separate the country from Argentina; on the north and east between Uruguay and Brazil three rivers and Lake Mirím form the boundary most of the way, with the Santa Hills for some distance.

History

In 1512 the explorer, Juan de Solis, entered the gulf-like River Plata and landed upstream, 70 miles beyond Montevideo. Here were found Charrúa Indians, accounted by the Guaranís rather ferocious. On his next visit, 1515-16, Juan de Solis was slain by them with all his party that had gone on shore. It was many years later that permanent settlements were made in this region by Portuguese or Spaniards

and not until 1726 was the city of Montevideo founded by Spaniards. In 1777 a rival Portuguese settlement was driven out by General Zavala of Buenos Aires. Subsequent to 1750 Montevideo was independent of Buenos Aires. After the Junta was formed in that city in 1810 the Spanish Viceroy for a short time had his seat at Montevideo; but the people soon became eager for independence. Under Artigas they waged war for years against the Spanish, the Portuguese, and also the Porteños of Buenos Aires. When in 1824 the power of Spain was finally destroyed in Peru, Uruguay alone was not independent. Accordingly a refugee in Buenos Aires, Lavalleja, with others, 33 in all (Treinta y Tres, a popular name in Uruguay), set out from Argentina, crossed the Uruguay River, gained adherents, captured Dolores, and August 25, 1825, established a government at Florida. In August, 1828, after many struggles Brazil and Argentina both acknowledged the independence of Uruguay; and May, 1829, Lavalleja entered Montevideo. In 1830 the Assembly elected Rivera President, after which Lavalleja tried to overthrow the Government. Under the second President, Uribe, one of the 33, a battle occurred when the colors red and white were used by the opposing parties, from which date the two parties: Red, Colorados, party of Rivera; Whites, Blancos, of Uribe and Lavalleja. Strife continued, the deaths of the leaders making no difference to the factions, and the parties continuing to the present with these names. In February, 1865, Flores, who had secured the support of Brazil, became dictator, but Paraguay having been previously asked to interfere continued the fight. Flores was assassinated, in 1868 occurred a terrible visitation of cholera, and in ’69 a financial crisis that ruined thousands. Troubles continued;

until within the last few years no President has had an entirely peaceful term. In view of this fact the development and prosperity of the country has been remarkable.

Government

The government of the country is that of a centralized republic with the usual divisions; the President is elected for four years and not eligible for reëlection. The new Constitution which began to operate March 1, 1920, is unusually radical in character, a tendency observed in Uruguay some years ago. The Executive Power is shared by the President and a National Commission of nine members elected by the people. Some Members of the Cabinet are appointed by the President, others by the Commission. Congress elects the members of the Supreme Court, approves or rejects treaties. Bills may be presented to either Chamber by Cabinet Members, who may take part in deliberations or be summoned by a vote of one third to answer questions. A permanent committee, two Senators and five Deputies, represents Congress when it is not in session, and has power to convoke it.

Departments	**Area, in square miles**	**Population**	**Capitals**	**Populat**
On the Uruguay River				
Artigas	4,400	37,000	San Eugenio	9,(
Salto	4,900	69,000	Salto	30,(

Paysandú	5,100	63,000	Paysandú	22,(
Rio Negro	3,200	30,000	Fray Bentos	12,(
Soriano	3,600	52,000	Mercedes	18,(
On the Plata River				
Colonia	2,200	78,000	Colonia	15,(
San José	2,700	56,000	San José	15,(
Montevideo	256	400,000	Montevideo	435,(
Canelones	1,800	110,000	Canelones	10,(
Maldonado	1,600	38,000	Maldonado	4,(
On the Atlantic				
Rocha	4,300	44,000	Rocha	12,(
Bordering on Brazil				
Treinta y Tres	3,700	38,000	Treinta y Tres	8,(
Cerro Largo	5,800	55,000	Melo	14,(
Rivera	3,800	44,000	Rivera	15,(
In the Interior				
Tacuarembó	8,100	58,000	San Fructuoso	9,(
Durazno	5,500	53,000	Durazno	17,(
Flores	1,700	17,000	Trinidad	13,(
Florida	4,600	55,000	Florida	10,(
Minas	4,800	64,000	Minas	15,(

The 19 Departments or States with approximate area, population, and capitals, beginning at the northwest, are given on the preceding page.

Population

The population of Uruguay, about 1,500,000, is practically of the Caucasian race with slight intermixture of Indian and Negro. The Indian tribes previously inhabiting the country were mostly exterminated, a few departing into adjoining regions, a few of the milder tribes being absorbed by their conquerors. In the north are some negroes near the Brazilian border and some of mixed blood. More than any other country of South America Uruguay is inhabited by a homogeneous white population.

Education

A fine educational system has been developed, with primary and graded schools throughout the country, so that hardly more than 25 per cent of the population is illiterate. Primary education is free and obligatory. In the Capital is a well equipped University with the usual Departments, including Engineering and Architecture; a School of Arts and Trades, kindergartens, and two Normal Schools; six of the latter are found in other cities. In the suburb of Montevideo is a School of Agriculture; four model farms are located at Colonia, Salto, Paysandú, and Cerro Largo.

Press, Religion, etc.

The Press is of high character with a number of good papers in Montevideo, and some in other cities.

The Religion, of course, is Roman Catholic, although there is no State Church. Complete toleration exists for other forms of worship.

Telegraph, etc. The Government has about 4800 miles of telegraph lines and four wireless stations. Wireless is compulsory on all steamers visiting Uruguayan ports. Telephones belonging to two private companies are likely to be taken over by the Government; 19 towns have this convenience.

Money. The gold standard was long ago adopted, but no gold was coined and no bullion is carried by the State. In spite of this we have the curious fact that the paper peso is equivalent to gold, and in ordinary times to $1.034 of our money; though unhappily when once I received some of the bills here, exchange being normal, I could obtain but 90 cents on the dollar for them. One broker even offered me 80 cents. Subsidiary coins are of silver and nickel, and a silver dollar is carried at par. The credit of Uruguay is obviously excellent, and its bonds are often above par.

Weights and **Measures** according to the metric system are obligatory. The importation even of other weighing apparatus is forbidden.

Physical Characteristics

Uruguay is roughly a right-angled triangle in shape, its apex at the northwest, the western boundary line nearly perpendicular, the south side almost at right angles with it, and the Brazilian boundary the hypothenuse; with a little extra piece at the southeast bordering on the Atlantic. For the most part a gently rolling country well suited to

agriculture as for cattle raising, it slopes towards the east, west, and south; having rougher and higher land at the north, where the greatest elevation is a little above 2000 feet. A central cross depression is the Valley of the Rio Negro. The perimeter of Uruguay measures 1148 miles, of which 668 are on the ocean or large rivers. The country is well supplied with rivers, some of which are navigable. Besides the Plata and Uruguay, there are the Negro, Tacuará, Cebollati, Climar, and the Yaguarón; also Lake Mirím. Besides Mirím on the Brazilian border there are a few lakes along the ocean front; a few islands lie off the coast. The country differs from the Argentine campo in having plenty of stone.

Climate

Extending from 30° to 35° South Latitude with no considerable elevation and being close to the sea, Uruguay naturally has a temperate climate with no great variation over its limited area. The temperature generally ranges from 40° to 90°. There is sufficient rainfall, about 40 inches, and the country is well watered. Its coast offers agreeable places for summer resorts, which are patronized both by natives and by Argentines. The country in general has a particularly salubrious climate, 244 sunny days, it is said, in the year.

CHAPTER XLIII
URUGUAY: CAPITAL, DEPARTMENTS, CHIEF CITIES, PORTS

The Capital

Montevideo, the capital and chief port of Uruguay, with a population approaching 400,000, is a pleasant city, a more homelike place than Buenos Aires and preferred as a residence by many, though doubtless more persons enjoy life better in the larger gayer capital. Favorably situated near the entrance, but on the Plata River, on a peninsula of high ground which shelters a good harbor on the west, while attractive beaches lie on the side towards the ocean, Montevideo is in some respects a contrast to South America's metropolis, 100 miles distant, on the other shore. With fine drainage facilities it is a clean healthful city, well lighted, and well served by electric tramways. Pure water is brought a distance of 30 miles. Though with fine buildings, theatres, broad, well-paved avenues (150 miles of them), open squares, and attractive parks, the city seems quite up to date, yet somehow a trifle old fashioned, with an agreeable air of solid respectability. The hotels are comfortable, but only those facing the beaches, at a distance from the business section, are really of the first class. An underground telephone system is proposed.

Departments

Canelones is directly north and east of Montevideo, extending along the River Plata. In

proximity to the Capital and with good rail connection, fruit growing and agriculture are important, viticulture is common; but even here the pastoral industry leads. Canelones boasts of several towns of 8000-10,000 population, one of which, Pando, a pleasant agricultural centre, is connected with Montevideo by a good macadamized road.

San José, west of Montevideo and Canelones, has industries similar to the latter with timber in addition, supplying wood for fuel and for building.

The capital, San José, with a population of 15,000, has the distinction of being the largest of the country towns as distinguished from the ports. It has a good macadam road to the capital, Montevideo, 60 miles, and an up-to-date flour mill.

Colonia, west of San José, running up to the entrance of the Uruguay, is called the richest Department of the Republic. Agriculture, dairy farming, fruit and viticulture are well developed; its stone quarries are worked; and lying opposite Buenos Aires, with good steamship service to that city as well as rail connection with Montevideo, it is certain of increasing prosperity.

The capital city of Colonia is a quiet old town with historic associations; a new town three miles east has been created as a pleasure resort. Colonia Suiza, with 4000 people and many Swiss chalets, is devoted to the dairy industry; one enterprising proprietor who began as a milk peddler now turns out from his factory in the spring one ton of butter daily.

Soriano on the Uruguay River, nevertheless has its chief town, Mercedes, population 18,000, on a tributary, the Rio Negro, here one-fourth of a mile wide. The main industry is cattle raising; the town

has a saladero and is also a centre of charcoal making. Stone quarrying is carried on in the Department and some minerals exist, topaz and amethyst in considerable abundance. A peculiar water stone is of curious and undetermined origin.

Rio Negro follows on the north of the Negro River, the chief centre for the breeding of live stock, as might be expected from the fact that the capital is Fray Bentos, the original home of the Liebig industry, beginning in 1865. The company now owning nearly 5,000,000 acres, and establishments elsewhere, Fray Bentos is of less relative importance than formerly; yet with 180,000 cattle slaughtered here in a single season, the business is considerable. It is quite a model town, with good streets and homes for employes, schools, etc.

Paysandú, the next Department north, has a larger population of which the capital of that name contains nearly half, 22,000, being the second city of the Republic in commercial importance. Electric lights and telephones are in service, also horse cars. Here the stream narrows and this is the last port of call for ocean steamers. The chief employments in the Department are agricultural and pastoral; there are some meat curing factories.

Salto, Department and city, each with larger population than the Department south, is also a pastoral region; but it is rich in minerals, and is an important wine producing district, where a great variety of other fruits, including oranges, flourish well. Here the Uruguay River is bridged to Concordia in Argentina, an important railway centre. This is called the head of navigation, as here are falls and rocks, but smaller boats ply the river above.

Artigas, the most northern Department with a

long frontier on Argentina and Brazil both, has some railway service, though not the main line to Brazil. The capital, Artigas, population 10,000, is on the Brazilian border. This Department has more timber, hard and soft, and less agriculture and grazing. Some districts are noted for minerals and precious stones.

Rivera is next along the Brazilian border, one of the largest Departments. The capital, population 15,000, is a clean, well paved town, of growing importance as the terminus of the Central Uruguay Railway, here connecting with the Brazilian Railway to São Paulo. The Department, though thinly peopled, has considerable agriculture and gold mines of importance.

Tacuarembó, directly south, largest of all the Departments, is the most sparsely populated. It is chiefly devoted to agriculture; tobacco flourishes, and rice culture has met with some success. Gold and manganese are found.

Cerro Largo next to Rivera on the Brazilian border is chiefly pastoral with agriculture advancing. Its prosperity is likely to increase with connection with Brazil now planned from the capital, Melo, 14,000 population, the present railway terminus.

Treinta y Tres, its capital with 8000 population, is chiefly pastoral with very little agriculture; it is well wooded with valuable timber. The great Lake Mirím along the eastern border is of much value, and further railway construction will promote development.

Rocha, south of Treinta y Tres, has also a long eastern frontier on the Lake, a bit of Brazil, and much on the Atlantic. Grazing is the chief industry with some viticulture. Seal fishery is important, and

there are minerals: copper, gypsum, alabaster, marble, jasper.

Maldonado, south of Rocha and east of Canelones, also borders on the ocean at the southeast. Chiefly pastoral, the Department has some agriculture and wine making. There is seal fishing on the islands off the coast. Timber will soon be important as tree planting is encouraged by the Government. The British Consul received a gold medal for planting over 10,000 maritime pines. The beginning was difficult, the young trees being continually buried in masses of sand. Dunes are characteristic of this coast. But when the trees were once established continuance was easy and now 100,000 or more are flourishing in this section. Others followed the example, making land formerly worthless now rated at $5-$25 an acre. Piriápolis, a new town west of the capital city, is a remarkable place due to the patriotic energy of Señor Piria, who here began planting trees over 20 years ago. These are now a forest, with millions of trees, seven miles of eucalyptus woodland stretching from the Piria castle to the ocean, near which a hotel has been erected and chalets, the beginning of a prosperous town and summer resort. A railway serves this western edge of Maldonado.

Minas is back of Maldonado and west of Rocha. It has pastoral and agricultural industries with a good endowment of minerals.

Florida, west of Minas and north of Canelones, abounds in cattle and is developing agriculture.

Durazno, north, in the centre of the Republic, is also chiefly devoted to cattle raising.

Flores, west of Durazno, is not well populated and is chiefly pastoral.

Ports

Ocean Ports. The only ocean port of importance in Uruguay is Montevideo and this indeed is on the Plata River. It ranks, however, among the best in South America in depth, capacity, and ease of access, admitting ships of 32-foot draft at low tide. A free port for goods in transit, where they may remain a year in the Custom House without tax, it has excellent docks and harbor works, including ample warehouses and facilities for handling all classes of merchandise, 1400 tons unloaded in ten hours. A port railway serves to connect sea and land traffic, transferring passengers as well as freight directly from steamers to railway cars. The port works constructed by the French, concluded for the most part before the War, cost in the neighborhood of $40,000,000. In the vicinity a Hotel for Immigrants accommodates 1000.

Ships of many lines call in passing, passenger steamers for Buenos Aires and many which do not go up the river, either because of too heavy draft, or to save time when on the way to the West Coast or to other ports. For some this is the ultimate destination. Nightly trips between the two great cities are made by steamers of the Mihanovich Line, which rival all but the finest plying between New York and Boston. Smaller steamers sail from here or pause on their way up the Uruguay, or the Paraná and the Paraguay, the latter perhaps going through to Corumbá, 1800 miles, those for the Uruguay at most 300 miles to Salto or Concordia.

River Ports. Montevideo would strictly come under this head. Others of importance are Colonia on the Plata and Paysandú on the Uruguay, to which

ocean steamers of 14-foot draft may ascend; to Salto beyond, steamers of 8-foot draft. Above the rapids at Salto on the Uruguay and on a few of its branches smaller steamboats and other craft are used. The Rio Negro is navigable 50 miles to the town of Mercedes. The entire fluvial navigation is 700 miles. The Uruguay Navigation Company with a capital of $10,000,000 has recently been organized for traffic on the Plata, Paraná, Uruguay, and Paraguay Rivers.

CHAPTER XLIV
URUGUAY: TRANSPORTATION, RESOURCES AND INDUSTRIES

Railways

Even more than in Argentina the railways have been developed by British capital. The first concession in 1865 was for a road from Montevideo to the Rio Negro. Construction has been more expensive than on the plains of the neighboring Republic, on account of rolling country and the many bridges required, over 300. There is a single tunnel, in the Department Rocha. Happily all of the railways are of the same gauge, the standard, 4 feet $8^1/_2$ inches. The length of those in operation is 1680 miles, the greatest in proportion to area of any country in South America.

The Central Uruguay, with its extensions, is the main line from which most of the others branch. The original ran from Montevideo to the Rio Negro in the centre of the Republic, from which it was prolonged to the northern border at Rivera. In May, 1917, closer connection was established with Sant' Anna, across the Brazilian border, and sleeping car service to São Paulo in $4^1/_2$ days, which should shortly be $3^1/_2$. The prolongation is called the Northern Extension. The Eastern Extension starts at Toledo, 16 miles from Montevideo, diverging to San Ramón, Nico Peréz, and Melo, with a branch from Nico Peréz, to Treinta y Tres, 311 miles in all. The Western Extension runs from San José on a branch of the Central, to Mal Abrigo and Mercedes. From Abrigo a line goes to Rosario and Puerto del Sauce,

and from Rosario on to Colonia, altogether 211 miles.

Other roads are the Midland and the Northwestern, the former connecting with the Central near the Rio Negro, passing west to Paysandú, then north to Salto, while the Northwestern runs 113 miles from Salto to Cabellos, then northwest to the corner of the Republic, there connecting by an international bridge across the Cuareim River with Quarahim, Brazil, and its Great Southern Railway running northward. At Salto there is considerable interchange of traffic with Argentina through Concordia opposite, an important railway junction and city. At Cabellos connection is made with the Uruguay Northern, another road running to the Brazilian Boundary, the terminus San Eugenio.

The Uruguay East Coast Railway with 78 miles of road, starting from Olmas on the Central Uruguay runs to Maldonado. Much of the traffic is to the seaside resorts, Puente del Este and Piriápolis; there is also considerable freight for the Montevideo market, of agricultural and pastoral products and fish. An extension northward from San Carlos to Rocha is authorized. The road has been purchased by the Government. A line from Durazno on the Central to Trinidad, begun by the Farquhar-Pearson Syndicate as part of a line designed to cross the country diagonally from Colonia to the Brazilian border, was taken over by the Government, which has in view the securing of a system of State railways. Besides building the 31-mile line from San Carlos on the East Coast Railway it intends purchasing the 23-mile line from Rocha to the port Paloma. Further needed construction is planned by the Government as soon as may be practicable.

Aeroplane service is to be installed by a British company from Montevideo to Rio de Janeiro and Pernambuco, and aerial postal service is planned for the interior.

Resources and Industries

Stock raising is by far the leading industry, as is evident from the fact that in 1917 nearly 98 per cent of the exports were of stock products. Of the 44 million acres devoted to livestock and agriculture the latter occupies hardly 5 per cent. In 1603, 100 cattle and two herds of horses were brought into the country; the cattle increased so rapidly that at one time they were killed for their hides, as more recently in Paraguay. Since 1860 when Durham bulls were imported and stock breeding began, much advance has been made in quality. Herefords, Devon, a few Polled Angus and others have also been imported; some for dairy purposes, as Swiss and Flemish. In 1917 the cattle numbered about 8,000,000. The best *estancias* have sheds to house pedigreed stock, they plant trees and have cattle dips. Societies encourage scientific breeding and the Government subsidizes agricultural shows. One *estancia* of 60,000 acres has 15,000 cattle, 20,000 sheep, some horses, and pays dividends of 16-25 per cent on a capital of £120,000. Another company with 40,000 acres and a capital of £40,000 pays dividends of 14-20 per cent. At least 20,000 acres are devoted to dairy farming; 50,000 pounds of butter are made monthly, and both butter and cheese are exported. The best of apparatus is employed.

Sheep, imported from Argentina in 1608, flourish to the number of 11,700,000; the varieties of Merino,

Lincoln, Romney Marsh are found among others, the English breeds being preferred.

Horses of good quality are raised, 570,000, both light and heavy, but few in comparison to the cattle. There are 300,000 pigs, a few mules, 16,000, and 12,000 goats.

Meat Packing. In 1754 the first meat salting plant was established but the true pioneer dates from 1786. Others followed. There are now 13 besides seven factories for preserving meat and two *frigorificos*. The slaughter season is from November to January. The meat for *saladeros* is separated from the bones, dried 4-6 days in the sun, and then salted. It is arranged in four grades according to fat or lean; the fat meat is sent to Brazil, the lean to Cuba and elsewhere.

Of *frigorificos* the Swifts own one, and exported to Europe in 1915 and 1916, each, over 700,000 frozen quarters of beef and 100,000 chilled; also mutton and lamb. The *Frigorifica Uruguaya* shipped nearly 44,000,000 pounds of beef to Europe in 1916 and over 2,000,000 pounds of mutton. The total export of animal products shipped in 1916 was worth $73,000,000. A model slaughter house and cold storage plant is in prospect. A new one for wool washing has a capacity of 132,000 pounds daily. Saving in freight cost and immunity from deterioration are thereby attained.

The Liebig Extract of Beef Company, with extensive holdings in and near Fray Bentos and with a total capitalization of £2,000,000 usually pays 20 per cent dividends on the ordinary shares; 5 per cent in 1916. They use the best of meat, and their Oxo capsules and Lemco have a world-wide reputation. They own and rent in Uruguay, Argentina, and

Paraguay 1,120,000 acres.

In spite of strikes and labor troubles the livestock industry has brought prosperity to the country, with record prices for beef, mutton, hides, and wool, thus greatly increasing land values. The cattle are pastured on the natural long thick grass, very little alfalfa being cultivated. Hogs, hens, bees, and silkworms are raised. The seal industry and fisheries are important.

Agriculture

The agricultural products are insufficient for the use of the country although 2,000,000 acres are in cultivation. About 900,000 acres are in wheat, 700,000 in corn, 128,000 in flax, 100,000 oats, some barley and canary seed. In 1916 agricultural exports were valued at $1,500,000. Among other crops are tobacco, which is especially promising, linseed, alfalfa, sugar cane, some cotton, potatoes, etc. Viticulture is quite extensive, American grapes growing better in the south, and French and Italian in the north. Other fruits, oranges, olives, apples, pears, cherries, peaches, and melons flourish.

Forestry

Forestry is encouraged so far as planting is concerned; about 1,000,000 acres are in natural forest land. Millions of trees have been planted on land not otherwise useful. The supply of wood in future will be greatly increased and there may even be export.

Minerals

Minerals are of some importance and may become of more. The country is believed to contain considerable wealth in gold, silver, coal, marble, jasper; and in other minerals and semi-precious stones, including amethyst and topaz. There is little export save sand, stone for paving, and similar articles.

Gold. The chief gold fields are in the Department Rivera near Cuñapiru not far from the Brazilian border. A district 35-40 miles long and 7 wide contains auriferous reef with gold 5 ounces to the ton; if deep the prospect is limitless. A modern English plant is now getting out gold. Bars worth $4000 were exported in 1915. Four hundred mines have been denounced in the Department. Enormous quantities of manganese are in the neighborhood. Gold is found also in Minas, Salto, and Tacuarembó.

Copper exists in quantity in Cerro Largo, Maldonado, Minas, Paysandú, and Salto. Iron, silver, slate, gypsum, asbestos, lead, etc. may be exploited later. Even greatly needed coal of fair quality has been found in Montevideo, Santa Lucía, and especially in Cerro Largo where it seems promising, though no working of minerals is sufficiently developed to present decisive results. Indications of petroleum have been noted at the north, the strata coming in from Brazil.

Manufactures

Naturally manufacturing save for home consumption is of slight importance, except of products of the pastoral industry, as of dairies and of meat extract. For home use there are 115 flour mills, 45 others, as of hardware, soap, macaroni; 1 sugar

factory, 3 starch, 1 cement, 4 breweries. Many of these are in Montevideo. The Government proposes the construction of chemical factories for the production of sulphuric, nitric, carbolic, and acetic acid, glycerine, benzol, alcohol, sulphuric ether, etc., and a powder and explosive factory; these to cost over $2,000,000, material and machinery to enter free of duty.

An important project of the Government is the development of water power from the cataracts of the Uruguay River, which will be equivalent to 3,000,000 tons of coal per annum. Two dams are planned, one movable and one fixed, with canals by which 419 miles of river will be open to navigation from the lower section. Irrigation is included in the project, and 37,000 acres near Montevideo are to be irrigated as an illustration. Fifteen cities have authorized work in connection with this project.

Investments

Aside from the development of hydro-electric power and the construction of public works of various kinds including railways, it is probable that agriculture and fisheries present the most favorable openings, with good possibilities also in manufacturing industries, stone cutting, and mining. Stock raising is already pretty well developed.

CHAPTER XLV
BRAZIL: AREA, HISTORY, GOVERNMENT, POPULATION, ETC.

The country of Brazil, largest of the South American Republics, has also a greater area than the United States without Alaska, and is more than three-fourths the size of all Europe. It cannot therefore be considered as a whole so easily as the other Republics. It is essential to differentiate between the various regions and States; for the dissimilarity is not confined to climate and productions; or to the character of the people, by reason of some being indigenous and others of European descent. It arises in part from the long coast line and the difficulty of land communication; in part from the fact that in some districts the population is almost entirely of European descent while in others there is a large percentage of negro blood; as well as from differences in physical and climatic conditions. Thus the Capital is not so markedly the centre of the Republic as in Argentina, and the States are more loosely bound together than in the other Republics. The States and the character of the people may be said to differ as much among themselves as the countries of the West Coast from each other, a point of importance to notice in commercial relations.

Area, Population, Boundary

Area. Brazil covers a surface of 3,112,453 square miles. Its length, 2750 miles, is about that of Chile; its extreme width, 2560 miles, is ten times at great.

The coast-line is much longer, 4140 miles. A considerable portion of this immense area is still but superficially explored.

Population. According to the cabled report of the census of 1920, Brazil has 30,553,509 inhabitants. Its population, therefore, exceeds that of any other South American Republic even more largely than its area.

