INTERNATIONAL BUREAU OF THE AMERICAN REPUBLICS,
WASHINGTON, D. C.

BOLIVIA.

GEOGRAPHICAL SKETCH, NATURAL RESOURCES, LAWS, ECONOMIC CONDITIONS, ACTUAL DEVELOPMENT, PROSPECTS OF FUTURE GROWTH.

Edited and Compiled by the
INTERNATIONAL BUREAU OF THE AMERICAN REPUBLICS.

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The Bureau wishes to express its deep obligation to the several sources of information which have aided in the compilation of this book, and especially to Señor Don M. V. Ballivian, of the National Bureau of Immigration, Statistics, and Geographical Propaganda of La Paz, Bolivia, whose work "Sinópsis Estadística y Geográfica de la República de Bolivia" (1903–4) has been exhaustively used for official, statistical, and descriptive data.

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BOLIVIA.

CHAPTER I.

GEOGRAPHICAL SKETCH—AREA AND POPULATION—BOUNDARIES—TOPOGRAPHY—OROGRAPHY—HYDROGRAPHY—CLIMATOLOGY—SEISMOLOGY—FLORA AND FAUNA.

Geographical position.—The Republic of Bolivia, named in honor of its founder, Gen. Simon Bolivar, occupies that portion lying in the heart of the South American continent, known during the Spanish colonial rule as "*Alto Perú*" (Upper Peru). Bolivian territory originally extended between 57° 30′ and 74° west longitude Greenwich, and 6° 30′ and 26° 52′ south latitude. Before the final settlement of the Brazilian boundary, November 17, 1903, by reason of certain boundary conventions, the area of the country was generally accepted to extend from 57° 30′ and 73° 47′ 30″ west longitude to 7° 6′ 5″ and 25° 20′ south latitude. This area, however, is subject to correction and readjustment upon the actual demarcation of the Brazilian boundary line, as provided by the boundary treaty referred to. Bolivia is surrounded by Brazil on the north and east, Paraguay on the southeast, Argentine on the south, Chile on the southwest, and Peru on the west. The country is landlocked, having no seacoast, and with the exception of its southwestern extremity belongs to the Torrid Zone.

AREA AND POPULATION.

The area of Bolivia, as described, measures 1,822,334.75 square kilometers, the extreme length of the territory being 2,065 kilometers from north to south, while its extreme breadth measures 1,384 kilometers and extends from east to west. By reason of its area Bolivia ranks third among the South American republics, Brazil and Argentine being the first and second, respectively, while it is larger than any European country, Russia excepted.

The area of Bolivia is politically divided as follows:

Departments.	Square kilometers.
National Territory of Colonias	497,931.05
La Paz	139,277.74
Beni	264,155.53
Oruro	49,537.53
Cochabamba	60,417.36
Santa Cruz	366,128.03
Potosi	126,390.49
Chuquisaca	68,420.28
Tarija	183,606.16
Litoral or Atacama	66,170.58
Total	1,822,334.75

Census.—Several attempts to make an accurate census of the Republic have been made at various times, the figures resulting from such work being the following:

Departments.	1831.	1835.	1845.	1854.	1882.
La Paz	348,142	373,587	412,867	593,779	346,139
Beni	41,228	(a)	48,406	114,922	16,744
Oruro	84,100	111,000	95,324	91,751	111,372
Cochabamba	226,727	162,401	279,048	382,919	176,760
Santa Cruz	43,775	54,381	75,627	255,599	97,185
Potosi	192,155	226,320	243,263	254,728	237,755
Chuquisaca	112,590	94,990	156,041	349,119	123,347
Tarija	36,215	32,975	63,800	277,724	62,854
Litoral or Atacama	3,836	5,123	4,520	5,585	.....
Total	1,088,768	1,060,777	1,378,896	2,326,126	1,172,156

[a] The population of Beni is included in that of Santa Cruz.

Census of 1900.—The latest official census of the Republic is that of September 1, 1900, the first of the censuses to be made in future every ten years. According to the census returns the population in the eight departments and the National Territory numbered 1,555,818 inhabitants. To these returns 5 per cent has been added for omissions, bringing the total to 1,633,610 inhabitants, but, as there are about 91,000 natives leading a tribal life in the northern and eastern frontiers of the Republic, the grand total is officially estimated at 1,816,271. The following table shows the figures such as given officially:

Departments.	Area in square kilometers.	Population.				Number of inhabitants per square kilometer.
		Reported.	Estimated.	Indians not civilized.	Total population.	
National Territory of Colonias	497,931.05	7,228	9,655	15,000	31,883	0.06
La Paz	139,277.74	426,930	3,686	15,000	445,616	3.19
Beni	264,155.53	25,680	500	6,000	32,180	.12
Oruro	49,537.53	86,081	.....	.....	86,081	1.71
Cochabamba	60,417.36	326,163	.....	2,000	328,163	5.43
Santa Cruz	366,128.03	171,592	18,000	20,000	209,592	.57
Potosi	126,390.49	325,615	.....	.....	325,615	2.57
Chuquisaca	68,420.28	196,434	.....	8,000	204,434	2.98
Tarija	183,606.16	67,887	10,000	25,000	102,887	.56
Litoral or Atacama	66,170.58	.....	49,820	.....	49,820	.75
Total	1,822,334.75	1,633,610	91,661	91,000	1,816,271	.99

Percentage of population.—Bolivia, ranking third among the South American States as regards territorial area, by reason of its population is the seventh, and the last in the list as regards percentage of population per square kilometer. As compared with the nations of the world, Bolivia occupies the tenth place by reason of its area, the thirty-ninth on account of its population, and the last for its percentage of population per square mile. Tripoli, which is the least populated district in the world, has a percentage of 1 inhabitant per square kilometer, while Bolivia's rate is only 0.99. This shows the enormous difference between the actual population of the country and that which could be held within its boundaries.

Racial elements.—The population, according to racial elements and sex, as shown by the National Census reports, is as follows:

Race.	Males.	Females.	Total.	Rate per 1,000.
Whites	115,139	115,949	231,088	146.4
Mixed or mestizo	238,689	245,922	484,611	294.5
Indians	401,739	391,111	792,850	484.2
Negroes	2,079	1,866	3,945	1.8
Not reported	61,600	59,516	121,116	73.1
Total	819,246	814,364	1,633,610	1,000.0

Foreign population in 1900.—The foreign population in the several departmental capitals is shown in the accompanying table:

Capitals.	Native.	Foreign.	Total.
Puerto Acre	283	62	345
La Paz	59,014	1,017	60,031
Trinidad	4,246	48	4,294
Oruro	15,197	701	15,898
Cochabamba	21,620	266	21,886
Santa Cruz	18,085	250	18,335
Potosi	20,687	223	20,910
Sucre	20,602	305	20,907
Cobija	433	650	1,083
Tarija	6,814	166	6,980

The foreign population was represented as follows: Europeans, 1,163; Latin Americans, 1,691; North Americans, 33, and other nationalities, 160. The percentage of Europeans is represented by Italians, Spaniards, Frenchmen, Germans, and Austrians in the order given, while in the percentage of Latin Americans the Peruvians lead, followed by Argentines and Chileans.

Urban and rural population.—The urban or city population reported in 357 cities and towns amounted to 438,660 and the country or rural population to 1,194,950. Adding to the above figures the estimated number of inhabitants not reported and that of the Indians not civilized, the following is the general census of the Republic:

City population	438,660
Rural population	1,377,611
Total	1,816,271

the percentage of the city population being about 25 and that of the country or rural population about 75.

BOUNDARIES.

Brazilian boundary.—The United States of Brazil lie to the north and east of Bolivia. The boundary between the two Republics has been finally established by the treaty signed at Petropolis, Brazil, on November 17, 1903, by Don Fernando E. Guachalla and Don Claudio Pinilla, on behalf of Bolivia, and Baron de Rio Branco and Don J. F. de Assis Brazil, on the part of Brazil.

Article 1 of the treaty determines the frontier as follows:

"1. Starting from latitude 20° 08′ 35″ south, in front of the outlet of Bahia Negra in the Paraguay River, the boundary line shall ascend this river to a point on the right bank distant 9 kilometers in a straight line from Fort Coimbra—that is, approximately in latitude 19° 58′ 05″ south and longitude 14° 39′ 14″ west of the observatory of Rio de Janeiro (57° 47′ 40″ west of Greenwich), according to the frontier map drawn up by the Mixed Boundary Commission of 1875—and shall continue from this point, on the right bank of the Paraguay, by a geodetic line which shall meet another point 4 kilometers distant in the exact location of 27° 01′ 22″ northeast from the so-called 'bottom of the landmark of Bahia Negra,' the distance of 4 kilometers being accurately measured on the present frontier, so that this point shall be approximately in 19° 45′ 36.6″ latitude and 14° 55′ 46.7″ longitude west of Rio de Janeiro (58° 04′ 12.7″ west of Greenwich); thence it shall follow in the same direction determined by the Mixed Commission of 1875 as far as latitude 19° 02′, and thence to the east along this parallel to the brook Conceição, which it shall follow to its mouth on the southern bank of the outlet of Caceres Lake, also called the Tamengos River; thence it shall ascend by the outlet to the meridian which cuts Tamarineiro point, and thence to the north along the meridian of Tamarineiro to latitude 18° 54′, continuing along this parallel to the west till it meets the present boundary line.

"2. From the point of intersection of parallel 18° 54′ with the straight line which forms the present boundary line it shall follow in

the same direction as the present frontier line to latitude 18° 14′, and along this parallel it shall meet to the east the outlet of Lake Mandioré, which it shall ascend, crossing the lake in a straight line to a point on the old boundary line equidistant from the two present landmarks; thence along this old frontier line to the landmark on the northern bank.

"3. From the landmark on the northern shore of Lake Mandioré it shall continue in a straight line in the same direction as the present boundary line to latitude 17° 49′, and along this parallel to the meridian of the extreme southeastern part of Lake Gahiba; thence following this meridian to the lake, and crossing the latter in a straight line to a point on the old boundary line equally distant from the two existing landmarks, and thence following the old frontier line to the entrance of the Canal Pedro Segundo, also recently called Pando River.

"4. From the southern entrance of the Pedro Segundo Canal, or Pando River, to the confluence of the Beni and Mamoré the boundary shall be the same as that established in article 2 of the treaty of March 27, 1867.

"5. From the confluence of the Beni and Mamoré rivers the frontier shall follow the course of the Madeira River to the mouth of the Abunan, its tributary on the left bank, and shall ascend the Abunan to latitude 10° 20′; thence it shall continue westward along parallel 10° 20′ to the Rapirran River, following this river to its main source.

"6. From the main source of the Rapirran the line shall follow the parallel of the source westward till it meets the ~~Aquiry~~ Iteuxy River; thence along this river to its source, and from this point to Bahia Creek it shall follow the highest elevations of land or a straight line, as the Boundary Commissioners of the two countries shall deem most convenient.

"7. From the source of Bahia Creek it shall go down this stream to its mouth on the right bank of the Acre or Aquiry River, and thence along this river to its source, if the latter is not more to the west than 69° west of Greenwich.

"(*a*) In the case foreseen—that is, if the longitude of the source is less western than the one indicated—the frontier shall follow the meridian of the source to its intersection with parallel 11° south, and thence it shall continue westward, coinciding with this latter parallel until it meets the boundary line with Peru.

"(*b*) If, as seems certain, the Acre River should cross longitude 69° west of Greenwich and run now north now south of parallel 11°, more or less following the latter, the bed of the river shall form the dividing line to its source, and it shall continue along its meridian to parallel 11°, and thence westward along the latter parallel to the frontier of Peru; but if west of meridian 69° the Acre should run always

south of parallel 11°, the frontier line shall be continued from this river along meridian 69° west to its intersection with parallel 11°, and thence along the latter parallel till it meets the frontier of Peru."

The treaty further declares, among other provisions, that the transfer of territories resulting from the demarcation described includes all their inherent rights and the responsibility of maintaining and respecting the rights acquired by citizens and foreigners in accordance with the principles of civil law. All claims arising out of executive acts or of deeds done in the exchanged territories shall be examined and decided by an arbitration tribunal, which shall be composed of one representative from Brazil, one from Bolivia, and a foreign minister accredited to the Brazilian Government. This third arbiter shall be the president of the tribunal, and shall be chosen by the two high contracting parties soon after the exchange of the ratifications of the treaty. The tribunal shall sit for one year in Rio de Janeiro, and shall begin to transact business within six months after the exchange of the ratifications. Its mission shall be to accept or reject claims, fix the amount of indemnity, and designate which of the two Governments shall pay the award. Payments may be made in special bonds at par, bearing 3 per cent interest, the sinking fund being 3 per cent per annum.

There being no equivalence in the areas of the territories exchanged between the two nations, the United States of Brazil agrees to pay an indemnity of £2,000,000, which Bolivia accepts with the intention of using the same mainly in the construction of railways or other works tending to improve the communications and develop commerce between the two countries. The payment shall be made in two installments of £1,000,000 each, the first installment to be paid within three months after the exchange of the ratifications of the treaty and the second on March 31, 1905.

It is also provided that a mixed commission, appointed by the two Governments within one year from the date of the exchange of the ratifications, shall proceed to the demarcation of the frontier as stipulated in Article I of the treaty, beginning its work within six months after its appointment. Any controversy arising between the Brazilian and Bolivian commissions which can not be settled by the two Governments shall be submitted to the final decision of a member of the Royal Geographical Society of London, chosen by the president and members of the council of the same. Should the boundary commissioners appointed by one of the high contracting parties fail to be present at the place and time fixed for beginning the work, the commissioners of the other shall proceed to the demarcation, and the result of their operations shall be binding on both.

The negotiation is contemplated within eight months from the ratification of the treaty referred to, of a treaty of commerce and naviga-

tion, based upon the principle of the most ample freedom of transit and river navigation to both countries, a privilege which they shall enjoy perpetually on condition of their respecting the fiscal and police regulations established, or which may hereafter be established, in the territory of each contracting party, both countries being authorized to appoint custom-house agents at certain points in the Bolivian and Brazilian Territories, as stipulated.

The United States of Brazil binds itself to build on Brazilian territory, by itself or by a private company, a railway to extend from Santo Antonio on the Madeira River to Guajara-Mirim on the Mamore, with a branch running through Villa-Murtinho or another point in its proximity, in the State of Matto Grosso, to Villa Bella, at the confluence of the Beni and Mamore. Brazil shall endeavor to finish this road within four years, and both countries shall use the same with right to the same immunities and rates.

Brazil also declares its intention to negotiate directly with the Republic of Peru the boundary in dispute in the territory lying between the source of the Javary and parallel 11°, and that it will endeavor to reach a friendly solution without responsibility for Bolivia, in any case.

Paraguayan boundary.—The boundary with Paraguay, which lies to the southeast of Bolivia, remains as originally, no boundary treaty having changed its status. From the Apa River, 22° south latitude, the line descends to the Pilcomayo and follows the course of the Paraguay River. This latter constitutes the natural boundary between the two countries.

Argentine boundary.—Argentine lies to the south of Bolivia, and the boundaries of the two Republics as established by the treaty of May 10, 1889, are as follows:

"In the territory of Atacama the boundary shall follow the range of the same name to the head of the Devils Creek (*quebrada del Diablo*) to the northeast along the eastern slope of the same cordillera to the beginning of the ridge (*serrania*) of Zapalegui. From this point it shall follow as far as the ridge of Esmoraca along the highest peaks until it reaches the head of the western branch of Quiaca Creek, whence it shall descend by the middle of it to its mouth in the Rio de Yanapalpa. From this point it shall run due west and east to the summit of the Cerro del Porongal. From this point it shall run to the western end of the Rio Porongal, following the middle of the stream to its confluence with the Bermejo opposite the town of that name. From this point the divisional line shall follow the waters of this same river Bermejo to its confluence with the Rio Grande de Tarija, otherwise the forks of San Antonio. From these forks it shall follow up the waters of the Rio Tarija until it comes to the mouth of the Rio Itau, whence it shall follow the course of the latter stream as far as

the twenty-second parallel, from which point it shall continue to the Rio Pilcomayo."

The work of marking off this boundary has not yet been completed. It has been provided in this treaty that all questions which could not be settled by the delimitation commission to be appointed should be submitted to arbitration.

Chilean boundary.—Chile lies to the southwest of Bolivia, and its boundary line has been temporarily established by the Treaty of Truce, concluded April 4, 1884. From the summit of the Zapaleri the boundary line starts in a westerly direction to the Licancaur Volcano; thence to the Cabana Volcano (extinct), and from this point to the farthest water source south of Lake Ascotán, and crossing this lake to the Ollagua Volcano, and thence to the Túa, where the boundary ends.

Peruvian boundary.—Perú is situated to the west of Bolivia, the boundary line being the arcifinious frontier of the western Andes and its spurs. The line commences at Miscanti, on the Loa River, and follows the trend of the summits of the Huasco, Cancoso, and Isluga volcanoes, the Tarujiri and Huallatiri peaks, Lake Chungara, and the summits of the Colpa and Caracara. Thence following the summits of Ancomarca, Llusilla, and Tapara, descends to the headwaters of the Yaro, down to the Desaguadero River, and then ascending the waters of the latter extends as far as the Winamarca Lagoon. Thence the line takes a northwesterly direction across the Isthmus of Yunguyo, in the peninsula of Copacabana, and thence diagonally across to Lake Titicaca and the Huarapaya Cove. Thence to the Quequerana River to its confluence with the Suches River, up the stream of the latter to Suches Lake, and following the Cololo and Apolabampa ranges to the headwaters of the Sina River. From this point the line follows the course of this river down to its confluence with the River Madre de Dios, and thence to the Jaquirana, which is the source of the Inambari, at 7° 6′ 55″ west of Greenwich.

By Article VIII of the Brazilian boundary treaty Brazil declares its intention to negotiate directly with Perú the boundary in dispute in the territory lying between the source of the Javary River and parallel 11°, and that it will endeavor to reach a friendly settlement of the question, without responsibility for Bolivia in any case.

TOPOGRAPHY.

In general terms, the relief of the Bolivian Territory is formed by deep valleys to the north, immense plains to the east, and to the west by a range of steep mountains, the loftiest peaks of which are ever snow clad and surround a wide plateau having two large connecting lakes.

Toward the north there are rich hydrographic basins formed by rivers, all navigable for the greater part of their course, while toward

the east there stretch the *llanuras* or *Chaco*, immense rolling plains covered with luxuriant pasture fields and thick wooded lands, irrigated by large rivers flowing toward the northeast and the southeast. The climate in this region is a perpetual spring.

