

CHAPTER IX

THE REPUBLICS OF THE ANDES—BOLIVIA

The great mountain republic of Bolivia, notwithstanding that it has been, to the outside world, little more than a name, partakes very largely in both the historical and topographical interest of its more prominent neighbour Peru, with which it has much in common, and of which in viceregal times it formed part. The same vast mountain range of the Cordillera of the Andes—more stupendous indeed in some respects than in Peru and Ecuador—dominates the land and has determined its life, character, and environment. The people who dwell there, and the social system, share equally with Peru their origin, but preserve their own traditions and individuality.

Bolivia is bounded on the west, and shut off from the Pacific coast, by Peru and Chile. on the east and north lies the enormous expanse of Brazil, and on the south Argentina and Paraguay. Thus the republic is entirely an inland country, without direct access to the seaboard: a condition due to the loss of the littoral province of Antofagasta in the Chilean war. It is partly as a result of this isolation that Bolivia has remained comparatively so little known to the outside world, and that its economic development has been so long delayed. Bolivia is the third political division in point of size in South America, estimates of its area varying between 520,000 and 703,000 square miles; nearly two-thirds of the country lie within the Andean mountain zone: the remainder forming part of the great Central Plains of the continent.

The Andes reach their greatest width and development in this part of South America; displaying colossal parallel

ranges crowned with snow-capped peaks and enclosing broad tablelands and profound river valleys. The snowy range extending from mount Sorata or Llampu, to mount Illimani, in an unbroken line, is one of the most striking portions of the Andes; as is well seen from the west in crossing lake Titicaca: and the great lacustrine basin of Titicaca, the lake and the desolate *punas* or plains surrounding it, are overlooked by a number of snow-clad peaks, ranging from 19,000 to 21,000 feet elevation. Bolivia, although lying entirely within the tropics, is, like Peru and Ecuador, characterised by climatic conditions of an Arctic nature in its rugged, elevated territory. The mountain masses of Bolivia form one of the most impressive and inclement regions in the world: and possess features of considerable interest and economic value. Thus, the greater part of the west and south central portions of Bolivia is mountainous, and many of the loftiest summits of the Western Hemisphere, the main line of heights, are contained in the different ramifications of the Eastern Cordillera, or Cordillera Real. Between this and the Western Cordillera is included part of the great plateau and interior basin, the Altiplanicie Central, about 500 miles in length, with an elevation of 12,000 to 13,000 feet, the northern half of which is occupied by lake Titicaca, and the southern parts by lake Poopo or Aullagas, and other saline bodies of water. These constituted at one time a vast united inland sea, the outlet of which was through the Beni river, to the Amazon, through the gorge of La Paz, as before described. The loftiest mountain summits are the non-volcanic peaks of Illampu, 21,490 feet, and Illimani, 21,190 feet, both in the department of La Paz. Huayna Potosi, between these, has an elevation of 20,260 feet. Potosi, upon this mountain, is the highest town in the world.

Bolivia is, however, by no means of an entirely mountainous or elevated nature: for more than a third of its area is composed of alluvial lowlands. North and east of the mountains the country falls away in vast, undulating plains to the valleys of the Amazon basin, and the Gran Chaco of Argentina. A part of this great lowland region is covered

with extensive swamps, subject to inundation and of little use at present for pastoral or agricultural purposes: but the extensive llanos, or plains, of Guarayos and Mojos, contain rich agricultural districts, where cattle-raising has been successfully carried on since the industry was introduced by the Jesuit missions in past centuries. These great plains and the valuable forestal areas, and the fertile sub-tropic valleys in the lower Andean region, redeem the country from a natural reproach of sterility; and they demonstrate its capabilities for sustaining a large population. The outlet for the great plains is the Madeira river and its tributaries, which are being improved for navigation to the Amazon: especially by the Madeira-Mamore railway: and to the affluents of the River Plate, with their outlet through the republics of the Plate.

The variations of temperature experienced in Bolivia, due to elevation, as opposed to latitude, are very marked. Upon the high tablelands, or *puna brava*, as the natives term the cold highlands, in distinction to the *yungas*, or lowlands, furious storms are encountered, with striking electrical effects, as described elsewhere. Lake Titicaca is at times lashed to fury by these storms. The lower *punas* from 11,000 to 12,500 feet, which include most of the great central plateaux of Bolivia, have two seasons: winter and a cold summer-autumn, too short for the production of any crops except barley and potatoes. Above this the *puna brava* extends, a bleak, inhospitable region, whose only inhabitants are scattered miners and shepherds; and bands of alpacas, llamas, and vicuñas; and sheep where the scanty vegetation affords any means of livelihood for such. The tin mines of Bolivia have acquired some importance: they are situated in extremely high bleak regions, where the conditions of life are trying for the foreigner. The mining communities in this part of South America form the highest inhabited places on the globe.