Boundary. The boundary of the country, though familiar from that of the others, may be rehearsed. On the north we find Colombia, Venezuela, and the three Guianas with the Atlantic beyond; on the east and southeast the Atlantic only, on the south Uruguay, a speck of Argentina, Paraguay, Bolivia, a bit of Peru; on the west a small corner of Argentina, Paraguay, Bolivia, and Peru. The only countries of the continent not touching its border are Ecuador and Chile. However, a few writers mention Ecuador on the west, as the southeast boundary line of that country is still undetermined.

History

The first of the South American countries to be discovered after Colombia and Venezuela, it was to the region of Brazil that the name America was first applied. It is therefore especially unbecoming for us to appropriate to ourselves in any exclusive sense the title of Americans; though having no other name, with apologies to the others, it may be pardonable for us to employ it when necessary.

In the year 1500 the first landing on this part of the continent was made by Pedro Alvares Cabral, then on his way from Portugal to the West Indies. In commemoration of that event, May 3rd is a Brazilian

national holiday and the date of the assembling of Congress. As soon as the news was received in the home country, an expedition was sent out under Amerigo Vespucci, who explored the coast from its eastern extremity almost to La Plata, nearly 2000 miles. Fifteen Captaincies, each 150 miles along the coast, were later allotted and settlements were begun. The earliest of these which rose to importance were São Vicente in the neighborhood of Santos, and Pernambuco; a little later, Bahia and Rio de Janeiro. These were the first agricultural colonies to be founded in South America, gold and silver being the attraction elsewhere. The French also had an eye to this country, making a settlement at Rio de Janeiro; the Dutch as well, who about a century later captured Bahia and Pernambuco; but both were ultimately expelled, the whole country remaining in the hands of the Portuguese. Conflicts with the Indians took place, at first with some who were unfriendly, and afterwards through attacks made by the invaders upon those Indians who had been christianized by the Jesuits. Their settlements were destroyed, 300,000 are said to have been slaughtered, and the rest were driven by the Paulistas from the region of the upper Paraná.

As Philip II of Spain in 1581 became ruler of Portugal, during the 60 years following, the expansion of Brazil to the west in territory which had been assigned to Spain was permitted, and such possession remained permanent. At other times conflicts occurred with the Spaniards at the south, but in 1777 peace was made with the boundaries as at present.

In 1807, Prince João, fleeing from Napoleon, came with his court to Brazil. He soon opened the five

chief ports to commerce, he encouraged science, education, literature, art, and the immigration of foreigners, thus inaugurating a development of permanent value. On his return to Europe in 1821, the Prince, in view of the revolts of the Spanish colonies, hinted to his son whom he left in charge the advisability of himself assuming the crown, if a disposition towards independence became manifest. Accordingly in 1822, the son was crowned Emperor of Brazil; but having alienated his supporters, in 1831 he abdicated in favor of his infant son, Pedro. In 1889, the old Emperor, Dom Pedro II, who for many years had ruled wisely and well, was expelled on 24 hours' notice; after a brief interim a Republic was established in 1891. Extravagance, insurrections, and financial distress followed, but since 1900 the country has made rapid advancement in wealth and in varied lines of development.

Government

The government is a federalized republic with the usual branches, the States more loosely bound together than with us, or than in any other South American Republic. They may even fix export taxes, and levy stamp duties. The President, with a Vice President, is elected for four years and is ineligible for a succeeding term. He has a Cabinet of seven Ministers. Congress is composed of a Senate with 63 members and a Chamber of 212 Deputies. There are 20 States, a Federal District, and the Territory of Acre. The last is composed of three Prefectures, with capital cities where government is administered by Government appointees. The States have their own administrative bodies, some with one house of legislation, some with two; and with a Governor or

President as chief executive, a slight confusion possibly arising at times where the latter term is employed. All male citizens over 21 may vote except illiterates, soldiers, beggars, and members of monastic orders subject to vows of obedience, a wise prescription. The list of States precedes, with the usual figures, as accurate as obtainable, the areas from the latest Government survey. The list begins at the northwest, goes down the coast, and follows with the interior.

States	Area, in square miles	Population	Capitals	Popula
Amazonas	645,940	435,000	Manaos	60
Pará	399,000	992,300	Belem	250
Maranhão	150,830	853,000	Maranhão	40
Piauhy	89,850	548,250	Therezina	35
Ceará	62,160	1,436,300	Fortaleza	65
Rio Grande do Norte	15,925	552,000	Natal	20
Parahyba	22,548	785,100	Parahyba	20
Pernambuco	38,570	1,975,440	Recife	200
Alagôas	10,400	990,000	Maceió	40
Sergipe	8,983	535,000	Aracajú	30
Bahia	206,990	3,373,000	São Salvador	300
Espirito Santo	16,860	479,200	Victoria	20

Rio de Janeiro	16,408	1,502,000	Nictheroy	30
São Paulo	101,890	4,823,000	São Paulo	510
Paraná	73,465	674,300	Curityba	50
Santa Catharina	43,168	633,000	Florianopolis	30
Rio Grande do Sul	92,350	2,138,800	Porto Alegre	125
Minas Geraes	227,238	5,789,000	Bello Horizonte	35
Goyaz	284,000	529,000	Goyaz	18
Matto Grosso	554,400	274,100	Cuyabá	32
Territory of Acre	67,712	104,000		
Federal District	450	1,150,080	Rio de Janeiro	1,150

Population

The population, by the recent census 30,553,509, is of a more varied character than that of Uruguay and Argentina at the south. Some figures given are 52 per cent white, 26 mixed, 13 Indian, and 9 per cent negro. The original settlers were Portuguese, and at first immigration was from the mother country. In the early days many negroes were imported from Africa as slaves, yet there was little color prejudice so that the number of mulattoes and lighter as well as of negroes in some sections is very

large.

During the last hundred years over 3,000,000 immigrants have arrived, of whom the Italians formed the larger proportion; next in number were the Portuguese, half as many Spaniards; those of other nationalities included 100,000 Germans, and a small colony from our Southern States, who left in disgust in 1867. The negroes, freed in 1888 and endowed with suffrage, were less qualified for it than in the United States. While some have made good advancement others have relapsed into a worse condition, being able in many parts of the country to exist on almost nothing. Indolence is a failing among many of all complexions, as is natural in tropical regions; on the other hand many Brazilians even in the warmer sections are characterized by great activity and industry. In the large cities culture and elegance are noticeable and aristocracy of birth is cherished. In some regions the inhabitants are less pretentious, live more simply, and practise the homely virtues; the most primitive section according to Oakenfull is between the São Francisco River and Maranhão. Women in general are more secluded than in some of the other Republics. The Brazilians have much literary and artistic taste and as a rule are punctilious in courtesy, though exceptions may be noted.

Education

Education is highly regarded in Brazil. Primary and secondary are free and secular, generally provided by the States and Municipalities. The Federal Government administers several Professional Schools as of Medicine, Law, Engineering, etc., and many of Agriculture in various parts of the country.

With some of these, local schools are affiliated, as Schools of Law, of Applied Science, at Rio of Social Science, at Recife Engineering, etc. The different States spend 4-21 per cent of their revenue on primary education, averaging above ten. The Federal District spends 28 per cent. There are also private schools in different cities, several English or American; the American Mackenzie College at São Paulo is affiliated with the University of the State of New York.

Press, Religion, etc.

The Press is influential and of high quality, the leading papers of Rio, São Paulo, and other cities comparing well with those of cities of corresponding size in other parts of the world.

Religion. In Brazil there is entire separation of Church and State and absolute religious freedom. Civil marriage alone is recognized.

Post and Telegraph. Brazil has 3700 Post Offices.

Telegraph wires (over 26,000 miles) are in part national; other lines belong to the railways; there are submarine cables, and one up the Amazon. Wireless stations have been installed at many points on the coast and in the interior, including the Amazon district, as at Manaos and beyond. Telephones are to be found in all cities of any considerable size, about 80 systems.

Money is more complicated and bothersome than in any of the other countries, the unit being of 1000 instead of 100 parts, as is usual. Thus the milreis, written 1$000, equals 1000 reis as the name indicates. The milreis of gold is equal to 54.6 cents,

but exchange varies, and the paper in common use varies from its ordinary value, 33.3 cents, to half that or even less in disturbed conditions. A conto of reis, a term often used, is 1000 milreis, and is written with a colon, thus: 5 contos, 20 milreis, and 300 reis would be written 5:20$300.

The Metric System is legal and compulsory, but in some places, the old Portuguese measures persist; these differ from the Spanish. A vara in Peru is less than a yard, but in Brazil it is 1.111 metre, or 1.215 yard. A libra is 4.695 kilos; an alquiere varies from 24 to 160 litres. Other variety exists in the same or in different places.

CHAPTER XLVI
BRAZIL: PHYSICAL CHARACTERISTICS

Brazil presents in physical characteristics more variety than is generally supposed. As the great Amazon Basin is in striking contrast to the immense Andean Range, the entire country is thought of as hot. Since it extends from 5° 10′ N. Lat. to 33° 45′ S. Lat. with the widest part near the equator, the greater portion of the territory is evidently in the torrid zone, 11° only in the temperate, with more than twice that in the tropics. However, in this comparatively low country, there is happily a variation in altitude sufficient to affect the climate and to give rise to variety in productions; to which diversity the 11° in the temperate zone also contribute. The territory may be considered as in four general sections: the Amazon Basin, the Plata (the two almost connected over low elevations), the Coastal Belt, and a mass of mountains and highlands along the coastal states, extending also at a lower level across to Bolivia. In addition there are the Guiana Highlands at the north.

The Coastal Belt

The coastal section is largely a low-lying sandy tract, varied by swamp lands overgrown with palms or other verdure, and slopes covered with dense tropical vegetation. Without deep indentations in the form of gulfs and bays there is a considerable number of good harbors. In the far south two large lakes have been created which are connected with the ocean. The coastal strip varies in width from one

to 100 miles.

The Guiana Highlands

Of the mountainous regions, the range forming the boundary line with Venezuela and Guiana on the north with its offshoots and the country between has attracted little interest and been but slightly explored. From Mt. Roraima, 8500 feet, at the corner of Venezuela and British Guiana, the range lowers toward the East, the highest point on the French frontier being about 2600 feet. South of this are broken ranges and deep river courses on the Brazilian plateau, which with an altitude of 2000 feet slopes south and east. Excepting the part near the coast, this section called Brazilian Guiana is semi-arid, on account of the mountains extracting the moisture from the northeast trade winds. Inhabited by a few roving bands of Indians and in the east visited by white mining adventurers, it has been deemed one of the least attractive parts of the Republic. Recent exploration, however, has reported an extent of valuable forest lands and immense areas of open country suited to cattle ranges. A railway from British Guiana is talked of to render this district accessible to the outside world.

The Plateau and Mountain Region

An important part of Brazil is the plateau region (altitude 1000-3000 feet) south of the Amazon, especially that portion extending along the coastal states. The greater part of the central section was once covered with a thick sandstone sheet, now deeply eroded by numerous rivers which have left

high flat ridges between the lower basins. The true mountain systems which rise from the plateau are parallel ranges following the coast, and the Central or Goyana system. An almost continuous range, the Serra do Mar, stretches from Rio Grande do Sul to Cape Frio, just east of Rio de Janeiro; beyond this, farther from the coast, broken sections extend well towards Cape St. Roque in Rio Grande do Norte. The highest point in the Serra do Mar or Coast Range is 7223 feet in the Organ Mountains near Rio, as the capital city is often called for short and may be so understood when here used.

A second parallel range runs from Eastern São Paulo northeast and north to the point where the São Francisco River turns east in Bahia; Itatiaiá, 9823 feet, in Rio de Janeiro State, is its culminating point in Brazil. West of the São Francisco River is the Central or Goyaz Range, also in two branches, running from the southern part of Goyaz northeast, one branch across western Minas Geraes, the other in Goyaz with highlands extending far north separating the Tocantins Basin from the São Francisco, and in the south separating it from the Paraná. The highest point is near the city of Goyaz, Mt. Pyraneus, 7750 feet. How the great table-land has been broken down by rivers is shown by the Tocantins-Araguaya Basin excavated northward for 700 miles. From 100 to 500 miles wide, it is from 10 to 1500 feet deep.

The eastern margin of the plateau is near the Atlantic where it breaks off suddenly with an average height of 2600-3200 feet. This plateau is the best part of the country, the Atlantic slope heavily wooded, the more gradual west slope with many grass covered plains. A fertile soil, rich forests, and regular rainfall make this a favored region. Farther

north than Minas Geraes, the section has less rain, is thinly wooded in places, with large areas suited to grazing but subject to drought. The plateau extends across Brazil north of Paraguay abruptly breaking down from a height of 2600-3000 feet towards the Paraná and Paraguay Basins. It has a gradual slope towards the Amazon, the parts excavated by the rivers having lowland characteristics.

The Amazon Basin

The section of the Amazon Basin is indeed immense. The whole drainage area with that of the Tocantins, generally included though not strictly a component part, spreads over 2,700,000 square miles, much of it as we have already seen outside of Brazil, and occupying two-fifths of South America. This area is greater than the basins of the Mississippi, Missouri, Danube, and Nile, all combined. The course of one tributary to the sea is 3200 miles. Of the 55 largest rivers in the world, it is said that 33 are mainly if not wholly in Brazil. Twenty-seven thousand miles of navigable rivers are found in the country, the greater part connected with the Amazon, which is itself navigable for ocean steamers to Iquitos, Peru, a distance of 2300 miles, and 486 miles farther for vessels of 14 feet draft. The true mouth of the Amazon is west and north of the Marajos Island which is greater in area than Holland or Belgium, while the Pará River at the south and east is the mouth of the Tocantins. This, however, is the usual entrance for Amazon steamers even when they do not wish to call at Pará, for this river is connected by natural channels among islands with the greater stream, and the northern entrance has too strong a current to be desirable for navigation. As a

matter of convenience the Tocantins is generally included with the Amazon in descriptions. The depth of the estuary is 90-900 feet, averaging 150.

The Tocantins River is a great artery of Brazil flowing from south to north a distance of 1600 miles, with a west affluent, the Araguaya, almost its equal in size and 1000 miles long above the union. Both rivers receive many tributaries. The flat broad valleys are overlooked by steep bluffs. The cataracts and rapids which occur on nearly all of the rivers as they come down from the plateau greatly interfere with navigation, but in their lower courses many are navigable for hundreds of miles, the Tocantins for 130.

The Xingú, the next river, with a length of 1260 miles is the first true tributary of the Amazon on the south. This also flows nearly north with many rapids and at last a fall, Itamaracá, at the head of navigation, 105 miles from its mouth. Near this the river expands into a great lake which communicates with the Amazon by many natural channels.

The Tapajós, 1158 miles long, entering the Amazon about 500 miles above Pará, rises near Diamantino on the plateau, and flows through a long, hot, unhealthful valley. One hundred and eighty-eight miles are navigable, the lower 100 of these being 4-9 miles wide and throughout much of its course very deep. Along the lower river valley are bluffs 300-400 feet high.

The Madeira, entering 870 miles above Pará, almost rivals the Amazon in volume. In the rainy season, during which it rises 50 feet, the largest ocean steamers may ascend 665 miles to the falls of Santo Antonio and the Madeira-Mamoré Railway;

from June to December it is navigable for vessels of 5-6 foot draft only. Tributary to the Madeira on the east is the river formerly called the Duvida, first completely traversed by Colonel Roosevelt and his party and now named in his honor Rio Roosevelt. The Madeira which has 90 tributaries and a basin of over 600,000 square miles is formed a little higher up by the junction of the Beni and Mamoré, both of which streams rise close to the head waters of the Paraguay. From Santo Antonio south, the Madeira-Mamoré is obstructed for 263 miles by a series of rapids and cataracts, the Madeira Falls, where the Beni comes in, presenting a vast display of whirlpool and boiling torrents. Above Santo Antonio the drainage is received of the southwest slope of the State of Matto Grosso, the north slope of the Chiquitos Sierras, and the northeast slope of the Andes from Santa Cruz de la Sierra in Bolivia to Cuzco in Peru. The most important of the affluents are the Guaporé, Baurés, Itonamas, Mamoré, Beni, and Madre de Dios. The almost level Mojos and Beni plains are said to rival if not to exceed in fertility the Nile Valley; they are the most healthful and most inviting grazing and agricultural regions in the Amazon Basin, which has an area about equal to that of France and Spain. However, 35,000 square miles are flooded 2-3 feet, three or four months every year.

The Purús, over 2000 miles in length, is a very sluggish stream parallel to the Madeira, in the great depression between the Brazilian plateau and the Andes. A peculiar feature is five parallel canals coming into it from the Amazon northwest at almost regular intervals, making five low islands; and nearer to the great river are three more. The Purús is navigable for light steamers 1648 miles five months in the year; for 800 miles its depth is not less than 45

feet. The lands are subject to inundation, the river at times rising 50 feet.

The Juruá is a similar river, navigable for 1133 miles.

The Javary, the boundary line between Brazil and Peru, is navigable for craft 260 miles. The region is occupied by savages.

The Trombetes. On the north side of the Amazon there are fewer important rivers, the Trombetes, the first from the east, which is navigable 135 miles, comes from the Guiana Highlands.

The Negro, 900 miles from Pará, 1500 miles long, is navigable for 450 miles forming midway a succession of lagoons, and overflowing its banks, often for a width of 20 miles. The rivers farther west have been sufficiently described.

The average depth of the Amazon is 50 feet, the current is three miles an hour. Beginning to rise in November the river is fullest in June, then falling to November. The Madeira, which rises and falls two months earlier, is in places 4-6 miles wide. The width of the Amazon is 20-60 miles, while in periods of inundation the forest is partly submerged for a width of 400 miles.

The Plata Basin

A much smaller portion of Brazil lies in the basin of La Plata; this, at least for the moment, is the best and richest part of the entire country, containing the greatest population outside of the coastal fringe.

The Uruguay. At the south the several rivers forming the Uruguay, which rise in the Serra do Mar,

drain Rio Grande do Sul and part of Santa Catharina, while from there up to the north end of São Paulo and into Goyaz only a narrow coast region is outside the Paraná Basin.

The Paraná. The most remote source of the Paraná, that of the branch Paranahyba, is in the Serra Pyreneos in Goyaz, while the Rio Grande branch rises in the Serra da Mantiqueira near the peak Itatiaiá, so to say, in sight of Rio. Many affluents are received from the States of São Paulo and Paraná, these generally flowing northwest or west; the Paraná itself flows southwest forming the western boundary of those States. A branch, the Tiété, in São Paulo, 700 miles long, is broken by 54 rapids and two falls. The Paranapanema in Paraná, 600 miles long, is navigable for 30 miles. The Iguassú, rising in the Serra do Mar in Santa Catharina and flowing west is hardly navigable for canoes.

Twenty-eight miles above the mouth of the Tiété the course of the Paraná is interrupted by the Falls of Urubupungá. From here to the Guaira or Sete Quedas Falls, 400 miles, there is unobstructed navigation. At this point the river forms a lake $4^1/_2$ miles long and $2^1/_2$ wide before cutting through the Serra de Maracajú. Then after rushing through a deep and narrow gorge for two miles, it plunges down a long cañon hardly 200 feet wide in a series of rapids or falls called the Sete Quedas, Seven Falls. It is reported as able to supply over a million horse power, probably the most of any cataract in the world. Again the river is navigable from a little below the falls, and with regular service it forms an outlet for the State of Paraná to the ocean.

The Paraguay. The River Paraguay rises near

Diamantino in Matto Grosso receiving a number of tributaries from that State, one of which, the Cuyabá, called the São Lourenço lower down, has its source close to that of the Tapajós branch of the Amazon.

Coast Rivers and Lakes

Other rivers flow directly into the Atlantic, several of some importance. North of the Amazon a few small rivers are called auriferous, the Araguary of considerable length. South of the Amazon Delta, some rivers flow north and northeast among the mountain ridges, others directly to the ocean. Of the former the most important are the Parnahyba, 900 miles long, navigable in sections, and farther south the São Francisco, the largest river of the coastal region, navigable 192 miles from the coast to the fine Paulo Affonso Falls, and above these for a much greater distance. The Jequitinhonha, 500 miles long, has 84 miles navigable. The most important river south of the São Francisco is the Parahyba do Sul, 658 miles long, rising in the State of São Paulo and flowing across Rio. It is navigable from its mouth a distance of 57 miles and 90 in its upper course.

The Ribeira de Iguapé. The only coast river of economic importance south of Cape Frio is the Ribeira de Iguapé which rises on the table-land of Paraná and after receiving several affluents breaks through the mountains near the boundary of São Paulo. Besides a navigable channel of 118 miles it communicates with an inland waterway called the Iguapé or Mar Pequeno, extending many miles along the coast. In Rio Grande do Sul, where the coastal plain extends half across the State, several rivers partly navigable flow into the important Lagôa dos Patos, with which is connected by a navigable

channel, 61 miles long, the Lagôa Mirím.

Lakes. The Lakes of Brazil are few in comparison with the rivers. Those in the Amazon Basin are reservoirs from the overflow of the rivers and rise and fall with these. The coastal section has lagoons and inland channels formed by uplifted beaches; they are usually shallow and some, as in Bahia, are associated with swamps; but on the Alagôas coast the lakes are long, narrow, and deep. The largest coastal lakes are the two in Rio Grande do Sul already mentioned, separated by broad sand beaches from the ocean, with which they communicate by a channel 42 miles long at the south end of the Lagôa dos Patos. This lake is 140 miles long and 30 wide; the Mirím is 78 miles long and at the most 25 wide. Both are navigable, though shallow and with many sand bars.

Climate

This great country of Brazil presents considerable diversity of climate, as already observed. The forest covered Amazon Basin is hot, with slight variation throughout the year, and with heavy rainfalls; but while the average temperature is over 80°, ranging from 65° to 95°, some locations are decidedly preferable to others. The regular rainy season is from November to March, a second of less degree from August to October; also the rainy season is said to last nine months. On the upper Amazon there is a short dry season in January and February. There is a flood time November, December, and higher water from March to June. The average rainfall is about 78 inches, the rise of the river 45 feet. There are east winds, warm and moisture laden, the deflected trades, and colder winds from the west and

southwest.

The coast region as far south as Santos is generally warm and humid (except for a stretch at the northeast), with a wet and dry season, though it rains also in the latter, except on the arid northeast coast. A variation occurs in Pernambuco where it rains from March to August, the dry and cooler season in Rio. Here on the edge of the tropics the annual temperature is 5° lower than on the Amazon. At Santos rainfall is heavy and the place is hot, but farther south it is cooler with a wider range of temperature and a more even distribution of rain. In Rio Grande do Sul the mercury ranges from 20° to 80°. Cold southwest storms from the Argentine pampa, occasionally as far as Rio, create discomfort for two or three days at a time. The highest temperature in Rio is 98.7°.

The Brazilian plateau is very different. As a rule the days are hotter and the nights cooler, the air drier, than on the coast at the same latitude. With mean temperature 68° there is occasional frost. Brazilian Guiana is hot and arid, though with more rain at the east and west than in the centre. South of the Amazon from Piauhy to southern Bahia is another semi-arid section with a rainless season from June to December, when streams are dry and fields are burned bare. With heavy rains from January to May, the country is covered with verdure; when these fail, sometimes for successive years, the droughts are destructive to agriculture and cattle. The plateaus of Minas, São Paulo, and Rio have a climate which is modified by luxuriant vegetation, south winds, and their altitude; though Minas Geraes, having forests only along the rivers and at the south, is hotter by day, but with always cool

nights. The open lands of São Paulo also have higher daily temperature; the annual mean is 68°-77°. In south Minas and São Paulo frosts occasionally occur. In the State of Rio there is a delightful climate in the high valleys of the Serra do Mar, temperature 45°-90°. The table-lands farther south, Paraná, Santa Catharina, and Rio Grande do Sul enjoy a temperate climate with abundant rain, occasional frost, but no snow. The northern valleys of the Paraná River are sub-tropical, the mean annual temperature of Goyaz City being 77°.

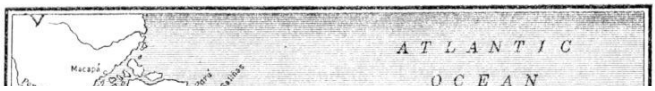
The country over a large extent may be considered healthful; the yellow fever which once afflicted Rio and some other cities has been exterminated by rigid sanitary measures, and the conditions of life on the eastern plateau and in the temperate south are agreeable. The Amazon Valley is of course malarial, though some sections are far better than others. It would seem that the lower parts which are subject to inundation can hardly be made suitable for residence whatever precautions are taken; but the higher lands may be to some extent free of malarial poison, and certain parts have a climate which some Europeans, even Englishmen enjoy.