Toward the west there is a mountainous piece of country, having a large plateau where the two lakes before mentioned are found, and running east and west of this plateau there lies the region of the perpetual snow. The extreme length of this plateau is estimated at 835 kilometers, its mean width at 128 kilometers, while its elevation is given at 3,824 meters above the level of the sea. Vegetation is poor in this region as there is not sufficient irrigation, the waters from the melting snow in the tall mountains surrounding it flowing either to the lakes, or else to the marshy or swampy lands to the west.

Toward the south the table-lands or plateaus are arid and covered by salt for a stretch of over 7,750 kilometers. The climate in this region is cold, the atmosphere being very clear. To the southwest there is a belt formed by sandy plains and a volcanic range. There are no large rivers in this region, but at certain points water and vegetation are found. Borax and nitrate abound in this plateau in deposits called "*salares*," while copper, silver, and other metals are found in the mountainous region.

OROGRAPHY.

There are two main mountain systems in Bolivia, the Andean or "Andino," on the west and that of Brazil on the east. The former is represented by lofty peaks, snow-capped mounts, and several important mountain ranges with varying altitudes, while the latter is formed by low chains, having no particular characteristics. The Andean system of Bolivia lies to the west, extending to the east, where it becomes a succession of low chains. This system is divided into two main branches, called "*Cordillera Occidental*," or Western Cordillera, and the "*Cordillera Real*" or Eastern Chain. Between these imposing ranges there is a vast table-land or *llanada* at an altitude of about 3,800 meters, measuring an area of 106,950 square kilometers, called the "*Altiplanicie Boliviana*," or Bolivian Table-land, which extends toward the southern boundary of the Republic. In the western section of the territory the Andes Range attains but a comparatively low altitude until it strikes the southern portion of the Titicaca Lake, where it forms a solid mass of mountains 96 kilometers in breadth.

South of this region the cordillera has several ridges, the highest being the Huatacondo and Silillica chains. From this point there is a depression in the cordillera extending as far as parallel 21°, where it rises again forming the Atacama Range, called "Cordillera Occidental de Atacama," having the lofty peaks San Pedro, Paniri, Licancaur,

Miniquis, and the Soronipa and Antofalla volcanoes. This cordillera has several secondary ranges, the principal being the ridges of the northwest—the Tata Savaya, Silillica, Volcanes, and Huatacondo.

The "Cordillera Real," or "Oriental," runs in the main from a northwesterly to a southeasterly direction, its greatest body lying north and east of the Altiplanicie or table-land. It extends from parallel 69°, north of Titicaca Lake, to parallel 67, near the city of Oruro. This portion of the cordillera forms a single range of perpetual snow-capped peaks, some of them attaining an altitude of 6,500 meters and over. Three lesser cordilleras start from this main range, viz: Cololo, ending at the Callinsani Peak; Illampu, or Ancohuina, where the Illampu and Illimani peaks are found, and the Tres Cruces, which runs north of Oruro, where, due to a depression, it branches off in several small ridges.

Besides this main body of mountains there are many others chains, the principal among which are the following: Asanaques, Frailes, Corregidores, Lipez, Mosetenes, Tunari, Herradura, Charcas, and Chayanta. These cordilleras are the starting point of innumerable ridges or *serranias* traversing the country in all directions.

Grand Plateau or "Altiplanicie Occidental."—This immense, lofty table-land, at an altitude of 3,842 meters, surrounded by a series of snow-capped mountains, stretches from 15° to 22° south latitude, and lies between the Andes Occidentales and the Cordillera Real. The area of the Altiplanicie measures 17,000 square kilometers, its extreme length being 835 kilometers and its mean breadth 128. This Grand Plateau is cut into two portions by the Llica and Tahua or Salinas Ridge, the upper or northern portion of the plateau containing Lake Titicaca, considered the highest body of soft water in the world, measuring over 31,000 square kilometers, the Poopó Lake, over 2,790 square kilometers, and the great Coipasa Marsh or Swamp, 310 square kilometers in extent, besides several rivers of potable water. The lower or southern portion of the plateau is characterized by a lack of streams, by the saline nature of its soil, and a solid deposit of salt measuring 750 square kilometers, floating in a subterranean lake.

The general features of this plateau lead to the belief that it was originally an inland sea, the enormous horizontal salt layers and deposits, and the large lakes having no visible outlet and considerable depth seeming to confirm this view. This system of highlands is composed of many smaller table-lands called "*pampas*," or plains, the principal being the Huasco and Chacarilla plains, the latter, measuring about 873 kilometers, being notable for its total lack of water, and the Empesa and Coposa plain between the Sillilica and the Volcanes Range. The soil in the largest portion of these plains is covered by a thin layer of salt, sodium, and magnesium, the territory being partly arid, although enormously rich by reason of its mineral deposits.

SAN BARTOLOMÉ MOUNTAIN PASS, POTOSÍ.

The *Puna de Atacama*, estimated to be over 70,000 square kilometers in extent, lies between the Cordilleras Oriental and Occidental. This is another important plateau, with deep depressions where salt deposits or *salares* are found in abundance. There are large open plains and rich basins covered with luxuriant vegetation toward the northwest. One of the most important zones or belts of the Bolivian Territory is the region where the basins of the Beni, Madre de Dios, and Caupolican plains lie, measuring about 523,647 square kilometers, and containing the richest agricultural section in the country. Other plains called "*llanos*" extend east and southeast, the most important of which being the Mojos, Guarayos, Chiquitos, and Manzo, or upper Chaco. These smaller plains are well irrigated and contain thick wooded portions, being devoted to agriculture and stock raising, and measuring about 400,000 square kilometers.

"*Pasos*," *or mountain passes.*—The several mountain chains of the Bolivian system form natural passes or gorges, most of them at an imposing height, affording access from one section of the country to the other. In the Cordillera Occidental the lowest and most frequently used of these passes to descend from the Altiplanicie, or Grand Plateau, to the coast are the Sajama Pass, leading to either Tacna or Arica; the Collpa Pass, leading to Camina or to the port of Pisagua, and the Iluba, at an altitude of 4,702 meters, leading to Tarapacá and other ports in the same province. On the Cordillera Oriental the principal passes are the Catantica, 4,700 meters elevation, leading from the Altiplanicie to the plains on the northwest; the Llachisani, 4,705 meters high, leading to the deep valleys of the north and thence to the Amazone; the Unduavi, or La Paz, 4,462 meters altitude; the Challa, 4,239 meters high; the Livichuco, the Guasaco, 4,792 meters, and the Santa Fe, at an elevation of 4,833 meters.

Highest peaks.—The following is a list of the principal peaks over 5,000 meters high:

	Meters.
Cordillera Occidental:	
Guallatiri	6,696
Miniquis	6,030
Tacora or Chipicani	5,910
Sajama	5,546
Tahua	5,300
Cordillera Real or Oriental:	
Illampu or Sorata	6,616
Illimani (Conway, 1,900)	6,463
Chachacomani	6,533
Karkaake	6,160
Tres Cruces	5,598
Malmisa	5,453
Cololo	5,370
Azanaques	5,135

Cordillera de Lipez:	Meters.
Lipez	5,982
Nuevo Mundo	5,949
Todos Santos	5,902
Bonete	5,754

Cuzco, 5,396 meters, Ubina, 5,208, and Chorolque, 5,603, are among the most notable peaks in the Porco and Chicas cordilleras.

Volcanoes.—The volcanic belt lies mainly on the western portion of the country, the principal volcanoes being the Isluya, which is always active, and Cancoso, on the Andes Occidentales, Chela, Olca, Tua, Ollague, Licancaur, Lascar, and Soronipa. Some of these volcanoes are constantly active while others are subject to intermittent eruptions.

Altitude of certain inhabited places.—Owing to the peculiarly mountainous formation of Bolivia, there are a number of cities and other inhabited localities situated at very high altitudes, among the principal being the city of La Paz, 3,630 meters; Oruro, 3,694; Uyuni, 3,660; Colquechaca, 4,221; Aullagas (mine), 4,769; Potosi, 4,146; Corocoro, 4,023; Calamarca, 4,083, and Huanchaca, 4,114 meters high.

Geological formation.—Silurian rocks and strata are found in the Department of La Paz, from Illampu to Illimani. forming the whole of the Cordillera Oriental and the eastern portion of the Grand Plateau. This formation is also present in several other localities. Devonian and Silurian formations are found in the belt through which the Madera, Mamore, and Guapore rivers flow, while Carboniferous formations are common in several parts of the territory, their general direction being north-south. Permian stratifications are notable in the Grand Plateau, or Altiplanicie, to the south and west of Lake Titicaca. Jurassic rocks abound in this same region and in the upper section of the Cordillera Occidental. Tertiary formations are found to the southwest of river Itenez, and Miocene formations extend toward Tarija. At Suches, north of Lake Titicaca, there is a Pliocene formation containing certain fossils. The more recent formations are diluvial in the largest portion of the central plateau, from La Paz to Viacha, the plains west of the Cordillera Occidental, and large sections of the Upper Chaco. Alluvial formations are common in the Madidi, Alto-Beni, and Madre de Dios basins, while plutonic rocks are represented to a large extent—granites, porphyry, and trachytes being most abundant.

HYDROGRAPHY.

Hydrographic belts.—The territory of the Republic may be divided into four hydrographic regions or belts, one lying to the north, another to the west, a third to the southwest, and the fourth to the southeast.

Amazon region.—The first or northern belt is also called the Amazon region, and is formed by the rivers emptying into the Amazon either directly or through their affluents. The principal rivers in this region are the Madeira, Beni, Mamore, and Madre de Dios, with their respective numerous tributaries. River navigation in this region is carried on by means of steamers, steam launches, and special river craft, such as large canoes and rafts or catamarans of different kinds.

The Madre de Dios is navigable by steam launches throughout its entire course. The navigable area of this region is estimated at 9,000 kilometers. The Mamore, Guapore, and Beni rivers and their several tributaries form the Madeira River in Brazil.

There are several river ports along the course of the largest of these streams.

Western region.—The second hydrographic belt, also called western region, embraces the high lakes and other streams flowing toward the lower portion of the Altiplanicie Boliviana. As this region is completely surrounded by the eastern and western cordilleras, the course of its rivers is necessarily short, the smaller streams generally disappearing by suction from the soil, while those carrying a larger body of water either empty in the lakes of the plateau or form large swamps or marshes. The principal rivers of this region are in the first place, the Desaguadero, rising on Lake Titicaca and emptying on Lake Pampa-Aullagas. The Desaguadero measures about 297 kilometers in extent, being 8 meters deep at its source and 3 meters deep about the middle section of its course. This river is navigable for steam launches. Rivers Suches or Escoma, Keka, and Vilaque empty in Lake Titicaca; the Corque and Marquez empty in the Pampa-Aullagas Lake; the Coipasa Swamp receives the waters of the Lauca, Choquecota, and Lacahauira. The latter has its source on the Pampa-Aullagas Lake, flows west for about 6 kilometers, then it disappear completely for about 17 kilometers, where it reappears in the shape of numerous springs and marshes, and resuming its course flows on in a westerly direction until it empties in the Coipasa Swamp. The total course of this river from its source to its mouth is estimated at 97 kilometers. The Rio Grande de Lipez is another of the principal streams of this region.

Atacama region.—The third hydrographic region, or the Atacama region, is formed by the streams which ultimately flow into the Pacific Ocean, and contains only a few rivers. The only important body of water in this region is the Loa River with its several small tributaries. There are also a few creeks of slight importance.

Southeastern region.—The fourth hydrographic belt or southeastern region is made up of all the streams emptying into the Paraguay River and flowing toward the Plata, the extensive swamps formed by the

streams of the Chiquitos and Chaco valleys, and those of the central southern portion of the territory. As stated, the waters of this hydrographic division empty, either directly or indirectly through tributaries into the Paraguay River, the principal affluents of which are the Pilcomayo and the Bermejo.

The former rises in the eastern section of the department of Oruro and flows in a southeasterly direction, its principal tributaries being the Cachimayo, Mataca, and Pilaya or Camblaya. From its confluence with the Pilaya, the Pilcomayo empties in the Paraguay River. Its width at certain places measures over 1,300 meters, and at times becomes extremely narrow. The bottom of the Pilcomayo is very irregular, especially toward the middle section of the river, making steam navigation throughout its entire course impracticable. Steam launches sail up the river for a considerable distance. The Pilcomayo has been explored several times and found to be navigable up to about 700 kilometers from its mouth. Further up navigation is impeded by waterfalls or rapids, called "*cachuelas*," and other natural obstacles.

The Bermejo rises in the department of Tarija, on the Escayachi and Tolomosa ranges, and flows in a southeasterly direction, emptying in the Paraguay. Its main tributary is the Tarija or San Lorenzo, formed by the Camacho, San Luis or Grande, and Itau rivers. The Bermejo, from its confluence with the Tarija, has a tortuous course, particularly at a point called Teuco. The length of this river is estimated at about 1,150 kilometers, its minimum depth at 1 meter, at its narrowest point at 50 meters. Navigation is carried on by means of steam launches and small steamboats for a distance of about 960 kilometers, there being a line of steamers plying regularly between the ports of Esquina Grande and Rivadavia.

The Paraguay is also navigable for steamboats and launches as far as and beyond Lake Gaiba (17° 40′) and up the Jauru to Puerto Alegre. Its minimum depth at this point is about 2 meters, and nearly 3 meters at Lake Gaiba. There are regular steamers plying in the waters of this river. The Aguarayguazu has a clean bed toward its lower course, and navigation is carried on by steam launches up to 600 kilometers from its mouth during the overflow season.

Principal lakes.—The principal lake in the Amazon or first hydrographic region is the Armentia, on the left shore of River Madre de Dios, above the confluence of this river and River Heath. This lake contains a large island named Figueira. The second lake in importance is the Domu or Rogoaguado, in the Department of Beni, between the rivers Mamore and Beni, at an elevation of 272 meters above the sea level, and measuring 1,500 square kilometers in area. This lake is surrounded by several smaller lakes, and has within its shores several islands covered with an impenetrable growth. Lake Roguagua lies to the southwest and probably empties in the Rio Negro. The Mamore-

bey is about 10 kilometers wide, while the Itonoma is 11 kilometers wide and 27 long, being navigable by the ships plying on the river of the same name. Lake Concepcion, in the Department of Santa Cruz, measures about 70 kilometers, and is situated at an altitude of 290 meters above the level of the sea.

Lake Titicaca.—The principal lakes on the second or Altiplanicie hydrographic region are, in the first place, Lake Titicaca, one of the largest lakes in South America. All the rivers and large streams flowing down from the western, eastern, and southern slopes or watersheds of the Andes empty into this lake. It lies on the northern section of the Grand Plateau or Altiplanicie, at an elevation of 3,814 meters, its area being estimated at 8,340 square kilometers, its depth at over 400 meters near the island of Titicaca. Its maximum length is given at 223 kilometers, and its extreme breadth at 111 kilometers. The shores of the lake narrow down toward the southeast, forming the Copacabana and the Tiquina peninsulas, between which lies the Tiquina Strait, 500 meters in width and 150 in depth. The waters of this strait are from 3° to 4° warmer than the atmospheric temperature in winter and have always a very disagreeable taste.

Titicaca Lake has a large number of bays, coves, islands, and peninsulas, the principal among the former being the bays and coves of Escoma, Achacachi, Huata, Puerto Perez or Chichilaya, Aigachi, and Guaqui, all affording sufficient depth to the anchorage of the steamers plying on the lake. Among the numberless islands found in the lake the principal is the island of Titicaca, 10 kilometers in length by 7 in width, containing most important archæological monuments of the time of the Incas, the ruins of the Temple of the Sun, the Temples of the Sun's Priestesses, the Inca's Palace, and many other remnants of that wonderful civilization. There are also several prehistoric monuments in the island of Coati. Tiquina, Copacabana, and Taraco are the only peninsulas worthy of mention.

The principal open ports on Lake Titicaca are Escoma, Ancoraimes, Huata, Puerto Perez, Carabuco, and Huaqui, this latter connected with the city of La Paz by rail. Other lakes in this region are the Suches and Ichucota, in the Department of La Paz. There are several rivers emptying into the Titicaca, which has but an outlet at the southeastern portion of the lake, forming the river Desaguadero, literally "drainage river," which, after a course of 297 kilometers, empties into the Pampa-Aullagas or Poopo Lake.

Poopo Lake.—This lake, also called "Choro" and "Pampa-Aullagas," lies in the central portion of the plateau, at an elevation of 3,700 meters, its area being estimated at 1,000 kilometers. Its depth has not been accurately ascertained, but it is known to be sufficient for navigation purposes, there being a deep current toward the middle of the flow. The island of Panza, measuring 15 square kilometers,

lies about the center of the lake. This island is inhabited by Indians, who speak a special dialect. About 33 kilometers from Panza Island there is another island called Filomela. There are several rivers emptying into the Poopo Lake, the principal being the Desaguadero, Sorasora, Sevaruyo, Marquez, and Corque. The lake empties through a single outlet, the Lacahahuira, forming a powerful whirlpool. Pazna, Sato, and Marquez are the only good coves in this lake.

The quantity of water running out of the Poopo Lake is by far smaller than that poured into it by its several tributaries, the inlet being estimated at 6,000 cubic meters per minute, while the outlet is only about 56 cubic meters. The Desaguadero River disappears shortly after leaving the lake, to reappear 17 kilometers beyond, where it empties into the Coipasa marsh, a great swamp 50 square kilometers in extent. The other lakes in this region are Vilama, the largest in the department of Potosi, and Churagara, Department of Oruro.

The third or Atacama hydrographic region has no lakes, but a few lagoons, the principal being Zoncori, Chiuchiu, and Ascotan, besides a few small deposits of brackish water.

Marshes.—The Plata or southern region contains large swamps or marshes called "*bañados*" and lakes of a certain importance. Among the marshes the most remarkable are the Jarayes, on the upper Paraguay River, the Tacuaral, and Bahia Negra south of the Jarayes. Puerto Pacheco, through which the import and export trade of the department of Santa Cruz is carried on, is situated at the mouth of the Bahia Negra swamp, which has depth enough toward its eastern section as to allow steam navigation, being considered a good bay. Lakes Uberaba, Gaiva or Chavez, Mendiore, and Caceres, all important by reason of their area, lie to the north and south of the Paraguay River. Steamboats of very light draft sail on the Caceres Lake as far as Suarez, one of the Bolivian ports situated on the southern shore of the lake. Corumba, a Brazilian port, is situated at the mouth of the Caceres Lake, and farther down a Brazilian shipyard has been established.