The total population of Bolivia is estimated at nearly three million, more than half of which are Indians, 40 per cent. mestizos, and the remainder whites, more or less mixed with the mestizos. As in Peru and the other Andean countries,

the Indians of the highlands are those who lived under the semi-civilisation of the Incas, and are now Christianised. The Indian of the forests, the Guayos and Chiquitos and others, are distinct; but they were organised and taught by the Jesuits, and since the expulsion of these have retrograded somewhat. The Indians' worst vice is the excessive use of alcoholic drinks, for which they will barter almost anything. The fiery rum they consume is manufactured largely in the sugar estates of Bolivia and Peru. Sunk in a lamentable state of ignorance, due partly to this defect and to the attitude of the ruling and propertied classes, these generally peaceful and industrious people show little or no signs of social advancement: nor can it be said that they are increasing in numbers, except in respect of one or two tribes, who in the lowlands enjoy better conditions. Of the savage tribes of Indians in the very remote and practically unexplored regions little is known; and they still dwell unmolested in almost impenetrable wilds. The mestizos, who number about half a million throughout the country, are also extremely backward, taking into consideration the advantages of the Spanish language and possibilities of civilisation which they possess. They are often apathetic, superstitious and intemperate, and the century of self-government which Bolivia has enjoyed has not shown much result. It would be unfair, however, to suppose that they differ greatly in these matters from their neighbours, and it cannot be doubted that education may in time bring about their development as a useful and active people, and upon them the country must mainly depend for labour. Much good might be brought about by vigorous immigration, and of this the governing classes are generally aware; and efforts are made to encourage immigrants. But time must elapse before the tide of emigrating humanity from Europe is likely to be directed to such remote regions.

The city of La Paz, the principal city of the republic, is attaining growing importance due to increasing railway building. It is served by the line from Antofagasta, on the Chilean coast, the seaport formerly belonging to Bolivia; and the railway which reaches the capital via

Uynini and Oruro, skirting lake Poopo. The southern railway of Peru, from Mollendo, Arequipa and Puno, via lake Titicaca, and the new railway from Arica to La Paz both put the city in communication with the coast, and thus it enjoys three routes of access. From Uynini a line to the south at Tupiza, when completed, will unite the railway system of the republic with that of the Argentine, which would be of great importance, as this route will give Bolivia an outlet by rail to the Atlantic. The construction of other lines is projected towards the navigable affluents of the Amazon, mainly the Beni, which is the principal waterway of Bolivia. The government of the republic is committed to a vigorous railway-building policy, limited only by its financial resources, which there is tendency to tax too heavily, as later observed. It is but a few years since La Paz was isolated from the world, without means of transport except that of ill-maintained coach and mule roads, and the advent of the railway brings the community to another age. The approach to La Paz by rail is striking and peculiar. Traversing the high uplands after ascending from the coast, the line approaches the edge of a deep precipice, and the city is suddenly seen in its marvellous valley 1,000 feet below, spreading out with its towers, buildings, parks, and avenues seen in miniature, reminiscent of a relief map or model. The descent to the city from the plateau is performed by an electric railway, which descends the side of the great barranca, or valley.

La Paz is not the political capital of the country, that distinction belonging to Sucre, a town of less importance. The population of La Paz is estimated at about 107,000. The city shares the characteristics of its sister mountain capitals of Spanish America, especially of Quito and Arequipa, in the presence of a large Indian population, whose national dress and primitive occupations form a strongly contrasting background for the upper classes, with their Europeanised manners and costumes. The sandalled and poncho-covered Indian in the streets and plazas rubs shoulders with the black-coated professional and upper classes, and contrasts with the Parisian attire of their ladies

The Indians form about 35 per cent. of the inhabitants of the city, and constitute its menial and poorest class. The white population, numbering some 40,000 souls, constitutes the ruling and professional classes. They are descendants of Spaniards and other Europeans who have remained unmixed, or only partially mixed, with the aboriginal inhabitants; and in them is mainly vested the wealth and education of the community. They are lawyers, doctors, bankers, business men, statesmen, politicians, and so forth, and form a class much apart. The membership of the senate and congress are drawn from this class, which holds all the official posts. They dress well, after the manner of London or Paris, and are to be seen, as in Lima or Mexico, or other Latin American capitals, in the theatres and cafés whenever opportunity presents. The women dress equally well, often extravagantly, after the manner of the Latin American upper class generally, who are notably addicted to extravagance in dress; but they are of the attractive and affable character which is a pleasing feature of the Latin American woman; and the invigorating environment of the mountains has produced in Bolivia a complexion less pallid than among the women of the coast cities. The mestizo class, between whom and the whites no hard and fast line can be drawn in the upland regions, forms about 32 per cent. of the population of La Paz, and to them fall the petty town industries of small shopkeeping; and they are also mechanics, artisans, domestic servants and the like.

Due to the elevation above sea level, of 11,000 feet, the climate of La Paz is bracing, often cold for the European, and the cold is felt more keenly by reason of the absence of fires in the houses. The mean annual temperature is 50° F. Stoves are not used in La Paz, and this is the usual Spanish American custom; the inhabitant considers that pulmonary troubles accrue from the use of such. Pneumonia and bronchial complaints are common, but consumption is rare.

The river Chuquiapo, upon which La Paz is built, in the deeply-wooded valley of the Cordillera Real, was, it is considered, the outlet of lake Titicaca in earlier times. The valley is of a barren nature, and its precipitous sides, scarred

by torrential rains and dyed by solutions from mineral ores, rise 1,500 feet above the city to the margin of the great Titicaca plateau: the city lies in the *puna* elevation and zone, notwithstanding its situation in the depression, and the summers are short and cool. The valley descends thence through a more fertile region to the temperate, and lower down to the tropical zone. The transverse streets of the city are steep and irregular, the ground rising rapidly from the river, and are generally narrow and roughly paved, with numerous small bridges. The cathedral was begun at the time when the mines of Potosí were pouring out their wealth, but was never finished, due to the poverty of the community later. It has a finely-carved stone façade, facing upon the great plaza. There are other notable buildings of brick and stone, but the houses of the poor are of mud. Among them is the old San Andre university, in which fortunately are preserved many relics of the Inca ruins of Tiahuanaco and elsewhere; saved from the vandalism of the modern railway builders, who took away trainloads of prehistoric stone blocks and sculptures to form bridges and warehouses.