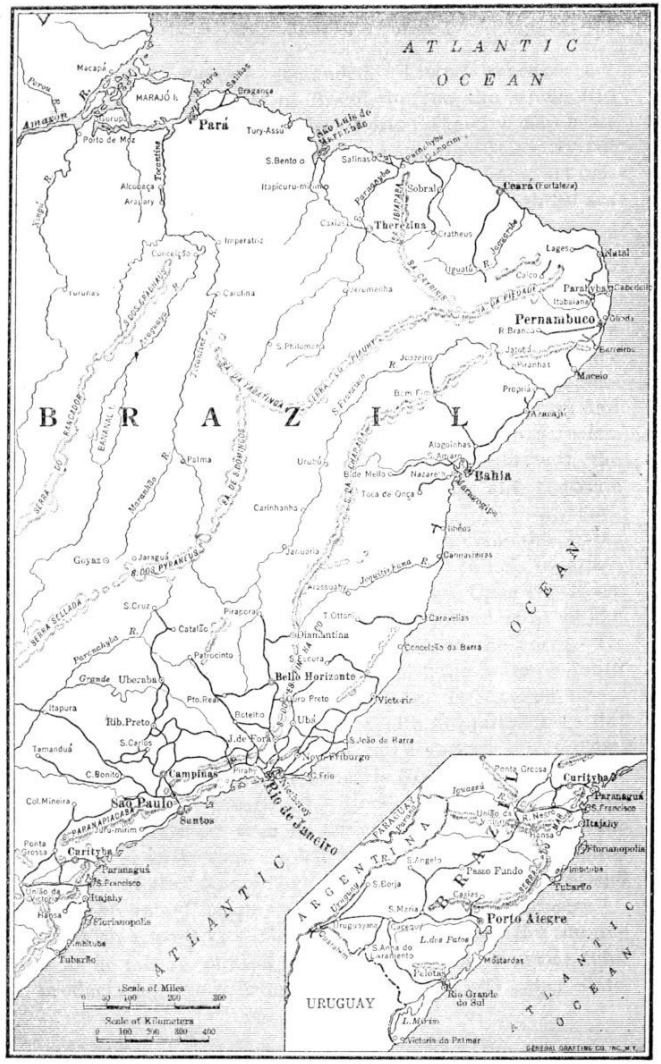
CHAPTER XLVII
BRAZIL: THE CAPITAL, INDIVIDUAL STATES, CITIES

The Capital

Rio de Janeiro, the capital of Brazil, with a population of 1,200,000, the second city in South America and the fifth in the Western Hemisphere, is generally conceded to have the finest harbor in the world. It is also the most beautiful city in respect to natural advantages, while the improvements which have recently been carried out have made the artificial structure of the city in harmony with its picturesque surroundings. In the early part of this century the Government awoke to the disadvantages of the narrow streets, the poor facilities for commerce, and the notoriously bad conditions of health. Immense improvements were inaugurated and speedily executed. Fine drainage canals were installed, mosquitoes practically exterminated, wide avenues were cut through dense quarters, and port works constructed, so that in health, beauty, and commercial convenience, nothing remains to be desired. A new Central Avenue, now renamed Rio Branco, is counted among the finest in the world; other splendid avenues are lined with fine commercial structures or beautiful private residences, perhaps with royal palms; along the shores are magnificent boulevards unrivaled in beauty, often thronged with luxurious automobiles, all amid surroundings of ideal loveliness of sea-shore and of mountain. Hotel accommodations, hitherto only fair, and inadequate, are improving with the erection of needed new structures, as increasing

travel for business and pleasure demanded. Living expenses are called high in all parts of Brazil, but on the whole Rio has seemed no dearer than New York. The city may boast of a splendid opera house, said to have cost $5,000,000, of the largest library in South America, and the finest art gallery, a wonderful botanical garden, museums, delightful sea and mountain resorts, etc., etc.





EASTERN BRAZIL

States and Cities

As the country of Brazil is so large and of such

diversity in its various sections and even in single States, with many independent systems of railways connected with its numerous harbors, it may be desirable to speak of its ports and to some extent of its railways in connection with a review of the different States. In this we may begin with the Coastal States, coming up from the south, and conclude with those of the interior.

Rio Grande do Sul, eleventh in area among the States of Brazil, and equal in size to Indiana and Illinois together, borders on Uruguay at the south. The Uruguay River separates it from Argentina on the west and most of the way from the State of Santa Catharina on the north. Its population is about the same as that of the State of South Carolina, which is one-third of its size. It is called a pastoral State as its chief source of wealth at present is cattle; 45 of the 70 million acres are cattle ranges, $6^1/_4$ million, farms, and $13^3/_4$ forests. The nearly 9,000,000 head of cattle are called the best in Brazil. Blooded stock is being introduced and packing houses are taking the place of *saladeros* for *charque* or dried meat, which formerly were the destination of most of the cattle. High class poultry is extensively and profitably raised, $4,500,000 being invested in the industry.

With a temperate climate and well watered, the country is by no means confined to stock raising, for its agricultural products are more diverse than those of any other state. Not only cereals like wheat and oats, but cotton, rice, sugar cane, tobacco, *manioc*, alfalfa, etc., even tea are successfully raised, as well as temperate zone fruits and vegetables. It has important coal mines, with some of copper, gold, and wolfram also being operated, and a wide distribution of these and other minerals. With 13,000 industrial

establishments its important factories include nine textile mills.

The capital, Porto Alegre, is the chief manufacturing centre, and the State is third in such industries. The capital is the largest city in southern Brazil, with a cosmopolitan population one fourth of German descent. An important commercial and industrial centre, it has fine public buildings, colleges, theatres, clubs, good shops, parks, and hotels. The population is nearly all white with a large percentage of Italians as well as of Germans.

Rio Grande is the chief port, 1000 miles south of Rio de Janeiro, and 180 by sea north of Montevideo. The city lies just inside the entrance of the Lagôa dos Patos at its south end. Unfortunately, the entrance has been obstructed by a sand bar with a varying depth of water above. Vessels drawing more than 11 feet could not pass; uncertainty, often a few days' waiting was the fate of others. An attempt to dredge a passage was unsuccessful, but with building of jetties improvement is manifest. Port works in the city, including a mile of quays, have been established, and a rapid development of the region is expected to follow. The city, population 40,000, has an active commerce by rail and water. By rail it is connected at Cacequy with the through line from São Paulo to Montevideo, and beyond this line at Uruguayana (population 20,000), on the Uruguay River, with the Argentine railways on the other side. There is regular steam navigation to the port of Pelotas, three hours, population 32,000, noted for its dried meat products, and to Porto Alegre at the north end of the lagoon, 150 miles and 12 hours distant.

Santa Catharina, north of Rio Grande, less than one third of its size, has rather similar

characteristics. Bordering on the Atlantic, it has Argentina on the west; on the north is the State of Paraná, from which it is separated for half the distance by the Iguassú River. The State is notable for wheat growing and other grains, for cattle and dairy products, for its exports of fruits, for its coal mines, and for the timber from its forests, especially the Paraná pines. It ranks second in Brazil as a producer of *yerba mate*, in Portuguese *herva matte*, 14,000,000 pounds being its annual output. Its manufacturing establishments (174) are of small size.

The capital and chief port is Florianopolis on an island of that name. Improvements in the way of good port works are in hand, and though without rail connection a tonnage of about 300,000 has entered and cleared in a year. The port of São Francisco, a smaller town in the State, is called the best port south of Santos. This advantage will give the city future importance. Already it has rail connection by way of the town Rio Negro with Curityba and Paranaguá, and so with Ponta Grossa on the São Paulo-Uruguay Railway which of course crosses the State, a distance of 225 miles. The city is expected to be the terminus of a road which will pass through União da Victoria to the Iguassú Falls and across Paraguay to Asunción.

Paraná, about the size of Rio Grande, is between Santa Catharina and São Paulo, having Argentina also on its southwest corner beyond the Iguassú River and its great Falls. Along the western border flows the larger river, the Alto Paraná (with the tremendous La Guayra Falls) separating the State from Paraguay, and farther north from Matto Grosso. Besides these boundary rivers the Paranapanema, affluent of the Paraná, flows between this State and

São Paulo, while the Rio Negro and Iguassú are between it and Santa Catharina. Many more tributaries of the Paraná are entirely within the State. *Matte* is the chief industry at present, 100,000,000 pounds being annually exported; but with the best wheat land of Brazil, its forests of Paraná pine, and other varieties of timber it may have another leader before long. Paranaguá, the State's chief port, with a deep anchorage and improvements planned, is now visited by 650 vessels a year and has a total annual trade of $6,000,000. A smaller port, Antonina, is on the north side of the same bay.

The capital, Curityba, has rail connection with the two ports and with Ponta Grossa on the line to Uruguay traversing these three States. In the delightful four hours' journey of 70 miles from Paranaguá to the capital, the climb of the Serra do Mar up a steep tropical valley is made without cogs or cables by means of high trestles, bridges, and 17 tunnels; the ride rivaling if not surpassing in beauty the more famous one from Santos to São Paulo.

São Paulo, a great and justly famous State, about the size of Arizona, more than twice that of New York, has Minas Geraes on the north, also east with a small extent of the State of Rio de Janeiro; the ocean is southeast, Paraná south, and Matto Grosso west. This enterprising State is the leader in agriculture, producing 60 per cent of the world's coffee supply, besides cotton, sugar, tobacco, cereals, etc., in large quantities; it is second to Rio in manufacturing industries, contains large mineral riches, is advanced in stock raising, leads in educational advantages, and has the best railway service of 4300 miles. The wealth of this State is estimated as at

$1,100,000,000 in agriculture, $500,000,000 in manufactures, $170,000,000 in railways, and $2,230,000,000 miscellaneous. While most of it is in the torrid zone, the altitude of the State averaging over 2000 feet gives it (except for the narrow coastal strip) a fine healthful climate, a blessing enjoyed too by the States previously mentioned. In the Falls of its rivers the State possesses 3,000,000 horse power of which only 250,000 is employed.

The port of Santos, population 80,000, is regularly visited by the large Transatlantic and North American steamers. It is called one of the best and most important ports of the world, receiving 1600 ships annually besides coasting vessels. The largest ocean steamers, 20-40 foot draft, come up to the quay which extends for three miles along the harbor front; fine granite walls rise five feet above high water mark on a base 10-20 feet thick. Modern machinery is provided, making it the best equipped port in Brazil, and nothing is allowed to interfere with the efficiency of the service. It is a very busy city though warm. The heat does not prevent people from rushing about. A Brazilian writer has said, “People do not run, they fly.” The reason for this unusual haste, by no means manifest in Rio, is that many prominent business men come daily, others occasionally, from São Paulo by morning train, returning at four P.M. A splendid railway which will be referred to later, leads to that important city, a two hours’ ride.

The capital city, São Paulo, 310 miles from Rio and 50 from Santos, while lacking the charm of Rio’s scenic beauty, is preferred by many as a place of residence on account of its cooler climate, the greater business activity apparent, and the

cosmopolitan society, more than one third of the population being of foreign birth and another one third direct descendants of Europeans. The city has many splendid buildings, both public and private, including an opera house superior to any in the United States, a large number of excellent schools of various kinds, and all the attractions and facilities, except good and adequate hotels, of a city of half a million inhabitants.

The Federal District of Brazil, the capital, Rio de Janeiro, has been sufficiently described except as a port city. From a commercial point of view the harbor and port works are the chief interest. The Guanabara Bay is a wonderful harbor, not merely on account of its size, depth of water, absolutely safe anchorage, and the beauty of its surroundings, but it is extraordinary from the fact that it is hardly a mile from the ocean to the landing docks. Here a granite quay extends for $2^1/_4$ miles along the water front with a depth of water alongside of 31 feet. The deep channel entrance is narrowed to a mile in width by long narrow peninsulas extending on either side and further by a small island blocking the waves. The docks have the additional protection of a projecting point of the city, on the other side of which, on rare occasions, the waves do break over upon the splendid boulevard. The larger inner harbor is hardly noticeable, being cut off by peninsulas and islands, of which last the bay contains nearly a hundred. The entire bay is 18 miles long, and the inner section is 15 miles wide. At the docks the most modern machinery is provided for hoisting, loading and unloading ships, with electric power for the work and for lighting. A width of 80 feet was left for railway tracks; back of these are storage warehouses, administration offices, and customs, for

which a space of 110 feet was allowed. Behind these buildings is an avenue 125 feet wide, with double tracks on which run electric cars. Two million dollars are now (1921) to be expended for additional port works, an extension of the granite quay or dock wall about 2000 feet and two breakwaters of 800,000 cubic feet.

Rio de Janeiro. This State, though containing or surrounding the capital, is distinct from it, with a capital of its own on the opposite shore of the bay. As the direction of the coast line changes here, the State has the ocean east and south; São Paulo is west, Minas Geraes north, and Espirito Santo at the northeast. The State is comparatively small, being only about one sixth the size of its western neighbor, and less than one twelfth of its northern; it is even a trifle smaller than Espirito Santo, its next coastal neighbor.

Nictheroy, the capital, is a comparatively small, quiet town of 65,000 population, which has some important manufactories. The State has other smaller towns, as Petropolis, the so-called summer capital, population 30,000, at an elevation of 3000 feet. The Parahyba Rio do Sul, which flows northeast, back of the mountain range, is navigable to the city of Campos, population 30,000, 60 miles from its mouth. The agricultural products are important, the State ranking third in coffee and second in sugar. Large quantities of corn and rice are raised, the coast lands with lakes and lagoons being well suited to the latter. Valuable forests and minerals exist, and in manufacturing industries of great variety the State stands first. Besides the harbor of Rio there are a number of good though small ports.

Espirito Santo. Little Espirito Santo, northeast of

Rio State, has Minas at the west and Bahia north. The principal products of the State are coffee, rice, and other cereals, sugar, cotton, and *mandioca*; while the export of fine timber, rosewood, satin and brazil wood, is increasing. Gold and precious stones are its chief minerals. Its factories are few, but the town of Itaperim on a navigable river has cheap electric power, which makes it a fine centre for industry in the future.

The capital and chief city, Victoria, population 20,000, is the first port of importance north of Rio. On a fine bay $2^1/_2$ miles wide with a narrow entrance of less than $^1/_2$ a mile, it is the outlet of the eastern part of the State of Minas, which contains the richest mineral deposits so far exploited in Brazil. A railway connects the port with interior cities. Works of importance have been planned, a quay $^5/_8$ of a mile long with 28 feet of water and with suitable equipment; the widening and deepening of the channel entrance, and the building of a steel bridge to the main land from the island on which the city stands. Over 500 steamers and 200 sailing vessels clear yearly.

Bahia, an important and well known State, the largest yet considered, exceeding California in area, touches three smaller States on the north, Piauhy, Pernambuco, and Sergipe; it has Espirito Santo and Minas on the south and Goyaz west. All kinds of tropical and subtropical products are found here, cacao, sugar, and coffee in large quantities, rubber of the *maniçoba* and *mangabeira* varieties, cotton, vanilla, the finest kind of oranges and pine apples, and other fruits. Bahia has the principal whale fisheries of the country and the best grounds for table fish. Its mineral wealth includes even the sand,

monazite, the most important supply in the world.

The capital and chief port, 720 miles northeast of Rio, about 60 hours sail, is generally called by the name of the State, though its proper title is São Salvador. It has an excellent and beautiful harbor, though over-shadowed by the more remarkable picturesqueness of Rio. The bay, Bahia de Todos os Santos, about 25 miles wide (three at the entrance), and 20 miles deep, provides good anchorage for large steamers, 40 feet close in shore. It is a port of call for Trans-Atlantic liners and for steamers from North America, the only one north of Rio for some of the Lines. A company has undertaken port works which will greatly advance the prosperity of City and State, the works to include three breakwaters and two quay walls, the levelling of a large wharf space, erection of store-houses, laying railway lines, installing electric cranes, and constructing a floating dock and a lighthouse. Over 1000 large steamers with 2,300,000 tonnage enter the port annually. The imports are $13,000,000, the exports $20,000,000. The city is connected by rail with various cities in the interior of the State, and with the São Francisco River at a point above the Falls, from which there is navigation upstream a distance of 990 miles. The river has a length in the State of 850 miles. Bahia is a great cocoa port, shipping about one-fifth of the world's supply; the State produces about as much tobacco as Cuba.

Sergipe, the smallest of all the States, is larger than nine of ours, a trifle bigger than Maryland and Delaware together. The São Francisco River separates it from Alagôas on the north, it has Bahia on the west and south. Its chief products are cotton, sugar, and rice; the cattle industry is important; the State

has profitable manufacturing industries; cotton mills, sugar, shoes, soap, and other factories, and unworked mineral deposits.

The capital, Aracajú, population 40,000, is a small port with 95,000 tons of shipping yearly; but it suffers the disadvantage of receiving ships of no more than 8 feet draft, and needs the improvements now planned.

Alagôas, of triangular shape, has Sergipe on one side and Pernambuco on the other, the ocean on the third. Its main products are sugar and cotton; the cattle industry is prosperous; it has copper, lead and iron deposits, not operated, and very important milling industries, particularly of cotton. The São Francisco River is regularly navigated 175 miles to the Paulo Affonso Falls, around which there is a railway 52 miles long to navigation above.

The capital, Maceió, is a modern city; its suburb, the port, Jaraguá, with a tonnage of 600,000. The State is the most thickly populated next to Rio de Janeiro.

Pernambuco, the twelfth State in size, with area equal to that of New York, extends well into the interior, though with a coast line of 112 miles only. Ceará and Parahyba are on the north, Alagôas and Bahia on the south, and Piauhy on the west. The State leads in the production of cotton and sugar, sometimes exporting 150,000 tons of the latter, and raw cotton worth $5,000,000. Other agricultural products are secondary, but cattle and dairying are important, still more the milling industry. Minerals, coal, iron, saltpetre, kaolin, and manganese exist in paying quantities. There are two good ports besides the capital; railways connect Recife with Maceió and with cities inland.

Recife (often called Pernambuco), capital of the State, is a port protected by a coral reef parallel to the shore, where fine works are being constructed: these include a breakwater three-fourths of a mile long, a stone jetty one-half a mile; quays, one with 33 feet of water, one with 28-30, together three-fourths of a mile long, also other equipment. One thousand steamers are its annual quota, with tonnage of 1,750,000; the city has obviously great commercial importance, exporting especially cotton and sugar, also rum, hides, and cereals. Its imports surpass those of any other Brazilian city except Rio. The cost of living is high.

Parahyba has on the north Rio Grande do Norte, Pernambuco south, Ceará west, and 72 miles of coast east. Cotton is the chief product, and mandioca is important. Vast coconut groves of trees, growing wild, should be taken advantage of. The pastoral industry is important, with goats a specialty as with its neighbors.

A little below the capital, Parahyba, at the mouth of the Rio Parahyba do Norte, is the seaport Cabedello, where port works are planned.

Rio Grande do Norte is the first of several States which have the Atlantic Ocean on the north. It is on the east also, forming a coast line of 290 miles. Parahyba is south and Ceará west. Here, too, cotton and sugar are the chief products, though 180 tons of rubber annually, from the *maniçoba* trees, are of value; the cattle and goats are important; *carnaüba* wax and vegetable oils come from the forests; the State, from natural *salines*, supplies much of the salt used in Brazil. Dried and salt fish are supplied to the rest of the northern States, and much cotton cloth and thread are exported. Natal, the capital, is near

the mouth of the Rio Grande. A great reservoir with a dam 160 feet high and a capacity of 2,200,000,000 cubic metres of water is to be constructed, the irrigation of 250,000 acres thereby transforming a large district; others here and in Ceará.

Ceará, smaller than Pernambuco, is nearly twice the size of Rio Grande do Norte, which with Parahyba is on the east; Pernambuco is south and Piauhy west. Cotton is the chief product though coffee, sugar, cacao and cereals are also raised. Cultivated rubber is exported as from Bahia; the cattle industry is important, though affected by occasional severe droughts. However there are approximately 2,000,000 head of cattle. Minerals and precious stones are found in variety.

The capital and port, Fortaleza, is one of the worst on the coast. Three powerful dredges are maintained by the Government for the continual dredging of the channel into which sand from the dunes is ever drifting. Two smaller ports require similar dredging.

Piauhy, eighth of the States in size, with a deep interior has the smallest coast line, only 43 miles. It has Ceará and Pernambuco east, Bahia south, and Maranhão west, from which it is separated by the Parnahyba River. The State has the expected agricultural products, vast herds of cattle and large flocks of goats; important forest wealth of rubber, timber, wax, and medicinal plants, and a variety of minerals. It has one seaport, Amarraçao, but a good deal goes out from a port of the next State, Tutoya, on the other side of the river Parnahyba. Therezina, the capital, is of some importance.

Maranhão, a little larger, has Piauhy east and south, Goyaz south and west, almost touching Bahia between these two; it has Pará also on the west. Its

coast line is 100 miles more than Piauhy's. Cotton is the chief agricultural product, but others exist; the cattle industry is important, much live stock going to Amazonas; there is good forest wealth, various minerals, and important cotton factories.

São Luis do Maranhão, the capital, population 50,000, is called the chief port though troubled by sand, while Tutoya is excellent.

Pará, a name at last familiar to all, is third of the States in area, equal to Texas and California, with West Virginia thrown in. It has Guiana on the north, with the Atlantic northeast; east are Maranhão and Goyaz. Matto Grosso is south, and Amazonas west. Its chief products are of the forest, particularly rubber, also Brazil nuts, medicinal plants, oils and timber. Little is done in agriculture though many plants grow freely such as cotton, rice, tobacco, and especially cacao, of which 3500 tons a year have been exported. There are large herds of cattle, perhaps 2,000,000 head, and various minerals are found. One railway, with branches, leads from Pará to Bragança, near the ocean, and to other towns; and one is open for a short distance in the valley of the Tocantins, the beginning of an ambitious project.

The capital, Belém, usually called by foreigners Pará is a fine city of 200,000 and the only considerable seaport, if so it may be termed, as it is on a bay of the Pará River 80 miles from the ocean. Mean temperature 78°. Harbor works, begun in 1906, and costing over $60,000,000, have been of immense value. They include a fine quay a mile and a half long with a depth of water part of the way of 30 feet, docks and storehouses, two floating docks, a Custom House, oil storage tanks, etc. One thousand steamers formerly entered yearly with tonnage of

1,500,000; imports at one time were valued at $15,000,000 and exports at $30,000,000. A channel from the outer river, 30 feet in depth, is marked by 26 buoys lighted by acetylene gas. The city is notable with attractive plazas, a unique forest park, a museum, a white marble theatre, and a good hotel. The various cities or villages are coast or river ports, some on the Amazon, others on the Tapajós, Xingú, Tocantins, Araguary, or smaller streams.

Amazonas, first of the inland States, and the largest of all, has Colombia and Venezuela north, Pará east, Matto Grosso, Bolivia, and Acre south, and Peru and Colombia west. Its area is equal to that of our three Pacific Coast States with Idaho, Montana, Nevada, and Colorado. In this great space the population, estimated at 435,000, is about one person to $1^1/_2$ square miles. Manaos, the capital, and the various other centres of population by the river side mean rubber. There are no roads except of water, no paths save those made by rubber gatherers, with a few by Indians, the number of whom is a mere guess. All tropical products thrive but their production is negligible save that of rubber. Various minerals are unexploited. Manaos, 924 miles from Pará, 1030 from the ocean, and 2000 from Rio, is the first real city in the wilderness, though Obidos, still in the State of Pará, is a port where 300 vessels call in a year, and a number of smaller places claim that title.

Manaos, a city of 60,000 population, is located just off the Amazon seven miles up the Rio Negro, on a large quiet bay. Port works have been constructed, a fine stone wall over 1500 feet long, with floating docks to fit the 50-foot rise and fall of the river, and 16 electrically equipped warehouses conveniently

arranged. Considering its location, it is a wonderful city, well lighted, with a splendid opera house, expensive of course, a fine cathedral, schools, a public library, museum, and good sanitation. One thousand four hundred miles farther is the Peruvian city of Iquitos, near the limit of navigation for ocean vessels on the main stream. Some distance below Manaos the Amazon is entered by the Madeira River which gives access to the State of Matto Grosso and to Bolivia.

Matto Grosso is second in size, equal to the States mentioned above without Nevada and Colorado. Estimated population 275,000. This State has Amazonas and Pará on the north, Goyaz, Minas Geraes, São Paulo, and Paraná on the east, Paraguay and Bolivia are on the south, and Paraguay and Bolivia west. The State is much more open than Amazonas; its chief industry is cattle. Forest products however abound, with all kinds of rubber and magnificent timber. There are large agricultural possibilities and considerable *matte* is exported. Diamonds and auriferous sands are exploited though their origin is uncertain. The river systems north and south meet in the highlands, and connection might be made by a short canal, opening a way from Pará or Manaos to Buenos Aires.

Cuyabá, the capital, on a river of the same name, an affluent of the Paraguay, is quite a city, population 32,000, although 1045 miles above Asunción, while Corumbá, lower down, on the Paraguay, is of nearly equal size. The river at Corumbá is 1000 feet wide, and 6 feet deep at the docks at low water. Corumbá is regularly visited by steamers, though 1800 miles by river from Montevideo. Its export and import trade amounts to

at least $4,000,000 annually.

Goyaz, the fourth State in size, following Pará, has Maranhão on the north, Maranhão, Bahia, and Minas Geraes are on the east, Minas and Matto Grosso are south, and Matto Grosso and Pará west. Three hundred thousand is the estimated population with a guess at the number of Indians of many tribes. The principal industry is stock raising and many cattle are exported to neighboring States. The forests have the *maniçoba* and the *mangabeira* rubber, also a vegetable silk, *paina*. There are great mineral riches, placer gold in many streams, and veins in the hills; many diamonds and rock crystal are also produced. Other metals as iron and copper exist. Navigable rivers are the means of communication as in the neighboring States, but a railroad is coming and more rapid development will follow.

The capital, Goyaz, is not much of a place, though of late evincing progress. Several other cities have from 5000 to 10,000 inhabitants.

Minas Geraes, the fourth inland State and the fifth in size, has Bahia on the north, Bahia and Espirito Santo east, Rio de Janeiro southeast, São Paulo southwest, and Goyaz west, a small southwest corner about reaching Matto Grosso below. Although without a seaport and with no large city, Minas is the most populous of the States, with an active industrious population. The State leads in mineral riches of almost every kind; it is one of the foremost in agriculture of all varieties, being second to São Paulo in coffee; it has vast pasture lands, exporting 300,000 head of cattle a year, a sugar refinery, flour mills, and a great dairy industry. It has increasing railway service as well as river transportation. It is believed to have a mineral future rivaling that of the

best region in the world. Its factories are important and there is a great store of water power.

Bello Horizonte, the present capital, was made to order in 1897, and is well laid out with broad streets, water supply, sewerage, everything of the best type: a Government Palace, the finest State building of Brazil, and a fine Agricultural School. Ouro Preto, the old capital, has a free Mining School, said to be one of the best in the world.