Floods.—The eastern, northeastern, and northwestern sections of the country are subject to periodical floods, seriously affecting commerce and agriculture in the afflicted districts. From November to March, and sometimes until May, the flood season lasts, the water rising at times as high as 10 meters. This is especially the case in certain towns of the Department of Beni, where the streets become channels, communication and traffic being possible by boat only. The rivers Beni, Madera, Mamore, and Guapore have an outlet of 1.30 cubic meters of water for each square league (about 31 square kilometers) of tributary area. It is estimated from the mean velocity of the waters that from twenty to twenty-one days are necessary for the first flood to travel the distance between Exaltacion, Yacuma province, depart-

RAPIDS OR CACHUELA ON THE YOTAU RIVER.

ment of Beni, and the Madeira River. The Beni and Mamore rivers, due to difference in climate and elevation of the mountains where they have their headwaters, overflow long before the Guapore. The annual rainfall in these regions has been estimated at 200 centimeters. The sudden and excessive overflow of these streams sometimes cause the waters of their tributaries to flow backward.

In the territory of the Gran Chaco the floods take place from December to April.

CLIMATOLOGY.

There are three distinct climatic belts or zones in the Bolivian territory, according to the altitude of the respective regions. These regions are called "*yungas*" (an Indian word meaning "hot valley"), "*valles*," or valleys, and "*punas*," or cold lands, according to their climate.

The *yunga* region is that portion of the territory rising from the sea level to an altitude of 1,688 meters. The *valle* region starts at this point and continues to an elevation of 3,058 meters, and finally the *puna* commences at this altitude and ends at an elevation of 4,787 meters. The region of perpetual snow varies from 5,000 to 5,260 meters, according to the watershed of the mountains. These three main climatic divisions are subdivided into intermediate belts. The mean annual temperature of the *yunga* region varies from 22° to 19° C. (71.60° to 66.20° F.); that of the *valle* region, up to an altitude of 2,500 meters, from 19° to 16° C. (66.20° to 60.80° F.). *Cabecera de valle* (head of valley) is a subdivision of the latter main division, and rises from 2,500 meters to 3,058, with a mean annual temperature of 16° to 14° C. (60.80° to 57.20° F.). The *puna* is also divided in two portions, the *puna* up to 3,614 meters with a mean temperature of 14° to 10° C. (57.20° to 50° F.), and the *puna brava*, rising up to 4,787 meters, where the annual temperature varies from 10° to 2° C. (50° to 35.60° F.).

In the *yunga* region the climate is spring-like. There is no winter; humidity is constant, rainfall abundant, and the soil is fertile, producing all kinds of tropical fruits. The temperature in the *valles* is mild; rain lasts from November to March; winter is very mild; the climate is healthy, and the soil produces cereals, vegetables of all kinds, and many fruits of foreign lands. The variation in climate and seasons are more marked in the *cabecera de valle* belt, the products of this region being less abundant than those of the *valle* proper. The *puna* has but two seasons—autumn and winter. The atmosphere is dry and cold, the sky diaphanous during the afternoon, and the temperature mild. In good weather nights are cold. This region only produces good pasture and certain tubers. In the *puna brava* the air is always cold, dry, and rarefied. The weather is bad and the atmosphere is heated through the refraction of the sun rays upon the barren soil. This is a region of powerful atmospheric disturbances, particularly in

the evenings. Rain is unknown in this belt, as the precipitation takes invariably the shape of snow or hail. Vegetation is confined to a few cryptogamia.

Temperature.—Although the territory lies within the Torrid Zone, the temperature is not that corresponding to such zone, as it varies according to altitude, latitude, nature of soil, direction of the winds, distance to the cordilleras, and other factors. In the valleys, within a few hours, temperature will show a variation from 13° to 17° C., or 54° to 62° F., while in the vicinity of the mountains, or cordilleras, the change is from 8° to 15° C., or about 46° to 59° F. At an altitude of 3,000 meters the annual mean temperature is 15° C., or 46.40° F., while at an elevation of 4,500 meters the temperature is 6° C., or 42.80° F. Sorata, a town at 2,710 meters, and about 9.25 kilometers from the region of perpetual snow, is situated in a valley where the climate is mild and soft, notwithstanding its proximity to the snows.

The variation of temperature according to altitude above the sea level has been estimated as follows:

Altitude above sea level.	Temperature.	Difference.
Meters.	° *C.*	
0	26.5	.....
1,000	21.8	4.7
2,000	18.4	3.4
3,000	14.5	3.9
4,000	7.0	7.5
5,000	1.5	5.5

The mean temperature and the production of the several Bolivian zones is officially given as follows:[a]

Zones.	Altitude.	Mean temperature.	Products.	
			Vegetation.	Animal life.
	Meters.	° *C.*		
Snow region	5,000	1.3	Valerian and other umbilliferæ.	The condor, or Andean eagle.
Puna Brava	4,787	6.4	Cryptogamia	Llama, vicuña, alpaca, chinchilla.
Puna	3,614	12.1	Stipa bromus, bacaris, bolax glebaria, ocsalis tuberosa, quenopodium.	Cattle, sheep, horses, donkeys, bears.
Cabecera de Valle	3,058	15.2	Wheat, vegetables, trees	Improved species of the same stock.
Valle	2,500	17.9	Fruit-bearing trees, corn, pulse, etc.	All kinds of domestic animals.
Yungas	1,688	21.0	Thick woods, coffee, cacao, sugar cane, coca, rubber, cinchona bark, and fruits of all kinds.	Puma, tapir, and birds of beautiful plumage.

Seasons.—The thermal seasons do not correspond with the astronomic seasons, the meteorological changes being different from those

[a] Sinópsis Estadística y Geográfica de la Republica de Bolivia. La Paz, 1903. Vol. I.

taking place outside of the Tropics, because the territory of Bolivia is within the Torrid Zone. Spring covers the months of August, September, and October; summer lasts from November to January, autumn from February to April, while the winter months are May, June, and July. Spring is remarkable for its mild temperature and occasional high winds. Summer has two distinct periods, one dry and hot and the other rainy. Heat is excessive even in the higher regions, and the atmosphere is charged with electricity during the first two months of the season, before the rainy period commences. During autumn, which in reality only lasts through March and April, the humidity in the atmosphere tempers the cold weather. In winter it snows continuously during the three months the season lasts, there being occasional showers.

In the *yunga* or deep valley region winter is unknown, spring being prolonged, due to the high temperature and excessive humidity of the atmosphere. When rain has been scarce in this region heat is severely felt, as it is always felt in the *puna* region during the months from August to November.

Winds.—The windy season is from July to September. The direction of the wind is from the south generally, although in the plains high winds from the north are common. The winds that sweep the Santa Cruz and Beni plains originate in the Argentine pampas, producing sudden changes of temperature, which has been known to fall as much as 20° C., or about 36° F., in a few hours. These winds, which are called *surazos* (south blow), are more common during the month of September.

Rainfall.—The rainy season begins, as a general rule, during the month of November, lasting until March, though sometimes it commences in October and ends in February. When rains are late, the central section of the country has suffered heavy losses through failure of the crops. In the *yunga* region and in the wooded valleys rain falls in heavy showers. The eastern section of the Republic is the one most frequently visited by rains.

The average annual rainfall in Bolivia is shown in the following table, as given in the official publication before mentioned:

Latitude.	Temperature.	Rainfall.
	° *C.*	*mm.*
0	38.00	836
5	35.34	818
10	32.68	800
15	30.02	782
20	27.56	764
25	24.90	746

Electric and other phenomena.—Owing to the peculiar topographical formation of the country electric and other phenomena are of constant

occurrence in Bolivia, the principal zone where such disturbances take place being the Altiplanicie, or Grand Plateau. As the atmosphere is always heavily charged with electricity, both in summer and winter, *dry storms* or electrical storms are of most frequent occurrence both on the plateau and in the valleys.

Before the rainy season sets in electrical accumulation becomes considerable on the plateau region, its most violent manifestations taking place toward the eastern section of the table-lands. 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 with the electrical fluid. When this phenomenon takes place men, animals, and inanimate objects give forth a sudden glimmering light, and the quivering, stifling atmosphere takes a reddish hue.

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 variations of the temperature of the lower atmospheric strata. In such case the accumulated clouds become phosphorescent at night, shedding a tremulous bright halo, accompanied by intermittent flashes of most vivid light, until every mass of clouds becomes a powerful center of incessant detonations, producing a constant low, rumbling sound. Sometimes this phenomenon takes place at a single point, as in 1878, when the Illampu Peak, near the town of Sorata, department of La Paz, suddenly became brilliantly lighted while its surroundings were in total darkness. This phenomenon was accompanied by a heavy rumbling at the summit of the peak, while the air became hot and stifling and there was a constant succession of flashes of lightning from the accumulated clouds. The disturbance lasted all night, until the electrical storm resolved itself into a heavy shower.

Besides these phenomena, due to an excess of electricity in the atmosphere, *mirage* is also remarkable, being peculiarly clear and bright in the Oruro Plains, toward the Atacama Desert, and in the upper Chaco, especially during winter.

SEISMOLOGY.

The volcanic belt of South America follows the general trend of the Andes, on the western coast of the continent. Bolivia, therefore, has but a small portion of its territory lying within that belt, as the Bolivian Andes do not show any volcanic signs, except in the western branch of the cordillera, running parallel to the Pacific coast, the site of constant seismic disturbances. Under these conditions the central

section 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. The only severe shocks ever felt in the central section took place in August, 1892, and July, 1896.

In general terms, the country is outside the seismic belt of South America, and the numerous important geological phenomena that have taken place in Bolivia are not all due to seismic disturbances, but to internal or external disaggregations, denudations, or the natural leveling of the earth surface in that part of the country. In April, 1582, a portion of the plateau south of the city of La Paz suddenly collapsed, forming the Achocalla Valley, which covers quite an extensive area. At the beginning of the sixteenth century the town of Ancoanco, in Tembladerani, a region lying to the southeast of La Paz, disappeared entirely, its site being marked at present by a series of small swamps and lagoons. In 1837 one half of the Quilliquilli hills, near La Paz, collapsed, the other portion remaining at its original level. In 1873 another section of the Tembladerani region suffered a similar depression.

The great basin where La Paz is situated is nothing but the result of a geological depression which changed the course of the Choqueyapu River.

In the eastern section of the Republic seismic disturbances are but rarely felt. Tradition, however, has it that at the place now called Opaburu, department of Santa Cruz, there was once a sudden collapse, causing the total destruction of a town and forming the large mineral spring now existing at that point. 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 to an elevation of 10 meters, the entire population of the town having perished by drowning.

Thermal springs.—Due to the peculiar formation of its soil, thermal springs are abundant in Bolivia, their temperature varying from 20° to 90° Réaum. (77° to 235° F.). The principal springs are those of Urmuri, near La Paz, 300 meters above the level of the valley and 709 below that of the plateau, the mean temperature being 13° C., or about 55° F., and the Vizcachani, Calapachi, Ilabaya, and Charavani, in the same Department. In the departments of Oruro, Cochabamba, Chuquisaca, Potosi, and Santa Cruz several mineral springs are found containing many mineral or chemical combinations and claimed to possess healing properties for many diseases.

Altitude of some of the principal cities and towns.

City or town.	Meters above the sea.	City or town.	Meters above the sea.
Abapo	480	Laja	3,919
Achacachi	3,960	Leñas (Potosí)	4,053
Ancoraimes	3,965	Machamarca	3,702
Antequera	4,004	Machareti	771
Antofagasta de Mar	5	Mapiri	590
Antofagasta del la Sierra	3,616	Nazacara	3,826
Ascotan	3,956	Ollague	3,692
Aullagas	4,769	Oruro	3,694
Ayoayo	3,920	Pacheco (port)	100
Caiza	500	Pampa Aullagas	3,726
Calama	2,265	Parapeti	826
Calamarca	4,083	Poopo	3,709
Callapa	3,831	Portugalete	4,282
Caquiaviri	3,995	Potosí	4,146
Caracollo	3,857	Puerto Acre	123
Caraugas	3,952	Quijarro (port)	167
Carumbey	454	Quillacas	3,936
Cballa (Cochabamba)	4,131	Riberalta (Beni)	159
Challapata	3,706	San Cristobal (Potosi)	4,380
Cochabamba	2,557	San Pablo	4,409
Colcha	3,020	San Pedro (Atacama)	2,420
Colquechaca	4,221	San Pedro (Lipez)	3,777
Coripata	1,826	Santa Bárbara (Atacama)	2,984
Corocoro	4,023	Santa Catalina	3,830
Corque	3,756	Santa Cruz	442
Cotagaita	2,954	Santa Rosa (port)	420
Garcimendoza (salt mines)	3,680	Sicasica	4,275
Guanay	390	Sorata	2,710
Guaqui	3,813	Suarez (port)	106
Huaillas	4,132	Sucre	2,844
Huancane	3,740	Tarija	1,924
Huari	3,704	Tolapampa	4,028
Inambari	198	Trinidad	500
Desaguadero	3,843	Tupiza	3,005
Estarca	2,950	Turco	3,885
Exaltacion (Mamore)	159	Viacha	4,160
La Paz (Murillo Square)	3,630	Villa-Bella	122
La Paz (Alto, railroad station)	4,085	Uyuni	3,660
Lagunillas (Oruro)	4,751	Yaciuba	634
Lagunillis (Potosi)	3,949	Yani	3,510
Lagunillas (Santa Cruz)	1,022	Zaipuru	759

FAUNA AND FLORA.

Fauna.—Bolivia's fauna is as varied as it is extensive, embracing, in general terms, all the species known to Peru and Brazil. Among the mammalia those considered characteristic of the territory are beef cattle, sheep, goats, horses, mules, and asses. The *vicuña* (*Camelus vicogna*), the *alpaca* (*Auchenia alpaca*), and the *llama* (*Camelus lama*) are highly prized, the first two on account of their delicate, beautiful, silky wool and the last both by reason of its wool, which is used for coarse or common fabrics, and because the llama is used as a beast of burden. Among the other animals the following are well worth mentioning:

Chinchilla (*Chinchilla laniger*), highly prized on account of its fur; *huanaco* (*Auchenia huanaco*), somewhat similar to the vicuña; the *anta*, a species of elk; deer; boar; *venado* (*Cervus campestrix*); the *onza*, or ounce (*Felis uncia*), and the *puma* (*Felis concolor*). The sloth (*Cholopus didactylus*), the ferret, and the otter are also of value by reason of their fur. There exists in Bolivia a species of black bear and many other mammalia useful to man and to industry. There are in

the country beautiful song birds and birds whose plumage is famed the world over on account of its bright and variegated colors. Herons and ostriches are plentiful, as well as flamingoes, tucans, and parrots. Eagles and condors (*Sarcorhampus gryphus*), sometimes of great size, are found in the Andes. Gallinaceæ of all kinds is abundant. There are many kinds of fish, turtles, alligators, and other amphibia. Boas and rattlesnakes are very common. Silkworms, cochineal, and bees are also found in the country, affording the means of living to many native families.

Flora.—The flora is extremely varied, embracing both the products of the cold and the tropical zones. Among the alimentary plants the following are the principal: Wheat, corn, chick-peas (*Cicer arietinum*), beans, manioc, bananas, sweet and white potatoes, *quinua* (*Kenopodia*), *oca* (*Ocsalia tuberosa*), barley, rice, peanuts (*Arachis hipogaca*), olives, almonds, cacao, coffee, and nutmeg. Sugar cane is claimed to be of an excellent quality, as well as the *mate* grown in Bolivia. The fruit-bearing trees and plants number, among others, pears, peaches, oranges, lemons, limes, apples, figs, alligator pears, quinces, dates, grapes, and pineapples.

Among the medicinal plants the following are worthy of notice: *Quina*, or cinchona bark; *matico* (*Artanthe elongata*), *guaraná* (the fruit of the *Paulinea soibilis*), ipecac (*Radix disenterica*), sarsaparilla, jalap (*Ipomea purga*), copaiba, gentian, cinnamon, valerian, ginger castor beans, camphor, and tolu (*Myroxylon tuluiferum*). Industrial plants are also plentiful, the principal being cotton (two varieties, white and purple), vegetable silk (*toborochi*), tobacco, *quillai* (*Saponaria sapindus*), *taray* (*Casalpina tara*), excellent for tanning purposes, and several other tanning barks and plants; vanilla, hemp, *miti*, and *huembé*, from which an excellent kind of fiber is extracted for the manufacture of cordage. Indigo, saffron, Brazil, and log wood are plentiful, as well as many other dye woods and plants. Rubber is conceded to be of excellent quality, as well as the *manicoba*, which yields a fine gum, and many other resinous trees and plants. *Coca* is by far the most important vegetable product of Bolivia on account of its medicinal properties. Bolivian forests yield a large variety of timber, the principal being cedar, mahogany, hemlock, walnut, holly (*Ilex opaca*), boxwood, beech wood, storax, *colo*, a very hard wood not affected by moisture; the *jacarandú*, remarkable by reason of its bright colors, and the *quebracho*, species of ironwood, used for railroad sleepers on account of its resistance.

CHAPTER II.

NATIVE RACES.

By Dr. J. Hampden Porter.

Politically, Bolivia is a unit; but naturally—in topographical features, soil, climate, vegetal productions, zoological species and human groups—its boundaries inclose two distinctly different countries. One of these—the western highland region, or "Alto Peru"—was a conquered province when South American history began; while the eastern slopes conterminous with undulating or mountain-ridged plains now united in part to Brazil, Paraguay, and Argentina, were inhabited by unsubdued savages. This whole area, once made part of an imaginary Inca empire, extending from 2° to 37° south latitude. So far as the Bolivian portion of that wide-spread dominion is concerned its physiography exhibits many violent contrasts, which have profoundly affected resident populations. De Leon, writing early in the sixteenth century, refers to marked unlikenesses in men and nature existing between localities on comparatively low levels and upland plateaus also.[a]

[a] In the course of these chapters on Native Races, differences not only between connected families, but also tribes included in one family, have frequently been noticed. Those resemblances which might be expected among members of congeneric groups are often wanting and replaced by striking unlikeness in traits usually regarded as original; moreover, the diverse characteristics referred to may associate themselves with a structural sameness that can not be attributed to external influences operating at such places as groups have occupied during all known periods.