Bolivia is divided into eight departments and a territory, as follows (estimate of 1918):

DEPARTMENT	AREA Sq miles	POP.	CAPITAL	POP
La Paz	53,777	734,000	La Paz	107,300
El Beni	102,111	50,000	Trinidad	3,200
Oruro	19,127	137,000	Oruro	6,100
Cochabamba	23,328	513,000	Cochabamba	30,800
Santa Cruz	141,368	328,000	Santa Cruz	25,800
Potosi	48,801	516,000	Potosi	30,000
Chuquisaca	26,418	320,000	Sucré	11,700
Tarija	33,036	160,000	Tarija	30,800
Nat. Territories	192,260	63,000	Riberalta	1,000

There are no other populous towns beyond the provincial capitals. Four of these capitals, those of Sucre or Chuquisaca, La Paz, Cochabamba and Oruro, have at different times served as the national capital. After the revolution of 1898 the capital was fixed at La Paz, which is the commercial metropolis, and more accessible than Sucre. Among the smaller towns which have attained some prominence

due to some special industry or commercial position may be instanced the Huanchaca mining centre of Pulacayo, with a population of 8,000, where more than 3,000 men are employed in the silver mines and works of this important mining company; Uyuni, with a population of 3,000, at the junction of the Pulacayo branch line with the Antofagasta and Oruro railway, where converge several important highways and projected railways; and Tupiza, with a population of 2,500, the commercial and mining centre near the Argentine frontier, and the terminus of the Argentine railway extension into Bolivia. All these towns are in the department of Potosi. Viacha, with a population of 2,000, is a station on the railway from Guaqui to La Paz, fourteen miles from the latter, and the starting point of an important projected railway to Oruro. In the department of Cochabamba is Tarata, with 5,500 inhabitants, and Totorá, with 4,500, two trading centres of some importance; and in the department of Santa Cruz is Ascension, with a population of 5,800, with a large mission station in the Chiquitos hills.

The government of Bolivia is a highly centralised as opposed to a federal system, representative according to its constitution, but autocratic in its working. The constitution of 1880 was a model in its form and intention, like those of the Latin American republics generally; a result of the lawyer-like temperament of their statesmen. The Executive is composed of the president, vice-presidents, and five ministers of state, whose portfolios are: foreign relations and worship; finance and industry; interior and "fomento"; justice and education, and war and colonisation. The legislative branch consists in the senate and chamber of deputies; the first of sixteen members, two from each department, elected by direct popular vote for a period of six years with one-third retiring every two years; and the second of seventy-two members, elected for four years, one half retiring every two years. Suffrage is exercised by all male citizens twenty-one years of age, if married, or eighteen if unmarried, who can read or write or own real estate or have an income of 200 bolivianos per annum. The electoral body is by these reasons small, and no matter

what party is in power the community is ruled and controlled by a political oligarchy. The Judiciary consists in a national supreme court, and eight superior district courts, and lesser officials. The departments are administered by prefects, appointed by the president, and in their turn they appoint all subordinate officials, sub-prefects, *alcaldes* and *corregidores*; there are no legislative assemblies in the departments, and the system of government easily tends to become autocratic. Given the sparsely settled regions and character of the people this is to a certain extent inevitable.

Education in Bolivia is backward, and only a small proportion of the people can read and write, but under the free and compulsory educational system, the number of schools is increasing considerably of late. Spanish, which is the official language, and that spoken by the educated and mestizo classes, is in a minority, the people generally speaking their aboriginal Quechua, Aymara, and Guarani tongues; and these form the bulk of the population. Many of the schools are entirely of modern equipment, and there are a number of foreign teachers. There are only two universities in Bolivia which possess more than one faculty, those of La Paz and Sucre, at both of which degrees may be obtained in law, medicine and theology; while at La Paz there is also a commercial faculty. There is a normal school for training teachers of Indians at La Paz; also a normal school for teachers, and a national school of commerce, with a women's section. The total number of schools in the republic is 1265, with about 60,000 pupils. There are Boy Scout and Girl Guide organisations, which have been well received by the public. The schools known as the American Institute at La Paz and Cochabamba have met with considerable success and receive a government subsidy. The national mining school has acquired some importance, and the engineering profession should attract the Bolivian.

As regards the church, the Bolivian state supports the Roman Apostolic religion, and public worship is prohibited by law, as in Peru, except in the foreign colonies, where it is tolerated, and this toleration is tacitly extended to resident foreigners of other religions. The census of 1900

shewed 1,609,000 of the Roman Catholic population, and 24,300 of other creeds. The Indians greatly reverence the clergy—reverence mixed with the superstition of their ancestors ; and they are deeply influenced by the ceremonies of the church, which are scarcely modified since the early Spanish times. Bolivia contains an archbishopric and three bishoprics. Mission work among the Indians is in charge of the Propaganda Fide, which has five colleges and a number of missions, with a state subsidy, and some 20,000 Indians are directly controlled. The religious orders maintain several convents.