The Acre Territory, triangular in shape, has Amazonas north, Bolivia south, and Peru west. It is naturally similar to the neighboring sections. There are three Districts: Juruá, of which the capital is Cruzeiro do Sul, population 2000, 1351 miles from Manaos; Purús, capital, Senna Madureira, population 4000, 1320 miles from Manaos; and Acre, capital Rio Branco, population 2000, 1351 miles from Manaos.

CHAPTER XLVIII
BRAZIL: TRANSPORTATION—OCEAN, RIVER, AND RAILWAY

Ocean and River Traffic

Brazil has a considerable navy, several warships; and a merchant marine of 450,000 gross tonnage. The leading national line is the Brazilian Lloyd which with 62 ships has a service to the United States as well as a coastwise, the latter shared by the Navegaçao Costeira and other companies. Rio de Janeiro has three dry docks, one with a capacity for the largest battleships, and a yard where ships are constructed. The country has 30,000 miles of navigable rivers, with boats for these having a tonnage of 75,000.

Coastwise and river steamers have service in the Amazon Basin, the most important as follows: Pará-Obidos-Manaos, 975 miles; Pará-Santarem-Itaituba (Rio Tapajós) 729 miles; Pará-Maués, Pará Tocantins, 1544 miles; Tabatinga (Frontier) Remate dos Males, 1743 miles; Pará-Santo Antonio (Madeira) 1617 miles; Pará-Rio, Peru-Senna-Madureira, 1934 miles; Pará-Chaves (Marajos Island), Oyapock River; Manaos and Rio Negro to Santa Isabel, 423 miles; Manaos to the Yapurá River—to the Juruá River, Cruzeiro do Sul, 1090 miles.

Other companies have service, Maranhão north to Pará, 599 miles, south to Pernambuco 884 miles; Recife north to Maranhão 803 miles, south to Bahia 385 miles, east to Fernando do Noronha Island, 239 miles. On the São Francisco River, Januaria to

Pirapora. Other Lines serve from Rio de Janeiro to ports south to Laguna and Ribeira de Iguapé, São Paulo; also on the Paraná and the Rio Grande, and on the Lakes Patos and Mirím. Service from Rio de Janeiro to Corumbá, 765 miles above Asunción, and 280 miles farther to Cuyabá on the Cuyabá River, in time of high water is continued on the Paraguay 250 miles beyond to São Luiz de Caceres.

Railway Transportation

While the great rivers of Brazil with their 27,000 miles of navigable waters have been a large factor in the development of the country, of equal importance for the future is transportation by rail. The total present mileage, second to that of Argentina, exceeds 16,500, these having developed from $9^1/_2$ miles in 1854 and about 10,000, 50 years later. About 90 per cent are of metre gauge. For the economic unity of the great Republic, the Government policy is favorable to a rapid extension of the present railway systems, a matter as important as was the creation of our railways to the Pacific 50 years ago. The development in Brazil has been retarded by the difficult topography of the country, in striking contrast to the Argentine plains. Along the greater and better part of the coast is the high steep wall of the plateau region, which must be climbed to enter the interior. Once at the top the way in some sections is easier, but in others there are additional mountain ranges. The wall, obviously low in comparison with the mighty rampart of the Andes, presents difficulties, but none to compare with those experienced in Peru.

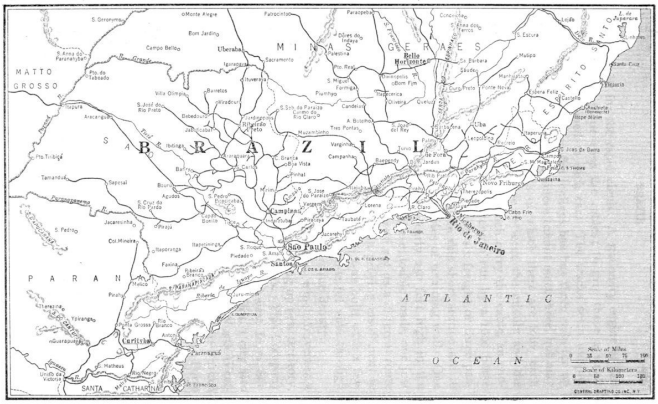
The first railway, built and operated in 1854, was from Mauá on the north shore of the Rio harbor to

Fragosa. Soon after carried to Petropolis, it is now a part of the Leopoldina Railway system. Only two South American railways antedate this, the Demarara of British Guiana and the Caldera-Copiapó in Chile.

The Central of Brazil Railway was the first of much importance, its first section, 32 miles, opened in 1858. For this road leading out of Rio expenses were heavy. Many were the difficulties of construction, tunnels, bridges, etc., the boring of one tunnel, only $1^1/_2$ miles long, requiring seven years. The system, now in Government ownership, has a network of lines extending from Rio to the city of São Paulo, to Bello Horizonte in Minas, and to other points. It has express trains with sleeping cars (state rooms), and a heavy suburban traffic. It is intended to carry this system northward to the city of Pará, with branches to new territory. Twenty-five million passengers are carried annually with much freight of coffee, lumber, iron, manganese, etc. The railway is to be electrified near the capital with a Government appropriation of $32,760,000.

The São Paulo Railway. The most successful, financially and otherwise, of the railways of Brazil is no doubt the São Paulo, operating a double track, broad gauge line (5 feet 6 inches) from Santos to the town and junction, Jundiahy (population 20,000), 86 miles; it passes through the city, São Paulo, and has a branch to Bragança, 65 miles. This road has a granted monopoly of trade between the two cities, Santos and São Paulo, 50 miles apart. This, in spite of the great expense of the railway construction, has insured them large profits, dividends in 1912-13 being 14 per cent. The train mile earnings are the largest in South America and normally are greater than any reported in the United States. With the

construction of more and more lines in this State and beyond, a steady increase in the traffic seems assured, as nearly all must pass in and out by way of Santos. The road now carries annually more than half of the world's coffee supply.



ENVIRONS OF SÃO PAULO AND RIO DE JANEIRO

One of many engineering triumphs in South America, the railway is ranked among the greater achievements of the world. An ascent of 2600 feet is made within seven miles. Beginning 15 feet above the sea not far from Santos five inclined planes with 8 per cent grade, each $1^1/_2$ miles long, serve for the rapid climb. A stationary engine at the top of each plane runs the cables; to grip these a small engine is attached to each car. The tracks seem unique. The double track on the inclines has but three rails for up and down cars, which therefore cannot meet there, but may on the intermediate levels of which there are four, each 600 feet long. On each side between the middle and the outside rails are the pulleys which carry the cable, an endless steel wire of enormous strength run by a 1000 horse power engine, capable of carrying six freight or three passenger cars at the same time. In this short section

are 16 viaducts, 15 tunnels, and two miles of retaining wall. One viaduct is 334 feet long, and nearly 150 feet high in the centre. There are now two of these double roads, one just above the other, as I have seen, and not on a different route as stated elsewhere. The first soon proving insufficient to accommodate the freight, the second was built with a few technical improvements. It is a wonderful ride through tropical forests, with scenes of picturesque beauty.

The Sorocabana Railway, 864 miles, which traverses a rich and progressive part of Brazil opening up new territory, has important connections with other lines. This Company has several lines running west and northwest from São Paulo. One of the most important is to Baurú, a city also on the Paulista Railway. From this point the North Western Railway has continued the line to Itapura on the Paraná River and across the State of Matto Grosso to Porto Esperança on the Paraguay, about 40 miles by land from Corumbá on the west side of the River, and 80 by water. Probably a train-car ferry will later be provided at Esperança and the road continued on the other side to Corumbá. By the present road connection is made with Bolivia opposite, and by water with Paraguay farther down, the capital Asunción being about 700 miles distant, Montevideo nearly 1800. Previously to the completion of this railway Corumbá and that section of Brazil was reached from Rio only by a long, long sail, three weeks (farther than to Europe) by steamers of the Brazilian Lloyd Line. After making calls along the Brazilian coast, at Montevideo and Buenos Aires, these boats continue up the Paraná and Paraguay Rivers, arriving at last once more in their own country. This new railway and others now in

construction will be an immense factor in opening the great central table-land of Brazil, with its rich possibilities for agriculture, cattle raising, and mining.

The São Paulo-Rio Grande, another important railway, 853 miles, runs from São Paulo to Sant' Anna do Livramento on the border of Uruguay, where it connects with the Central Uruguay Railway to Montevideo. Improvements have been made so that with better connections and sleeping cars to the border, which were lacking part of the way in 1916, the journey is now made in comfort in $4^1/_2$ days to Montevideo. The road runs through a rich, often beautiful country; in some places with splendid scenery and fine forests, in others with open grazing lands where good cattle are visible, past small towns and pleasant rivers. People who are willing to work could find agreeable homes in this section with excellent temperate climate. Low land values are spoken of, which if genuine should make this an attractive region now that fairly good transportation exists with more in prospect. This line has several branches of its own, while other railways are connected with the through line, local roads to ports or to interior towns. One of these, the Paraná Railway, has its main line from the port Paranaguá to the State capital, Curityba, and to Ponta Grossa on the São Paulo-Rio Grande; it has north and south branches, the latter to Rio Negro and to São Francisco.

The southern part of the São Paulo-Rio Grande Line belonged to the Compagnie Aux Chemins de Fer de Brasil which had a concession for the entire State of Rio Grande. Roads from Porto Alegre and from the city of Rio Grande extend to the line from São Paulo,

thus making connection with Montevideo and Buenos Aires. From the Cacequy junction a line goes west to Uruguayana on the Uruguay River. Along this river the Brazil Great Southern operates in Rio Grande 110 miles from Quarahim on the Uruguay border through Uruguayana north to Itaqui, with an extension to São Borja 77 miles farther up. At Quarahim an international bridge 700 yards long connects the Brazil and Uruguay Railways. Across the Uruguay River connection is made from Uruguayana with Argentine Railways, and a direct route to Buenos Aires.

There are other roads in the São Paulo, which has the best system in Brazil and the most mileage: over 4000.

The Paulista Railway, extending northwest from Jundiahy through rich coffee territory with Barretos a recent terminal, has many branches and a mileage of 721.

The Mogyana goes much farther north, crossing a corner of Minas and entering the State of Goyaz, on the way to the capital city of that name. It has arrived at Santa Cruz, still quite a distance from Goyaz, though with a total mileage of 1081.

The Southern São Paulo Railway runs along or near the coast 100 miles from Santos to Juquiá.

The Leopoldina. An important British line or system nearly 2000 miles in length is the Leopoldina, the main line extending from Nictheroy, on the bay shore opposite Rio, to Friburgo, Campos, Victoria, Leopoldina, and other points in the States of Rio, Minas, and Espirito Santo. Lines run also from Rio and Mauá up the mountain to Petropolis and beyond, connecting with the main line. This follows the

Parahyba Valley for some distance and then crosses four mountain ranges, a work involving many unusual feats of engineering. On the main line the maximum grade is 8 per cent, on the Petropolis section 15 per cent. The territory traversed is highly productive, and in spite of expensive construction good returns in normal times are assured.

The Great Western. Under British control is the Great Western Railway which has Pernambuco as its centre. Lines extend north along the coast and also to the interior with 1000 mileage in the several states of Pernambuco, Alagôas, Parahyba and Rio Grande do Norte. It reaches the ports of Maceió, Parahyba, Cabedello and Natal. Two and a half million passengers were carried in one year and much freight.

In the state of Bahia short lines run back to the interior, one, 140 miles, from Nazareth, south of the bay, and one from São Felix, 165 miles, to Santo Amaro, serving the best sugar district, as Nazareth that of cacao and manganese ores. The principal road is from Bahia, 281 miles, to Joazeiro, on the São Francisco River; the oldest, opened in 1860, is along the coast to Aracajú in Sergipe, 268 miles. Two other small railways are farther south, in all about 950 miles.

The Brazil North East Railway operates in Ceará about 472 miles, one division from the port of Forteleza, another from the port Camocím to Granja and Crato.

The State of Pará has less mileage than most of the others, the short line, 40 miles built, at the junction of the Tocantins and Araguaya to avoid bad cascades. Another road, the Bragança, runs northeast

from Pará to the Atlantic Coast.

The Madeira-Mamoré is in some respects the most remarkable railway in Brazil, perhaps in the world. It was built in accordance with a treaty with Bolivia in settlement of the Acre difficulty, and in compensation for the surrender by that country of the Acre Territory, to give access to that Republic by making a way around the prohibitive falls and rapids on the Madeira and the Mamoré Rivers. In the heart of the wilderness, 570 miles up the Madeira River and about 1100 miles from the sea, this road, 202 miles long, was constructed. In 1871 an American, Colonel George Earl Church, a Civil War veteran, and a distinguished civil engineer, turned the first sod of the railway, but work was soon suspended. In 1877 P. T. Collins of Philadelphia undertook the task and completed 20 miles of railway, but the difficulties were too great, especially the mortality, modern methods of sanitation not then being understood; the work was therefore abandoned. In 1907 the recent operations were begun, again in charge of Americans, and the road was opened for traffic, July 15, 1912. From Porto Velho the road runs up the river to Guajará-Mirím, the road of course on the Brazilian side of the river, and in the State of Matto Grosso, which is thus made accessible as well as Bolivia. The new little American town of Porto Velho of 1500 population has an ice plant making six tons a day, a wireless telegraph to Manaos and other conveniences. The road passes through a jungle which is cut out 100 feet wide. Two days are required for the short journey. At Abuná they halt for the night; leaving early next morning they should arrive at the terminus at 3:15. About 60 miles south of Abuná, Villa Murtinho is passed, opposite the town of Villa Bella in Bolivia, at the junction of the

Beni and the Mamoré, which two rivers form the Madeira. A road across from Villa Church opposite Guajará-Mirím or from Villa Bella to Riberalta on the Beni was in the plan, as the Beni below Riberalta is unnavigable on account of rapids. Automobile roads are now in construction, at least one from Riberalta to Puerto Bello (Villa Bella) or to Villa Church.

CHAPTER XLIX
BRAZIL: RESOURCES AND INDUSTRIES

Brazilian industries as we have already seen have the variety befitting a country of its enormous area. The States of Minas, Pernambuco, and São Paulo can produce almost anything, but even these have specialties. Of the various products of Brazil, as in the other South American countries except Bolivia, the vegetable are the most important, with coffee far in the lead. Stock raising comes next; minerals of prodigious variety and richness are third. Manufactures, developing later, may in time largely satisfy the requirements of the inhabitants.

Agriculture

Coffee, we all know, is in value the most important crop of the country, growing over vast areas, chiefly in what we may call the northern part of South Brazil, the States on or near the edge of the tropics, São Paulo, Rio, Minas, and Espirito Santo. North and south of these States coffee grows and flourishes more or less according to local conditions. There are said to be 1,400,000,000 coffee trees in Brazil, which produce perhaps three-fourths of the world supply, more than half of them in the State of São Paulo. The State contains about 60,000 plantations. Probably more than $1^1/_2$ billions are invested in the industry, $900,000,000 in São Paulo. The larger part of the crop moves over the wonderful railway between São Paulo and Santos and goes out from that port, some from adjoining States as well as from São Paulo. For ten years the average value of

the coffee exported was $120,000,000.

Great fortunes were made by some who embarked many years ago in the business; the coffee king, Colonel Schmidt, who has 8,000,000 trees and produces 11,000 or 12,000 tons of coffee yearly, was himself a poor immigrant. But the best lands were taken up long since; production is increasing in other countries, as well as consumption, and there is not now the opportunity of earlier days. São Paulo especially has the rich red soil that the plant loves, the sloping ground, the right climate, and the water supply, over a greater extent of accessible territory, probably, than any other land in the world; though districts in other countries produce coffee of equal excellence. Here of course there are different varieties and grades, the original plants having been imported from Arabia and Java and preserving their characteristics. Life on the *faezendas*, as the farms are called, is agreeable both for the rich proprietor and for the Italian and other laborer, who has his own garden and whose wife and children help in the picking season. The rows of trees extend for miles in even lines; there are great cement drying grounds in the sun, pulping machinery, and store-houses. The business generally is in the hands of Brazilians, though there are foreign stock companies, paying large dividends. Coffee is about 40 per cent of the Brazil exports and 97 per cent of São Paulo's.

Cacao. Other agricultural industries are of importance and capable of infinite expansion. Cacao is a product the consumption of which is rapidly increasing. Bahia stands second in production, a crop of 40,000 tons being exported from the city in 1917. Cacao forms 60 per cent of the State's export. Large areas of suitable land are said to be available for

plantations in States south of the Amazon, including North São Paulo and Matto Grosso. That grown in Maranhão ranks as the best. The groves run inland along the river valleys, full of rich red soil. There are two gathering seasons, one from September to April, the next crop beginning in May, less important. It is said that one person can take care of 1000 trees, which yield from 5 to 13, sometimes 20 pounds annually. A plantation at pre-war prices cost 80-85 cents a tree. Three hundred are planted to an acre. The investment of a moderate sum is pretty sure to give good returns after three or four years.

Sugar plantations are increasing and sugar is exported in considerable quantities. This was one of Brazil's earliest industries, but languished on the discovery of gold in the 17th century, to be followed by several revivals. The amount exported varies, in 1909 it was 70,000 tons, in 1916, 54,000. It is cultivated near the coast and inland, chiefly from Rio Grande do Norte south to São Paulo, though it is also raised down to Rio Grande do Sul, where the 1916 crop was worth $3,000,000. In one year 441,000 tons were produced, 109,000 exported. The yield in some States farther north is 20 tons to the acre. In general little fertilizing is done and crop rotation is not followed, so that lands have become degenerate after centuries. The most flourishing seats of the industry are in Rio, and in Pernambuco, 1000 miles north. In Rio, Campos is the focus. The State has 31 large sugar mills, Pernambuco has 46. São Paulo is third, other States have fewer, but small mills are scattered everywhere making brown sugar and *cachaca*, native rum. In the large mills the best machinery is used, and it is said that 300,000 tons is the total output. The export is to Uruguay, Argentina, Great Britain, United States, and Portugal.

Almost every cotton, coffee, or other *faezenda* grows its own sugar. Eighty or ninety pounds a head are used. Cane ripens in the northern States in about 15 months; south of Rio in 18-20 months.

Tobacco was in use in Brazil in prehistoric days. The State of Bahia is the centre of the largest production, though it is raised in almost every State. The quality varies in different localities, but in some it is said to be equal to the best Havana, especially in Bahia, where the soil is similar. Forty-five thousand tons were exported in 1902, chiefly to Germany; in 1916, 2100 tons, valued at over $7,000,000. A plantation of 37 acres earns $10,000 a year.

The Coconut is another product, which might be more important. It is found near the coast from Parahyba to Bahia, 1,250,000 trees bearing 50,000,000 nuts, the size of which compares well with others. One hundred million trees are also reported. At present there is practically no export, but large possibilities exist for an important industry. There are three shipping ports, Cabedello, Maceió, and Recife, three-fourths of the trees near the first two. On the plantation the nuts sell for $25-$35 per 1000, according to size, and in cities at $42.50. No attempt is made to produce copra, as the natives are fond of the milk and fruit. With New York price $160 a ton for copra and $10 freight it is better to sell the nuts at home, but if business were done on a large scale, good profit would result. Improper spacing injures production; of two groves, one 75 trees to the acre and one close by, 130 trees, the yield of the first is four times that of the second. Labor is cheap, disease and pests unknown. The by-products are valuable; fibre for cord or rope, the husk for fuel, the milk for breakfast, and palm leaves for building or

for hats. To develop 2000 acres of land a capital of $30,000 is estimated as necessary, giving a net return for the first seven years which would average $31,865 a year, 105 per cent on the capital, with gross receipts for the last year of $300,000. If the profits are half the estimate the investment would seem a good one.

Other Nuts. The Brazil nut is an equally well known edible, mostly exported from Pará; in 1914 over $2,000,000 worth. The trees are large, often 150 feet high. *Babassú* nuts are exported, some thousands of tons, chiefly from Bahia, yielding a high percentage of oil, similar to that from the coconut. Also the *souari* or butternut brings a good price and has commercial possibilities, having a larger percentage of fat than other known species. Its cultivation is believed to be more profitable than that of coconuts. Tagua nuts are exported in small quantities.

Cotton is an important product likely to have a large increase, though a diminishing amount is exported, $8,000,000 worth in 1914 and $500,000 in 1916. This does not indicate lessening production but large increase in cotton milling. Cotton of long silky staple of high merit here grows wild or with careless cultivation. Growing in almost all parts of the country, it is best on the northeast promontory and along the coast to the Amazon. There is little culture, not yet $^1/_2$ million bales, where 20 might be produced. United States cotton buyers in 1916 were astonished to find here the long silky fibre. One of the best varieties is similar to the Peruvian, a hardy, prolific perennial growing 13 feet high and yielding for at least three years. One tree was bearing after 16 years. Maranhão has raised this kind for centuries. It

has the high percentage of 38 to the boll and is similar to that cultivated by the Incas. Under the names Moco, Serido, and Sede de Ceará, this cotton is grown in these north States. *Gossipium microcarpum*, related to *peruvianum*, is said to produce a pound of clean cotton from 120 bolls. These varieties have fuzz on the seeds, but four other varieties have clean seeds, the most important, the *Gossipium vitifolium* found wild in Brazil, still producing long silky staple. Sea Island and the best Egyptian belong to this stock. These varieties can be cultivated here without fear of rival anywhere, and offer a fine field for the investor. In the State of Pernambuco cotton production is more important than sugar. Much is produced in São Paulo. Export growers, and good roads or railways are needed to stimulate production.

Cereals are obviously of far less importance in Brazil than in Argentina, yet many tons are produced and the possibilities are large. Rio Grande do Sul alone produces wheat in quantity, though not enough for her own needs; Santa Catharina, São Paulo, the hills of Rio and Minas are suitable for cereals, and wheat, barley, oats, and a little rye are seen in the south near European colonies. The chief cereal grown is maize; in patches it is found everywhere, and in enormous fields in the centre of Brazil. With *mandioca* it is the food of the common people, in spite of the large consumption of flour in the cities.

Fruits. The fine fruits of Brazil deserve greater exploitation. I have eaten really delicious pineapples in Rio only. There may be as good elsewhere, there cannot be better. The oranges of Bahia have an equal reputation. It is from that State that the navels were

introduced into Florida. If superior to the California fruit as were the old Floridas, it is time they were more extensively cultivated and exported to the United States.

Rice is growing in importance. Formerly imported, its production has increased until now there is an export balance.

Beans are raised and consumed in great quantities; recently some have been exported.

Forestry

It is well known that the forest country of Brazil has an enormous area. The entire rubber region is estimated by a Brazilian authority as covering 1,000,000 square miles, half of which is in Brazil. Other forest regions of a different character are on the highlands and at the south, all together covering $1^1/_2$ million square miles. The forests contain the varieties that might naturally be expected with others peculiar to the country, medicinal plants, trees with gums and resins, woods hard and soft, but mainly hard; some ornamental, others useful as timber; plants supplying tannin, quebracho and others; the beautiful Araucanian (Paraná) pine, the candelabra tree, of which there are 800,000,000 in Paraná. The wood is said to be 20 per cent stronger than the pine of Sweden; the trees are nearly 200 feet high, with a diameter at the base of ten feet. Other figures are 100 feet tall and three feet in diameter.

The timber industry is of slight development, but Paraná and Santa Catharina afford much good building material. The Brazil Company has in the

two States over 500,000 acres with 5,000,000,000 feet of good standing timber and three mills. One of these, at Tres Barros, located on a railway, has a capacity of 40,000,000 feet a year, with planing mill, box factory, etc. There is a great market in Brazil and Argentina. Among unusually valuable trees is the *peroba*, with a trunk weighing 30 tons, worth $7 a ton on the spot. The *imbuya* tree which resembles mahogany is heavier than water. An infinite variety is found with infinite uses.

Rubber still has some importance, in spite of the great diminution of export owing to the development of the Ceylon plantations. Once the price was $3 a pound; in June, 1921, $15^1/_2$ cents. Unfortunately the industry in past years was very badly conducted, with short-sighted policy, wasteful methods in tapping trees, foolish importation at excessive cost of all kinds of supplies including food, far too high prices to the laborers; partly in consequence of extortion and cruelty, a scarcity of labor; in addition, high export duties. The idea prevailed that people could get rubber nowhere else and must pay whatever price was asked. It was a severe shock when Ceylon rubber came more and more into the market, and was found to be a formidable rival. Although not generally considered equal to *Pará fina*, the Ceylon answers for most purposes.

The Government is now lending aid to the industry, encouraging plantations, and better methods otherwise. The export tax at Pará has been slightly lowered but is now $24^1/_2$ per cent. A Government investigation, however, in 1912-14 at a cost of $47,000,000 did little besides paying fat salaries to favored individuals. The Ceylon export has recently been 300,000 tons to Brazil's 37,000. So

far synthetic rubber with the special therapeutic base has cost four times the *hevea*. The *Pará fina* is of course the *hevea brasiliensis*, which constitutes the larger part exported from the Amazon, 80 per cent of a good workman's product. *Sernamby* is a by-product of scraps or careless work, though even the better is liable to be contaminated more or less with leaves, nails, etc. *Caucho* from the *castilloa elastica* is not so good, and in procuring it the tree is usually destroyed, as previously stated. Near the mouth of the Amazon where some collectors are quite independent, owning their own homes on the edge of the forest, are white rubber trees producing *fraca* or weak rubber; not so good as the *hevea* which has the most resilience, and is tough and elastic. For many purposes these qualities are essential, hence the higher price. Red rubber coagulates badly.