This is a fact worth taking into consideration, whether it can be explained or not; yet very many ethnological generalizations wholly ignore it, and consequently fail in exactness. Those exclusively zootechnical theories of classification among human varieties, based upon minute anatomical differences whose significance had been greatly exaggerated, recently became discredited as biological and psychological features began to assume their proper anthropological importance. Men are now more studied with reference to their general fitness; as living beings struggling for existence rather than skeletons. It is in this respect that American indigenes vary so much. Everything belonging to human capacity and the status or accomplishments of mankind finally resolves itself into ultimate questions concerning race and environment. These factors become visible here in their action upon masses; but not so with regard to smaller numbers. We should have to know every detail connected with these subdivisions before attempting any explanation of their variations. That, however, is impossible. Throughout the continent, and especially in its central or

Speaking generally, an upheaved parallelogram, 14,000 feet high and intersected with mountains or mountain spurs in all directions, was settled by Indian families at periods which it is impossible to determine. Of these peoples certain members became extinct during prehistoric ages; others survived until they were recognized, and then disappeared; while a third contingent, unmixed with foreign blood, still exists. The Bolivian section of that champaign country extending from Brazil into Patagonia contains a population, which has experienced like processes of destruction or decrease. In the elevated provinces artificial food production is essential to multiplication in numbers and social progression, whereas this lowland region affords actual support without expenditure of organized labor or need for acquired skill. On these highlands American aborigines reached their ultimate developmental grade; but those exuberant plains lying below have never harbored anything except savages.

Archæological remains, indicating comparatively advanced culture among highlanders, generally exist within the limits of depressions which, beginning as alpine gorges, gradually broaden into fertile valleys, and finally emerge from Andean foothills to be lost in river basins farther east. They gave shelter against storm or cold; arable soil accumulated through erosion and vegetable decay; subsidiary combes or swales were watered by mountain streams and likewise stocked with a variety of useful products. These quebradas formed the best as well as most uniformly favorable part of Bolivia for settlement, yet their combined expanse was comparatively small, as each occupied an isolated position, and all probabilities seem adverse to an opinion that such vestiges of progress as they contain actually

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southern sections, different groups of one stock display unlikenesses among qualities which tend toward survival and progress. Customarily, degenerative phenomena, as evinced by civilized individuals or families, are referred to bad blood—transmitted vice of mental and physical constitution; *damnosa hæreditas*. There is no doubt about the disastrous issues in such cases; but having played a conspicuous part among aboriginal populations, they require attention, even if nothing can be offered beyond a mere suggestion that dislocated and intermixed American societies must necessarily incur the risk of absorbing inferior strains.

Whatever the cause may be, the facts are as follows: One portion of affiliated inhabitants in regions where climate, soil, and productions were apparently uniform, adjusted themselves and evolved within certain limits; another part stood still, dwindled, or perished. Related tribes from the same locality, though frequently hostile toward each other, have exhibited an unfaltering love of country that suppressed their enmities when a common danger threatened and kept them united. In many instances, however, such peoples fell apart at once, took opposite sides, resisted with devoted heroism, or sank into slavery almost without a struggle. So far as expressions of mental power, moral faculty, plasticity, and ability to improve equal opportunities go, there is little likness between congeneric nations. This dissimilarity meant everything in relation to these indigenes, but the rationale of such incongruities among relatives similarly placed has not been expounded with any clearness.

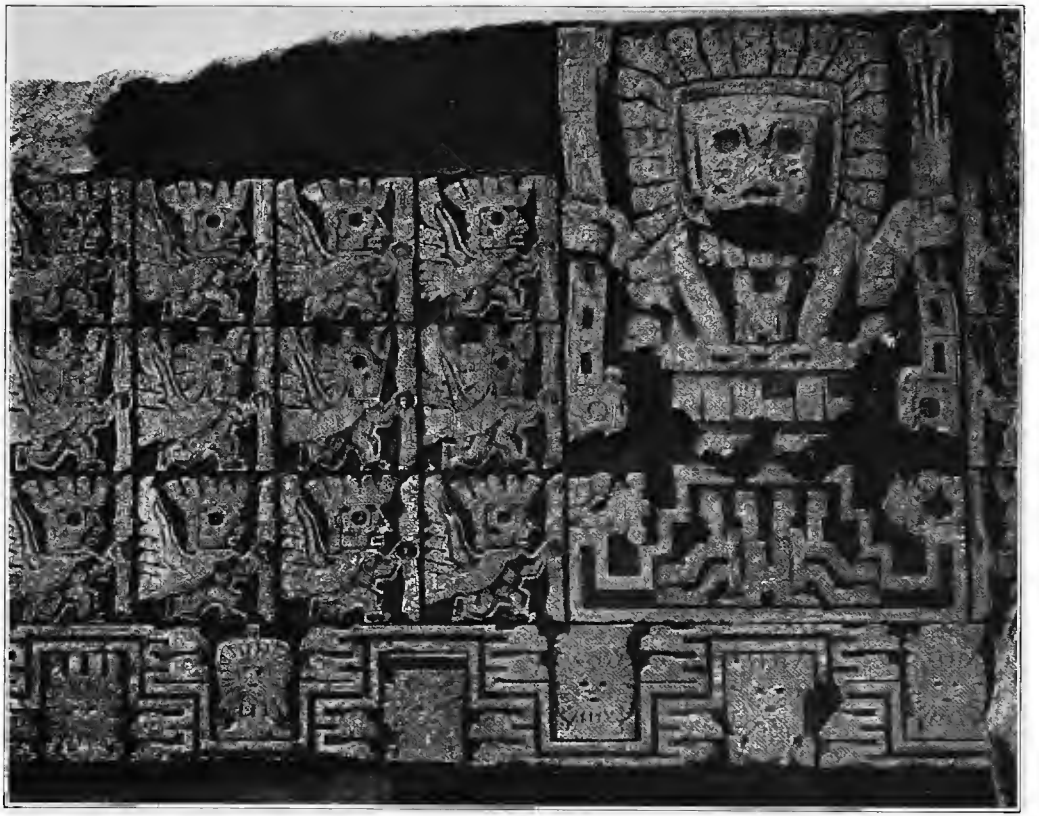
originated there. Conversely, however, upland vales most probably subserved important purposes in affording resting places for somewhat advanced immigrants, who needed more preparation before entering upon arid plateaus, where the struggle for life taxed every resource which relatively unevolved societies could command.

One stock, among several that invaded "Upper Peru," carried there an antecedent development which is implied in the ability to live, multiply, and improve amid such surroundings. This means that previous evolutionary processes had generated methods of avoiding natural selection's direct effects. It signifies enlarged faculty, with possession of those appliances which are inseparable from mental development, and vouch for a physiological and mental plasticity, enabling men whose sociological progression was as yet inchoate to adjust themselves when continued unfitness would have involved extinction.

De Nery[a] calls the Amazon "a daughter of the Andes," but that family who made western Bolivia their home and became acclimatized in regions which, excepting Tibetan pamirs, reach loftier elevations than any other permanently inhabited tracts, were not originally mountaineers, and came to these heights after an indefinitely protracted residence upon low-lying alluvial plains traversed by vast river systems. Had these Indians not possessed faculty and those acquisitions its exercise entails, such surroundings must have broken masses up into nomadic bands, sharing the degradation common to residents of this region. They formed, however, the one group of Bolivia's settlers who possessed inherent powers that could rescue them from oblivion.

This aggregate is now called the Aymara-Quichuan family, which, emerging from a chaotic congeries of lowland tribes whose best efforts merely resulted in slight modifications of savagery, took long steps toward civilization under circumstances where persistently primitive societies must have dwindled or become extinct. Those societies above named, with Muyscas in South America, and Huaxtecan or Nahuatlac peoples north of Darien formed the American culture group. Self-preservation, as also improvement, always coincides with the number, degree, and complexity of adjustments established with surroundings. Faculty or fitness can not be created by difficulties, as Hegel's excogitated Philosophy of History teaches—they are simply quickened into activity. Apart from what is insuperable in all environments, everything depends upon endowment or race traits. Cold, storm, an unproductive soil, in no way transferred exceptional Cordillera tribes to successively higher social grades; these conditions merely stimulated preexisting powers, which developed with exercise.

[a] La Pays des Amazones. Paris, 1899.



PRE-INCAN MONOLITHIC CARVINGS AT TIAHUANACO, DEPARTMENT OF LA PAZ.

Similarly, Maya-Quiche congeners [Deniker] of Aymara-Quichuas turned altogether different natural antagonisms to account among the tropical jungles overspreading Honduras and Yucatan.

Keane[a] adds Atacameños to that dominant Bolivian family just mentioned as being distributed on the plateau region called Charcas, an area crossed by ranges of nearly impassable mountains, intersected in all directions with their spurs, and cut up in this way so effectually that there could never have been any possibility of important concentrations among tribes, or those associations between communities which promote general progress. Comparative isolation among resident populations, however, does not here imply a localization of inhabitants according to race. It is an altogether impracticable undertaking for systematists to divide Bolivia into ethnological provinces. Branches of its stocks scattered widely within this country, passed beyond political lines, and sometimes lost those traits by which they could be identified.

Primitive influxes of proto-Europeans, neolithic Mongols, and each subdivision formed through intermixture between them, together with numerous causes tending toward dispersion or variation, have been at work throughout the entire territory. Successive arrivals here via Darien probably bore little resemblance to those irruptions that took place during the period of "nation wandering" in Europe or Asia. There is no record of Bolivia's peopling; but none is needed to show how completely its future depended upon those qualities which distinguished immigrants settling there, or to imform us concerning the more important circumstances attending migration. Briefly, bands differently composed, unequal in numbers, variously qualified, gathered in low-lying fertile spaces where subsistence was easily procured. Finally a group destined to preeminence detached itself by degrees, ascended the Andean counterforts, and succeeded under conditions that entailed failure upon all others who made a like movement. This separation was apparently voluntary, since these emigrating communities had found no trophic center on the plains below, no place capable of fostering population until it became superabundant for available food supply, so that disrupture became necessary. They possessed the pioneer spirit, however, evinced true social instincts, and were the authors of a rudimentary culture excelling their neighbors, thus being able to profit by opportunities which with less well-constituted men came to naught. Collateral observations will illustrate what has been said. Masses resembling modern Chiquitos or Chiriguanos, for example, lived in the Bolivian yungas, and, like them, seemed organically incapable of proceeding beyond a savage state. Certain portions of these aborigines managed to survive and preserve

[a] Stanford's Compendium of Geography and Travel. London, 1901.

their integrity, but no doubt they frequently broke under shocks accompanying hostile inroads, famine, pestilence, etc., and dispersed, to be absorbed by larger aggregates or perish entirely. Events prove that progenitors of the coming "Inca race," kept themselves alive and vigorous amid vicissitudes from which they could not have been exempt. Communities belonging to this civilizing aggregate planted maize around the ancient Mojo Sea, cultivated in Eastern Paraguay, and extended agricultural settlements around that great Argentine gulf which once nearly approached those mountain valleys leading into "Alto Peru." Sedentary habits insensibly augmented the solidarity arising from consanguine ties. Human beings of any intellectual superiority can not abide together long without so organizing as to lessen disaggregative tendencies. They must needs become more self-supporting with consolidation, and their internal relations will assume an increased complexity. Such changes are essentially developmental. While it is obvious, despite the absence of records, that social improvement followed favorable routes (what were at first lines of least resistance) and was localized within more or less well-provided districts where enough forwardness was gained to initiate successful advances toward the future culture center situated at Titicaca, it is inconceivable that any men took their first steps in progress there. A caveat to the unqualified assertion that American cultures are isolated and local should be entered.

Few ethnological results which can be regarded as certain, are derivable from a survey of populations in upper Bolivia during prehistoric ages. At various unknown eras since that remote epoch when Peroche says race making began with dispersion, was continued through adjustments to new surroundings, and acquired definiteness by intermixture, many peoples made their way into these regions where Paul Marcoy's specification of a particularly representative blood strain is altogether arbitrary. We know scarcely anything concerning the genealogies, physiognomy, or tenor of those times—certainly not that Acolhuan immigrants founded Bolivian culture. To one well-marked stock, however, all approximations toward civilization were due, and whatever was accomplished must be ascribed. Collahua, or the highlands, called after their supposititious settlers, is rather a vague and indefinite expression, which at different eras probably was applicable to several provinces, seeing that Peru when first brought to light included four states, now independent of each other, but once chiefly held by a single composite group whose modifications easily account for the local disappearance or translation of any title to territory seized upon in the first instance, soon regarded as having been immemorially possessed by those communities then living there.

West of 68° the oldest distinguishable societies of those civilizing peoples who built pueblos on the Andean plateaus are probably Collan.

Predecessors belonging to the same type—unknown offshoots from several northern families with whom ethnologists have identified such of these Indians as raised themselves above savagery—no doubt wrought to the same purpose, but left nothing discernible. Moreover, Collan aborigines themselves, if as a separate class they effected anything important, lost claim to their achievements because they were subsequently merged in Aymara-Quichua mementos. These latter also became obscured under Inca rule, for those head war chiefs and ulterior high priests of mixed multitudes, consistently endeavored to destroy whatever their own direct ancestors could not appropriate and call its own. Hence the pre-Inca origin of barbaric societies around Lake Titicaca has only lately been discovered, and while much stress is laid upon advancements attributed to supposititious descendants of Manco Capac, tribes to whom the latter owed nearly everything were until lately sunk in oblivion. Canas and Rucanas, of doubtful lineage, represent populations that had become largely Americanized physically, and characteristically developed socially, at the earliest period to which examination extends. No fossil remains have been unearthed whose evidence is conclusive as respects primitive man in this country. The presence of proto-Europeans at Minas Geraes does not admit of doubt; yet if those archæic Brazilians entered Bolivia, ethnologists do not know it. Features unquestionably inherited from them prove intermixture somewhere, but nothing more. Similarly with mongoloid primogenitors, whose generalized traits survive, though neither the fossilized bony structures of neolithic Asiatics nor their first creolized descendants have come to light. Down to comparatively modern times genealogies and interrelationships are uncertain, while even the systematic classifications possess little that is altogether trustworthy. As has been the case everywhere, only particular parts of congeneric masses became prominent enough to be scrutinized and present traits for delineation. Here, as elsewhere, subsidiary though consanguine members of aggregates never stood out from that neutral background whereon innumerable subdivisions of human races faintly disclose themselves.

What is now loosely called the "Inca race" was not an ethnic unit, but, so far as known, a specially well-constituted Aymaran offshoot, which may have been Collan in origin, or derived from more than one source. This people chiefly belong to Perú, for the reason that their expansion is identified with that State. It should be said, however, that they came from a site outside its present limits, equipped by nature for conquest and progress; fit both mentally or physically for making necessary adjustments; endowed with innate qualities which enabled them to utilize opportunities and take the initiative amid less well-endowed communities. So far as Bolivia is concerned, its mixed inhabitants apparently received all higher social and cultural impulses from the Aymarans alone.

The eastern portion of this Aymara-Quichuan family were conquered during prehistoric times, and became instruments wielded by a powerful kindred for carrying out their own designs—beneficiaries who received whatever improvements elevated them, at the hands of more cultured Inca relatives and masters. Bolivians had no distinctive art, religion, or social organization which can now be separated from Peruvian models. Minor contrasts, some varieties in features and temperament due to an unlike distribution and its necessary adjuncts, distinguished the countries. Cis-Andean natives, crossed with other strains, lived on different food, and in several particulars practiced modes of life dissimilar to those of their congeners beyond that mountain chain, sundering closely connected ethnic elements. Creolization, however, has not entirely veiled the characteristic lineaments inherited from remotest ancestors. This "mixed" family, as Deniker calls it,[a] still indicates through structural reversions those wholly diverse sources whence it came. In cranial conformation (general character of brain case, taken without reference to craniometrical minutiæ, which are without diagnostic value and have no biological significance) these Aymara-Quichuan indigines, together with their inconspicuous and no doubt frequently overlooked or unrecognized kinfolks, show results arising from intermingling, but have not been perfectly blended. They approach a new type, though coalescence has failed to form one. Strictly speaking, the predominence of proto-European, proto-Mongol, or native American features is an unknown anatomical quantity. Skull indications as affording a basis for ethnological classification fails upon being subjected to scientific tests, yet accordantly with principles already explained, Keane's statement that "head shape points toward unity of stock"[b] can not be contradicted. In any instance, nevertheless, more precise and extensive data than were ever collected are essential for reliable conclusions. Evidently results depend on the number of specimens examined, and it is obvious that these have always been insufficiently numerous to warrant generalizations. Consequently, *ex cathedra* decisions upon families and even types often disagree. De Quatrefages feels justified in separating Aymaras from Muyscas, Chontals, and Cunas, on evidence given by partial cranial measurements.[c] On like grounds Broca puts Mexicans and Peruvians together and Pruner Bey divides them. Tollmann[d] sets long-headedness on this continent at a considerably lower average than that of equal or almost equal transverse and longitudinal diameters, while Topinard unhesitatingly assumes the entire American race to be mesati-

[a] Races of Men. London, 1900.
[b] Man, Past and Present. London, 1899.
[c] Histoire Générale des Races Humaines. Paris, 1889.
[d] Zeitschrift für Ethnologie, 1883.

cephalous. In view of such declarations and of the fact that this Aymara-Quichua family inherited long skulls on one side with short ones on the other, some intermediate contour should be looked for; but beyond what has been said respecting general amalgamation, accompanied by more or less reversion toward both ancestries, there are no conclusions to be arrived at.

Clemens Markham[a] says: "There was no sign of civilization when the Incas invaded Collao. Garcilasso de la Vega describes Quichuans in words that can not be true, since such utter savages as he depicts—men like Panos on the Amazon headwaters, Cashibos or Carapaches, who live like Fuegians along the Ucayali—could scarcely have found support where these resided. It is impossible to prove them better off economically than those Caribs whom Desiré Pector[b] introduces into that elevated region, and changed conditions of existence would have been fatally felt at once. Plateaux Indians, who multiplied and advanced, eliminated themselves from surrounding Karipunas, Pacaonares, Setebos, Sipivios, stagnating in the plains. Immediately upon change of place, however, they had to do regular work, and fortunately possessed means by which labor was made effective. Lowlanders, whom Consin, Orellana, De Lepe, Quesada, came in contact with, lived idly from hand to mouth, and were either ignorant of maize planting or constitutionally incapable of utilizing that plant to any extent; besides which their country provided no animals that could be domesticated. On the heights, both these accessories, with good mental endowments, will account for what followed through regular evolutionary processes. Squier suggests that old pueblos of Aymaraland may have been coeval with Mycenæ and Tiryns, or were, perhaps, more ancient than either. Tiahuannco happens to lie within the present confines of Bolivia, but political lines have little bearing upon those questions considered here. Most probably one division of an Aymaran stock built this town and left other similar constructions which show that they pushed their way northward. No answer can be given when questions relating to particular builders or special dates are asked, since no one is able to say precisely who the Inca Indians were, or when they constructed these old towns, temples, and tombs. We are only justified in assuming that they belonged (with several other peoples) to a more or less differentiated mass, afterwards named as if it contained but two contingents. Payne's theory of an original division among lowland immigrants after reaching the plateaux (Aymaras going south and Quichuas north) is plainly based on existing distributions, and proves nothing respecting settlements made during remote ages. Even supposing that occupation as it is now had always been the same, our knowledge of Aymaraland's priority in progress would still leave it doubtful which integral part of

[a] History of Peru. Chicago, 1892.