Industrial activity in Bolivia is in a rudimentary condition. Herds of cattle and horses are maintained on the plains, and meat is supplied, both fresh and as jerked beef, from the *saladeros*, or salting establishments, for home consumption. The breeding of llamas and alpacas on the high uplands is a peculiar industry of Bolivia, as it is in Peru ; and the upland flocks supply the world's demand for the various classes of the wool, including the vicuña wool. The natives weave their own garments, employing primitive spindles as in the time of the Incas, and looms of rude early Inca or colonial type, as described for Peru. They produce an excellent home-spun, and very fine fabrics are woven both from sheep and vicuña wool, the women being especially expert : and the fabrics thus manufactured by the women often bring a high price. Formerly the Cholos of Bolivia and Peru made their own beautiful dyes, but these are being supplanted by the cheap German article, and the same is happening with the woven fabrics to some extent, to the impoverishment of these excellent cottage industries. The llama and alpaca were domesticated by the early Peruvians far back in history before the Spanish advent, whilst the vicuña and guanaco are wild and are encountered in great bands or smaller groups by the traveller on these inclement uplands. The llama is the most valued possession of the native. It performs all his carrying trade, except where mule-trains are in use, and marches along at four miles an hour, carrying up to 100 lbs., feeding itself as it goes. Its coarse wool furnishes the material for the native's clothes, from which

the Indian and his women weave their cloth, sometimes resembling in pattern and texture a British tweed. The llama is the only hoofed ruminating quadruped or beast of burden that America, in its pre-Hispanic condition, produced, and prior to the advent of the horse and ox was the only servant of man upon the desolate steppes of the Andes, and remains so over vast areas to-day.

The fauna also includes deer, the monkey, tapir, wild boar, wolf, chinchilla, anteater, jaguar, foxes, wild cats, ostrich, condor, flamingo, parrot, wild turkey, bird of paradise, quail, snipe, and all kinds of water-fowl. The forests are characterised by a great variety of genera and species: a single acre of land may contain hundreds of different trees and shrubs, with many orchids and other rare and beautiful flowers and timbers.

Among agricultural products maize and potatoes were valuable native foods before the Spanish advent, and are the staple articles of diet. The sugar-cane plantations of the lowlands are largely devoted to the production of rum, which commands a good sale; and the manufacture of this *aguardiente* is often more profitable than that of sugar. Its consumption, however, is a serious vice, and is extremely detrimental to the Indians, but national interests are unfortunately often secondary to private profits and the sale to the Indians of alcohol continues. The Indians are also fond of the cakes of brown sugar, which are largely consumed. Tobacco, cocoa, coffee, all of excellent quality, are grown in the warm valleys of eastern Bolivia, but have no market beyond the local one. Coca, which produces the leaf so highly prized by the Cholo population of Bolivia and Peru for its sustaining qualities, and which is the raw material of cocaine, is cultivated to a considerable extent in Bolivia, as is the quinoa, a valuable product and staple article of food among the natives of the Andes. The Bolivian cinchona bark yields the highest percentage of quinine sulphate of any in the Moñtana, and large areas of virgin forests of the trees exist, although they are diminishing rapidly.

Notwithstanding its great natural resources, the cost of

food and living, fuel and other matters in the Bolivian capital is often very high, and has increased rapidly of late. The fault is laid by local economists partly to the high freight charges on the railways and an increase of commercial activity resulting on the increased production of tin, and to heavy importations of gold by the banks as a reserve. The prices of various articles of common consumption in such situations is very high; even those procurable in the country. It is a common condition of Latin American towns that small local supplies, fresh vegetables and so forth, are difficult to obtain, the result of indolence or ignorance in matters of market gardening. Imported tinned goods are largely consumed by the upper classes, but these are expensive.

Fuel in Bolivia is also exceedingly high-priced. Coal on the railways to the coast costs £8 per ton, and in the Potosi mines, £14; in the town of Potosi wood fuel costs £6; charcoal, £7 10s.; yareta and taquia, the vegetable and animal fuels before described, £1 6s. per ton. The exploitation of the petroleum beds should be of value in this connection.

As shown, manufacturing in Bolivia is still in a primitive condition, textile fabrics being made largely as cottage industries; and fine, serviceable fabrics are made in the Andean departments, as in Peru. Saddlery and tanning are carried on with excellent results, and robes and rugs from alpaca skins are made, for which there is a demand. Native industry also supplies cigars and cigarettes, soap, candles, hats, gloves, cheese, pottery, and starch. Some of the Bolivian pottery is excellent and of handsome appearance, and the ceramic art was largely inherited from the Incas. Sugar is made by old-fashioned methods, and there is some production of wines and spirits.

Water power is one of the native assets of Bolivia, which will doubtless be more fully developed in the future.