Men from the State of Ceará, especially in times of drought, have been glad to go to the Amazon as rubber collectors; and half wild Indians of Peru and Bolivia have been employed. The rubber is collected in the dry season, June to November. Dr. Oswaldo Cruz, a famous Brazilian physician, said of some of the Amazon regions that there were no natives, as all the children die; others declare that the normal condition of older persons is to be afflicted with malaria, beriberi, dysentery, pneumonia. Still others maintain that much of the higher land is fairly healthful for persons of careful habits who have good food. Conditions are improving. American and other companies are organizing on a more scientific basis than formerly, and with humane plans which in the long run will prove profitable. Lands have been secured in desirable locations where men can live all the year, raise their own vegetables, and not be dependent for their entire living, aside from fish, on

canned stuff at enormous prices. To put Amazon rubber on a better basis it is necessary that the output be cleaner, the expenses of the collector smaller, and his living better through local cultivation of fruit and vegetables, which here grow luxuriantly, and with better habitations on suitable sites, so attracting a better labor supply. A further reduction by the Brazilian States of the rubber export tax, now about 24 per cent in Pará, seems also desirable.

Besides the *hevea* and *caucho*, two other varieties of rubber are exported, the *maniçoba* and the *mangabeira*, which have a place, like the balatá of the Guianas and Venezuela and the Guayule shrub from Mexico. The first is from the *manihot* tree which grows up to 4000 feet altitude, on a rocky soil where there is not too much rain; it is good for many purposes. The *mangabeira*, mostly from Pernambuco, grows on a sandy soil at 3000-5000 feet, but is a wet rubber not highly valued.

The Ceylon rubber trees, the seeds of which were taken from the Amazon and germinated in Kew Gardens, first blossomed in 1881. The seeds were used to plant more trees. In 1900 four tons of rubber came from the East, in 1910, 800 tons; the output in 1916 was about 150,000 tons. One million, three hundred thousand acres are now producing in Ceylon, India, Borneo, and elsewhere, a monument to British enterprise.

Herva Matte. A very important export, rather forestal than agricultural is called in Portuguese *herva matte*, the *yerba mate* of Spanish. Paraná is its special home where it grows wild in the forests, straying over into the neighboring States of Matto Grosso, São Paulo, Santa Catharina, and Rio Grande

do Sul, and being native as we have seen to Paraguay, and to Misiones in Argentina. The trees or shrubs often grow in sections with the tall Paraná pines, the tree with the candelabra top, which is not only an ornament to the landscape but supplies good lumber, and pine kernels as large as chestnuts. These when boiled make a nutritious food, much relished by the Italians. The chief export of *matte* is through the city of Paranaguá, after preparation in the mills of the region. In 1915, 75,800 tons were exported, largely to Argentina, some also to Europe; 40,000 tons is an average amount. It is much used by the residents of Paraná, but in most of Brazil coffee has the preference.

Fibres. Besides cotton Brazil produces fibres of excellence from a variety of plants. A wonderful article but little known to the general public is the remarkable *paina*, called in Europe *kapok*, 34 times as light as water, 14 times, as cork. Chiefly produced in the Orient, it is obviously excellent for life preservers, also for mattresses, pillows, and for whatever needs to be light, warm, elastic, and impermeable. The best fibre, best packed, comes from Java, inferior grades from India and Africa. Introduced into Venezuela, it was so packed with stones and refuse that it was rejected when sent to Europe, although the article was of fine quality. Careless exporters of all articles should take warning. Other good fibres of Brazil are *aramin*, from which coffee bags are made; *pita*, from which the Amazon Indians make hammocks woven with much art, and sometimes with feathers interspersed along the edge. Palms and aloes supply other fibres, some equal, they say, to the famous *henequen* (*sisal*) of Yucatan. Banana fibre is used by north lace makers for a curious stiff shiny lace, some quite beautiful, fine

and intricate, and some with a darned-in pattern of heavier silk thread, on a filmy background.

Carnaüba Wax, which forms an under coating of the leaves of the *carnaüba* palm, is not unlike beeswax. Nearly 600 tons were exported in 1915 valued at $2,400,000. The trees grow in the north States, especially in Rio Grande do Norte, where there are 15,000,000 trees, and in Ceará. Large amounts of the product are used locally. The wax is of excellent quality, melting at a low temperature and burning with a bright light. Mixed with a little beeswax and 10 per cent fat, it is easily worked and makes candles of high quality. It is much used for shoe blacking.

CHAPTER L
BRAZIL: OTHER INDUSTRIES

Cattle Industry

A leading industry of Brazil which, it has been said, may even in São Paulo supersede in importance that of coffee is live stock. Two packing houses now slaughter 300,000 cattle per year, one Brazilian, at Barretos, the other an American, the Continental Products, at Osasco near São Paulo, exporting chiefly to France and Italy. Another American Company has at São Paulo a plant that will handle daily 1500 head of cattle, 1000 hogs, and 2500 sheep. In tributary territory, which would include parts of Matto Grosso and Minas, 2,500,000 cattle are estimated. It is said that the best breeding ground is Matto Grosso, where the cattle run wild as once in Texas, though each rancher has a certain range and his cattle are branded. The Brazil Land and Cattle Company procured 8,000,000 acres in Matto Grosso, Paraná, and Minas, mostly well watered and with good grazing, except in Matto Grosso. Much fencing was done and buildings were erected. Recent increase in prices has improved prospects. This property is now owned by the Continental Products Company, in which the Wilson packers are interested.

Other vast lands are available. From the ranges of Matto Grosso the cattle are driven across to fattening pastures of southwest Minas and northwest São Paulo where the land has been planted to grass, though it is said that a native grass, *caipim gordura*, grows there all the year round. Argentina's alfalfa lands make the cost of fattening an animal six

months $7.50, while with *caipim gordura* in Brazil $1.33 covers the expense. Some Brazil grasses are of the highest class while others are good only for goats. On the Araguaya River the grass is 16-17 feet high. The Jaragua is over 3 feet. In Amazonas and Pará cattle are said to flourish but not goats or pigs. Rio Grande near the Uruguay line has fine grazing lands; those in Minas and São Paulo at an elevation of 1200-1400 feet where animals never need shelter are excellent.

Before the packing houses were started jerked beef only was marketed from the herds, hence, as thin cattle were preferred for that purpose, there was no object in improving the grade. Now there is systematic progress. Breeding farms are operated, fine stock has been imported, and in time high grade meat, perhaps equal to the Argentine, will be marketed. Twelve thousand tons were sent to Europe and the United States in six months in 1916, though the first experimental $1^1/_2$ tons was sent in November, 1914. At the School of Agriculture, Piracicaba, São Paulo, are good imported bulls, and one of native type, the Caracú, with pale buff hide, fitted to be the base of standardized herds. It seems that in some sections, notably Matto Grosso, a cross with the Indian zebu, which has a hump, and its descendants, is best qualified to resist the climate and the insect pests of that region; but in the pastures of Paraná and Rio Grande, Herefords, Durhams, Jerseys, etc., will flourish. The zebu is of large size and its skin is excellent leather, but packers say the hump does not pack well, and the shoulder is thin. Plants now or soon to be in operation south of São Paulo are three: in Rio Grande, one of Swift, one at Pelotas, Brazilian, and one at Sant' Anna of Armour. The President of

Paraná has been extending high roads towards Guarapuava to tap the State of Matto Grosso, and a large drove of cattle has come down. He desires to have an American packing house established in the State and will arrange with a suitable company to make no advance on the export tax for 15 years. Paranaguá, a port which we have already noted, is well served by the Brazilian Lloyd Line and the Funch-Edye from New York. Similar concessions are offered in Santa Catharina, which State has lower export duties; and by the Governor of Rio Grande, who would exempt from all export taxes any foreign company; though a tax of 10 milreis, $3.33, is imposed for every cow slaughtered, to protect the herds from decimation. If all the herds number 30,000,000, 2,500,000 or more might be slaughtered yearly without diminution. Cattle formerly were killed for their hides only, and the export of these is still important; 37,000 tons exported in 1915 were valued at $13,000,000.

Sheep raising seems inappropriate for a tropical climate, but in Rio Grande do Sul development is possible, also on the highlands of São Paulo, Minas, and Matto Grosso. Experiments with Romney Marsh have been successful for both wool and meat. Now there are 11,000,000 sheep, 7,000,000 goats, 18,000,000 hogs, 6,000,000 horses, and 3,000,000 mules and donkeys in the country.

Manufactures

While Brazil may not be called a manufacturing country, she had over 26,000 such plants in 1916; and her statesmen are eager to increase these industries, for which her immense water power gives her unusual advantages. The largest concern in this

field has a capital of $8,000,000 and an annual output worth $4,500,000; it employs 2800 hands making sacking, yarn, rope, thread, etc., this in São Paulo. In the textile field, the cotton mills naturally lead with over 200 mills and an investment of $80,000,000. They exist in various States, employing 80,000 persons; one in Pernambuco near the city of Olinda is a sample. The estate of 45 square miles of pasture and woodland borders on the sea, the shore fringed with coconut trees. Machinery and some technical workers were brought from England. All the processes of making fine cloth are there followed; they spin, dye, weave, color, and print. Native dyes are used in part. Of 3500 hands employed 70 per cent are women and children. Over $35,000 a month are paid in wages. Dwellings are rented at low prices or owned by employes; schools, hospital, and dispensary are free. A dairy and a stock farm belong to the estate, brick factories, a bakery, etc. A lumber yard is important. One thousand tons of coal a month are usually consumed, but in war time wood was used. The cotton is bought, $200,000 a month, and as much a year is spent for chemicals, drugs, etc. From 960 looms 1,500,000 metres of cloth 22-26 inches wide are produced a month, from blue denim to fine flowered fabrics; the products are sold in 80 stores owned by the Company in various States. Brazil has 11 flour mills of commercial importance, located in the States of Rio, São Paulo, Paraná, and Rio Grande do Sul, at one time having no tax on wheat, but ten cents a kilo on flour, by means of which the infant industry was started. In 1915, 800,000 barrels of flour were imported from the United States and 600,000 from Argentina, a little from Uruguay; at the same time enough wheat was imported and milled to make 2,750,000 barrels,

evidence of the work of the mills. For metal working there are 134 shops for imported iron. Factories exist of almost every kind. Leather goods are produced especially shoes for which there are many factories; hats, clothing and a variety of ordinary articles, such as soap, hosiery, brooms, paper, wagons, etc. Brazil workmen are skilful and the industries are certain to increase.

Mining

The mining industry of Brazil, if not precisely in embryo, for it has been in a very flourishing condition, is now in a state of prospect; on the verge of a great development rather than of active operation, except for a few varieties of metals. At the moment there is little working except in gold, diamonds, monazite, manganese, and coal.

Manganese has recently been the chief mineral exported on account of war necessities, 245,000 tons valued at 7 million dollars, in the first half of 1917, in contrast to 85,000 tons in the same part of 1914. The mines are in Minas, Matto Grosso, Bahia, and elsewhere, those in Minas being accessible to the port of Rio. In Matto Grosso, 18 miles from Corumbá, there is a deposit called the Urucum, estimated at 30,000,000 tons of undeveloped ore; one, the Quelez, in Minas of 5,000,000, 30 miles from Rio, and others. The ore averages over 50 per cent of metallic manganese, with a little iron silicate and phosphorus. Americans are interested in the works as the metal is valuable in the iron and steel industry. With better transportation facilities for these and other deposits, a good future is certain.

Gold mining was naturally the first to be

developed. Minas has been the chief producer. Of Minas Geraes the writer Diaz said, “In this State what does not hide gold contains iron; what does not contain coal spreads diamonds.” After the discovery of gold in 1693, 80,000 men toiled for a century at placer mining for the King of Portugal. About $1,000,000,000 has been taken out. The Morro Velho, said to be the oldest producing mine in the world, is now with the Ouro Preto worked by British Companies. The first is being worked at the depth of a mile with no sign of exhaustion. The gross receipts for the year ending February 28, 1917, were over $4,000,000, the profits $750,000, from a tonnage crushed of 187,400. The Ouro Preto Company operates the Passagem Mine five miles from the former capital of that name, being the first to use a stamp mill in 1819. The average thickness of the lode was ten feet, now about eight. Gold properties exist in many States, the most important around three mountain chains, the Mantiqueira and Espinhaço, which cross Minas and Bahia, running into Pernambuco; the range between Minas and Bahia, and Goyaz, continuing into Piauhy and Ceará, west of the São Francisco River; the third east of the Paraguay and Araguaya Rivers. Those most worked are in the Espinhaco Range in Minas and Bahia. Dredging has been carried on with varying success, but some of the companies have been overcapitalized. An American Company has recently acquired some old concessions of land in Goyaz, rich in gold and diamonds, where extensive operations are expected shortly.

Diamonds. As for diamonds, since the first stone was discovered in 1721, many precious gems have been produced. During 40 years in that century $17,500,000 worth were exported. The city,

Diamantina, 500 miles from Rio, is the centre of one of the most important fields. Gems are found in pot-holes, one of which contained 10 pounds of diamonds and 28 of gold. Others are in clay deposits in rocks of sandstone and schist. In the River Bagagem near the border of São Paulo, 250 miles from Diamantina, three great diamonds have been found: the Estrella do Sul, in 1853, weighing 254 carats uncut, was sold to the Gaekwar of Baroda for $400,000, the others weighing 117 and 175 carats. Other fields are in Paraná, Bahia, Goyaz, Matto Grosso, and São Paulo, in Goyaz on the Garças River, tributary to the Araguaya. Apparently most of the stones are now smuggled. They are said to be finer than the Cape diamonds and also to be sold for them. Black diamonds are found, of great value in the arts, and many precious and semi-precious stones, such as amethysts, tourmaline, topaz, etc., in various places.

Copper exists in several States, but production is slight. A mass weighing over 2600 pounds was discovered years ago near the city of Bahia, and there are six well known districts in the State. In Rio Grande do Sul an extensive property was opened which showed 6.5 per cent copper and 30 grams gold per ton. Minas will probably rank next to these States. Promising quantities are near Campos in Rio de Janeiro; there are also ores in Goyaz, Paraná, Matto Grosso, Parahyba, Ceará, Rio Grande do Norte and Maranhão; some are hardly accessible. One of those in Bahia covers nearly 15,000 acres, about 30 miles from the railway. Belgians and Dutch have operated at Camaquam, Rio Grande do Sul.

Iron in actual mountains occurs in Minas, 12 billion tons of the highest grade in 52 outcroppings. Deposits have been acquired by American, British,

German, and French interests. The manager of a British company which owned 90,000 acres said, "One could travel 23 miles one way and 16 another on outcrops of ore, *canga*, or rubble." In one deposit 30,000,000 tons are in sight, 60 per cent pure.

American interests, the Itabira Company, have secured deposits which include the celebrated iron mountain of Itabira do Matto Dentro in the east near the head of the Doce River. The hematite iron district is reached from Rio by the Central and the Leopoldina Railways; but this deposit will be tapped by a prolongation of the Victoria-Minas Railway, now running along a part of the Doce River. Also a branch will lead to a terminal 40 miles north of Victoria, Santa Cruz, a small port which will be developed and equipped with special loading machinery. Here will be erected a steel plant with an annual capacity of 150,000 tons of steel products, pig-iron, steel plates, rails, etc. The iron, 326 miles from this port, runs 69 per cent pure; some in the United States runs 52 per cent. It will be several years before manufacture can begin. Coal will be imported.

Development of iron properties has been retarded by lack of transportation and fuel. Wagon roads are unknown. The altitude is 2000-4000 feet and the climate good. The coal is hardly good enough or in sufficiently large supply. Oil development is uncertain. As there is water power the use of electricity may be arranged.

Near Ipanema, São Paulo, iron is found. A large deposit has been located in Paraná three miles from the port of Antonina. Other deposits in the two States south give good promise. So far charcoal has been used for a little smelting.

Coal mining has been carried on for a long time in a small and primitive way, but most of the coal used has been imported. The principal deposits found are in Santa Catharina and Rio Grande do Sul, others are in Paraná and Pernambuco. In Paraná American interests have made extensive purchases and expect to develop the property at once. Rio Grande do Sul has been estimated to have 800,000,000 tons and to be able to supply 1,000,000 a year.

In Santa Catharina the veins are about ten feet thick; some in Rio Grande are 4-10 feet, some 13. The property at Xarquedas, operated for some years, produces 20,000 tons per annum. With greater activity, in March 1918, 650 tons were produced daily from two shafts, and 1000 or more was expected by the addition of a third. With high volatile matter, good gas and salable coke are procured for Pelotas. Coal is found in several river valleys in Santa Catharina. State surveys are being made, and with improvement in transport by land and water a great industry may be developed of enormous value in promoting manufactures. Railway construction has been authorized by the President to aid coal companies in work, and other concessions have been made. The briquettes from Santa Catharina coal show hardly less caloric value than those of the Welsh patent fuel. Much is used by the Lloyd Brasileiro and other steamship lines including the Japanese; by railways, mills, etc. A little is exported to Argentina and Uruguay. The Rio Grande Railway is or was burning coal mixed with wood on its locomotives. The best coal is 42 per cent combustible, and when pulverized is equal to any other. Bituminous schist sold at $12.50 a ton was used for gas in São Paulo during the War. There are great seams 10-12 feet thick in São Paulo and Rio

Grande do Sul. Lignite occurs in Pará, Amazonas, and Minas, enormous peat beds in various places.

Monazite sands exist on the Brazilian coast, probably in larger quantities than in all the rest of the world. In 1910 Germany imported $1,000,000 worth. The thorium in the sands, used in the manufacture of gas mantles, is extracted in Brazilian factories before exportation. Two per cent of thorium is in the sand, sometimes nearly 6 per cent. It is found on the coast north of Rio and on some river banks in Rio, Espirito Santo, Bahia, and Minas.

Graphite exists in several States, especially Minas and Bahia in rather inaccessible locations, but one deposit in Rio is worked, for a pencil factory in the city of Rio; others in a small way for local use.

Other Minerals. Platinum is found in gold bearing quartz and in river alluvium in Pernambuco, Minas, and Parahyba; nickel in Minas, Santa Catharina, and Rio Grande do Sul; salt in Rio Grande do Norte, Rio, and Minas, worked in the last two; much is imported. Other minerals found in various localities are asbestos, antimony and tin, bismuth, barium, cinnabar, emery, kaolin; marble, white, rose, onyx, and green; mica, molybdenite, saltpetre, silver and lead, soapstone and talc, and wolfram. Among the stones garnets, opals, pearls, rubies, sapphires, emeralds, topaz, and tourmalines are found in more or less profusion as well as rock crystal, useful to opticians. Minas contains almost every variety of ore and gem, which with its good climate and fertile soil have made it the best populated State, though without a large city.

Petroleum has been discovered in a number of States, among them São Paulo, Minas, Alagôas, Pernambuco, Bahia, and Sergipe; some of excellent

quality in Bahia; but whether in quantities for large exploitation is uncertain until further investigation and work are carried on. Some geologists believe that prospects are highly favorable. Oil of fine quality is recently reported at Piracicaba, São Paulo, but as the petroleum is generally in schist rock its extraction would be expensive. Recent advices state that Brazil has 35 oil fields in four States with an area of 10,000 square miles; in the entire country 75,000 square miles with an estimated producing capacity within ten years of 500 to 600 million barrels.

Investments

In view of the varied resources of Brazil, to enumerate the possibilities for investors would be difficult. There is hardly a line of industry which cannot there be carried on successfully. That of coffee growing is so well developed as to be somewhat overcrowded, but in almost any other line there is a field for the investor. Whether it be mining of gold or diamonds, of coal, iron, or manganese, be it agriculture, stock raising, the lumber industry, or manufacturing, the harnessing of the waterfalls to produce hydro-electric power, the construction of public works, the field for the capitalist, large or small, is of infinite variety and excellent promise. The present Government is planning a broad and active development of the electric power available from its great and numerous water-falls.

CHAPTER LI
SOUTH AMERICAN TRADE

As to many it may seem presumptuous that one with no practical experience should venture to discuss foreign trade, I beg with an apology for my temerity to make a slight explanation.

On my six trips to South America (1903-1916) I saw and heard so much of the shortcomings of my countrymen there, and meanwhile perceived such ignorance at home that as early as 1907 I wrote an article on "Our Commercial Relations with South America," published in the *Van Norden Magazine*, wherein I set forth many points which prominent men of affairs have repeatedly urged upon the attention of their fellows, even up to the eighth Annual Trade Convention at Cleveland, May, 1921.

My personal observation being supplemented by extensive reading, I venture to hope that my remarks under this heading may be charitably viewed by those who are wiser than I, and prove of some slight service to those whose acquaintance with South American affairs is more limited.

In proportion to our wealth and our domestic activities our export trade before the Great War was indeed small in comparison to that of other nationalities. Slight interest was taken in outside matters of any kind, even our publicists giving little heed to foreign affairs. However, prior to 1914 there had been a slowly growing interest and a gradual

increase in our export trade, which from 1915 to 1920 showed a more rapid extension. In 1915 our exports amounted to $3,500,000,000, in 1920 to $8,228,000,000; to South America in round numbers, in 1915, $144,000,000, in 1920, $624,000,000, in 1921, $273,000,000.

As to the past and future of this matter, with especial reference to South America, two widely divergent opinions prevail; one, that we have accomplished wonders, and that our trade with that continent will be permanent and, with improvement in exchange and other conditions, increasing; the other, that we have not done so well as we might and ought; and that owing to our indifference, inefficiency, ignorance, and bumptiousness, we shall be unable to retain anything like the proportion of trade which we have enjoyed or so much of it as might seem our reasonable share. With some ground for each opinion, the truth as usual lying between, there is a possibility of either result depending upon a variety of circumstances. The first is whether some of us acquire a willingness to learn, or persist in certain mistaken notions and practices. Well merited criticism of the methods of some exporters and salesmen is far from applying to all. The “S” of a well known concern is as familiar in South America as in North. Other great corporations are famous the world over. Their success in foreign sales has meant the employment of many men abroad and of a large number at home, with the home business supplemented and steadied by the foreign. In addition to the extensive pre-war export of some large companies, many small ones, whose names are less familiar, have long sent their wares to foreign lands.

A matter of prime importance is that the entire nation and people become convinced of the value, the necessity even, of our maintaining a large export and import trade, for we cannot have one without the other. The provincialism of our thought and education, which have a reciprocal influence, must be laid aside. Congressmen should be able to feel that their reëlection will depend upon their ability to grasp the problems confronting the whole nation, problems of labor, transportation, commerce, finance, and world interests, rather than upon their catering to a special class or securing a sectional advantage. It would be well if they were high-minded enough to act for the country's best interests regardless of their future fate. To demand ability and statesmanship of their representatives in these crucial times is the privilege and duty of the people.

As a nation we have prospered because of the richness of our natural resources and the enormous extent of our agricultural lands. The latter being now for the most part occupied, with increasing population our welfare will depend more largely upon the development of our manufacturing industries and of our export trade. That the prosperity of our manufacturing towns and seaports will be reflected in our agricultural districts and will benefit the entire nation should be self-evident. Supported by the people the Government will act in accordance with its best judgment. In any case, every one should feel that it shows a shameful lack of a sense of duty and of patriotism to place one's personal fortune above the nation's welfare in peace no less than in war.

For success in foreign trade as well as for safety at home our Government must and no doubt will see

that production is not stifled for any reason, that our transportation on land and sea, and communication by wire is unhampered by strikes or otherwise. If need arises, previous restrictive measures should be removed and suitable aid granted. With abundance of shipping which we formerly lacked, equality with European freight rates must be maintained or competition will be impossible. The establishing by our banks of needed branches, fortunately made practicable, has been accomplished. The important question of trademarks and patents may require further Governmental consideration and diplomatic action, though some international agreements have already been made. In certain countries the laws have been unfair, prejudicial to the interests of honest manufacturers and favoring the unscrupulous; some of whom have taken advantage of the situation to the embarrassment of legitimate American business. Trademarks have been practically stolen, through previous registration by foreigners without title to use them. We must remember that the same thing has been done by Americans in the United States, who have registered here trademarks owned in Europe.

Of immense service would be a few free ports where raw material could enter, and without paying duty be exported either as entered or after being manufactured. Foreign countries have fostered commerce in this way and by allowing favorable freight rates through subsidies and otherwise. Competition under Government ownership has produced an enormous deficit. While better results may be expected under private ownership, our shipping will be at a disadvantage from difficulties imposed by the Seamen's Bill. It is said that American shippers may be able to pay higher wages

than European if relieved of the necessity of employing larger crews and superfluous engineers. The Bureaus of the Department of Commerce now perform very valuable service: the Bureau of Foreign and Domestic Commerce, the Bureau of Standards; also the Bureau of Markets of the Department of Agriculture. A consistent foreign policy, undoubtedly to be formulated and pursued by our able Secretaries of State and Commerce, will be of great service in relation to foreign trade and for our general prosperity.

To the intelligent sympathy of the country at large and the coöperation of the Government must be added the eager purpose of the manufacturer, and the interest of young men who will make of export trade their chosen field of labor. The manufacturer who contemplates entering this broader field or who, through peculiar war conditions, has been brought into it without preliminary investigation, should recognize the fact that careful intensive study is a prerequisite for successful permanent trade, a method which has been followed by many Europeans and by some Americans with excellent results.

The book here presented it is hoped will furnish a useful groundwork of information on South America, to be supplemented by further study of details appropriate to the character of the prospective exports and to any special conditions. In these countries generally, we have observed a great diversity in the population and disparity in their condition. One may hope that the latter will be diminished by advance in wages and by the education of the Indians, by means of which their producing and their purchasing power may be increased; but for a long time two broad classes must

be distinguished and catered to: the cultured and literate, and the poor and illiterate laborers, especially the Indians of the North and West Coasts. It is evident that the requirements of a cultivated society where the customs and dress are European in character, or of a homogeneous middle-class population, would be quite different from those of Indians who sleep on the floor, a whole family in one room. A personal acquaintance with the character of the people, their manner of life, and their methods of business is extremely desirable. If the head of a manufacturing industry is able himself to make "The South American Tour" even in a hasty manner, it will be to his advantage; if not, his export manager, if he has one, should personally study the ground. Those who look merely for a slight supplementary trade may best accomplish this by arranging with a reliable commission house and following directions. If the manufacturer decides to undertake the matter himself, he must plan a careful campaign.