[b] Notes sur l'Americanisme. Paris, 1900.

a complex aggregate pioneered. Allied predecessors or contemporaries—Collas, Pacasas, Urus, Lupacas—of those tribes alone mentioned in Bolivian records, have had no history. Whatever was found in possession of an ostensibly dual group, writers credited its known constituents with originating. Under the military Peruvian rule, and while oppressed by Spanish conquerors, or as free citizens of an independent State, it has so happened that indigenous populations, though superficially modified, lived always in like fashion, derived consolation from similar beliefs, and preserved much the same social system under completely dissimilar governments. Everything extraneous or incompatible with natural constitution and spontaneous development remained imperative because it was unassimilated, and left aborigines of "Upper Peru" essentially unaltered. Tribesmen, relieved from pressure, did not entirely revert to old usages or naturally evolved faith, nevertheless they displayed only external vestiges of those innovations forced upon them, and their crude and artificial civilization or religion had the same incongruous effect that wearing masquerade fragments would produce.

Monier[a] found this view of affairs completely substantiated by his personal observations. Sir Martin Conway,[b] also studying natives in situ, says "the present generation is doubtless as ignorant as any under Inca dominion, and Benzoni[c] records the ineffectiveness of new institutions nearly four centuries ago, when Indian reserves and mission stations had already begun to break up. We are not sufficiently acquainted with nomadic bands roaming over waste lands for any sufficient description of such bodies during earlier periods to be given. Both Aymara and Quichua indigenes, however, partly led similar lives. At best they were sedentary semisavages, somewhat modified by a pastoral element conjoined with an imperfectly organized agricultural system. Subsequently, under Peruvian sway, the population was arbitrarily divided and kept to an artificial order by force. When existing in a natural state—before Inca conquest, as well as after Spanish control had been thrown off—those pueblos where the better part of Bolivia's inhabitants dwelt, represented democratic military communes having no trace of feudal institutions. This subject will be discussed in connection with the native races of Peru. Here it suffices to say that all matters which public safety or need involved, were arranged by consolidated gens acting through officials appointed by popular vote and removable if occasion required. Highland tribes generally broke up into municipalities (meaning by this free towns), all of small size, because their means for support forbade large associations, and these established no mutual ties, for the reason that all this country was

[a] Des Andes au Para. Paris, 1890.
[b] The Bolivian Andes. London, 1890.
[c] Historia de Mundo Nuevo. Venice, 1565.

divided into isolated tracts by barriers which produced an absence of intercommunication, quashed reciprocal interests or sympathies, and stunted the growth of public sentiment. Even now, says Conway, the old communistic spirit and local exclusiveness survive. For example, "tame Indians" will only work for proprietors on shares. Having little idea of individual action, and none concerning nationality in its true sense, they rehabitate communal regulations, so far as possible, under modern socio-political conditions. Similarly as respects their conversion. These Catholics go to mass, and yet practice rites condemned by the church. Briefly, veneered Indians assume civilization's outward forms while utterly devoid of its essence. Surroundings which have not materially changed, with inherited traits, make them much the same men as their forefathers of La Paz, Oruro, and Potosi, in pre-Incan times, and when Cuzco dominated most Andean lands.

As a whole, there was no decided uniformity in Alto Peru among those family groups which have been constructed seemingly without reference to accessible ethnic criteria. Antisians or Chunchos, for instance, are a miscellaneous collection of savage mountaineers plainly exhibiting diverse origin by their somatological peculiarities. In this huddle of different strains, some show results by which creolization has produced the so-called "American man;" others display distinctively Mongoloid features that miscegenation has not obliterated; while a third class measurably preserve those characteristics and unmistakable traits belonging to proto-Europeans. These typical divisions stand between tribal fragments endlessly graded; who can not be catalogued even by name, as verbal designations have altered continuously from the practice of supplying old titles with newly adopted suffixes.

Aymara-Quichuas are no doubt kinsmen; yet they present marked contrasts temperamentally and in mental character, besides being, so far as is known, disinclined to mix. Probably the former cherished a hereditary disdain for peoples who were tributary before Inca rule was established over both. Previously to Spanish invasion venerated tradition guarded Aymaras against Cuscan iconoclasm. Their language was not suppressed, and in memory of its ancient renown that region around Lake Titicaca continued to be held sacred. These members of the greatest race this continent has produced, resembled each other structurally quite closely. They were medium-sized or rather short generally, but muscular, with deep chests, broad shoulders, and apparently robust frames; though on account of physiological deficiencies, whose origin in insanitary conditions has heretofore been explained,[a] staying power was wanting either to recuperate from overexertion, or bear up against the depression misfortune entails. Usually Quichuan noses are less aquiline than those of Aymaras, yet there is a similar facial massiveness and an equal cranial asymmetry

[a] Vid. United States of Brazil, etc.

from occipital excess, over frontal development. The whole family had some tendency toward obliquity in their black or dark-brown eyes; while all displayed coarse, abundant black hair, expanded nostrils, with smooth coppery-brown skins. Several ethnologists have concluded from studying the mummies found in old chulpas that these people once possessed disproportionately short and undeveloped legs.

This sign of inferiority, however, was most likely exceptional, merely an atavistic recurrence, whose not uncommon appearance led to unwarrantable generalization. At all events such is not the case now, nor could a malformation like this be persistent among mountainers who involuntarily lengthen their stride, and exercise the muscles of the lower limbs excessively, so that in time mechanical action would adapt them to those functions which were involved by surroundings—namely, locomotion on surfaces whose planes lay at different angles. Nondevelopment of the inferior extremities has a well-understood meaning in human natural history; likewise modifications due to special habits prevailing among communities, are also explicable. This assumed somatological trait of Aymara-Quichuans may be dismissed with the verdict, "not proven."

An outline of racial features wants completeness without illustrations, taken from from both sides of human nature, mental as well as physical. Bolivia, however, has no archæological remains, no inventions, arts, institutions, or cults which are peculiarly her own. So far as we know anything about it, mementoes of these classes were left by members of one group, which is only Bolivian through construction. Its representatives evidently occupied very different positions in culture history, and the only valid distinction is between populations who descended from Collans and indigenes referable to other stocks. If all pueblo Indians on the plateaus of High Peru were not more or less near kinsman, there is at least nothing to show that any civilizing aliens ever occupied those regions. On the other hand, everything indicates their occupation by several affiliated groups, among which one achieved preeminence during earliest times, dominated the rest, and disseminated improvements, so far as circumstances favored instruction, or ability for receiving it existed. On an increasingly great scale this process went on from its beginning in Aymaraland. Peruvians—that is to say, Quichuas—with Aymara and other tribes, destroyed, altered, and may have developed existing models, but they created nothing. Spanish invaders contributed what could not be effectively used. Thus from primeval days there was probably a like cultural discordance with that which now displays itself among natives of this country.

Keane remarks, that "in Bolivia the transitions between different ethnical and cultural groups are perhaps less abrupt than in most other parts of Spanish America."[a] It is true of this country as a

[a] Stanford's Compendium of Geography and Travel, p. 254. London, 1901.

whole that we do not now see many instances where savagery stands side by side with barbarism, or conditions improperly called civilized, which pure-blooded indigenes occasionally display. Approximative uniformity is, however, comparatively recent, and depends upon the fact that upland savages have nearly disappeared; while wilder denizens of forested plains or pampas, inhabit remote positions where they remain almost unknown. Moreover, the obvious inference from what has been said concerning Collan initiative, and such progress as was subsequently diffused among consanguine peoples, is opposed to an opinion that advancement proceeded regularly. At all times it must have been governed by subvarietal differences in tribes which were relatively capable or incapable. Furthermore, social evolution was contingent upon contact with those who propagated it, and thus became an accident of topographical position. No doubt a population now represented by Aymara-Quichuas displayed so much forwardness during primitive epochs as enabled them to live in plateau districts and multiply there; but they did little more en masse. Relatively modern culture belonged to a single class; its spread was effected through military colonies stationed in conquered territories, and most indigenous populations scarcely profited much from their presence. Special cases of resemblance or unlikeness frequently evade precise explanations. Such contrasts and similarities are, however, recognizable as results of situation, average mental constitution in aboriginal masses, or both. This mental sameness, or the presence of nearly identical surroundings, explain why Atacameños and Mojos are alike, except for certain extrinsic and superficial contrasts. These conditions also account for the fact which seems to be at variance with the statement just made, but really is not so; namely, that favorably placed sedentary communities on lowland sites resemble in social organization mountaineer communities who migrated from their original plains with little preparedness, and afterwards developed only enough fitness to sustain them in a new habitat.

Data for a systematic arrangement of Yunga Indians do not exist to an adequate extent. They may be arranged according to localities, and have in some instances been gathered into supposititious groups for whose formation there is frequently little reason and occasionally no warrant whatever. In fact, these dislocated and scattered bands mostly consist of heterogeneous and unconnected race elements. Bates[a] describing those boatmen attached to his expedition, and drawn from a district closely resembling this or the Peruvian montaña in ethnical diversities, says that "some were tall and well built, others had squat figures, with wide shoulders and excessively thick arms and legs. No two of them were at all similar in the shape of their heads." The

[a] The Naturalist on the Amazons. London, 1864.

facial variations equalled such corporeal differences as have been mentioned. Several showed oval faces, with delicate regular features; another part displayed distinctly marked Mongol physiogonomies—"broad, prominent cheek bones, and oblique eyes." Most of them presented gradations toward one or the other type, while dissimilarities in mind and character were not less pronounced than bodily unlikenesses. Eastern South America is predominantly a champaign country, where few obstacles to the intermixture of indigeneous populations are found. Contact and consequent fusion between variously differentiated aggregates make it "the despair of ethnologists," who, being unable to trace blood relationships through this maze, have constructed families on linguistic grounds, thus establishing connections which can not be substantiated on the evidence adduced. Those "somatological units" Deniker[a] finds in the colluvium of gentes distributed through east Bolivia, and which he says make their appearance on "the cordillera, * * * the plains of the Amazon and Orinoco, with those of Guiana," have been frequently noticed in these chapters as biological results due to reversion, or an escape made by certain communities from that general amalgamation process by which two alien stocks were fused into a new type under continental influences acting during cycles of time. Moreover, such physical subdivisions and survivals are not only where Deniker places them, but distributed from sub-Arctic latitudes to Cape Horn. Natural families continually grow smaller and more indistinct throughout the New World. Strongly marked men who preserve traits which reproduce ancestral features usually exist as enclaves amidst hybridized multitudes, and Captain Fitz Roy[b] judiciously remarks that there is less unlikeness among secondary traits exhibited by masses than selected specimens ever display.

The foregoing are facts concerning changes in a type whose creation America has witnessed, and whose end it is likely to see within a much shorter period than was occupied in forming it. Resident tribes of the Bolivian champaign being inextricably entangled, must be referred to separately. Michelena y Rojas[c] represents Maypures as now practically extinct; but none of those questions which their disappearance suggests, and which are of vital importance, can be satisfactorily answered. We do not know whether they died out or were absorbed. Even the group these natives belonged to is uncertain. Nominally, Maypures should be Guaranis from Paraguay and members of that so-called Tupi-Guaranian family whose tribal lists all disagree; but actual community by blood between those of the west and their theoretically allied eastern branch is uncertain. Llipis, Changros or

[a] Races of Men. London, 1900.

[b] Voyages of the *Adventure* and *Beagle*, vol. 11, p. 642.

[c] Exploracion Oficial. Bruxelles, 1867.

Moquehas, with Capac and Upenque Indians likewise, are either vanishing or already gone, without our being able to identify them or trace those causes which effected extinction, or will finally involve destruction. Conibos, Cacibos, Chipas, etc., have been included in an artificially constructed Pano group that appears to stand by itself, and is seemingly unconnected with plain-dwelling Mojos, Chiquitos, Chiriquanos, or Aymara-Quichua highlanders, separated from them by mountain barriers that La Condamine estimated as equaling 3,000 miles of sea. These indigenes evinced a disinclination to mix with neighboring communities. There was, however, little or no physical distinction between Panos natives and members of other societies, either near by or at a distance. They were better off economically, being well supplied with provisions, and also housed, clothed, equipped, in an unusually complete manner. Until far into the seventeenth century the sedentary, agricultural peoples referred to held positions much superior to those of surrounding tribes, and, altogether, existence among them may be properly compared with that maintained by pueblo Indians settled upon Bolivian plateaus.

The circumstances occasioning their decadence and subsequent downfall are not clear; yet it is evident that they must have operated under conditions like malign agencies heretofore spoken of as acting in Brazil, Chile, Argentina, Paraguay; namely, unsatisfied physiological needs inevitably entailing degenerative processes of all kinds, with initial psychical deficiency. There is no proof that public calamity broke them up; those societies most probably faded away, having done all it was possible to accomplish, and then merely lived on with an increasing death rate in a state of unstable equilibrium, easily disturbed by any irregularity in the rhythm of life. Once oscillation unsettled the balance between incident forces and adaptative or recuperative power, destruction became unavoidable. Race inheritance, habits of life, mental or physical capacity provided nothing to check decline, and these communities like so many others ultimately succumbed. Marcoy[a] represents them as now reduced to miserable remnants of the former group.

It has been said by Markham,[b] and several authorities agree with him, that eastern Bolivia shows a much greater diversity in economic or social states than can be found among "Incaized" plateau populations, to whom three centuries of Peruvian rule had given an external uniformity, principally through the "destruction of all former landmarks distinguishing tribe or creed." It should be mentioned in this connection, however, that when Keane remarked upon the absence of violent contrasts between upland societies and plain-dwelling tribes, he no doubt referred to highlanders en bloc, with such yunga communities only as were permanently settled, lived by tillage, and inhabited regu-

[a] Travels in South America. London, 1875.

[b] History of Peru, Introduction, p. xxi.

larly organized villages. Dabarla[a] estimates the entire number of native lowlanders at 274,000 individuals; but no reliance can be placed on this statement, since many aggregates are little or not at all known, none escape the liability to sudden change, and, as Sotomayor Valdes[b] observes, all occupy a country whose discomforts, difficulties, or dangers have thus far prevented any complete exploration. There is a shifting, evasive, varying entanglement of peoples here, forbidding computation, and impossible to arrange either numerically, ethnically, or as representing definite social gradations. At one end of this cultural scale stood comparatively recently extinguished Panos, while utter savages—naked nomads, without even so much as collective names which can be depended upon—constituted, and indeed still form, the opposite extreme. Immense spaces of time, vast expenditures of effort, incalculable organic differences, intervene between men so situated, supposing that evolutionary changes which imply involution also were operating. The former clothed themselves decently with fabrics made at home, built houses that, although constructed from perishable materials, had been comfortably furnished, and developed a complex system of communal life. They made effective arms, domestic implements for all necessary purposes, devised ornamental articles, and attempted to preserve their dead by burying them in painted earthenware jars, thus giving evidence of sentiments and speculative tendencies which pure savages do not display. Finally, these aborigines had so far awakened to self-consciousness that they recorded memorable events on maguey leaves. On the other hand, half-famished nomads like Canichanas or Guayraras, did nothing except seek for food of any kind, and lived after a fashion which De Gabriac[c] describes as positively brutal.

Blood strains cross here in a bewildering way; race criteria are jumbled together within the same districts; disconnected stocks jostle each other throughout this entire region. Nearly white Yuracares have their homes betwixt the Beni and Marmore headwaters, where every household exists separately, and yet, like Araucans, farther south, they are neither destitute nor unable to hold their own among surrounding indigenes. On the watershed draining into Paraguay short, dark, round-headed Chiquitos concentrate in small, undeveloped communes, and certainly do not live better, if so well, as those disaggregated aborigines just mentioned. There are Mojos with both long and short skulls, darker or lighter complexions, more or less well-grown frames, scattered about the Machupa, San Miguel, and Rio Blanco basins, besides an undetermined number of native bands (none otherwise than wholly savage); and, apart from the Guara-Yu—a yellow-skinned and bearded mass of so-called Guaranis—none having

[a] Histoire de l'Amérique du Sud. Paris, 1876.

[b] Estudio Historico de Bolivia. Santiago, 1874.

[c] Promenade à travers l'Amérique du Sud. Paris, 1868.

BUILDINGS OF THE COVENDO MISSION, ON THE BENI RIVER.

commonly characteristic features. Considering how many travelers belonging to various nationalities entered eastern Bolivia since the sixteenth century, some coming by way of Darien, others ascending the Madeira River or penetrating into this province from Paraguay and Argentina, it is astonishing how little we know concerning its inhabitants. Few first-class observers came hither, and most of what follows is merely an outline wherein multifarious groups show much the same arts, customs, and general conditions of existence. Manuel V. Ballivian has probably given all the information it is now possible to obtain.[a]

What has been said will apply to Siriones, on the Rio Grande and Rio Pirai; to Hichilos, who wander over Beni pampas; Penoquiguias, by the San Miguel's southern reaches; with Guarañocas and Potororas, inhabiting that Mesopotamian tract lying between the Tucabaca and Satiriquique; and likewise Chiriguanos, or Tobas, occupying lands along the Pilcomayos, upper course, or extending from thence into Argentina through the Vermejos lower basin. No one can say what groups besides these, now inhabit this region or have wholly passed away there. It appears from so much as is known of yunga societies, however, that most are in a decadent state, but were at one time more numerous. The "staying power" which Deniker has singularly enough ascribed to South American aborigines, failed in this instance signally. Every-day life, such as these Indians led, neither demanded an exhibition of sustained energy nor enforced any disciplinary routine, which might have to some extent at least evolved inherent qualifications through occupations. Fortitude upon their part is mainly physical insensibility, or may be attributed to undeveloped emotional feeling. The much exploited native composure originates in an absence of rational curiosity, and ever active inordinate vanity, which betrays all savages into mistaking unimpressibility for superior wisdom. Those in question disclose scarcely any reserve force of body or mind, and when great disasters overtook masses thus constituted, they naturally gave way. They were not so born, fed, or trained as to support mental and physical strain.