The flora of Bolivia is extremely varied, embracing both the products of the cold and tropical zones. Among the alimentary plants are the following: wheat, corn, chickpeas, beans, manioc, bananas, sweet and white potatoes, barley,

rice, pea-nuts, olives, almonds, cacao, coffee, and nutmeg, and many others. There are many kinds of fine woods suitable for all industrial purposes, such as railway ties, building and cabinet making, some of which are as hard as iron, and valuable from that reason. Rubber, Peruvian bark, and a multitude of medicinal plants abound in this soil, and among the indigenous plants are the palm, cacao, bamboo, the maté (or Paraguay tea), and the coca. The export of rubber reaches some 5,000 tons. Bolivia produces also balsam, bananas, vanilla, copal, cotton, coffee, sugar, tobacco, corn, potatoes, the chirimoya, farina, and sarsaparilla. The coffee and cocoa are conceded to be of the finest quality. The Bolivian Indians chew large quantities of the coca leaf. Fruits and all tropical products are abundant, where cultivated.

The mineral resources of Bolivia are very important, if, with the exception of tin, comparatively little exploited. The gold mines have been accredited from an early date with a large production, estimated, as from the middle of the sixteenth century to the end of the nineteenth, as having yielded a value of more than £450,000,000, largely from placer mining. The value of the annual output of gold is about £70,000 per annum; and that of silver more than £500,000. The Potosi mine, with a large output of silver during viceregal times, was one of the most famous in the world. After the Conquest the Spaniards rapidly extended their search for gold and silver throughout the land. In 1548 Alonzo de Mendoza founded La Paz—to-day one of the principal cities in the republic—attracted thither by the rich gold ore of the rivers of that section. The mines of Chiquiaguillo have produced great quantities of gold and nuggets of considerable size and value, and in 1718 the Marquis de Castel-Fuerte sold, among other nuggets, one encrusted in quartz weighing 52½ ounces, of which 47 were gold. The city of Potosi was founded in 1545, and fifty years later it had reached a population of 160,000, due to the enormous richness of the mountain at whose foothills the city stands. The city became a goal for all classes of adventurers: bankrupt Spanish nobles, merchants anxious

to acquire rapid wealth, and all kinds of men contributed to make Potosi a centre of prodigality, romantic adventure, revelry and disorder. The chronicles of the city are interesting, and depict the customs of those ages, with all their preoccupations and superstitions, the spirit of chivalry and love of adventure. Spanish hidalgos prided themselves on squandering great fortunes in feasts and revelry, which often caused jealousy and strife among the bands into which the city was divided.

Religious fanaticism also was a characteristic of the times: and in order to insure their salvation or pardon for their sins, the miners gave very large sums of money for the building of churches or convents, as was also done in Mexico, and for this reason it is that in the old Spanish American mining towns many churches are found to-day. The mines of Potosi had been worked by the Incas, and at night, their historian records, the hill was lighted up by their innumerable little furnaces, called "guayras," wherein the force of the wind was employed in primitive smelting.

Silver was first discovered at Potosi in 1545, and the yield up to the present time from the mines has exceeded three billion dollars. The production of tin follows immediately after that of silver, the chief centre being Huanuni. Gold is found in the Andes and in the several departments of La Paz and Santa Cruz; the gold washings of Tipuani have yielded large results. Copper mining has been extensively developed, especially in the districts of Corocoro and Chacarilla. Opals, diamonds, emeralds, and topazes are found. The value of silver exported in 1918 was 7,500,000 bolivianos, with 26,000 tons of copper: in 1897 the production of tin was about 3,000 tons, but reached 17,000 in 1905, and 49,000 tons in 1918. The development that railway facilities will offer to this industry, as well as to the general progress of the country, will doubtless be considerable. The exploitation of these mineral resources has been hindered by the distance of the mines from navigable water, and the expense of transporting the metal to the coast, but since the advent of the railways and the discovery of coal, which is found in

the departments of Beni and Chuquisaca, the revival in mining enterprise has been noticeable.

Probably the obstacles offered by the vast mountain walls of the Andes to free traffic and means of communication are compensated by the prodigious quantity of minerals these contain, and the region of the Cordilleras must be regarded as a great storehouse of natural wealth. The silver mines of Potosi, Oruro, Colquechaca, Huanchaca, and many others, have contributed hundreds of millions to the richness of the world; and no less important are the deposits of copper, bismuth, zinc, cobalt, gold, and tin.

Tin to the value of more than £2,000,000 annually has been shipped from the tin mines; a single Bolivian mine-owner draws 300,000 dollars yearly from this source. The principal deposits of tin ore are found in the eastern highlands of the main Cordillera; Sorata, Illimani, Huayna and Potosi. The majority of the deposits are still unworked, and may be expected to yield largely in the future. La Paz is the principal mining district in the north, Oruro in the centre, Chorolque in the south, and Potosi in the east. Oruro may be regarded as the central point of the tin-producing industry. An outstanding feature of the Bolivian tin deposits is that they were first worked for silver, and whilst some of them still produce it, in others the metal has entirely disappeared and given place to tin ores. Huanani, the richest of the tin mines in the department of Oruro, lies some fifteen miles from the Antofagasta railway. The Cerro de Pozcani mine is in a wild, broken, mountainous district at an elevation of 10,000 feet, and a number of lodes have been exposed, one yielding up to 20 and 50 per cent. of cassiterite. The Morococala mine, south of Huanani, has a vein of twelve to fifteen feet wide. In northern Bolivia the Huayna-Potosi mines, north of La Paz, and the Inquisivi mines are prominent, lying in the highlands at the southeastern extremity of lake Titicaca—mines with strong lodes of good width and of high-grade cassiterite ore, at elevations of 16,000 feet, and capable of a large output when fuller development shall have been undertaken. The relatively slow development of the industry, however, lies in the meagre

railway facilities in these high mining districts of the Andes. British, French, Chilean and other capital is invested in the working of the tin deposits, which are perhaps the most valuable in the world.