To make haste slowly is a good rule. Unhappily in the past some who have attempted foreign trade have ignored the advice and experience of others, and deemed information quite unnecessary. With the know-it-all attitude, the idea that business is business everywhere, and that goods and methods successful at home must be equally good for abroad, before the War they proceeded in such a manner as either to make an utter failure and abandon the project, or after large and needless losses to secure profitable business. Criticism of two different kinds made by South Americans should lead to the correction of faults; otherwise there will be a complete loss of trade on the part of those who are guilty, and much injury to our commerce generally from the resulting bad reputation given to all Americans. One form of

criticism is directed to the character, methods, and manners of the traveling salesman or agent, the other to the shortcomings of the home office.

During the War period when at times our goods alone were available, even poor methods and service brought results. That the continuance of such a course will be successful in the face of the severe competition now arising is too much to expect. A friendly Englishman long engaged in business in South America, in 1916 remarked that he was *afraid* the Americans would lose 60 per cent of their business after the War. A Peruvian the same year declared that they would lose it *all*; so much had he been disgusted by the arbitrary manner of some salesmen of the type who said practically, "There is the stuff. Take it or leave it as you like." With a correct atmosphere in the home office and a more careful choice of salesmen such crudeness would be avoided.

If the heads of the office are unable to visit the countries, there is greater reason for wide reading. The "Movies," which seem to entertain many, present pictures of a few phases of life; but it is not by such means that one acquires the intimate knowledge of a country and people essential for a proper conduct of trade. For agreeable and profitable relationship of any sort with those of other nationalities we must realize that they also have their point of view; we need to consider how they regard us. While we may believe our country to be the greatest and best, and our ways and manner of living superior, we must bear in mind that others are equally loyal to their own; though their country may be smaller and in some respects less advanced, its people are equally patriotic, they prefer their own

way of living and methods of business where these are different. Many South Americans have a wider knowledge of the world, greater culture and taste, and these in general are more punctilious in manners and dress than the majority of Americans. We must therefore, while preserving our own tastes and ideals, have equal respect for theirs, cultivating a catholicity, a breadth of view, quite different from the spirit common among us, that everything different is thereby inferior, that we can teach the world everything, and that we have nothing to learn. Such an attitude is merely a mark of ignorance and provincialism.

Aside from visiting the countries there are many sources of information in regard to sales possibilities for any class of goods. The lists of imports of the countries and of some cities are available in commerce reports, with figures showing the approximate quantity and ratio of these. While the list of our exports seems to embrace almost everything, all of the goods are not sold everywhere; a knowledge of the various markets, of the prices at which goods are sold, and of trade conditions is necessary, to ascertain whether competition is possible and if there is a prospective increase of present business. Detailed information as to many lines of manufactures and markets may be obtained from consular reports, from the branches of the Department of Commerce located in a few cities, or by writing directly to the Bureau of Foreign and Domestic Commerce in Washington. Many persons have written to our Consuls in Latin America, often to their great disgust, for information, not merely such as might be procured in Washington, but what might be gained by looking in a geography or reading one of many available books. The Consuls

are continually making reports with suitable information on matters which are within their province. Membership in certain commercial organizations gives the privilege of receiving trade information; the Philadelphia Commercial Museum, the National Association of Manufacturers, and the American Manufacturers Export Association, chambers of commerce, commercial clubs, trade associations, such as one of jewelers and silversmiths, all may be useful in this direction. The Pan American Union through its Bulletin and otherwise furnishes much information about Latin America. Export Trade Journals, other magazines and newspapers, are serviceable.

If from investigation it appears that there is a market for one's goods in any section or universally, that quality and prices can be such as to make competition favorable, that the market can be enlarged, or should there be none that one can be created, and a determination is therefore formed to enter export trade, the next question is how the goods shall be sold. The methods are various, but of only two kinds: the direct and the indirect.

Direct methods include the establishing of branch houses; the appointing of a general agent for one or more countries or of a local agent for a limited territory; the employment of traveling salesmen; and advertising in circulars, newspapers, or magazines, for mail orders to be filled by freight or parcel post. The choice of methods, and the appointing of agents or salesmen demand the greatest care. Exclusive rights of sale have been given for the whole continent to a South American, incompetent even to take care of a small district. Salesmen have been appointed from the home office who perhaps had

done well here but were utterly unfit for work in South America.

It is desirable to have representatives of our own nationality. Others if employed solely by an American Company may do their best for it, but we now know that many Germans, possibly others, have taken agencies for the sole purpose of keeping the goods out of the market. A good salesman or agent of any sort should have as his first qualification ability to speak Spanish fluently, unless his work is confined to Brazil, in which case of course he must speak Portuguese. Next he should be a gentleman and *simpático*. The spirit which led some youths in the early days in Panamá to call the residents niggers, monkeys, and savages is one which, though not indulged in outwardly to such a degree, is sufficient to prevent the harmonious relations necessary to make permanent, satisfactory business dealings. Unquestioned integrity, unfailing courtesy, patience, tact, straightforward action, are all highly important qualities, as well as those essential from a strictly business point of view, such as critical knowledge of the goods, etc. Confidence and friendliness count more in South America than at home. Social qualifications are desirable. It has been said of the British that they were too cold and exclusive, that the Germans were more friendly. On the other hand, some Americans have felt that the South Americans did not care for more than a business acquaintance. This is doubtless true in many cases, but one who is cultured, sympathetic, and well mannered is likely to have social opportunities which he may accept to advantage.

Branch houses will best serve the large manufacturer, giving a standing not otherwise

attained, and best promoting permanent relations. From these houses salesmen go to neighboring territory. The manager must be a man of wide experience, familiar not only with the product and home matters, but with the language, customs, and business methods of the country in which he is located. Some corporations engage business houses in different sections as local representatives or distributors, with exclusive rights in restricted territory. Such arrangements, supplemented by advice and literature from the home office may prove effective in securing sales.

Those who cannot afford branch houses or the risk which may attend the cost of a traveling salesman's exclusive service are now able through the Webb-Pomerene law to coöperate with other houses in the same or in associated lines of industry. Both investigation and sales may thus be profitably conducted. Advertising only, without the employment of other agencies, has been highly profitable to many. It is said that advertising in South America brings better results than in the United States. To avoid utter waste of money careful investigation as to sales possibilities and media should be made before planning a campaign. One large mail order house has carried on an enormous foreign business. Other firms have accomplished much in a similar way. Advertising is done in journals and magazines published here and circulated there, in local publications of various kinds, in moving-picture houses; also by means of mailed circulars, and to some extent by electric signs.

The importance of correct technical and idiomatic translation in advertising in Spanish and Portuguese cannot be over-estimated. Gross and ridiculous errors

have been made in the past. A book knowledge of languages seldom prepares one adequately for such work. Foreign translators are more numerous than formerly, but they, also, too often make egregious blunders; not of the same character, but caused by their not comprehending exactly the English which they translate.

If indirect methods of trade are preferred as involving less risk, trouble, and preliminary expense, and if the medium is carefully chosen, it may be more profitable. Export commission houses or export agents will relieve the manufacturer of almost all care. One large commission house not only acts as selling agent for manufacturers through its branches in many parts of South America; it also operates steamship lines, carries on banking and exchange, and handles important financial transactions for South American Republics. Certain firms of national or worldwide reputation and large capital have for many years been satisfied to conduct their foreign trade through such a house. The opportunity for commission houses of this sort was not overlooked by foreigners and one company of these in New York did an annual business of $30,000,000 before the War.

The experience of a commission house is an asset, which saves many mistakes. Their experts have a wide range of information covering American and European competition, and details such as suitable patterns, correct packing, etc. The commission house may have its capital tied up for six months in transactions, or did prior to the more general use of the trade acceptance, while the manufacturer might receive cash for his goods. For small people this method of sales has many advantages, especially

when first launching into export trade. Conference and honorable coöperation are necessary and the protection of the commission house from direct under-selling or from other unfair dealings. The service of export agents is preferred by some, these acting as salesmen, forwarders, or shippers, either for one or more concerns, perhaps on salary and commission, or as independent agents.

After securing orders, by whatever means employed, the responsibilities of the shipping department begin. The principles governing the execution of orders would seem to be rudimentary. One wonders how a business in this country could achieve even a small measure of success when violating the most elementary rules of conduct. Yet this has been and still is done in South American trade as recent information from various sources shows, despite the fact that these things should go without saying, and furthermore that they have been iterated and reiterated for years.

First, the goods to fill an order should be precisely like the sample, if there was one, not something inferior, as has often happened, nor something just as good, or even better. If ordered without a sample strictest attention should be paid to prescribed details. If it is specified that cloth be $28^{1}/_{2}$ inches wide or 25 centimetres, that is what is wanted. If two-wheeled vehicles are ordered, what sort of business is it that permits of sending, by mistake, four-wheeled vehicles a distance of 5000 miles, even though the bill was made the same and the goods were more expensive? as was done by a well known manufacturer to his loss. The loss to the purchaser was greater, for the vehicles sent could not be used at all in that country.

The assumption that the seller knows better than the buyer what the latter wants is offensive if true. Generally it is not true. Mistakes are unpardonable. Requests for particular colors, patterns, size of bolt, and character of weave must be complied with if trade is wanted. The willingness of the Germans to oblige in such matters largely accounted for the rapid growth of their South American trade. The Latin American business men are as acute and intelligent as any. They know what they want and are discriminating buyers as to quality and price.

Criticism of the shortcomings of the home office is the second of the two forms previously referred to. Lack of accuracy and of attention to details is a grievous fault, apparently arising from want of discipline and thoroughness in our homes and schools, a fault recognized by many heads of offices here. The dishonesty of sending goods inferior to sample or order, a practice injurious to the entire national trade as well as to the guilty individual, shows an utter lack of patriotism, as well as folly if permanent trade is desired.

Another elementary matter is that of packing. Woful tales of breakage and loss from bad packing have been rife for years, and volumes have been written and spoken concerning it. In 1916 an experienced traveling man told me that before his last trip, in view of war conditions, he had taken on the agency of some new people and received many orders for them. He had sent explicit instructions as to packing and other export details. But now he found his new customers swearing mad and was booking no more orders for his new patrons: for they had paid not the slightest heed to his directions either as to packing or forwarding, with disastrous

results. In February, 1919, a letter from Brazil said: "We cannot imagine why your shippers ever accepted the travesty of an export bale dumped on you by the spinners, and we must clearly state that our factory will not accept any yarns which arrive in bad condition due to bad packing."

Unwillingness to profit by the knowledge and experience of others, the belief that one knows everything without learning anything, is called a peculiarly American trait, though happily it is not universal. The British not only pack and handle goods in the best manner, but they are careful to send and land them in all parts of the world by the best route and with the least expense to the receiver, as the world knows. Of course we can do the same if we take the trouble. The packing department for the soldiers overseas showed the highest excellence. The baling of clothes instead of boxing saved labor, box material, and two thirds of the space, and goods arrived in better condition. Fifty-five million dollars were saved at one plant in a year. Forty-nine million dollars of this was cargo space, other things were rent, freight, etc. Fifty-eight million feet of lumber of 30 years growth were spared. The burlap required would be useful in South America. Square packages instead of round are advantageous. Those who wish a share in foreign trade must take the pains to do everything right. The most careful man, familiar with the metric system, should be in charge. The scales should show pounds and kilograms, and figures be given for net weight, container, etc. Aside from careful packing to avoid breakage or other injury as from water, dampness, or pilfering, instructions are often given as to size and weight of package. Mules, donkeys, and llamas usually carry two packages, one on each side; the ordinary load of each is 200, 150,

and 100 lbs. respectively, though some mules will take 300 lbs. for a moderate distance. For the interior, especially on the North and West Coasts and in some sections on the East, these animals are the only means of transport, and goods must be packed accordingly; machinery in sections, etc. Many boxes of 1000 pounds weight have been left on the dock or at a railway station, the goods a total loss.

To arrange the packing with an eye to the custom house is important, both in order that the contents may be easily examined, and so that fines or exorbitant imposts may be avoided. Directions and governmental regulations as to giving separate weight of container and goods, and the separation of different classes of the latter must be scrupulously followed. Heavy fines are often imposed for trivial errors in packing or invoice, and corrections of any mistakes by cable are expensive if frequent.

Obligations of every kind should be fulfilled with fidelity though a bad bargain has been made resulting in financial loss. On the other hand consideration for the embarrassments of the buyer should be shown, whether these are purely personal or the result of national conditions such as followed the outbreak of the War or the conclusion of the Armistice. After the unexpected cessation of War many orders which had been placed here were suddenly cancelled under the supposition that coöperation such as had always been extended by European merchants would not be refused here. British representatives promptly *offered* to cancel orders for goods that the buyers might not care to receive under the changed circumstances, while the majority of Americans made many difficulties: a contrast in conduct liable to influence unfavorably

future trade, especially when added to the fact that vast numbers here cancelled orders and that the average American manufacturer had taken advantage of the situation created by the War to charge exorbitant prices in excess of those applying to domestic trade. Thus some manufacturers who have cried out about the bad faith of the South Americans, with no consideration for their difficulties, have forfeited their confidence and friendship, with a probable loss of future trade unless able to offer remarkably attractive bargains.

The utmost care should be taken in the shipping of goods as well as in the packing. Promptness is an important feature. Where regular sailings occur space should be engaged in advance, and the necessary papers accurately made out in good season, in view of the many copies of the consular invoices, the bills of lading, the clearance papers, and the short hours of some of the consulates. To avoid the trouble of attending to these and other elaborate details, many manufacturers find it convenient to employ a Freight Forwarder who looks after such matters including insurance of various kinds covering theft, damage, and total loss. He will know the most favorable trade routes, look after transfer and storage, and fill all requirements, if qualified for his job.

No dealings should be initiated in any country until after the registration of patents and trademarks.

Trouble should be taken to adjust any *bona fide* complaint and to satisfy reasonable customers. On account of length of time and distance, especial pains should be taken to avoid possible difficulty or disagreement.

The establishing of American banks in South America has been a boon to manufacturers. The

houses of Dun and of Bradstreet perform much service for their clients in the line of credit information. It has been suggested that the Government might collect information for general private use. It may be said that experience shows losses in foreign trade to be less than in domestic. Yet, as shysters exist everywhere, suitable precaution should be exercised, guarantees required, or the reliability of the house made certain.

The use of the trade acceptance, a negotiable note given by the purchaser to the seller of goods, now becoming general, is of great assistance to those who were deterred from entering South American trade on account of the long credits which seemed necessary. Foreign bankers invest in the commercial bills of other countries, knowing them to be convertible into cash in those countries. Private houses handling investments or commercial paper have added departments for dealing in acceptances. The subject of foreign exchange should be familiar, the fluctuations having an important bearing on purchasing power and trade, while exchange itself is dependent on foreign trade conditions, being an index of international transactions. Careful consideration of this matter is necessary in quoting prices. In normal times it was customary on English imports to reckon the pound as $4.90, and in export as $4.80 to cover incidental expenses.

In certain lines, for example, in hand-made goods, it is impossible for this country to face European or Asiatic competition. In some kinds of machine-made goods we excel. In lines where competition seems difficult the excellent suggestion has been made that costs may be reduced. The lowering of the daily wage has in some cases occurred; and more may be

accomplished by diminishing overhead expense. The high salaries of the heads and of numerous assistants in plants of moderate size and the expenses of salesmen are often unnecessarily large, giving rise to foolish and injurious extravagance, which indeed has permeated all classes of society. Carnegie while building up his Steel Company, and President McKinley smoked cigars costing five cents each, while some modern salesmen pay 50 cents for one, with other things in proportion. Some hotels charge 40 cents for a potato not costing one; a Washington hotel asks 60 cents for a slice of watermelon when a whole one is selling on the street for 15 cents. The head of a company suggests that by reducing one-third of the personal and family expenses for luxuries they will live longer and be happier; that one-third of the middle men might be cut out; that the office and supervising class could accomplish 25 per cent more and cut down office expenses one-third; that the laboring man could increase his efficiency and output one-third without injury and come nearer to earning his wages; and that the unreasonable waste of material should be diminished. I would however add that many heads of establishments and departments work harder and more hours than the ordinary office force or laborer.

One would naturally desire to have his firm name on such goods as permit this; “Made in U.S.A.” seems desirable where practicable. It has happened that Germans handling American machinery have covered such marks with their own. It may be noted that in South America many of the large mercantile establishments of various kinds, dry goods and others, are in the hands of British or German firms. A considerable portion of trade in the large cities is conducted by other than the native born.

For the best development of our foreign trade it is necessary that young men entering this field should be of higher type than the average in domestic affairs, particularly those who will go to foreign lands. The larger number may not be called upon to go outside of their town or country, as many must be engaged in the export department, at the factory or the seaport, or in commission houses and banks, as export agents or freight forwarders, etc. Others will go abroad as salesmen on tours, or to reside a few or many years in the capacity of local agents, in branch houses of large companies, civil and mining engineers, etc.

Many of both sexes have enough of the spirit of adventure to enjoy the prospect of at least a temporary residence in another land. It is to be hoped that those who desire the broader career will enter it not solely for the pecuniary reward but with something of the spirit which animated our soldiers, the knowledge that they may extend the prestige of their country and uphold the best traditions of democracy; with the feeling that their work, if well done, is patriotic in character, an essential and splendid vocation, a dignified career for the development of the commerce and the promotion of the welfare of a great nation. Character, the manners of a gentleman, and educational preparation are among the requisite qualifications. Of prime necessity is a familiarity with one or two foreign languages; also a training that will develop thoroughness and accuracy and the consciousness that these are essential. Nothing will accomplish this better than a good groundwork of Latin; which makes mere play the acquisition of any derived language like Spanish, French, or Portuguese. A sound understanding of Latin syntax is needed for

easy comprehension of these languages, with their varied forms and constructions, so different from our simple English, which indeed one who is ignorant of any other language hardly comprehends. The ability to conduct business correspondence correctly and with at least some degree of the elegance and courteous phraseology current in other lands where our brusque letters and speech are disliked if not resented: Knowledge of office routine especially as to the various papers to be procured and prepared in connection with foreign transactions: An acquaintance with the requirements of shipping practices, trade routes, types of vessels, freight rates, insurance of various kinds, loading and unloading facilities at different ports, and details as to the arrival and despatch of cargoes and vessels: A study of the principles of commercial law needed to enable one to decide business questions, disputes and misunderstandings, according to equity and international practice: A close study of the economic conditions which govern the production of the countries, of the social institutions and customs, of advertising needs and methods, of shipping facilities, of banking facilities and methods, credit practices and requirements, and any discrimination in tariffs or regulations:

A study of the foreign trade practices and methods of those countries already occupying these markets, the character and style of their goods and their methods of securing and holding business: Acquaintance with the financial and investment relations of other countries as affecting international trade; with foreign banking practices and with the mechanism of foreign exchange: A study of physical geography including the natural resources, climatic conditions, and characteristic peculiarities of each

country: A knowledge of the history and affiliations of the countries, with the character of their governments as likely to bear on their commerce:—All these are matters which must not be overlooked by any one who wishes to become an expert in foreign trade. Some acquaintance with the racial origin and relations of the nations, with their social customs, religious tendencies, and traditions may at times help in determining trade possibilities. It is important to realize that the cultivation of tact, dignity, and judgment is necessary for success as a foreign representative, and that such an one may prove a more valuable ambassador than some of those occupying such position, to whom a similar training would be of advantage.

Furthermore we must realize that no nation can sell largely abroad unless it buys also, and that we must purchase from South America if we expect to sell there. Fortunately they have many agricultural products, which we do not produce, and other raw material of which we have not sufficient. Yet probably we cannot take as much from them as we should like to sell. WE MUST therefore INVEST, now that we are a creditor nation, in the securities of others, the bonds of the countries and cities; we must send our capital to develop public utilities where these are lacking, as for sewerage and water supply. Electric lighting plants and power, docks and railways, have proved excellent investments. The better banking facilities now provided encourage these on our part. The British, French, and Belgians have been beforehand in this matter. The British have invested more than two billions in Argentina, $1,200,000,000 in Brazil, smaller sums in Uruguay and Chile. The Germans have not invested much money, their banks bringing chiefly credit and

making money by taking part of the business of local banks, a practice not conducive to popularity. The United States, i.e., some people, have invested $175,000,000 or more in Brazil, smaller sums in other countries. Large opportunities lie open in this direction.

That loans should be made to foreign countries only on condition that the money be spent *here*, seems a short-sighted policy, as also restrictions on our export of gold, when our excessive holding of that metal is a contributing cause of the unfortunate exchange situation. Many Republics need railways, for which construction material and equipment would be here purchased if here financed; but part of the money must be spent on the ground; so with works of irrigation and other public or private construction. If we must always be selfish, at least our selfishness should be enlightened, and we should realize that in the long run we shall gain more by manifesting a friendly spirit of service and coöperation rather than by showing intense eagerness for the “mighty dollar.”

CHAPTER LII
LIFE IN SOUTH AMERICA

While the variety of conditions in South America makes any treatment of this subject necessarily superficial, a few words beyond those already said may not be out of place, since it is evident that for the successful conduct of our trade many persons from the United States must spend some years or reside permanently in the several countries. From the descriptions given one should have a fair idea as to climatic conditions in these and make an intelligent choice of locality if any is offered. Some persons will be happy in warm Rio or even in more tropical Pará. Others will prefer Andean heights, from 7000 to 14,000 feet altitude, the higher for persons with sound hearts only. Most of the cities where one is likely to be stationed have a fairly temperate climate, and good health conditions, except as previously indicated.

In respect to social advantages there is considerable variety. In general the smaller the city the greater the hospitality and the more will one's society be cultivated, as is true in the United States also. On the other hand in the important commercial cities, the English-speaking folk are numerous enough to make an agreeable society for themselves, and some South Americans have made the criticism that the English and Americans hold aloof, apparently preferring their own company: a mistake from a business point of view and also nationally. One must, however, have the right qualifications for cordial recognition anywhere. It has been stated of Buenos Aires that the fact of membership in the

diplomatic corps did not entitle the gentleman and his family to more than official courtesies; to be received socially he must be *persona grata*. This is true to some extent everywhere. At the same time one who is at the head of a large commercial establishment is more likely to have social opportunities than members of the office staff, one of whom, a young man of unusually good manners and attractive personality complained to me in Lima some years ago, that he had no social opportunities. It is different now. On the other hand a young dentist in a city of Argentina where Americans are few associated with the best people and married into one of the first families.

At the mining camps of the Americans provision is now made for the social life of the employes and for exercise and recreation, also by other large corporations. In general I believe that men enjoy the life in South America better than their wives. Some of the latter decline to go or to remain after being there a while: a great mistake if they have any regard for their husband's welfare, unless the care of children or other serious matter compels their return. Many women are perfectly contented, this depending in some degree on their location, but chiefly upon their disposition. In the town of Sorata, Bolivia, I chanced to meet one who seemed perfectly happy, though she was the only English speaking woman in the place, or within 100 miles.

It is desirable for banks and business houses to give their young men sufficient salaries to permit them to marry and take their wives along. It will be better for both parties in the long run. Perhaps there are no more temptations than in our own large cities, but in most places there are fewer forms of

wholesome recreation. Too many men in cities and in mining camps have gone to pieces as they say.

Some men prefer life abroad for the reason that they feel less restraint than in their native home or even in our metropolis, rather than the responsibility which a real patriot should recognize of presenting the highest American ideals of manners, conduct, and business practices. If one cannot be contented without going somewhere every night, except in Rio or Buenos Aires he might be unhappy or worse. It would be well if persons everywhere had sufficient intelligence to enjoy themselves at home with a good book, a quiet game of cards, even cribbage; but especially books that are worth while, valuable as literature or as containing information about the world in general or on matters connected with business. “Movies” are found almost everywhere; in the larger cities, theatres and a long or short season of opera; clubs with opportunities for golf, tennis, and other sports; often horse races. In smaller towns horseback riding is a common, sometimes the chief diversion; but in such places one sooner enters the social life of the community. Some Americans say they would not take a wife to such a place, but if she is wise she will go.

Punctiliousness in dress as well as in manners is more highly regarded in South America than in the United States. Evening dress is more general in large cities than in most of ours, and correct afternoon dress for men is a more rigid requirement. Some persons on important missions have astonished the Latins by their negligence in this regard. Of course a gentleman is a gentleman the world over and such an one will have no trouble. It is unnecessary to imitate certain mannerisms of many South Americans, yet a

little more effusiveness is easily acquired and may be an improvement on the coldness of the Anglo Saxon. It will be noticed that men regularly lift their hats to each other, that they shake hands much oftener, when you come and when you go, make more inquiries after your health, etc. That they pat each other on the back, give mild hugs, or at times kiss one another (not you), will perhaps not seem so terrible as formerly, now that so much has been written about brave marshals and generals kissing soldiers on both cheeks when conferring decorations.

Courtesy must not be considered hypocrisy because phrases like “The house is yours” mean no more than our remarks “I am glad to see you” or “How are you?” though we may wish the caller in Africa and have no real interest in his health. Not everywhere is the same courtesy evident. On my first visit to La Paz in 1903 I noticed that men frequently stepped from the narrow sidewalk into the gutter to allow a lady to pass. More recently in a much larger city, still with some narrow sidewalks, I frequently stepped into the street myself to avoid crowding past a gentleman (?) who made no move to give way.