[a] Sinópsis Estadística y Geográfica de la República de Bolivia. La Paz, 1903. The ethnological section of this work contains an exceptionally large body of information relating to native races in this country, which is also thoroughly systematized. Existing knowledge concerning Bolivian groups, both savage and partially reclaimed, will scarcely enable anyone to construct more complete tribal lists, or improve upon the author's review of their regional distribution. Furthermore, unusual stress has been laid upon those striking but mostly unexplained contrasts in mind and character between consanguine peoples who were similarly situated. From an anthropological standpoint this is very important. Heretofore these dissimilarities have received no more than a cursory notice, and any contribution toward resolving mysterious causes of difference, either through presenting additional data or scientifically discussing materials already collected, has an undoubted value.

Topographical details are mostly wanting; but indigenous groups for the most part inhabited tracts extending along those "three thousand miles of river" that Church says[a] "converge like the arms of a fan upon the Madeira's falls." Haenke[b] points out how many streams flow through forests, where cultivation is impossible, and natives are of necessity fishermen or hunters in primitive savagery.

Luxuriant as its vegetation is, this country only produces spontaneous food growths, which, eked out by the animals of its waters, woods, and plains, will barely support a sparse population, who are nearly or quite without artificial means for procuring supplies. Although numerous species—arboreal and terrestrial—make their home here, or migrate to the yunga, this region does not form anything like a great natural game preserve. Woodland openings were sometimes cultivated in a primitive way, but even natives living in comparatively treeless districts remained backward with regard to the division of labor, and indeed, all cooperative action, doing little toward accumulating such stores as would have forwarded effort if progress had been among those possibilities allowed by circumstances. There can be no hope of redemption for men whose entire energies are expended in avoiding starvation; whom destitution divides into insignificant bands, incapable of those generative social functions which only become operative where considerable aggregates can maintain themselves permanently.

One of the ethnological facts conspicuous here, and strikingly displayed elsewhere among South Americans, is family unlikeness. It can not be said that stock bears no relation to social status, because civilizing aborigines throughout Andean provinces belong to one group; but its members may be wandering savages or village Indians, with as much culture and general development as falls to the lot of native Americans. Moreover, physical type—those organic criteria from which elevation or degradation are usually inferred—fails completely when applied to sociological classification in this domain. Three of the four families into which Von den Steinen[c] puts all Brazilians enter these lowlands, together with Paraguayan Chiquitos, Argentine Tobas, and Collan cognates from Upper Peru; but nowhere does bodily conformation necessarily correspond with prosperity or power. In fundamental structural characters the old builders around Lake Titicaca are much on a par with modern yunga savages, who occupy dwellings not so well constructed for shelter or defense as those designed by many inferior animals. Furthermore, river valleys belonging to this district contain tall, symmetrical, light-complexioned men, having high-caste heads, oval faces, and well-cut features, yet whose daily life is noway superior to that led by stunted, hideous crossbreeds, malformed and miserable.

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[a] The route to Bolivia via the River Amazon. London, 1877.
[b] Navigable rivers flowing into the Maranon. London, 1877.
[c] Unter den Naturvölken Zentral-Braziliens. Berlin, 1894.

Different parts of the champaign tracts, nevertheless, offer more or less favorable conditions to men upon whom their environment exerts an almost direct effect; consequently (other things being equal) those most advantageously placed should succeed best, which is probably the case, as a rule. We see here, however, indubitable evidence that this is in nowise universal; since communities most diversely conditioned, both socially and economically, live under almost precisely identical natural influences. It seems useless to seek an adequate explanation of those human varieties which pervade Bolivian pampas, gather around lakes Cavinas, Pacaguaras, Bubues, Torromanas, Nahas, etc.; bands that cultivate woodland opens, wander over grassy plains or by streams where jungle growths are so dense that the interior of forests become uninhabitable. They defy classification, and their names in numerous instances seem without import or identificatory significance. Thus Pacagudras, Chapacúras, Maropas, Sirionos, are titles of Indian tribes and rivers also, a small portion of whose length is claimed by each people mentioned. Travelers have no doubt in great part bestowed tribal designations taken from those waterways on which they encountered particular societies. It is unheard of for savages to speak of a whole great stream under one name; therefore collective titles must have been arbitrarily applied to sections of aboriginal aggregates and withheld from their blood relations who were located at sites somewhat removed.

As was previously said, the archæology of Bolivia is no more Bolivian than that commonly identified with Peru is in a true sense Peruvian. This subject, however, can not be now considered. Its literature has enlarged into such formidable proportions as to prevent anything like an intelligible or truthful summary; besides which, works of art—taking them in their most comprehensive meaning—are, in connection with these inquiries, only object lessons throwing side lights upon anthropological subjects.

Processes of disaggregation, absorption, and extinction are rapidly going on among Bolivian lowlanders; but how should anything that can be preserved in a museum explain why this population, as a whole, is decadent and seems to be dying out? Unfortunately very little has been learned with respect to tribal descent or particular modes of life. Except for some imperfect information throwing a faint light upon climate, topography, sanitation, social state, and intelligence, there are no clues to aid in discovering the secrets of these peoples' fate. Spanish explorers of an early period had better opportunities for observing peoples in this province, as they remained from pre-Columbian times, than other travelers, though, excepting Cieza de Leon,[a] who soon left the plains for upland regions, every adventurer, lay or cler-

[a] Travels, 1532–1550. Hakluyt ed. London, 1864.

ical, exclusively regarded Indians as sources of profit, or "children of Satan" to be coerced into a state of grace. Preconceptions, ignorance, and the grossest superstitions, blinded both classes to many things it was most desirable that they should see. Chronicles and Missionary Relations show how unprepared their authors were to express opinions upon men and things. Even so strikingly exceptional a man as Cieza de Leon constantly needs to have his text qualified or corrected. He says of the route from Panama to Potosi that it extends over "more than twelve hundred leagues." "This," continues Cieza, "I traveled over by land, and saw, examined, and know those things which I describe."[a]

Incomplete as his narrative is, and must necessarily have been, it nevertheless contains information of great value. So far as aggregates can be grouped according to social status, this account introduces some order into the northwestern tribal mélange of South America. In those days, while distinguishing features, since obliterated, were still visible, he found Popayan, and most tracts north of Bolivia's champaigns, peopled by sedentary groups who had also settled along the northern Andean counterforts. One theory of their origin is that these communities, among whom Atratos may be regarded as a representative class, were allied to Mexicans; another derives them from Maya sources, besides which strains others also were intermingled. However this ancestry really was, there were resemblances both to Huaxtecans and Nahuatlans in many ways. Concrete agricultural societies within which subdivisions of kinsmen (gens) were the formative and functional elements, lived under elective chiefs exercising, in combination with councils, an undisputed executive authority. From certain desultory remarks made by Cieza, it might be inferred that there existed here traces of the sacerdotalism which, united to superior power concentrated in one order and quasi-caste institutions, constituted a basis for Inca despotism. At all events, those Indians were organized socially, and strongly contrasted with Yunga tribes—better housed, fed, and clothed—in every respect more prosperous than they. The men bore good bows of black palm, made excellent pottery, besides manufacturing multifarious articles for use or ornament; while their women were cleanly—"decently dressed and combed." Furthermore, "individuals of either sex possessed many decorations and chains of fine gold." In addition, the chronicler says these natives inhabited "small villages, and their dwellings looked like long sheds. They slept in hammocks * * * were clean in eating, and had none of the dirty habits belonging to other nations," i. e., those lower savages also seated here—nameless bands whose presence is merely indicated.

[a] Chronicles of Peru. Part first. 1530.

All Pedro de Leon's observations are full of meaning to ethnologists, and he adds another significant fact, namely, that those communities mentioned uniformly engaged in active commercial enterprises. Orellana, Pinzon, and De Lepe encountered these indigenes under altered circumstances; yet their experiences are confirmatory of the foregoing. Ité saw not only "long houses" here, but also "casas grandes," octagonal wickerwork or wattle-and-daub dwellings, whose communal character was evident. Quevedo mentions good furniture, and palm-thatched roofs projecting so as to make a shaded space all around; while Herndon and Gibbon note separate hearths used by each family, guardrooms, detached quarters for youths and girls, as also other particulars that are real object lessons explanatory of their social system, together with its then existing grade. Doubtless Caripuna or Atrato societies were of different class from homeless, destitute, marauding savages Ygnacio Ananz describes as living in southern districts now included within Bolivian territory. Moreover, those specially endowed peoples who developed on the plateaux were possibly their offshoots or congeners, and, starting with the degree of progress stated, migrated from these plains already prepared for adaptative changes involved by new environments, thus advancing until they at length established that great civilizing center which had its focus at Tiahuanuco.

The group specified demonstrated a capacity for progress through all sociological phases below civilization. Little is known of it while its members remained on lowland tracts except the fact that considerable migrations to those mountain provinces which they permanently occupied certainly took place. Amazonas, Gran Chaco, and northwestern Argentina sent contingents, and it is most likely that bands of what are now called Atratos and Caripunas took part in such movements, while unidentified aggregates, variously descended, contributed to form the intermixed populations and remained stationary.

According to discriminations made between men on the basis of social, economic, and material conditions, none of these tribes inhabiting lower Bolivia had distinctly emerged from savagery. That grade, however, like those which succeed it, leaves room for considerable differences between the included communities. In many important particulars savages may not be at all alike. Their temperaments, tendencies, moral traits, mental habitudes frequently bear little likeness to each other. So far as the evidence in this case extends, that antagonism was strongly marked here, where indigenes, closely resembling each other so far as modes of life, appliances, or general traits are concerned, nevertheless differed profoundly. Upon the borders of their hunting grounds, as also when driven to places far removed, Indians of the river plains evinced the most striking dissimilarities in

those directions above mentioned. So to speak, side by side with tribes incapable of defense and equally unable to support servitude, others displayed an unyielding firmness, waging a hopeless war against aggression, generation after generation, while any were left alive. That implies a great deal, and is very significant when confronted with those sweeping generalizations which have been made about Yunga natives.

Cieza de Leon asserts that other communities who offered little armed resistence, still could not be conquered. There was little actual fighting, but when Spaniards appeared these people abandoned their poor possessions at once. The invaders gathered no prisoners for slaves, and collected scarcely any booty. Cabeza de Vacca, whose raids into this region were bloodier, though almost as unremunerative, describes the province in terms like those used by travelers of recent times. He says it is a country where our lately acquired knowledge assures us that an incipient civilization could not proceed. Its excessive rainfall, unhealthy climate, and the inferior character of natural food productions set limits to progress that primitive man never overpass either here or anywhere else. Brinton[a] calls "agriculture the only mollifying influence" which circumstances permitted to act upon American natives, although Andean peoples of highest grade were to some extent pastoral. Effective tillage, however, is not found in savagery. These societies lived separately and suffered all those vicissitudes inflicted by man or nature without receiving any efficient assistance from their countrymen. Their undeveloped state distributed most tribes along streams; it was easier to fish than cultivate, and they endured manifold ill consequences from famine or malnutrition, together with serious misfortunes arising from the perpetual depradations of piratical foes who infested rivers here after the manner of Paraguayan Indians. When grave disaster came upon communities scarcely able to cohere while undisturbed; if famine, pestilence, or defeat occasioned severe loss and general purturbation, the shock broke them up into small nomadic bands which might resemble Ucayalis, of whom Keane remarks that they look like Fuegians and live like wild beasts. Peoples in whom progressive qualities are not ingrained retrocede readily.

This Ucayali strain escaped to a large degree the effacement of original traits effected by creolization, and so retained many features characteristic of their proto-Mongol stock. Spix and Martius[b] observed them outside Bolivia's present confines; but allied types, or descendants from the same line, were domiciled within that country, together with populations representing every gradient which intermixture and physiographic factors could establish between races primarily

[a] Myths of the New World. Philadelphia, 1878.
[b] Travels in Brazil. London, 1824.

so distinct as generalized Mongols and Europeans. Illustrations of such ethnic variation and entanglement have been frequently given, and now it remains to state in a cursory way the adaptative capacity displayed by these aborigines at large.

Besides grasp of mind or corporeal fitness, mental and physical plasticity are likewise necessary for evolution, which consists essentially in making successively higher more numerous and complex adjustments to surroundings. Evidently those Bolivian indigenes who ascended from plains where men may live in some sort without any but the simplest correspondence with their environment were fitter than that portion remaining stationary. An occupation of lands so contrasted as are the alluvial bottoms at Beni and those sterile heights on which Collan culture culminated, implies initial adaptativeness, followed by a continuous increase of the same power. Maize would not grow around Tiahuanuco until an acclimated variety was produced through cultivation; yet Payne calls the social system of Aymaraland a "corn civilization." Natural potatoes are nearly worthless as articles of food; the Huanuco could do nothing for progress before it was domesticated; plateau existence depended upon artificial improvements that most lowland Indians could neither originate nor take advantage of when opportunities were offered to them. These latter would have hunted wild Auchenias everlastingly and gone no further, just as they ate the horses or cattle bestowed by strangers without profiting from this gift. There was an absence of intelligence and receptivity upon their part that no extraneous aid could compensate for. Yunga savages succumbed to organic deficiencies and natural obstacles. Foremost in this last class, the most formidable was an insufficiency of tissue-making, force-producing food. Cieza de Leon declares that these Indians could always find enough to eat, but nowhere did the population get properly fed, and under a permanent condition of innutrition any latent powers they may have possessed remained in abeyance. Throughout its entirety, from start to finish, amid every phase of human life, the imperious requirement for physiological aliment never relaxes.

That demand could be satisfied to some extent by lowland tribes, seated farther north than those crudely organized Yunga peoples specified. They either came here with means permitting the formation of sedentary self-supporting societies, or through inherent faculty these were developed under favorable circumstances. Maize was perhaps autochthonous in eastern Paraguay, and that was the foundation of every social structure in South America. Physical fitness or mental range are not originated by what men eat, but nutrition strictly conditions both. No result except failure should have been anticipated from attempts at converting and civilizing Canichanas, Itonamas, Cayubabas, Maropas, who could not or would not learn to plant. So

soon as outside pressure was withdrawn these latter tribes relapsed into idleness, destitution, and heathenism. Before men can form bonds of cohesion among themselves, before order, customary law, cooperative labor, or public enterprise can effectually influence them, they must be able to live together, and no such possibility existed in case of those tribes who had not become cultivators. De Leon says their small bands "were and always had been in a state of confusion," and that the whole of them "detested being under subjection to anyone." Regularity in any form or conformity with whatsoever system was intolerable, and to a greater or less degree an aversion to order and discipline is common to unevolved mankind, although not always ineradicable. In their primitive state, savage plain-dwellers were naturally blind to future advantages and incapable of resisting passing impulses. They exerted themselves only when incited by present needs. Those anticipatory acts, predetermining prosperous issues or preventing inevitable miseries, could not be performed by men whose cerebral constitution and correlative mental organization disqualified them for everything involving self-restraint or foresight.

Surveying Bolivian aborigines generally, it would appear that similar organic defects attached to the majority. Certain members of a single group proceeded farther than others, and all outstripped communities belonging to alien stocks, but none advanced continuously. This is a matter admitting of positive affirmation. What we know concerning ancient Aymaraland shows Collan pueblos in a state of decrepitude prior to Peruvian invasion. Apparently that exceptional subdivision of this family had already done its utmost. The Incas fell before a shock almost ridiculously disproportioned to those consequences it caused, and there is but one reasonable inference possible, namely, that degeneration had already taken place. Aymara-Quichuans occupying Bolivia shared their kindred's fate. The governing class exhausted its initiative, leaving those governed as they originally were, except for superficial alterations made by Peruvians and Spaniards. Statutes and doctrines, clothes and furniture, do not change men radically. When self-evolved these merely indicate social or intellectual states—presently existing conditions which naturally give rise to such institutions. Conversely, if arbitrarily imposed, common experience shows them to be inoperative. Human beings must be fitted to grow better; failing in this nothing can make them so. Artificial processes of metamorphosis will never transform human masses into anything they are organically disqualified for becoming. Unaided, one section of indigenous natives nearly reached barbarism; but Spanish domination or republican administration have not since converted them into anything more than barbarians.

Apart from influences operated through external agencies other than their surroundings (super-organic factors, that is to say), the three

URUBICHA, ON THE RÍO BLANCO.

groups composing this population are very much now as they were always. Two of them (the only ones definitely known), if not of one family at least belonged to allied races, or in so far as like developmental traits evince kinship, they appear as if congenitally related. The third is an agglomeration of tribes representing various strains (mostly extra-Bolivian) who possess no common ethnic characteristics, and have never done anything—not even kept themselves alive.

Their northern and more enlightened neighbors—Indians of the Atrato type—worked gold (if they did not procure it already made up from Chibchans or Peruvians), and everyday life with its appliances, accessories, and adornments, was on a plane corresponding to a partially developed social structure. Very little is known concerning their intellectual existence, but it seems evident from early chronicles and missionary reports, that the animistic stage in religion which accompanies pure fetichism had in some measure given way to crude naturalism and shamanistic cults. In many respects there is little difference between witch doctors and ministers of elemental spirits; yet a finer fancy enters into conceptions of beneficent divinities who dwell on sunlit peaks and quicken the earth to "bring forth her increase," than that which chiefly finds malign powers in nature—demons animating everything hurtful, deities enveloped by darkness and directing the storm. It is "nobler in mind," and bespeaks a higher style of man, when gratitude or hope replaces terror as an incitement to good conduct or devotion. Fear has never wholly eliminated itself from any religion, yet some Bolivian lowlanders rose above those sombre and grotesque conceptions which held full sway over their less elevated countrymen. Here, as among plateau communities, an entirely devil-beset mental environment had been broken through, and this fact conveys much to anthropologists. This was only a partial emancipation, however. No doubt the esoteric meaning of Inca sun symbolism would have been equally incomprehensible with Christian mysteries to most Aymara-Quichuan, Caripuna, or Atrato Indians. These groups, nevertheless, separately accomplished something that adds another resemblance to those likenesses existing between them, besides widening the interval by which they are removed from irremediable savages.

CHAPTER III.

GOVERNMENT AND CONSTITUTIONAL ORGANIZATION—LAW OF CITIZENSHIP—RIGHTS OF FOREIGNERS—GUARANTIES—RELIGION.

GOVERNMENT AND CONSTITUTION.

Spanish rule.—From 1544 to 1810 Spanish colonial rule was supreme in the country, then known as "*Alto Perú*," or Upper Peru. Between these two dates the country was governed by 53 viceroys, the last 13 being the rulers of the Viceroyalty of Buenos Ayres, to the jurisdiction of which Alto Perú was annexed in 1776.