The occurrence of petroleum in Bolivia is a fortunate one : and as a consequence of surveys of the petroliferous formation occurring in the south-eastern frontier of Bolivia, interest has been displayed in acquiring mining rights in that region, with a view to its exploitation. The existence of oil has been proved along a belt of country extending from north-west to south-east, a distance of over 150 miles, down to the Argentine boundary at Yacuiva. Thus, the petroliferous zone traverses the eastern provinces of Santa Cruz, Sucre, and Tarija, and continues into the Argentine republic to Comodoro Rivadavia, where noteworthy results have been obtained by recent borings. About 66,000 hectares have been taken up in holdings, embracing altogether about 230 square miles of ground in the oil-bearing region. A law was sanctioned at the end of the year 1911 exempting the holders of mining lands, for the production of petroleum, peat, coal, lignite, naphtha and sulphur from the annual fiscal tax for a term of five years. As the projected Yacuiva-Santa Cruz railway must cut through the centre of the oil-bearing region, the difficulties of transport will be obviated in the near future. The production of oil would be of great advantage to Bolivia, where no coal measures of commercial importance are as yet known to exist.

The great geological agencies that have transformed the continent of South America, and produced the uplifting of the Andes are very marked in Bolivia. The high plateau occupies an area of more than 66,000 square miles, with a mean altitude of from 10,000 to 13,000 feet above sea level : and the forests and vast plains extending eastwards, with about 7,000 miles of navigable rivers, comprise a fertile agricultural territory embracing more than 304,000 square miles.

The hydrographic system and rivers of Bolivia fall into three divisions : the Amazon, the Plata, and the Central Plateau or Titicaca systems. The first embodies the rivers which traverse the country, flowing north directly and

indirectly into the Madeira, one of the largest tributaries of the Amazon, with the smaller affluents of the Acré and Purus in the north; a drainage area comprising more than half the surface of the republic. The Mamoré and the Beni unite to form the Madeira in latitude $10^{\circ} 20'$ south. The Mamoré is 600 miles long, three-quarters of which length is navigable from Chimoré, at an elevation of 925 feet above sea level, to the rapids, and runs mainly through a vast level plain. Its principal tributary is the Guapay or Grande, rising to the east of lake Aullagas, with a tortuous, obstructed course, 700 miles long. The Beni and its great affluent, the Madre de Dios, are of smaller volume but greater economic importance, as they are navigable, and the region drained is of much fertility and dowered with great forests. The railway improvements around the rapids of the Madeira-Mamoré are one of the most valuable economic developments in the heart of South America, as described in the chapter on the Amazon valley. Bolivia formerly possessed a fluvial port at Puerto Acré on the Acré river, to which ocean steamers could ascend from Pará, but this was first disputed and then acquired by Brazil. The south-east drainage basin of Bolivia, that of the Paraguay river of the Plate system, is smaller and of less economic importance than the foregoing. The main stream is the Pilcomayo, rising on the east slopes of the Eastern Cordillera near the southern extremity of the Aullagas plateau, and flowing east and south-east through the Sierra region to the Bolivian Chaco. When the trade of southern Bolivia in the future greatly develops, the opening of a navigable channel in the Pilcomayo may be undertaken, giving river communication directly with Buenos Ayres and the Atlantic. Due to the nearly level country traversed, the current of this river is sluggish and its channels generally obstructed, but little is known of its tributaries in the Chaco. Another considerable stream of the region, which becomes lost in the great swamp areas of the Bolivian plain, is the Parapiti, which flows for about 150 miles. The third hydrographic system is that of Titicaca and the Desaguadero river, elsewhere described: and the boundary line of Bolivia traverses lake Titicaca midway.

The conditions of climate, temperature, rainfall, and seismic and other phenomena in Bolivia are of extreme peculiarity and interest. Although the territory lies within the torrid zone, the temperature is not that corresponding to such a zone; it varies according to altitude, latitude, nature of soil, direction of the winds and distance to the Cordilleras. In the valleys, within a few hours, temperature will show a variation from 54° to 62° F., while in the vicinity of the mountains the change is from 46° to 59° F. At an altitude of 9,800 feet the annual mean temperature is 46° F., while at an elevation of 14,700 feet it is 42° F. Sorata is a town at 8,900 feet and distant about six miles from the region of perpetual snow: it is situated in a valley, and the climate is mild and soft, notwithstanding its proximity to the snow. Generally speaking, the climate is healthful and suitable for settlement by European races. The mean temperature of the lowlands of the Amazon up to an altitude of 2,000 feet above sea level is 74°, to an altitude of 8,000 feet it is 66°; and in the Central Plain, where the altitude varies from 10,000 to 12,000 feet, it is 50°. The mountains are covered with perpetual snow, and on the highest tablelands there is frost every night in the year, but the air is dry and pure. At Potosi, which has an elevation of about 13,300 feet, the nights are always piercingly cold, but the rays of the sun are hot and powerful between 2 and 5 p. m. La Paz, at an elevation of 12,000 feet, has a mean annual temperature of 50°. Between the altitudes of 9,500 and 11,000 feet the climate is temperate, and wheat and maize are cultivated, while in the tracts of the *Medio Yungas*, which descend to about 5,500 feet, the climate is such as to permit of the successful cultivation of both tropical and semi-tropical fruits. This is the zone of the great cinchona forests, whose luxuriant development is one of the marked features of the flora of the Eastern Andes. "Perpetual summer," as it has been termed, reigns in the lowest regions, or *Yungas*, comprising the territory below 5,000 feet, producing all tropical fruits and vegetation; and the northern plains have a hot, humid atmosphere, and are covered with dense forests.