The cost of living is an item of practical interest. Some remarks on this subject have seemed to me exaggerated. Great diversity exists in this respect in the different cities: the larger the more expensive, as in the world generally. In most of the capital cities and chief ports rents are high; in some places many articles of food are dear with others cheap; similarly with dry goods and other articles, some higher than in New York, others lower. Recent unusual conditions have made sudden changes which may be repeated. Living expenses were increased by the War, and on account of the influx of foreigners for

business houses. In 1916 rents in Buenos Aires were lowered in the business centre; but they have now advanced to their former price or higher. Years ago one of our diplomats there paid more for his house rent than his entire salary on which others perhaps have managed to live.

In remote sections, for instance in the Huailas Valley, Peru, in 1906, a sheep cost $1, a lamb 40 cents, a chicken 15 cents, beefsteak, 9 cents a pound. The cook received $1.50 a month and board. Fresh fruit and vegetables were almost given away. In Lima then as now it was very different, some kinds of food were expensive, others cheap. Coal and kerosene oil are dear everywhere except in the Huailas Valley where coal is abundant with no market. In Buenos Aires a few apartment houses and hotels have hot water heating, but in many places in winter one freezes, or uses an oil stove or an electric heater, the former the cheaper and more effective.

Persons of adaptable disposition may spend a few years in South America with pleasure and profit, returning with broader minds, and with the ability to command higher salaries than if they had remained at home.

APPENDIX I
POSTAL REGULATIONS

Much repetition is avoided and probably greater convenience secured by presenting a summary of the Postal Regulations. All of the South American Republics are members of the Postal Union. In November, 1920, a Pan American Postal Federation was formed. According to the convention adopted, *domestic rates* will apply to letters, postal cards, and printed matter, among the various countries of Latin America and the United States, as soon as they have ratified the agreement. At present, October, 1921, this has been done by the United States and by the South American Republics, Argentina, Bolivia, Brazil, Colombia, and Peru. To these the letter rate is two cents, postal cards, one cent, return cards two cents; printed matter, newspapers and periodicals, one cent for four ounces. The old rates now effective in the other countries will doubtless soon be reduced, and should therefore be investigated.

Parcel post service has been extended so that parcels weighing up to 22 pounds may be sent to Argentina, Brazil, Colombia, Paraguay, and Peru. To Ecuador 20 pounds is the limit; to Bolivia, Chile, British, Dutch, and French Guiana, Uruguay, and Venezuela, 11 pounds is the maximum. The rate to all is 12 cents a pound or a fraction thereof; except that to Paraguay, on account of transit through Argentina, 30 cents additional must be paid for a parcel weighing 11 pounds or less, and 60 cents for one above that to 22 pounds. In Brazil, this service is

limited to Bahia, Bello Horizonte, Curityba, Manaos, Pará, Pelotas, Pernambuco, Porto Alegre, Rio de Janeiro (including Petropolis), Rio Grande do Sul, and São Paulo. Parcels are subject to customs duties, and these with other details should be investigated. Parcels may be registered for Bolivia, Brazil, British Guiana, Chile, Ecuador, Peru, Venezuela, but not for the other countries.

Money orders may be sent to Peru, Bolivia, and Uruguay.

Changes resulting from the Pan American Postal Congress at Buenos Aires in 1921 will be inaugurated January, 1923 or earlier.

Cable Facilities

On the North Coast, Cartagena has direct cable connection with Colon and so with New York. To Puerto Colombia a cable has been laid, which, however, December, 1921, has not yet been opened. A French company has a line from Salinas near Pará to Cayenne, Paramaribo, and Martinique, another from La Guaira, to Curaçao, and Santo Domingo. The Venezuelan Government has its own cable along the coast from Maracaibo, to La Guaira, Barcelona, and other points. A British line connects Georgetown, Guiana, with the Port of Spain, Trinidad.

The West Coast is connected with North America by three lines of the All America system: one from Nicaragua and two from Panamá to Santa Elena, Ecuador, one of the latter by way of Buenaventura and Esmeraldas. The three lines continue south to Callao, one touching at Paita. Two go on to Iquique and Valparaiso, one touching at Antofagasta, while a branch comes north from Iquique to Arica to make

connection with La Paz. A cable of another company from Callao touches at Mollendo, Arica, Antofagasta, La Serena, Valparaiso, and Concepción.

The East Coast is connected with the cables of the West Coast by three private wires of the All America Cables over the Andes from Valparaiso to Buenos Aires, so that they can handle messages to the Argentine metropolis, 7452 miles from New York, by automatic methods in 15 minutes. Another cable company has a land line from Valparaiso to La Plata, where connection is made with its Trans-Atlantic cable to Africa and Europe. Both companies have short lines to Montevideo, the focus of the East Coast lines. From here the All America has a cable to Santos and one to Rio de Janeiro. The other, the Western Telegraph, has one to Chuy, Uruguay, thence to Rio Grande do Sul, Santa Catharina, Santos, Rio de Janeiro, Bahia, Pernambuco, Fortaleza, Maranhão, and Pará, Brazil; and one from Chuy direct to Rio de Janeiro and Pernambuco. Four cables from the latter port connect with Africa and Europe. The Western Telegraph was to lay a cable from Maranhão to Barbados, there to connect with the Western Union line to Florida. The All America expects to lay a cable from Cuba south to Rio de Janeiro. The Amazon Company has a cable up that river from Pará.

Metric System

The Metric System of weights and measures is legal and official in all the Republics and obligatory in most, in Argentina, Brazil, Chile, Colombia, Peru, and Venezuela. In the other countries and in some of these, the old Spanish measures (Portuguese in Brazil) are more or less used, but these differ in the

various countries and are nowhere like ours. Always to employ the metric system is highly important and in the above mentioned countries necessary, though for shipping to some, the weight in pounds must also be given. In Chile the use of other weights and measures is prohibited; also in Uruguay, where their importation is forbidden.

APPENDIX II
LEADING BANKS OF SOUTH AMERICA

Including the branches and affiliations of American banks and banking houses, British banks, and the most important local banks of each country.

United States Banks

The National City Bank, 55 Wall St., New York City, which led the way, has branches in six of the South American Republics,

The Mercantile Bank of the Americas, 44 Pine St., New York,

The American Foreign Banking Corporation, 53 Broadway, New York,

W. R. Grace and Company's Bank, 7 Hanover Square, New York,

The First National Bank, 70 Federal St., Boston,

The American Express Company, 65 Broadway, New York, with offices in Buenos Aires, Argentina; Montevideo, Uruguay; and Valparaiso, Chile; and with correspondents in other cities, performs some banking service.

British Banks

Important banks with New York offices and with many branches in South America are:

The Anglo South American Bank, 49 Broadway, New York, affiliated with

The British Bank of South America, and with

The Commercial Bank of Spanish America, 49 Broadway, New York;

The London and River Plate Bank, 51 Wall St., New York,

The London and Brazilian Bank, 56 Wall St., New York,

The Royal Bank of Canada, 68 William St., New York.

Branches and Affiliations

National City Bank, Branches: Argentina, Buenos Aires, Rosario; Brazil, Rio de Janeiro, Santos, São Paulo, Pernambuco; Chile, Santiago, Valparaiso; Peru, Lima; Uruguay, Montevideo; Venezuela, Caracas.

Mercantile Bank of the Americas: Affiliated Banks: Colombia, Banco Mercantil Americano de Colombia, Bogotá Barranquilla, Cartagena, Medellín, Cali, Girardot, Manizales; Peru, Banco Mercantil Americano de Peru, Lima, Arequipa, Chiclayo, Callao, Piura, Trujillo; Venezuela, Banco Mercantil Americano de Caracas, Caracas, La Guaira, Maracaibo, Puerto Cabello, Valencia; Agency in Ecuador.

The American Foreign Banking Corporation: Argentina, Buenos Aires; Brazil, Rio de Janeiro.

W. R. Grace and Company's Bank: Argentina, Buenos Aires, W. R. Grace y Cia.; Bolivia, La Paz, W.

R. Grace and Company; Brazil, Rio de Janeiro, Grace and Company; Chile: Santiago, Grace y Cia., Valparaiso, W. R. Grace and Company, Iquique, Nitrate Agencies, Ltd.; Ecuador, Guayaquil, Guayaquil Agencies Company; Peru, Lima, W. R. Grace and Company; Venezuela, Caracas, Venezuela Commercial Company.

The First National Bank, Boston: Argentina, Buenos Aires.

The Anglo South American Bank: Chile, Antofagasta, Chillán, Concepción, Copiapó, Coquimbo, Iquique, Punta Arenas, Santiago, Talcahuano, Valparaiso; Argentina, Buenos Aires, Bahia Blanca, Comodoro Rivadavia, Mendoza, Puerto Deseado, Rio Gallegos, Rosario de Santa Fé, San Julian, San Rafael, Santa Cruz, Trelew; Peru, Lima; Uruguay, Montevideo.

The British Bank of South America: Argentina, Buenos Aires, Rosario de Santa Fé; Brazil, Rio de Janeiro, Bahia, Pernambuco, Porto Alegre, Rio Grande do Sul, São Paulo; Uruguay, Montevideo.

The Commercial Bank of Spanish America: Colombia, Bogotá, Barranquilla, Medellín; Ecuador, Guayaquil, Manta; Peru, Iquitos; Venezuela, Caracas, Puerto Cabello.

The London and River Plate Bank: Argentina, Buenos Aires, Rosario de Santa Fé, Mendoza, Bahia Blanca, Concordia, Córdoba, Paraná, Tucumán; Brazil, Rio de Janeiro, Pará, Maceió, Pernambuco, Bahia, Santos, São Paulo, Curityba, Pelotas, Porto Alegre, Rio Grande do Sul; Chile, Santiago, Valparaiso, Antofagasta; Colombia, Bogotá; Paraguay, Asunción; Uruguay, Montevideo, Salto, Paysandú.

The London and Brazilian Bank: Argentina, Buenos Aires, Rosario; Brazil, Rio de Janeiro, Manaos, Pará, Maranhão, Ceará, Pernambuco, Bahia, Santos, São Paulo, Curityba, Rio Grande do Sul, Pelotas, Porto Alegre; Uruguay, Montevideo.

The Royal Bank of Canada: Argentina, Buenos Aires; Brazil, Rio de Janeiro, Santos, São Paulo; British Guiana, Georgetown, Rose Hall (Corentyn); Colombia, Barranquilla; Uruguay, Montevideo; Venezuela, Caracas, Ciudad Bolívar, Maracaibo, Puerto Cabello.

Most if not all of the banks mentioned have correspondents or agents in the chief cities of the countries where they have no branches and some have connections in the smaller cities.

The Irving National Bank, Woolworth Building, New York, has correspondents in the principal cities of South America.

The Guaranty Trust Company, 140 Broadway, New York, is affiliated with the Mercantile Bank of the Americas and has other correspondents.

Other Important Banks in South America

Argentina: Buenos Aires, Banco de la Nación Argentina, with 18 branches in as many Argentine cities, Ernesto Tornquist and Company, Banco de la Provincia de Buenos Aires, American Bank of the River Plate; La Plata, the Central Bank of the Provincia de Buenos Aires, which has branches in many cities of the Province.

Bolivia: La Paz, Banco de la Nación Boliviana, branches in Cochabamba, Oruro, Potosí, Tarija,

Uyuni; Banco Francisco Argandoña, also in Cochabamba and Oruro; Banco Mercantil, also in Cochabamba, Oruro, Potosí, Tarija, Tupiza, Uyuni; Banco Nacional de Bolivia, branches in Cochabamba, Oruro, Potosí, Tupiza, Uyuni.

Brazil: Rio de Janeiro, Banco do Brasil, with branches in most of the Brazilian cities, Banco Nacional Brasileiro; São Paulo, Banco Commercial do Estado de São Paulo; Bahia, Banco de Bahia; Pará, Banco de Pará; Pernambuco, Banco do Recife; Bello Horizonte, Banco Hypothecario e Agricola de Estado de Minas Geraes; etc.

Chile: Santiago, Banco de Chile, branches in many cities; Banco Español de Chile with branches; Banco de A. Edwards y Cia.; Valparaiso, Banco de Chile y Argentina, branches in Punta Arenas, and also in San Julian and Santa Cruz, Argentina.

Colombia: Bogotá, Banco de Bogotá, Banco de Colombia. These banks have fewer branches, if any, than the Bancos de la Nación Argentina, de Brasil, or de Chile, Medellín has the Banco de la Mutualidad, Banco Dugand, and Banco Lopez, found also in Bucaramanga, and in other cities.

Ecuador: Guayaquil, Banco Comercial y Agricola, Banco del Ecuador, Mercantile Overseas Corporation, Juan Marcas y Cia., correspondent of the Guaranty Trust Company.

Guiana: British, Georgetown, Colonial Bank of London (22 William St., New York), branches in Henrietta and New Amsterdam; Dutch, Paramaribo, De Surinaamsche Bank; French, Cayenne, Banque de la Guyane.

Peru: Lima, Banco del Peru y Londres, branches in most of the Peruvian cities, Credito Hipotecario del

Peru.

Paraguay: Asunción, Banco Mercantil del Paraguay, branches in Concepción, Encarnación, Pilar, Villa Rica; Banco de la Republica, branch in Encarnación.

Uruguay: Montevideo, Banco de la Republica Oriental del Uruguay, with branches in many cities of the country.

Venezuela: Caracas, Banco de Venezuela, many branches; Banco de Caracas, some branches.

Other American Banks

with facilities for South American Trade are:

New York, American Exchange National Bank, 128 Broadway, Bank of New York, 48 Wall St., Battery Park National Bank of New York, 2 Broadway, Canadian Bank of Commerce, 16 Exchange Place, Lincoln Trust Company, 7 Wall St.

Boston, The Merchants National Bank, 28 State St.

Chicago, Central Trust Company of Illinois, 125 West Monroe St., Great Lakes Trust Company.

Cincinnati, The Fifty-Third National Bank.

Detroit, The Peoples State Bank, Fort & Shelby Sts.

Philadelphia, The Philadelphia National Bank, 421 Chestnut St.

Pittsburgh, Mellon National Bank, 514 Smithfield St.

San Francisco, The Crocker National Bank.

Additional banking information may be found in the Exporters' Encyclopaedia, annual edition; in

Commercial Travelers' Guide to Latin America, containing lists of banks for each city; and in the Bankers' Almanac and Year Book, London, annual, with complete lists of banks in the cities of all countries.

APPENDIX III
STEAMSHIP LINES TO SOUTH AMERICA

The North Coast

Colombia: Passenger and Freight Lines

NEW YORK to Puerto Colombia and Cartagena, Caribbean Steamship Company, 10 Bridge St., weekly, Five Continent Steamship Company, 2 Stone St., weekly, United Fruit Steamship Company Service, 17 Battery Place, weekly, also to Santa Marta.

BOSTON to Cartagena, Puerto Colombia, Santa Marta, United Fruit Company Steamship Service, Long Wharf.

NEW ORLEANS to Puerto Colombia, Pacific-Caribbean-Gulf Line, 630 Common St., fortnightly; Caribbean Steamship Company, Lykes Bros., monthly.

Grace Line, to Colombian ports, monthly.

Colombia: Freight Only

NEW YORK to Cartagena and Puerto Colombia, Tropical Steamship Corporation, 44 Whitehall St.

SEATTLE to Cartagena and Puerto Colombia, Tropical Steamship Pacific-Caribbean-Gulf Line,

A. M. Gillespie, Inc., Arctic Building, monthly.

Venezuela: Passengers and Freight

NEW YORK to La Guaira, Puerto Cabello, Maracaibo, Red "D" Line, 82 Wall St., weekly to La Guaira, fortnightly to the other ports.

To Ciudad Bolívar, Trinidad Line, 29 Broadway, fortnightly to Port of Spain, transshipment.

To Curaçao, Puerto Cabello, La Guaira, Cumaná, Carupano, and Port of Spain, Trinidad, Royal Netherlands West India Mail, Funch, Edye, and Company, 25 Broadway, fortnightly.

NEW ORLEANS to La Guaira, Puerto Cabello, Maracaibo, New Orleans and South American Steamship Company, Queen and Crescent Bldg., semi-monthly.

Grace Line to Venezuelan ports, monthly.

Venezuela: Freight Only

NEW YORK to La Guaira, Puerto Cabello, Maracaibo, Caribbean Steamship Company, 10 Bridge St., fortnightly.

NEW ORLEANS to La Guaira, Puerto Cabello, Maracaibo, Caribbean Steamship Company, Lykes Bros., monthly.

Guiana: British, Dutch, and French

British Guiana Passengers and Freight

NEW YORK to Georgetown, Quebec Steamship Company, 34 Whitehall St., every 10-14 days; Trinidad Line, 22 Pearl St., fortnightly; Royal Netherlands West India Mail, monthly, 25 Broadway.

NEW YORK to Georgetown, Paramaribo, Cayenne, Clyde Steamship Company, leave Pier 44 North River; fortnightly, freight only.

MOBILE to Georgetown, Windward Island Line, Passengers and freight, every three weeks.

Dutch and French Guiana: Passengers and Freight

NEW YORK to Paramaribo, Royal Netherlands West India Mail Line, 25 Broadway, monthly.

NEW YORK to Cayenne, Trinidad Line, 22 Pearl St., transshipment at Port of Spain.

The West Coast

Through Lines to Chile by Panama Canal, and from Pacific Ports.

Passengers and Freight

NEW YORK: Grace Line, 10 Hanover Square, fortnightly to Callao and Mollendo, Peru; Arica, Iquique, Antofagasta, Valparaiso, Talcahuano, Chile; 20 days to Valparaiso.

Pacific Steam Navigation Company, Sanderson and Son, 26 Broadway, monthly to Callao, Mollendo, Peru; Arica, Iquique, Antofagasta, Valparaiso, Chile; 20 days; a line

from Liverpool to same ports, also a line every three weeks from Arica to Iquique, Antofagasta, Valparaiso, Talcahuano, Coronel, Corral, Puerto Montt, Punta Arenas.

Compañia sud Americana de Vapores, Wessel, Duval, and Company, 25 Broad St., monthly to Guayaquil, Ecuador, Salaverry, Callao, Mollendo, Peru; Arica, Iquique, Antofagasta, Valparaiso, Chile.

SEATTLE AND SAN FRANCISCO: Grace Line, Hoge Building, Seattle, monthly to Talara, Paita, Salaverry, Callao, Pisco, Mollendo, Peru; Arica, Iquique, Antofagasta, Valparaiso, Chile; also to Ecuador.

PORTLAND AND SAN FRANCISCO: South American Line, to Guayaquil, Ecuador; Talara, Callao, Mollendo, Peru; Antofagasta, Chile.

Freight Only

NEW YORK to Peru and Chile, New York and Isthmian Steamship Lines, J. W. Ryan, 39 Cortland St., monthly.

West Coast Line, Wessel, Duval, and Company, 25 Broad St., monthly or oftener to Paita, Etén, Salaverry, Callao, Pisco, Mollendo, Peru; Arica, Iquique, Antofagasta, Taltal, Chañaral, Coquimbo, Valparaiso, Talcahuano, Chile.

Grace Line, Paita, Etén, Salaverry, Callao, Coquimbo, Valparaiso, Talcahuano, monthly.

Also from Baltimore, Clarence Cottman Company, according to demand.

BALTIMORE to Peru and Chile, Pacific Steam Navigation Company, Furness, Withy, and Company, 19 South St., monthly.

NEW ORLEANS to Ecuador, Peru, and Chile, New Orleans and South American Steamship Line Company, Queen and Crescent Bldg., monthly to Guayaquil, Ecuador, Callao, Mollendo, Peru; Arica, Iquique, Antofagasta, Valparaiso, Chile.

Grace Line, monthly to Ecuador, Peru, and Chile.

SEATTLE, PORTLAND, SAN FRANCISCO, AND SAN PEDRO to Colombia, Ecuador, Peru, and Chile, General Steamship Corporation, Colman Bldg., Seattle, every 20 days to Buenaventura, Colombia; Guayaquil, Ecuador; Paita, Callao, Mollendo, Peru; Arica, Antofagasta, Valparaiso, Chile.

SEATTLE to Colombia, Ecuador, Chile, Rolph Steamship Company, Hind, Rolph and Company, Henry Building, monthly to Buenaventura, Colombia; Bahia, Manta, Guayaquil, Ecuador; Arica, Iquique, Antofagasta, Valparaiso, Chile.

PORTLAND, OREGON, AND SAN FRANCISCO to Peru and Chile, Toyo Kisen Kaisha Oregon Pacific Company, Wilcox Bldg., monthly to Callao, Mollendo, Peru; Arica, Iquique, Valparaiso, Chile.

Colombia, Ecuador, and Peru

NEW YORK to Cartagena, Buenaventura, Guayaquil, Paita, Etén, Pimentel, Pacasmayo,

and Salaverry, every three weeks; freight only, Grace Line, 10 Hanover Square.

Colombia and Ecuador

NEW YORK: Pacific Line every three weeks to Buenaventura, Colombia; Esmeraldas, Bahia, Manta, Guayaquil, Ecuador; freight.

Colombia

NEW YORK to Buenaventura and Tumaco, Caribbean Steamship Company, 10 Bridge St., passengers and freight, monthly.

Other Lines with Transshipment at Colon

NEW YORK to Colon, Panama Railroad Steamship Line, 24 State St., weekly, passengers and freight; United Fruit Company Steamship Service, twice a week to Colon, passengers and freight; other service to Colon from Boston and New Orleans.

West Coast Lines from Colon and Panama

PACIFIC STEAM NAVIGATION, 26 Broadway, New York, fortnightly, to Paita, Pimentel, Etén, Pacasmayo, Salaverry, Callao, Cerro Azul, Tambo de Mora, Pisco, Lomas, Chala, Mollendo, Peru; Arica, Iquique, Antofagasta, Coquimbo, Valparaiso, Talcahuano, Penco, Tomé, Coronel, Chile; another line fortnightly to Buenaventura, Tumaco, Colombia; Esmeraldas, Bahia de Caraquez, Manta, Cayo,

Machalilla, Manglar Alto, Ballenita, P. Bolívar, Guayaquil, Ecuador.

COMPAÑIA PERUANA DE VAPORES (Peruvian Line), 32 Broadway, New York, every ten days to Guayaquil, Ecuador; Paita, Pimentel, Etén, Pacasmayo, Salaverry, Chimbote, Samanco, Casma, Callao, Cerro Azul, Tambo de Mora, Pisco, Lomas, Chala, Mollendo, Ilo, Peru.

COMPAÑIA SUD AMERICANA DE VAPORES, 25 Broad St., New York, fortnightly to Guayaquil, Ecuador, and primary ports of Peru and Chile; and by transfer to caletero boats serving Paita, Pimentel, Etén, Pacasmayo, Salaverry, Chimbote, Samanco, Casma, Huarmey, Supe, Huacho, Callao, Cerro Azul, Tambo de Mora, Pisco, Lomas, Chala, Mollendo, Ilo, Peru; Arica, Pisagua, Caleta Buena, Iquique, Tocopilla, Gatico, Antofagasta, Taltal, Chañaral, Caldera, Huasco, Coquimbo, Valparaiso, Talcahuno, Penco, Tomé, Coronel, Lota, Chile.

THE COLOMBIAN MARITIME COMPANY serves Buenaventura and Tumaco, Colombia.

The East Coast

Lines to Brazil, Uruguay, Argentina

From New York, Passenger and Freight

Lamport and Holt Line, 42 Broadway, fortnightly to Pernambuco, Bahia, Rio de Janeiro, Santos, Rio Grande do Sul, Brazil; Montevideo, Uruguay; Buenos Aires, Argentina.

Munson Steamship Line, 67 Wall St.,

fortnightly to Rio de Janeiro, Brazil; Montevideo, Buenos Aires.

Lloyd Brasileiro, 44 Whitehall St., fortnightly to Pernambuco, Bahia, Rio de Janeiro, Santos, Brazil.

Booth Steamship Company, 17 Battery Place, monthly or oftener to Pará, Manaos (transshipment for Iquitos, Peru), Maranhão, Ceará, Parnahyba, Maceió, Pernambuco, Cabedello, Natal; also semi-monthly service to Rio de Janeiro, Santos, and Rio Grande do Sul, with calls when required at Bahia, Victoria, Paranaguá, Florianopolis, and São Francisco.

Norton Line, Norton, Lilly, and Company, 26 Beaver St., passenger and freight service expected bi-monthly to Montevideo and Buenos Aires; sometimes to Rosario. Freight service semi-monthly to Montevideo, Buenos Aires, Rosario, occasionally to Santa Fé.

The Royal Mail Steam Packet Company has services from Liverpool and from Southampton to Brazil, Uruguay, and Argentina; also a Line around South America by the Straits of Magellan and through the Panama Canal, and vice versa, calling at the principal East and West Coast ports.

From New York, Freight Only

Munson Line, 67 Wall St., fortnightly to Rio de Janeiro, Santos, Montevideo, Buenos Aires.

Donald Line, Oriental Navigation Company, 39 Broadway, to Rio de Janeiro, Santos,

Montevideo, La Plata, Buenos Aires, Rosario.

Ward Line, New York and Cuba Mail Steamship Company, foot of Wall St., fortnightly to Pará, Maranhão, Ceará, Natal, Cabedello, Pernambuco, Maceió, Bahia, Montevideo, La Plata, Buenos Aires, Rosario.

Prince Line, Furness, Withy and Company, 34 Whitehall St., fortnightly to Rio de Janeiro, Santos, Rio Grande do Sul, Porto Alegre, Pelotas, La Plata, Buenos Aires, Rosario.

Commercial South American Line, Moore and McCormack, Inc., 5 Broadway, monthly to Pernambuco, Bahia, Rio de Janeiro, Santos, Paranaguá, Rio Grande do Sul, Montevideo, La Plata, Buenos Aires, Rosario.