Independence.—The country solemnly declared its intention to become independent on the 16th of July, 1809, the formal proclamation of independence being issued on the 6th of August, 1825, upon the termination of the war. The country took the name of Bolivia in honor of Gen. Simon Bolivar, its founder, and adopted a unitarian republican democratic form of government.

Political Constitution.—The Constitution now in force in Bolivia is that of October 28, 1880, and amendments. It is generally conceded to be one of the most liberal constitutions in Spanish America. The Constitution consists of 18 sections, divided into 139 articles, containing especial prescriptions relative to the fundamental principles of individual rights and how they are guaranteed. Other general provisions are the preservation of peace and order, the formation of the legislative power, and the administrative, judicial, and municipal organization of the State. The Nation is declared to be sovereign, and the exercise of its sovereign powers is vested in the Legislative, Executive, and Judiciary branches of government, which are independent among themselves. Agreements entered into by the State are inviolable. The Republic is organized under the unitarian system of government, its administration being a *representative democracy.* Individual rights are fully stated and guaranteed.

Legislative Power.—The Legislative Power is vested in the National Congress, a body consisting of two chambers, the Chamber of Deputies (*Cámara de Diputados*), equivalent to the House of Representatives in the United States, and the Senate or *Cámara del Senado.* The Chamber of Deputies consists of 72 members, elected by direct vote of the people for a term of four years. The Senate is composed

of 16 senators, 2 for each department, elected for the term of six years by direct vote of the people. One-half of the members of the Chamber of Deputies retire every two years, while in the Senate one-third of their number retire every two years. Congress meets annually, the regular session lasting sixty days. This session, however, may be extended, either at the request of the Executive or by joint resolution of both chambers, to a period of ninety days. Extraordinary sessions may be convoked by concurrent vote of the majority of both houses, or by executive proclamation setting forth the place of meeting and the special object for which Congress has been convened. During the extra session Congress must adhere exclusively to the business stated in the proclamation or decree calling such session. The chambers of Congress have both separate and concurrent powers, every chamber having specific duties, as set forth in the Constitution.

Representatives.—To be a *diputado* or representative it is necessary to have the following qualifications: (1) To be inscribed in the National Registry; (2) to be 25 years of age and a Bolivian by birth or naturalization, having resided permanently in the country for five years at least, and to have an annual income of 400 *bolivianos*[a] derived from a profession, industry, or real estate; (3) never to have been condemned to corporal punishment (imprisonment or hard labor) by sentence of any ordinary court of law.

The duties of the Chamber of Deputies are: (1) To impeach before the Senate the President and Vice-President of the Republic, the ministers of State, justices of the Supreme Court, and diplomatic ministers, for offenses committed in the discharge of their respective duties; (2) to elect the justices of the Supreme Court from the list of three names submitted by the Senate.

Senators.—The qualifications necessary to be a senator are: (1) to be a Bolivian by birth or naturalization, with five years' permanent residence in the country, and to be registered as a citizen in the National Register; (2) to be 35 years of age; (3) to have an annual income of 800 *bolivianos* from a profession, an industry, or real estate; (4) never to have been sentenced to corporal punishment (imprisonment or hard labor) by an ordinary court of law; (5) to have had four years uninterrupted residence in the country immediately prior to the election as senator, unless, in case of absence from the country, such absence is due to the discharge of a public duty or service.

The duties of the Senate are: (1) to investigate the accusations made by the Chamber of Deputies, as stated, and decide whether the impeachment is valid or not. Should the decision of the Senate be in the affirmative, such impeached officer shall be forthwith suspended from office and placed at the disposal of the supreme court for trial

[a] The *boliviano* is worth $0.422 United States currency, as estimated by the Director of the United States Mint, October 1, 1904.

under the law. The Senate can only try the justices of the Supreme Court and pass judgment upon them, whether the accusation originates in the Chamber of Deputies or from a complaint duly filed by the aggrieved party or by another person; (2) to submit to the Executive lists of three names for the appointment of archbishops or bishops, such appointment to be proposed by the Executive; (3) to submit to the Chamber of Deputies lists of three names from which the Chamber is to elect the justices of the Supreme Court; (4) to reinstate as Bolivians, or as citizens, whoever should have forfeited such qualification; (5) to permit Bolivians to accept honors, offices, titles, or emoluments from other governments, providing such are not contrary to the laws of the country; (6) to elect by secret ballot the generals and colonels in the army from the list of three names submitted by the Executive; (7) to decree rewards and public honors to those most deserving for services rendered to the country.

The annual cost of tho legislative branch of the Government may be estimated at 167,000 *bolivianos*.

Executive Power.—The Executive Power is vested in the President, who can only exercise his authority through the respective secretaries or members of the cabinet. The President is elected by the direct vote of the people; his term of office is four years, being ineligible for the next succeeding term. Two vice-presidents, one first and one second vice-president, are elected at the same time, in the same manner and for the same term as the President. In case of death, disability, or resignation of the President, or when by reason of a civil or international war he assumes personal command of the army, then the first vice-president shall discharge the duties of office, and in default of the first vice-president, then the second vice-president shall discharge such duties. The first Vice-president is the presiding officer of the Senate. The necessary qualifications to be first or second vice-president are the same applying to senators, except that they must necessarily be native Bolivians. The powers and duties of the President are set forth at length in the Constitution.

Cabinet.—The President is assisted in the discharge of his duties by a Cabinet consisting of five secretaries, called *Ministros de Estado*. To be a Minister of State the same qualifications applying to deputies are required. The Cabinet ministers are jointly responsible with the President of the Republic for all their acts of administration in their respective offices. The ministers are jointly responsible for all acts performed in their Cabinet meetings. All decrees and orders issued by the President shall also bear the signature of the Minister or Secretary of the respective department, without which such order or decree can not be enforced.

For the appointment or removal of a Minister the President's signature is sufficient, but a written or verbal order of the President does not relieve a Minister from personal responsibility. Ministers may be prosecuted before the Supreme Court by the aggrieved party for common offenses, and judgment shall be rendered according to the laws on the subject. Cabinet members may be present and take part in the debate of either chamber of Congress, but must leave the place before a vote is cast. Ministers are under obligation to send to Congress, as soon as the annual session is open, a complete report relative to the work done in their respective departments during the year. The Cabinet ministers are five in number, viz, Minister of Foreign Relations and Worship, Minister of the Interior and Promotion (Gobierno y Fomento), Minister of Finance and Industry, Minister of Justice and Public Education, and the Minister of War and the Colonies.[a]

Other important branches of the administration are the "*Supremo Tribunal de Cuentas*," an institution analogous to the office of the Auditor-General, the Bureau of Public Credit, the Mint, the Bureau of Posts and Telegraphs, Bureau of Immigration and Statistics, and the Engineer's Corps.

The total annual cost of the service may be estimated as follows, in round numbers:

	Bolivianos.
Foreign Relations and Worship	470,000
Interior (Gobierno)	200,000
Finance	420,000
Promotion (Fomento)	101,000
War	578,000
Colonies	400,000
Education	206,000
Departmental expenses	700,000
Total	3,075,000

Judiciary.—The Judicial Power is vested in a National Supreme Court of Justice, superior district courts, lower district courts (juzgados de partidos), courts for the preparation of criminal cases, called "*juzgados de instrucción*," the duties of such courts being similar to those of the Grand Jury, and parochial courts.

The Supreme Court is composed of seven justices appointed by the Chamber of Deputies from a list of three for each justiceship submitted by the Senate. The necessary qualifications to be a Justice of the Supreme Court are to be a Bolivian by birth or naturalization, to be 45 years of age at least, and to have had a permanent residence in the country for five years; to have been a judge in any of the superior courts of justice or District Attorney for five years, and to have been

[a] The powers and duties of the President and the members of the Cabinet are specifically set forth in articles 4 to 22 of the "Supreme Decree," January 10, 1903.

a practicing lawyer in good standing for ten years; never to have been condemned to imprisonment or hard labor by sentence of any ordinary court of law.

Besides those duties devolving upon the Supreme Court by virtue of the laws of the Nation, its constitutional duties are, in general terms, the following: To hear and determine on all appeals for the reversal of a sentence passed by the lower courts and to establish the main points at issue; to originally hear and determine on all questions of a purely legal nature the decision upon which depends on the constitutionality of a law, decree, or any other resolution whatever; to hear and determine on all cases concerning the responsibility of diplomatic and consular agents, judges of the superior courts, district attorneys, and other public officers, as specified, for offenses committed in the discharge of their respective duties; to hear and determine on all cases arising from contracts, negotiations, and concessions granted by the Executive Power, and on all suits brought against the Executive arising from executive action; to hear and determine on all matters relating to the national patronage exercised by the Supreme Government, and, finally, to settle all controversies between municipal councils, between these and the political authorities, and between either of them and the provincial municipal boards.

No justice or judge can be removed from office except by proper action, nor can they be suspended for any other offenses than those specified in the laws of the country. Publicity of judicial proceedings is the essential condition of the administration of justice in Bolivia, except in such cases where public morals may be offended.

The annual cost to the State of this branch of the service is estimated, in round numbers, at 600,000 *bolivianos*.

Departmental administration.—The political, administrative, and financial powers of government in the departments are vested in an officer called "*Prefecto*," directly responsible to the General Executive, whose immediate agent he is and with whom he is to communicate as determined by law. The provincial government is represented by *subprefectos*, subordinate to the prefectos. The district (*canton*) authorities are the *Corregidor* (a country justice), and for the smaller district subdivisions, called *campaña*, or rural districts, *alcaldes*, or petty justices, appointed by the respective prefects.

Municipal authorities.—There is a Municipal Council at each departmental capital, and in their respective sectional subdivisions there are municipal boards and municipal agents for the still minor subdivisions. Municipal councils are authorized to enter into mutual agreements or contracts for the construction and maintenance of roads and highways between two or more of their respective departments, whenever such agreements or contracts affect the revenues or moneys of the municipal treasury of the respective departments.

CITIZENSHIP.

Articles 31 to 36, inclusive, of the Bolivian Constitution thus determine citizenship, and the necessary qualifications to be a citizen:

"ART. 31. Bolivians by birth are:

"First. Those born within the territory of the Republic.

"Second. Those born in a foreign country of a Bolivian father or mother while in the service of the Republic, or while in exile for political causes are Bolivians, even in such cases where the law requires the condition of birth within Bolivian territory.

"ART. 32. They are likewise Bolivians:

"First. The children of a Bolivian father or mother born in a foreign country, by the mere fact of having their residence in Bolivia.

"Second. Foreigners who, having resided one year in the Republic, declare before the municipal authorities of their respective places of residence their intention to become citizens.

"Third. Foreigners who obtain as a concession from the Chamber of Deputies their certificate of naturalization (*Carta de naturaleza.*)

"ART. 33. The qualifications to be a citizen are:

"First. To be a Bolivian.

"Second. To be 21 years of age, if unmarried, or 18 years of age, if married.

"Third. To be able to read and write; to hold real property or have an annual income to the value of 200 *bolivianos*, provided that such income is not a compensation for services as a servant.

"Fourth. To be inscribed in the Civil Register.

"ART. 34. Citizenship rights are:

"First. To take part, either as an elector or as the elected party, in the formation of the public powers, or in the exercise of the duties thereof.

"Second. To be admitted to the discharge of public duties without any further qualification than that of being competent to discharge such duties, except as otherwise provided by the Constitution.

"ART. 35. Citizenship rights are forfeited:

"First. By naturalization in a foreign country.

"Second. By sentence of a competent court of law to corporal punishment,[a] until reinstatement.

"Third. By fraudulent bankruptcy, when this has been adjudged as such.

"Fourth. By admitting offices, emoluments or decorations from a foreign government without special permit of the Senate.

"ART. 36. Citizenship rights are suspended when the person is *sub judice*, by virtue of a decree of impeachment, or by having been distrained for a debt due to the public treasury."

[a] Imprisonment or hard labor.

Rights of foreigners.—Article 19 of the Constitution provides that: "All men enjoy in Bolivia the same civil rights, the exercise of which is regulated by civil law."

GUARANTIES.

The personal rights or guaranties granted by Bolivia are specifically set forth in Section II, articles 3 to 25 of the Constitution. They are, in general terms, as follows:

Slavery is abolished, all slaves becoming free upon their arrival in Bolivian territory.

Right of transit throughout the Republic is free, except as restricted by international law. The right to exercise any lawful trade or profession is also free. The freedom of the press and speech is granted, as well as the right to teach under Government supervision, and the right of association and peaceful assembly. Political and civil rights are liberally granted. Industrial and literary rights (trade-marks and copyrights) are inviolable, as well as the home, all private correspondence, and property. Personal security is protected, and torture or any other kind of personal punishment is forbidden under any and all circumstances. The attempt to violate, or the actual violation of any of the foregoing guaranties or rights makes the author directly responsible before the law, and no legal privileges or exemptions can be claimed.

Taxes apply equally to all, and are obligatory only when voted by the Legislative Power. Civil and criminal laws apply equally to all. Confiscation does not exist as a punishment for political offenses. Private correspondence, if violated, can not be used as legal evidence. Acts performed by persons without legal authority or proper jurisdiction are null and void.

Constitutional principles are applicable in preference to any other law, and any act or disposition contrary to the Constitution is void. Arrests, detention, or imprisonment can only be made in strict accordance with the law, except in cases of *flagrante delicto*, when it can be made without warrant, and by any person. No person, except the military, can be tried by a special court. No person is under obligation to give testimony incriminating himself or herself in criminal cases.

The penalty of death is abolished, except as a punishment for the crimes of murder, parricide, and treason. Civil death and infamous punishment are also abolished.

The Public Debt and all contracts and agreements entered into by the State, according to law, are guaranteed.

RELIGION.

The national church of Bolivia is the Roman Catholic, as stated in article 2 of the Constitution, which reads as follows: "The State recognizes and supports the Roman Apostolic Catholic religion, the public

CATHEDRAL, POTOSÍ.

exercise of any other worship being prohibited, except in the colonies, where it is tolerated." The large majority of the population professes that faith, but foreigners belonging to other church denominations are not molested in the free exercise of their religious beliefs.

The conversion of the wild Indians into the Roman Catholic Church is in charge of colleges for the *Propaganda Fide*, having at present about 18 missions.

The country is divided into 1 Archbishopric and 3 bishoprics, the first embracing the departments of Chuquisaca, Oruro, Potosi, Tarija, and Atacama, under the name of Archbishopric of La Plata, covering an area of about 137,515 square kilometers, with a population estimated at 750,000 inhabitants. This Archbishopric consists of 133 parishes, 5 monasteries, and 3 colleges for the propagation of the faith.

The bishoprics are that of La Paz, consisting of 90 parishes, 3 convents, 2 monasteries, and 1 college for the conversion of heathens, its jurisdiction covering an area of 139,227 square kilometers. The bishopric of Cochabamba consists of 3 monasteries, 1 convent, 1 missionary college, and 53 parishes, its jurisdiction extending over an area of 60,417 square kilometers. The bishopric of Santa Cruz has 61 parishes and 1 home for the missionaries, its jurisdiction extending over an area of 630,583 square kilometers.

There are five colleges for the propaganda—at Sucre, Potosí, Tarija, Cochabamba, and La Paz, respectively. The principal missions are found in the department of La Paz, working among the Mosetenes and Chimanes Indian tribes; in the department of Tarija, working among the Chiriguanos; in Santa Cruz, working among the Chiriguanos and Guarayos; and in Chuquisaca, its field of work being among the Chiriguanos and the Matacos Indians. The number of Indians under these missions is estimated at 20,000.

The religious orders have in the Republic 18 convents, 8 of which are devoted to nuns. The estimated number of members of religious orders and of the regular clergy is unofficially given at 1,088, divided as follows: Nuns, 280; friars, 241; regulars, 567. The support of the Roman Catholic Church costs the State the sum of 196,027 bolivianos annually, of which over 14,000 bolivianos is devoted to the missions.

The National Census of 1900 gives the following figures in regard to religious sects:

Religion.	Males.	Females.	Total.	Per 1,000.
Roman Catholics	805,953	803,412	1,609,365	985.1
Other creeds	13,294	10,951	24,245	14.9
Total	819,247	814,363	1,633,610	1,000.0

CHAPTER IV.

POLITICAL DIVISIONS—THE CAPITAL CITY, ITS POPULATION, RESOURCES, MEANS OF COMMUNICATION, PRINCIPAL BUILDINGS, AND PUBLIC INSTITUTIONS.

Territorial division.—Bolivian territory is divided into 9 departments and 1 territory, called the "*Territorio Nacional de Colonias.*" These departments are subdivided into provinces, 59 in number, 425 cantons, 232 vice-cantons, 18 missions, and 1 colony, as shown in the following table; also giving area, population, geographical position, and altitude above the sea level:

Departments.	Area.	Political divisions.					Population of Departments, 1900.
		Provinces.	Cantons.	Vice-cantons.	Missions.	Colonies.	
	Sq. kms.						
La Paz	139,277.74	11	103	35	3	.....	445,616
Beni	264,155.53	4	16	9	.....	.....	32,180
Oruro	49,537.53	4	23	17	.....	.....	36,081
Cochabamba	60,417.36	10	59	25	.....	.....	328,163
Santa Cruz	366,128.03	6	51	19	5	.....	209,592
Potosí	126,390.49	9	73	78	.....	.....	325,675
Chuquisaca	68,420.28	4	53	14	5	.....	204,434
Tarija	183,606.16	6	29	35	5	1	102,885
Atacama or Litoral[a]	66,170.58	5	10	.....	.....	.....	49,820
Territorio Nacional de Colonias	497,931.05	.....	8	.....	.....	.....	31,883
Total	1,822,334.75	59	425	232	18	1	1,816,271

Departments.	Department capitals.	Population of capitals, 1900.	Altitude above sea level.	Geographical position, Paris meridian.		
				South latitude.		West longitude.
			Meters.	° ′ ″		° ′ ″
La Paz	La Paz de Ayacucho	54,713	3,630	16 29 57		70 29 25
Beni	Trinidad	4,294	500	14 7 50		67 39 00
Oruro	Oruro	15,898	3,694	18 9 00		69 25 00
Cochabamba	Cochabamba	21,886	2,557	77 15 00		68 42 00
Santa Cruz	Santa Cruz de la Sierra	18,335	422	16 57 00		65 12 30
Potosí	Potosí	20,910	4,146	19 42 44		67 15 00
Chuquisaca	Sucre	20,907	2,844	19 30 00		67 13 00
Tarija	Tarija	6,980	1,924	21 41 00		66 32 00
Atacama or Litoral[a]	Cobija[a]	9,000	(c)	22 32 00		72 40 00
Territorio Nacional de Colonias.	Puerto Acre[b]	345	123	(c)		(c)

[a] Chilean figures, Dec. 31, 1900, as given by the Bolivian Census Report, 1902.
[b] These figures are the result of a military census taken February, 1902.
[c] No data available.