As described, the eastern region contains valuable grazing-lands, where the cattle industry may become lucrative. At present large herds of wild cattle exist in these great plains.

Owing to the peculiar topographical formation of the country, electric and other phenomena are of constant occurrence, the principal zone where such disturbances take place being the Altiplanicie or Great Plateau. As the atmosphere is heavily charged with electricity, both in summer and winter, dry or electric storms are of frequent occurrence both on the plateau and in the valleys. Before the rainy season sets in electrical accumulation becomes marked on the plateau region, its most violent manifestations taking place toward the eastern section of the tablelands. An electrical storm in these regions is always a most imposing spectacle, as the tremendous force of the wind, almost equal to a hurricane, and the heavy electrical accumulation in the clouds produce terrible atmospheric explosions and violent detonations, while the surface of the ground sparkles and crackles.* During this season, when there have been no electrical storms for several days, large masses of clouds hang over the Cordillera, covering it almost to its base, rising or descending, according to the variation of the temperature of the lower atmospheric strata. In such case the accumulated clouds become luminous at night, shedding a tremulous bright halo, accompanied by intermittent flashes of most vivid light, until every mass of clouds becomes a powerful centre of incessant detonations, producing a constant low rumbling sound. Sometimes this phenomenon takes place at a single point, as happened in 1878, when the Illampu peak, near the town of Sorata, suddenly became brilliantly lighted, while its surroundings were in total darkness. Besides these phenomena, mirage is also remarkable, notably on the Oruro plains, toward the Atacama desert and in the Upper Chaco, especially during the winter.

Bolivia has but a small portion of its territory lying within the area of volcanic disturbance. The Bolivian Andes do not show any volcanic signs, except in the western branch of the Cordillera. Under these conditions the central section

* Foreign Office Report.

of the country is comparatively free from violent earthquakes, the few shocks experienced being the last vibrations of the seismic waves originating in the Andes Chain. Severe shocks were felt in the central section in August, 1892, and July, 1896. In April, 1582, a portion of the plateau south of the city of La Paz suddenly collapsed, forming the Achocalla valley. At the beginning of the sixteenth century the town of Ancoanco (south-east of La Paz) disappeared entirely, its site being marked at present by swamps and lagoons. In 1837 one-half of the Quilliquilli hills, near La Paz collapsed, and in 1873 the land near Ancoanco again suffered a similar depression. The great basin where La Paz is situated is in reality the result of a geological depression, which changed the Choqueyapu river. In the eastern section of the republic seismic disturbances are but rarely felt. There is a tradition that a town disappeared at a place called Opaburu, in the department of Santa Cruz. Not very long ago the town of Tacuru, in the same department, disappeared under an eruption of mud, which eventually formed a lake, the waters of which rose 35 feet, drowning the entire population of the district. Thermal springs are abundant in Bolivia, their temperature varying greatly. It cannot be doubted that many elements of future value exist in these high, remote regions, little suspected at present.

The construction of railways in Bolivia, or the intention for such, has been the most marked feature of economic policy of the republic: as if Bolivia, long shut in and isolated, were resolved to free itself from isolation. Very extensive concessions have been granted and agreements entered into with foreign financiers, and it has been seriously questioned whether the resources of the republic have not been too seriously compromised in the guarantees undertaken for the subsidies. The amount of these liabilities is calculated at a total sum of £390,400 per annum,* actual and prospective. The construction and projected construction under the subsidies include that of the Bolivia Railway Company, the Eastern railway of Bolivia, the Cocha-

* Foreign Office Report on Bolivia, issued 1912

bamba-Chimore railway, the Fomento de Oriente, and the La Paz-Yungas railway. Part of the funds for the first-named enterprise was provided by the sale of the Acre territory to Brazil, for the sum of £2,000,000. A great deal of the capital is of North American origin, as is the work of construction. The lines will open up the rich mineral and agricultural sections of the republic, and in some cases the traveller will be conveyed, within a couple of hours' travel, from regions with a temperature of 40° to that of 70°, descending through the striking landscapes of the eastern chain of the Andes.

Extensive land grants have been made in connection with these concessions, in addition to money guarantees; grants of so large a nature that some fears have been expressed as to the possibility of so large an area of public land not being at the government's disposal. Bolivian territory generally is still unsurveyed, and part of it consists in almost inaccessible bogs, some of which, however, come within the grants in some cases.

The total length of railways in Bolivia is 1,100 miles, with about 300 miles in construction and 2,000 miles surveyed or projected (1921).