National Line, National Steamship Lines, 11 Broadway, monthly to Pernambuco, Bahia, Rio de Janeiro, Santos, La Plata, Buenos Aires, Rosario.

New York and Argentine Steamship Company, 50 Broadway, fortnightly to Rio de Janeiro, Santos, Buenos Aires.

North and South Line, P. Kleppe and Company, 11 Broadway, monthly to Rio de Janeiro, Santos, Buenos Aires.

To Brazil Only

United States and Brazil Steamship Line, Arthur Lewis, 39 Cortlandt St., fortnightly to Bahia, Rio de Janeiro, Santos.

Prince Line, 34 Whitehall St., monthly to Pará, Pernambuco, Bahia.

Lamport and Holt Line, 42 Broadway, monthly to Pará, Maranhão, Ceará, Natal, Cabedello, Pernambuco, Maceió, Bahia.

Ward Line, foot of Wall St., monthly to Rio de Janeiro and Santos.

Argentina and Uruguay

Barber Steamship Line, 17 Battery Place, fortnightly to Montevideo, La Plata, Buenos Aires, Rosario.

Argentina Only

Houston Line, 17 Battery Place, fortnightly to La Plata, Buenos Aires, Rosario.

Kerr Steamship Company, 44 Beaver St., semi-monthly to Argentine ports.

American and Rio Plata Line, Houlder, Weir and Boyd, 24 State St., monthly to La Plata, Buenos Aires, Rosario.

Grace Line, 10 Hanover Square, monthly to Bahia Blanca, Puerto Madryn; also to Punta Arenas, Corral, and Coronel, Chile, returning by West Coast.

BALTIMORE: New York and Argentine Steamship Company, W. R. Wiest and Company, Marine Bank Bldg., monthly to Rio de Janeiro, Santos, La Plata, Buenos Aires.

Green Star Line, 17 South St., monthly to

Bahia, Rio de Janeiro, Santos, La Plata, Buenos Aires, Rosario.

BOSTON: Emery Line, 114 State St., monthly to Rio de Janeiro, Santos, La Plata, Buenos Aires, Rosario.

BRUNSWICK, GA.: "Sam Line," Strachan Shipping Company, monthly to Pernambuco, Rio de Janeiro, Santos, Buenos Aires.

CHARLESTON: "Sam Line," The Carolina Company, monthly to Pernambuco, Rio de Janeiro, Santos, Buenos Aires.

JACKSONVILLE: "Sam Line," Strachan Shipping Company, monthly to Pernambuco, Rio de Janeiro, Santos, Buenos Aires.

MOBILE: Munson Steamship Line, 67 Wall St., New York, fortnightly to Rio de Janeiro, Santos, Montevideo, Buenos Aires.

NEW ORLEANS: Lamport and Holt Line, Alfred Le Blanc, 833 Gravier St., monthly to Rio de Janeiro, Santos, Buenos Aires, Rosario, and up-river ports.

Ward Line, New York and Cuba Mail Steamship Company, Whitney, Central Bldg., monthly to Rio de Janeiro, Santos, La Plata, Buenos Aires, Rosario.

Delta Line, Mississippi Shipping Company, Queen and Crescent Bldg., monthly or oftener to Rio de Janeiro and Santos.

Isthmian Steamship Lines, Norton, Lilly and Company, Canal-Commercial Bldg., monthly to Buenos Aires direct; by transshipment to Rosario.

PHILADELPHIA: I. F. C. Line, International Freight Corporation, Lafayette Bldg., Philadelphia, 170 Broadway, New York, semi-monthly to Rio de Janeiro, Santos, La Plata, Buenos Aires.

SAVANNAH: "Sam Line," South Atlantic Maritime Corporation, 7 East Bay St., monthly to Pernambuco, Rio de Janeiro, Santos, Buenos Aires.

WILMINGTON, North Carolina: "Sam Line," Alexander Sprunt and Son, Inc., monthly to Pernambuco, Rio de Janeiro, Santos, Buenos Aires.

SEATTLE: Swayne and Holt Line, A. M. Gillespie, Inc., Arctic Bldg., monthly to La Plata, Buenos Aires, Rosario.

SAN FRANCISCO to East Coast via Straits of Magellan: Pacific-Argentine-Brazil Line, monthly to Santos, Montevideo, Buenos Aires; if sufficient freight, Bahia Blanca and Rosario.

Sailings of most of the Freight Lines are liable to some irregularity as to dates of departure and ports of call, according to the amount of freight offered.

Full information as to Steamship Lines of the United States to foreign ports may be found in the Exporters' Encyclopedia, annual editions, with Supplementary Bulletins.

The Commercial Travelers' Guide to Latin America (Filsinger) gives also European Steamship Lines to South America.

APPENDIX IV
PUBLICATIONS

Of value to persons interested in South American Trade.

The Bureau of Foreign and Domestic Commerce, Washington, D. C., has published many important pamphlets and a few books. A list of the publications available, with their prices, may be obtained from the Superintendent of Documents, Government Printing Office, Washington, or from the District offices of the Bureau, in New York, Boston, Chicago, St. Louis, New Orleans, San Francisco, Seattle. Besides the ordinary consular reports, the Bureau offers publications in the following groups: Special Agent Series, comprising monographs on special industries, countries, and phases of commerce; Special Consular Reports; Foreign Tariff Series; Industrial Standards; and Miscellaneous Series.

Periodicals

PAN AMERICAN BULLETIN, Pan American Union, Washington.

THE SOUTH AMERICAN, 310 Lexington Ave., New York.

THE PAN AMERICAN MAGAZINE, 70 Fifth Ave.,

New York.

PAN AMERICAN REVIEW, Pan American Society of the United States, 15 Broad St., New York.

COMMERCIAL AMERICA, Philadelphia Commercial Museum, Philadelphia, Pa.

WEEKLY EXPORT BULLETIN, Philadelphia Commercial Museum, Philadelphia, Pa.

EXPORT AMERICAN INDUSTRIES, 60 Church St., New York.

AMERICAN EXPORTER, Johnston Export Publishing Company, 370 Seventh Ave., New York.

DUN'S INTERNATIONAL REVIEW, 290 Broadway, New York.

THE WORLD'S MARKETS, 290 Broadway, New York.

EXPORT AND SHIPPING JOURNAL, Board of Trade Bldg., Portland, Ore.

EXPORT NEWS, 16 Beaver St., New York.

EXPORT TRADE, 280 Broadway, New York.

EXPORTERS' STANDARD, 15 Park Row, New York.

ELECTRICAL EXPORTER, 114 Liberty St., New York.

EXPORT RECORDER OF SHOE AND LEATHER INDUSTRY, 207 South St., Boston.

IMPORTERS' GUIDE, 47 Broadway, New York.

INTERNATIONAL CINEMA TRADE REVIEW, 1587 Broadway, New York.

INTERNATIONAL TRADE DEVELOPER, 168 Michigan Ave., Chicago.

IRON AGE CATALOGUE OF AMERICAN EXPORTS,

239 West 39th St., New York.

PACIFIC PORTS, 626 Central Bldg., Seattle, Wash.

PAN PACIFIC, 618 Mission St., San Francisco, Calif.

House Organs

AMERICAN EXPORT MONTHLY, Arkell & Douglas, 44 Whitehall St., New York.

EXPORT WORLD AND HERALD, American Trading Company, 25 Broad St., New York.

EXPORTERS' AND IMPORTERS' JOURNAL, Henry W. Peabody & Company, 17 State St., New York.

FOREIGN TRADE BULLETIN, American Express Company, 65 Broadway, New York.

DU PONT PRODUCTS, Du Pont de Nemours Export Company, 120 Broadway, New York.

GRAPHIC ARTS, Parsons & Whittemore, 799 Broadway, New York.

THE GRACE LOG, W. R. Grace & Company, 7 Hanover Square, New York.

Periodicals in Spanish or Portuguese

AMERICA, National Association of Manufacturers, 60 Church St., New York.

AMERICAN LEATHER, 41 Park Row, New York.

AUTOMOTIVE EXPORTER, 448 West 37th St., New York.

BOOT AND SHOE RECORDER, 207 South St., Boston.

CINE MUNDIAL, 516 Fifth Ave., New York.

DUN'S INTERNATIONAL REVIEW, 290 Broadway, New York.

EL ARTE TIPOGRAFICO, 32 Burling Slip, New York.

EL AUTOMOVIL AMERICANO, 239 West 39th St., New York.

EL CAMPO INTERNATIONAL, 2 West 45th St., New York.

EL COMERCIO, 114 Liberty St., New York.

EL ESCRITORIO, 32 Burling Slip, New York.

EL INDICADOR MERCANTIL, 1328 Broadway, New York.

EL INGENIERO Y CONTRATISTA, 161 Water St., New York.

EL MERCURIO, 635 Common St., New Orleans, La.

EL MUNDO AZUCARERO, 407 Carondelet St., New Orleans, La.

EL NORTE AMERICANO, 310 Lexington Ave., New York.

EL REPORTER AMERICANO (Shoe and Leather), 166 Essex St., Boston.

EMPRESA, John W. Thorne & Company, 165 Broadway, New York.

EXPORTADOR AMERICANO, 370 Seventh Ave., New York.

FERRETERIA, Hurt Bldg., Atlanta, Ga.

GEYERS' REVISTA INTERNATIONAL de Papeleria, etc., 175 Fifth Ave., New York.

INGENIERIA INTERNACIONAL, Tenth Ave., at 36th

St., New York.

LA HACIENDA, 775 Main St., Buffalo, N. Y.

LA INDUSTRIA, 114 Liberty St., New York.

O ENGENHEIRO E EMPREITEIRO, 161 Water St., New York.

OFFICE APPLIANCE EXPORTER, 417 South Dearborn St., Chicago.

PICTORIAL REVIEW, 222 West 39th St., New York.

REVISTA AMERICANO FARMACIA Y MEDECINA, 66 West Broadway, New York.

VOGUE, 19 West 44th St., New York.

All the above publications are in Spanish except O Engenheiro, which is in Portuguese; La Hacienda and Dun's International Review have both Portuguese and Spanish Editions.

The Pan American Bulletin has Spanish and Portuguese editions, differing from the English edition.

Some Useful Books

Of fairly recent date

THE COMMERCIAL TRAVELERS' GUIDE TO LATIN AMERICA (with separate maps), by E. B. Filsinger. No. 89 of the Miscellaneous Series of the U. S. Bureau of Foreign Commerce, 1920, 592 p., $1.25, contains a vast amount of detailed information as to routes of travel and cities, large and small. With the

correction of some obvious errors now proceeding in a revision, the second edition will be of immense value to the persons for whom it is designed, and highly useful in the home office. The maps, included in the low price, perform a genuine and needed service, though not entirely accurate.

ENCYCLOPEDIA OF LATIN AMERICA: Marion Wilcox and G. E. Rines, editors, New York, 887 p. $10.

THE SOUTH AMERICAN TOUR, A Guide, by Annie S. Peck. George H. Doran Company, New York, 1913, ’16, ’20. Pronounced in 1916 by the Director of Commerce and Industry of Argentina, the best and most accurate book on South America that he had seen. 400 p. $3.00.

A GUIDE TO SOUTH AMERICA, by W. A. Hirst. MacMillan Company, London, 1915. 340 p. $1.75.

THE GREAT SOUTH LAND, The River Plate and Southern Brazil of To-day, by W. H. Koebel. Dodd, Mead & Co., 1920. 314 p. $4.50.

PAN AMERICAN COMMERCIAL CONGRESS, Proceedings, 1919. Pan American Union, Washington. $3.00.

ANGLO SOUTH AMERICAN HANDBOOK, by W. H. Koebel, 1921. Macmillan Co. $7.50.

THE SOUTH AMERICAN YEAR BOOK AND DIRECTORY, 1915. Louis Cassier Co., London (International Book Co., New York). 600 p. $8.50.

LATIN AMERICAN YEAR BOOK FOR INVESTORS AND MERCHANTS. Criterion Newspaper Syndicate, New York. $3.00.

THE STATESMAN’S YEAR BOOK. Macmillan Co., New York.

SOUTH AMERICA, PAST AND PRESENT, by L. C. Bollo, 1919, Whitehall Bldg., New York. 218 p. $3.00.

THE STATES OF SOUTH AMERICA, by Charles Domville-Fife. Macmillan Co., New York, 1920. Concise, unusually accurate and valuable.

GLIMPSES OF SOUTH AMERICA, by F. A. Sherwood. Century Co., 1920. 406 p. $4.00.

UNDERSTANDING SOUTH AMERICA, by C. S. Cooper. Geo. H. Doran Co., 1918. 426 p. $2.50.

THE GULF OF MISUNDERSTANDING, by Tancredo Pinochet. Boni & Liveright, New York, 1920. 275 p. $2.50.

MEN, MANNERS AND MORALS, IN SOUTH AMERICA, by J. O. Bland. Charles Scribner's Sons, New York, 1920. $4.00.

UNITED STATES AND LATIN AMERICA. Doubleday, Page & Co. $2.50.

Books on Individual Countries

Argentina

ARGENTINA Y SUS GRANDEZAS (with map), by Blasco Ibanez. E. P. Dutton, 1921. $12.00.

ARGENTINA, by G. J. Mills. D. Appleton & Co., 1914. 209 p. $3.00. Good handbook.

ARGENTINA AND URUGUAY, by Gordon Ross. Macmillan Co., 1916. 308 p. $4.25.

ARGENTINA IN THE TWENTIETH CENTURY, by A. B. Martinez and M. Lewandowski. Scribner, 1915.

THE ARGENTINE YEAR BOOK. R. Grant & Co., Buenos Aires, 10th ed., 1919. Donnell & Palmer, Whitehall Bldg., New York. $4.50. Gives commercial laws, regulations, statistics, information on trade and industry, etc.

FIVE MONTHS IN THE ARGENTINE FROM A WOMAN'S POINT OF VIEW, by K. S. Dreier. F. F. Sherman, 1920. $3.50.

BAEDEKER OF THE ARGENTINE REPUBLIC, by A. B. Martinez. D. Appleton & Co.

ECONOMIC DEVELOPMENT OF THE ARGENTINE REPUBLIC IN THE LAST FIFTY YEARS. E. Tornquist & Co., Buenos Aires, 1919. Pamphlet, 328 p. Free.

Bolivia

BOLIVIA: ITS PEOPLE AND ITS RESOURCES, by Paul Walle. Scribner, 1914. 407 p. $4.50.

GUIA GENERAL DE BOLIVIA; Commercial, Industrial, etc., 1918, by R. and V. Heredia. Imprenta Artistica, La Paz, Bolivia. 1959 p.

REPORT ON THE DEVELOPMENT OF COMMERCIAL RELATIONS BETWEEN THE UNITED STATES AND BOLIVIA, by J. L. Tejada, Second Pan American Financial Congress, Pan American Union, Washington, 1920. 55 p. Free.

Brazil

BRAZIL, TODAY AND TOMORROW, by L. E. Elliott. Macmillan Co., 1917. 338 p. $2.50. Good.

BRAZIL IN 1919, by J. C. Oakenfull, Commission of Economic Expansion of Brazil, U. S. Organization

Office, 50 Church St., New York. Important.

ECONOMIC NOTES ON BRAZIL, by I. S. Lopes, Ministry of Agriculture, Industry, and Commerce, Rio de Janeiro, 1919. 103 p.

NORTH BRAZIL, by E. C. Buley. D. Appleton, 1914. 216 p. $3.00.

SOUTH BRAZIL, by E. C. Buley. D. Appleton, 1914. 216 p. $3.00.

THE SEA AND THE JUNGLE, by H. M. Tomlinson. E. P. Dutton, 1920. $5.00. Delightful.

Chile

CHILE INDUSTRIAL, by P. L. Gonzalez, Soc. Imprenta y Litografia Universo, Santiago, Chile, 1919. 244 p.

CHILE, ITS LAND AND PEOPLE, by F. J. G. Maitland. Francis Griffiths, London, 1914. 293 p. $2.75.

CHILE, by G. J. Mills. D. Appleton. 193 p. $3.00. A practical handbook.

Colombia

BLUE BOOK OF COLOMBIA, Colombian Consulate, 17 Battery Place, New York, 1918. English and Spanish. 725 p. $15.00. Varied and valuable information.

COLOMBIA, by P. J. Eder. Scribner, 1917. 312 p. $4.50.

COLOMBIA, by V. Levine. D. Appleton, 1914. 220 p. $3.00.

COMERCIO EXTERIOR DE LA REPUBLICA DE COLOMBIA; por Direccion General de Estadistica, Imprenta Nacional, Bogota, 1919. 498 p.

Ecuador

ECUADOR, by C. R. Enock. Scribner, 1914. 375 p. $4.50.

The Guianas

BRITISH, DUTCH, AND FRENCH GUIANA, by J. Rodway. Scribner, 1912. 318 p. $4.50.

BRITISH GUIANA COMMERCIAL HANDBOOK, compiled by Comptroller of Customs. The Argosy Co., Georgetown, B. G., 1920. 36 cents.

Paraguay

PARAGUAY, by W. H. Koebel. Scribner, 1917. 348 p. $4.50.

Peru

PERU, by E. C. Vivian. D. Appleton, 1914. 235 p. $3.00. Good handbook.

Uruguay

URUGUAY, by W. H. Koebel. Scribner, 1911. 350 p. $4.50.

Venezuela

VENEZUELA, by L. V. Dalton. T. Fisher Unwin, London, 1918. 320 p. $4.50.

Valuable articles may be found in many magazines. Monographs of the different countries have been published by the Pan American Union and by the Bureau of Foreign Commerce.

Books on Foreign Trade

AMERICAN BUSINESS IN WORLD'S MARKETS, by J. T. M. Moore. Geo. H. Doran Co., 1919. 320 p. $2.00.

AMERICAN FOREIGN TRADE, Charles M. Pepper. Century Co., 1919. 350 p. $2.50.

AMERICAN MANUFACTURERS' EXPORT ASSOCIATION YEAR BOOK, 300 p. $3.00.

EXPORT TRADE DIRECTORY, Johnston Export Publishing Co., New York, Annual. $10.00.

EXPORTERS' ENCYCLOPEDIA, Exporters' Encyclopedia Co., 280 Broadway, New York. Annual. $15.00. Necessary Book of Reference with supplementary bulletins.

EXPORTING TO LATIN AMERICA, by E. B. Filsinger. D. Appleton, 1916. 565 p. $3.25. Comprehensive and valuable.

GETTING TOGETHER WITH LATIN AMERICA, by A. Hyatt Verrill. E. P. Dutton, 1918. $2.00.

INSTRUCTION BOOK FOR EXPORT PACKING OF ENGINEER MATERIAL, Engineer Corps, U. S. Army, Washington. 63 p. Free; important.

NATIONAL FOREIGN TRADE CONVENTIONS, PROCEEDINGS OF. Yearly, 1914-21 Valuable addresses, National Foreign Trade Council, India House, New York. $2.00 each.

PAN AMERICAN COMMERCE. Report of Pan American Commercial Conference, June, 1919; Pan American Union, Washington, 1919. 473 p. $3.00.

PRACTICAL EXPORTING, by B. Olney Hough. Johnston Publishing Co., New York, 4th ed., 1919. 529 p. $5.00. Useful book by a recognized authority.

PRINCIPLES OF FOREIGN TRADE, by Norbert L. Savay. Ronald Press, New York, 1919. 495 p. $4.00.

SELLING LATIN AMERICA, by W. E. Aughinbaugh. Small, Maynard & Co., Boston, 1915. 408 p. $2.00.

ADVERTISING FOR FOREIGN TRADE, by W. E. Aughinbaugh, Foreign Editor N. Y. Commercial. Century Co., New York, 1921. 300 p. $3.00.

SOUTH AND CENTRAL AMERICAN TRADE CONDITIONS OF TO-DAY, by A. Hyatt Verrill. Dodd, Mead, 1919. $1.50.

THEORY AND PRACTICE OF INTERNATIONAL COMMERCE, by A. J. Wolfe International Book Co., New York, 1919. 548 p. $5.00. Text Book of import, export, and banking practice.

TRADING WITH LATIN AMERICA, by E. B. Filsinger, Irving National Bank, New York, 1917, 1919. 186 p.

On Banking

ACCEPTANCE CORPORATIONS, and other pamphlets, issued by the Acceptance Council, 111 Broadway, New York, 1919.

ACCEPTANCES: Other pamphlets on this subject issued by the American Exchange Bank, N. Y., 1918, 79 p.; by Guaranty Trust Co., N. Y., 1918, 72 p.; by National City Bank, N. Y., 1918, 56 p.; by Merchants and Metals National Bank, N. Y., 1918, 50 p.; Trade Acceptance Review and other Pamphlets, Irving National Bank, N. Y., Foreign Financing under the Edge Act, Guaranty Trust Co., 1919, 40 p.; Handbook of Finance and Trade with South America, 1919, and Latin American Monetary Systems and Exchange Conditions, National City Bank; all free if available.

FOREIGN CREDIT INFORMATION, R. G. Dun, N. Y., 1919. 24 p. Free.

FOREIGN EXCHANGE EXPLAINED, by Franklin Escher. Macmillan Co., 1917 (reprint 1920). 219 p. $1.25.

FOREIGN EXCHANGE; Theory and Practice, by Thomas York. Ronald Press, N. Y., 1920. $2.50.

On Commodities

MINERAL DEPOSITS OF SOUTH AMERICA, by Miller and Singewald. McGraw-Hill Book Co., N. Y., 1919. 598 p. $5.00.

COCONUTS, KERNELS, CACAO, AND EDIBLE VEGETABLE OILS AND SEEDS OF COMMERCE; a practical handbook by H. O. Newland. J. B. Lippincott Co., Phila., 1919. 111 p. $2.50.

PITMAN'S COMMERCIAL COMMODITIES AND INDUSTRIES; a series of 27 illustrated volumes, each $1.00, on Coal, Coffee, etc. Isaac Pitman & Sons, London and N. Y.

WORLD'S FOOD RESOURCES, by J. Russell Smith.

Henry Holt & Co., N. Y., 1919. 634 p. $3.50.

WHAT BRAZIL BUYS AND SELLS, Ministry of Agriculture, Industry, and Commerce, Rio de Janeiro, 1918. 95 p.\

On Shipping

INFLUENCE OF THE GREAT WAR UPON SHIPPING, by J. Russell Smith. Oxford Univ. Press, N. Y., 1919. 357 p.

OCEAN STEAMSHIP TRAFFIC MANAGEMENT, by G. G. Huebner. D. Appleton, 1920. 273 p. $3.00. Appleton Shipping Series. Other volumes to appear.

PORTS AND TERMINAL FACILITIES, by R. S. MacElwee. McGraw-Hill Co., N. Y., 1918. $3.00.

PRINCIPLES OF OCEAN TRANSPORTATION, by E. R. Johnson and G. G. Huebner. D. Appleton, 1918. $2.75.

SHIPPING'S SHARE IN FOREIGN TRADE, Fundamentals of Ocean Transportation. Guaranty Trust Co., 1919. 30 p. Free.

Geographies, Maps, etc.

COMMERCIAL GEOGRAPHY, by G. G. Chisholm. Longmans, Green & Co., London and New York, 1918, 8th ed. 666 p. $7.50.

SOUTH AMERICA, a Geography Reader, by Israel Bowman. Rand, McNally & Co., Chicago, 1915. 354 p. 75 cents.

SOUTH AMERICA, by N. B. Allen. Ginn & Co., Boston, 1918. 413 p. 96 cents.

ATLAS AMERICANA LATINA, General Drafting Co., New York, 1919. $20.00. New maps and charts by experts. English and Spanish text.

COMMERCIAL ATLAS OF AMERICA, including South America in four sections. Rand, McNally & Co., Chicago, 1921. $35.00. Wall Map, of South America, 46 × 66, $10.00, $15.00. Pocket Maps, 4 sections, each 35 cents.

COMPARATIVE WALL ATLAS OF SOUTH AMERICA, George Philip and Son, London Geographical Institute.

LONDON TIMES SURVEY ATLAS OF THE WORLD, 1920.

THE DAILY TELEGRAPH VICTORY ATLAS OF THE WORLD, London, 1920.

BUSINESS ATLAS OF ECONOMIC GEOGRAPHY, C. S. Hammond & Co., N. Y. 88 p. $1.50.

SOUTH AMERICA, Maps, Richard Mayer, 70 Wall St., New York. Many sections, 42 × 30 inches. Each section, paper, $15.00, linen $17.50. Key map showing finished sections on request. Railroads and Mineral Conditions.

COMMERCIAL MAP OF SOUTH AMERICA, Scale 1:1,000,000, J. G. Bartholomew, London and Edinburgh. 3 s.

COMMERCIAL MAP OF LATIN AMERICA, 23 × 33 inches, Irving National Bank, New York.

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ATLAS DO BRAZIL, by Homem de Mello, Rio de

Janeiro, 1907.

MAPPAS DO BRAZIL, SOCIEDADE NACIONAL DE AGRICULTURA, 1907.

MAPA DE CHILE (Government), 1910.

ATLAS ARGENTINO, 1898.

No attempt has been made to supply complete bibliographies. Other works are listed in various books and in Government pamphlets. An excellent series of bibliographies recently published in The World's Markets may now be available in pamphlet form through the courtesy of the Service Department of Dun's International Review, 290 Broadway, New York, to which the author is much indebted.

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The figures in black face indicate references of especial importance.—Ordinary contractions are used, as *R.* for river, *Ry.* railway, *V.* for valley, etc.—As *ch*, *ll*, and *ñ* are regarded in Spanish as distinct letters, *ch* follows all the *c's*, *ll* the *l's*, and *ñ* the *n's*.—For additional agricultural and mineral products, see under the individual States.

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Page 361: "west of Montevido" changed to "west of Montevideo"

Page 471: "Buenventura and Tumaco" changed to "Buenaventura and Tumaco"

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