The railway from Arica to La Paz, which has recently been concluded, is a work of considerable interest. It was constructed at the cost of the Chilean government, under agreement with Bolivia, the contract having been given to an English firm for the sum of £2,750,000. The line is a metre gauge with heavy gradients, twenty miles of which are worked as a rack-rail. The railway leaves the arid plains of the Pacific coast and enters the Lluta valley, where alfalfa, maize, melons and other products of the warm lands are grown under irrigation; crosses the river Lluta several times in its course, and ascends the arid *quebradas* or ravines which conduct it up the slopes of the Andes through precipitous and broken territory, from which the line emerges upon the high Andean plateau, at an elevation of 12,500 feet above sea level. Thence along the plateau and crossing profound gorges, the line reaches the picturesque region in view of the high, snow-clad peaks of Bolivia, which flank

the way on either hand; among them the volcanoes, Tacora and Chupiquina, whose sulphur deposits form the basis of a business of sulphur export. Beyond this point the summit of the line is reached, 13,976 feet elevation, and the rails pass along the shores of the strange borax lake of Laguna Blanca. Crossing the Bolivia frontier, the line descends to the valleys of the streams, which run into the Desaguadero river. One of these, the Mauri, is a large stream running for twenty-five miles through a deep gorge, whose high, precipitous cliffs and slopes are covered with the terraces and tombs of the bygone populations of the Inca and pre-Inca period; clans which must have been numerous. The Indian villages which are then passed are the homes of the native breeders of the llamas and alpacas, thousands of which exist upon the plains. The river Desaguadero is crossed by a bridge 330 feet long, near the old Indian suspension bridge. The Desaguadero river is a remarkable stream, draining lake Titicaca into its sister lake Poopo, the two main bodies of water of the Titicaca basin, as before described. The river is as wide as the Thames at Windsor, running with a full flow of water, at an elevation of 12,000 feet above sea level and without an outlet beyond the lake, for the waters of the curious hydrographic system of Titicaca have no overflow, and are spent only by evaporation. The railway passes the mining district of Corocoro, follows the river Colorado, crosses the flat plain of Viacha and joins the Oruro-Antofagasta line, and thence runs to the edge of the steep valley of La Paz. The views upon the route are striking, and the magnificent Cordillera Blanca extends for 150 miles in a range of snow-clad peaks, including the high uplifts of Illimani and Sorata.

The amount of British capital invested in Bolivia is over £3,500,000, of which about £2,000,000 is in the tin mines. The Bolivia Railway Company holds about £3,750,000 for railway construction, but some of the bonds are held by Americans. The Antofagasta railway represents about £800,000, and the Guaqui-La Paz about £400,000. Of French capital about £4,000,000 is invested, mainly in the zinc and silver mines, electric lighting, railway, and other

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works at La Paz, and in loans. The total amount of German capital is about £1,000,000; and the American about £500,000. The Bolivian loan of 1908 floated in New York has been acquired by the Bolivian national bank. There is also a good deal of Chilean money in the country. British capital leads, and British trade accounts for 20 per cent. of the imports. It is considered, however, that British trade is losing ground.

The exports of Bolivia, if not of great amount, are interesting in character, and the following list shews their variety and extent for the year 1917.

	Metric Tons.
Tin	46,430
Copper	37,444
Bismuth	535
Wolframite	3,891
Lead ore	4,118
Zinc	427
Antimony	23,381
	Bolivianos
Silver uncoined	5,693,640
Silver coin	328,270
Gold ore	—
Gold coin	1,250
	Tons
Rubber	5,843
Coca	363
Hides	979
Quinine	218
Wool	158
Wool, alpaca	127
Coffee	34
	Bolivianos
Leather goods	76,900

The total exports for 1918 were valued at £14,600,000, and imports £2,750,000; the exports exceeding those of any year. To the United Kingdom went 27,203 tons of tin, and to the United States 18,189 tons. The main bulk of the rubber went to the last-named, and nearly all the copper. Of the imports, 12 per cent. came from the U.K., and 33 per cent. from the U.S., with 24 per cent. from Chile. The value of the exports for 1919 was Bs. 144,251,000, and the imports Bs. 61,998,000. The principal imports are iron, steel, machinery, textiles and coal.

The financial standing of the republic is good, with assets of Bs. 67,000,000 and liabilities 64,000,000.

The position occupied by Bolivia in the heart of South America, although the state is deprived of any littoral possessions, is one of considerable commercial and international importance, as the country lies in contact with several of the most progressive republics of the continent. The extending network of railways, building or projected, will place the capital in communication with its neighbours, and will lead to considerable commercial and social advantage; and the backwardness due to isolation will tend to disappear. The greatest need for Bolivia, as for the neighbouring countries, is the upraising of her lower classes, by education and better treatment, both economically and socially; and the encouraging of foreign capital and immigration under such conditions as will be conducive to the real welfare of the community as a whole. It is shewn that the natural resources of Bolivia are very considerable, and the range of climatic and topographical conditions, which to-day seem almost an obstacle to development, should in the future prove to be among the most valuable assets of the country. It is manifestly difficult to bring about the upraising of a large Indian population, but much can be made of the native intelligence of these people if the task be entered upon by the ruling classes in a spirit of national co-operation, such as the world is everywhere demanding from its governing element. The home industries of these upland people should be encouraged, not simply replaced by the establishing of great mills of a dividend-yielding nature to home or domestic capitalists. The arts of spinning and weaving, inherited both from the Incas and from the Jesuit teachers in early times, are cleverly carried on in the cottages, the women being specially expert, and it would be a grave economic error to uproot the system. A considerable inducement for foreigners is in the still cheap, unsettled areas of land; property such as in Argentina has long since been taken up and risen in value.