THE CAPITAL CITY.[a]

Between 1538, when the old town of Chuquisaca, now Sucre, was built, and 1604, date of the foundation of the city of Oruro, all the main cities of Bolivia, at present capitals of their respective departments, were established, among them the present city of La Paz de Ayacucho. This city was founded in 1548, under the name of *Nuestra Señora de la Paz* (Our Lady of Peace), but by act of January 3, 1826, the name was changed into La Paz de Ayacucho, in memory of the historical battle which sealed the fate of Spanish rule in South America, fought at Ayacucho.

Situation.—La Paz lies in a deep valley, irrigated by the Choqueyapu River, forming a fertile plain toward the south, while toward the north the valley disappears at the foot of the snow-capped Andean Range. The climate is cold, dry, and healthy, the mean annual temperature being estimated at 10° C. or 50° F. In 1862 magnetic declination was reckoned at 10° E., and in 1898 it registered 9°.

The latitude and longitude of La Paz, Paris meridian, is 16° 29′ 57″ and 70° 29′ 25″, respectively. The altitude of the city at the Plaza Murillo has been estimated at 3,630 meters above the level of the sea.

Area.—The city covers an area of 2,726.86 square meters, divided into 9 districts, embracing 147 city blocks, with a total of 1,808 houses, forming 110 streets and 10 public squares.

Population.—According to the latest official census (1900), the population of the city amounted to 54,713 inhabitants, divided as follows: Whites, 13,419; Indians, 30,606; mestizos (mixed), 10,555; negroes, 138; and 15 representatives of the yellow race. This total population was composed of 26,476 males and 28,237 females, of which there were 16,379 married, 4,679 widowers and widows, and 33,655 unmarried inhabitants. There were 39,420 persons who could neither read nor write, 147 able to read, and 15,146 who could read and write. The number of Roman Catholics at the capital was 54,603, and 110 persons belonging to other religious sects.

On the 20th of September, 1902, a special census of the city was taken, giving the results shown in the following table:

Census of the city of La Paz, September 20, 1902.

City districts.	Blocks.	Houses.	Population.	Percentage of population.	
				Block.	House.
El Sagrario	9	101	1,856	206.2	18.3
La Concepcion	11	116	2,086	189.6	17.9
Santo Domingo	17	336	6,186	365.0	18.4
El Carmen	13	127	4,147	319.0	32.6
Santa Bárbara	12	187	6,365	530.4	34.0
El Hospicio	18	259	8,196	455.1	31.6
San Francisco	17	273	9,863	580.0	36.1
San Sebastián	26	220	6,739	259.1	30.6
La Nueva Paz	24	189	5,728	238.6	30.3
Total	147	1,808	51,162	384.5	28.2

[a] Officially, Sucre is the capital of the Republic, but practically La Paz enjoys that distinction, being the seat of government.

To this total of 51,162 inhabitants representing the city population, a 3 per cent was added for errors and omissions, bringing the total population for the city alone to 52,697, while to the rural or suburban population of 1900, which gave a total of 6,984 inhabitants, a 5 per cent was added, so that the official figures for the population of the city of La Paz and suburbs can be safely given at 60,031.

Real estate.—The estimated value of real property in the city, other than public property, amounts to 29,000,000 bolivianos, and public buildings are valued at 4,804,713 bolivianos.

Industries.—There are several industrial establishments in the city, the principal being breweries, distilleries, tobacco and cigarette factories, soap and candle factories, looms, tanneries, and pottery works. The value of these industries is estimated at 5,000,000 bolivianos per year.

Commerce.—The principal interior customs district of the Republic is situated at La Paz, 796 kilometers from Mollendo, and 475 from Arica, the capital being the central point of distribution for the mineral and agricultural outlying districts. Imports consist mainly of cotton goods, wool and silk fabrics, ready-made clothing, furniture, hardware, provisions, wines, liquors, drugs, and other foreign products, while the exports are made up of silver, copper, tin, bismuth, gold, rubber, coffee, cacao beans, coca leaves, cinchona bark, and other native articles and productions.

The receipts from the custom-house of La Paz during the year 1902, latest available itemized data, were as follows:

	Receipts.		Receipts.
IMPORTS.	*Bolivianos.*	IMPORTS—continued.	*Bolivianos.*
Duties on foreign goods	706,099.07	Consular fees	15.59
Storage	30,286.45	Wharfage at Port Perez	21,131.49
Additional storage charges	27,258.50	Back rents	871.41
Local duties	913.21		
Postal orders	1,928.77	EXPORTS.	
Sugar and molasses	57,485.15		
Peruvian brandy	4,042.37	Tin	10,066.91
Peruvian alcohol	132,133.04	Sealed or stamped silver	2,047.20
Policies and manifests	3,239.40	Gold	343.51
Fines on consular invoices	16.40	Rubber	69,477.78
Permits or waybills	1,581.00		
Interest	321.70	Total	1,069,258.95

The total imports and exports through the same custom-house during the years 1900, 1901, and 1902, as officially given by a Bolivian authority,[a] are the following:

	1900.	1901.	1902.	Total.
	Bolivianos.	*Bolivianos.*	*Bolivianos.*	*Bolivianos.*
Exports	2,976,563.44	2,969,501.59	3,843,054.86	9,789,119.89
Imports	3,647,641.76	5,988,028.88	5,194,727.56	14,830,398.20

[a] Sinópsis Estadística Geográfica, Vol. II, 1903.

Figures for 1903 are 5,404,651 bolivianos for imports, and 3,602,318 bolivianos for exports.

Communications.—The city of La Paz is in communication with the rest of the world by telegraph, and with the Pacific coast through Tacna and Arica, in the south, and Mollendos in the north. The distance to Arica is estimated at 475 and to Mollendos at 796 kilometers. Interior communication is also had by telegraph and telephone. There is an efficient cab service in the capital, which is connected with Guaqui or Desaguadero, a port on Lake Titicaca, by a railroad 34 kilometers in length. There are several roads leading to the interior departments and also to Brazil, Perú, Chile, Argentina, and Paraguay. The city is lighted by electricity.

Education.—Official data for 1899 show that the number of public schools for the department of La Paz for that year was 112 devoted to primary education, with 6,865 pupils. On December 31, 1902, there were in the city of La Paz[a] 24 municipal schools, 13 for boys and 11 for girls, having 2,463 enrolled pupils—1,471 males and 991 females—with an average attendance of 1,255 for the boys and 834 for the girls. There were, besides, 22 public free schools for both sexes with 2,417 pupils, and over 400 boys and girls taking private instruction.

Primary education is therefore represented at the capital by 46 schools, employing 134 teachers and having 5,279 enrolled pupils. These figures do not embrace children being educated in private primary schools, nor a large number of Indians receiving instruction under the religious orders.

Other institutions of learning are the University, the Seminary, the School of Law, and several private schools and colleges.

Principal buildings.—The city of La Paz possesses many fine buildings, several public parks, and a Municipal Library created by decree of June 30, 1838, with 697 volumes. At the end of the first year the library had increased to 1,500 volumes, reaching the number of 3,917 in 1845, 6,810 in 1896, and about 15,000 in 1902. The library is open to the public during certain hours daily, except Sundays and holidays. The reading room is large and well lighted by electricity. Besides the Municipal Library there are other similar establishments in the capital, the principal being the library of the Convent of San Francisco with 3,500 volumes, and that of the Convent of Recoleta with over 5,000 volumes. The Seminary, the University, and the School of Law have also fine libraries, as well as the International Bureau of Immigration and Statistics, and the Geographical Society of La Paz.

[a] Memoria del Concejo Municipal en 1902. La Paz, 1903.

The Municipal Museum, which was open to the public in 1844, contains a fine collection of specimens of the natural wealth of the country, besides priceless aboriginal mummies found on the plateaus, curiously deformed skulls, ancient monoliths, and sculptures, specimens of ceramics and other paraphernalia from the Incas, and some samples of Bolivian paleontology, flora, fauna, and mineralogy.

There are in the city several remarkable churches and convents, a good theater, an Orphan Asylum, and many public dispensaries. Among the eleemosynary institutions the principal are the "Beneficencia" and the "Higiene." There is also a savings bank called "El Ahorro del Hogar," a manual training school "Don Bosco," several insurance companies, a race track, a gun club, and many other clubs and institutions.

The city of La Paz possesses a modern penitentiary, built in ten years at a cost of 430,000 bolivianos. This penal institution is divided into three main departments, one for the detention of accused persons, one for debtors, and the penitentiary proper with a capacity for 200 convicts. There are in the establishment four workshops for men and two for women.

ALANCHA CASCADE, NEAR LA PAZ.

CHAPTER V.

DEPARTMENTS AND NATIONAL TERRITORY—BRIEF SKETCH OF EACH—AREA AND POPULATION—RESOURCES—MEANS OF COMMUNICATION—TRADE—POLITICAL DIVISIONS.

The nine departments into which the Republic is divided are the following:

Atacama or Litoral.

Situation.—This department, which has been occupied by Chile since 1879, lies on the Pacific coast, to the southwest of Bolivia. It was created by a decree of July 1, 1829.

Area and population.—The area of Atacama measures 66,170.58 square kilometers, and the total population of the Department in 1900 was 49,820 inhabitants.[a]

Communications.—Antofagasta is the principal seaport of Atacama, and is connected with the city of Oruro by rail, and by means of highways with all the principal producing centers of Bolivia. The total distance from Antofagasta to Oruro by rail is 924 kilometers, the road rising from 5 meters above the sea level at Antofagasta to 3,694 meters at Oruro.

Trade.—A large portion of the foreign trade of Bolivia is carried on through the port of Antofagasta. There are no reliable statistics on this trade, however, as Bolivian exports and imports are credited to Chile instead of Bolivia. The British Consul-General at Valparaiso, in his report relative to the trade of Antofagasta,[b] states that the total of exports from Bolivia shipped through that port in 1901 amounted to 31,048,096 *pesos*, as follows:

Articles.	Value.	Articles.	Value.
	Pesos.		*Pesos.*
Silver	19,924,112	Copper and silver	130,948
Tin	6,865,391	Antimony	102,157
Sulphate of silver	826,433	Wolfram	10,477
Bismuth	723,751	Other articles	1,201,325
Copper	487,521		
Borate of lime	410,524	Total	31,048,096
Argentiferous lead	365,457		

[a] Chilian figures, December 31, 1900, as given by the Bolivian census reports, 1902.
[b] Bulletin of the International Bureau of the American Republics, February, 1903.

Divisions.—The department is divided into 5 provinces and 10 cantones. Cobija, or Puerto La Mar, with a population of 9,000, is the capital city. Other important towns are Antofagasta, as stated, San Pedro de Atacama, Tocopilla, and Mejillones.

BENÍ.

Situation.—This department, created by decree of November 18, 1842, is situated in the northeastern section of the country, bounded on the north and east by Brazil, on the west by the department of La Paz, and on the south by the departments of Cochabamba and Santa Cruz.

Area and population.—The area of Beni measures 264,455.53 square kilometers, with a population of 32,180 inhabitants, or a percentage of population of 0.12 per square kilometer. According to the census of 1900, this population has been estimated as follows: From census returns, 25,680; not reported, 500; Indians, not civilized, 6,000.

Communications.—There are several highways in this department connecting it with the other departments of the Republic, besides navigable rivers, there being the following open ports on the Beni River: Reyes, Rurrenabaque, Muchanes, and Magdalena. The department has 4 post-office stations, viz, Villa Bella, Trinidad, capital of the department, Rurrenabaque, and Riberalta. Telegraphic communication also exists with the rest of the country.

Trade.—The trade of this department and a large portion of that of the National Territory of Colonias is carried on through the customs district of Villa Bella, in the province of Vaca-Diez, a town situated at the confluence of the Mamoré and the Beni rivers, on the Brazilian boundary, 891 kilometers from Trinidad, the departmental capital. Villa Bella is the most important customs district of the department on the Amazon trade route, about 680 kilometers from La Paz by land and water, and 3,955 kilometers distant from Pará, Brazil. The trade movement through the Villa Bella customs district, is officially estimated for 1900, 1901, and 1902 at the following figures:

Trade.	1900.	1901.	1902.	Total.
	Bolivianos.	*Bolivianos.*	*Bolivianos.*	*Bolivianos.*
Exports	3,057,149	1,600,844	1,284,044	5,942,037
Imports	268,690	210,765	84,027	563,482

During the first six months of 1903 imports amounted to 31,286 and exports to 644,584 bolivianos.

A portion of the trade of the department of Beni is carried on through the Puerto Suarez custom-house, in the department of Santa Cruz.

Divisions.—The Department is divided into 4 provinces—Mojos, Iténez, Yacuma, and Vaca-Diez; 16 cantones, and 9 vice cantones.

Capital city.—Trinidad, in the province of Mojos, is the capital of the department, at an altitude of 500 meters above the sea. Its population numbers, according to the latest census figures (1900), 4,294 inhabitants, of which 2,109 are males and 2,185 females, or 2,556 city and 1,738 rural inhabitants. The city is built on a broad valley, at about 10 kilometers from Trapiche, a port on the Iboré River, an affluent of the Mamoré. The distance from Trinidad to the frontiers has been officially estimated as follows: To Brazil, via Villa Bella, 891 kilometers; via Puerto Suarez, 1,741 kilometers; to Argentina, 1,666; to Chile, 3,081, and to Perú, via Oruro, 2,235 kilometers.

The city of Trinidad is well laid out, its streets are wide, and the majority of its buildings one story high. It is in communication with the rest of the department by means of highways, traffic being carried on in large carts. Sugar-cane mills, tobacco factories, and a few looms represent the industries of the city.

The other principal provincial towns are Santa Ana, Magdalena, and Riberalta, capitals of the provinces of Yacuma, Iténez, and Vaca-Diez, respectively.

Chuquisaca.

Situation.—The department of Chuquisaca, created by decree of January 23, 1826, is situated in the southeastern portion of the country, bounded on the north by the departments of Cochabamba and Santa Cruz, on the west by Oruro and Potosi, on the south by Tarija and the Argentine Republic, and on the east by Paraguay and Brazil.

Area and population.—The area of the department measures 68,420.28 square kilometers, with a population of 204,434 inhabitants, which the latest census (1900) divides as follows: Population as per census returns, 196,434; not civilized Indians, 8,000, which gives a percentage of 2.98 inhabitants per square kilometer.

Communications.—Highways are the principal means of communication of Chuquisaca with the other departments of the country. There are three main wagon roads leading from Sucre, the capital of the department, to Cochabamba, 468 kilometers; to Potosi, 161 kilometers, and to Challapata, Oruro, 340 kilometers distant. Up to February, 1903, there was a stage line running between Sucre and Cochabamba, taking six days to make the trip. The Sucre and Potosi stage line is not very important by reason of scarcity of traffic. The contract made by the Government and the stage company expired in 1902, but no new bids have been made. The distance between the two provincial capitals by this road is 161 kilometers. The stage line between Sucre and Challapata is subsidized by the Government. The distance between the two terminal points is 340 kilometers, taking six days to cover it.

There are 6 post-office stations in the department, 220 kilometers of telegraph line, and an efficient telephone service on the State telegraph wires.

Trade.—There are no official data available in regard to the value and the extent of trade in this department. Imports consist in the main of foreign manufactured products of all kinds, while the exports are the few articles of consumption and staple goods produced by the department.

Divisions.—The department of Chuquisaca is divided into 4 provinces, named Yamparaez, Tomina, Cinti, and Acero; 53 cantones, 14 vicecantones, and 5 missions.

Capital city.—Sucre, the capital of the department, as well as the official capital of the Republic, is situated at an altitude of 2,844 meters above the sea, and in 1900 had a population numbering 20,907 inhabitants, 8,671 being males and 12,236 females. The city was founded in 1538 as La Plata, or Charcas, and was subsequently named Sucre by the Bolivian Congress in 1836, in honor of Antonio José de Sucre, one of the bravest and most honorable soldiers of the war of South American independence.

Sucre is a historical city, being the first to rebel against Spanish rule. It is the legal residence of the Executive, Legislative, and Judicial branches of Government, as already stated, and the See of the Archbishopric of La Plata, embracing the departments of Chuquisaca, Oruro, Potosí, Tarija, and Atacama.

Sucre possesses what is considered the best university of the Republic, several private colleges, public schools, literary associations, a commercial college, a public library, containing 6,048 volumes, 3,900 pamphlets, and 914 complete collections of periodical publications, a Law School, Geographical Society, and several newspapers and scientific publications. The Medical Institute is considered the best of its kind in Bolivia, as it is provided with the latest and most expensive instruments and material, and has an anatomical museum, a museum of natural history, several laboratories devoted to microbiology, chemistry, physics, toxicology, etc., and a fine medical library. The city has 22 temples, the principal being the Cathedral, Santo Domingo, San Felipe Neri, San Agustin, and the churches and convents of Santa Clara and Santa Teresa. Other notable buildings are the Palace of Justice, the Insane Asylum, the theater, the Palace of the Supreme Government, the National Bank, and the market. There are also several eleemosynary institutions, a bank of issue, and a mortgage bank. The principal public parks are the "Alameda" and the "Parque," with artificial lakes fed by an aqueduct 21 miles (about 33.79 kilometers) in length, passing through a tunnel cut in the rock 266 meters in length. Sucre is in communication with the rest of the world by

telegraph, and with the principal cities of the Republic by highways. Sucre is distant from the Peruvian frontier, via La Paz, 922 kilometers; from Chile,[a] by land 1,737; from Argentine, 661; from Brazil, via Chiquito, 1,527, and via Trinidad, 2,501, and 1,591 kilometers from Paraguay.

The principal provincial towns are Yotala, Padilla, Camargo, and Villa Monteaguda, capital of the Yamparaez, Tomina, Cinti, and Acero provinces, respectively.

COCHABAMBA.

Situation.—The department of Cochabamba was created by decree of January 23, 1826. It lies in central Bolivia, being bounded on the north by the department of Beni, on the east by Santa Cruz, on the west by La Paz, and on the south by Oruro and Chuquisaca.

Area and population.—Cochabamba measures 60,417.36 square kilometers in extent, having a population of 328,163 inhabitants, which, according to the census of 1900, is estimated as follows: 326,163 as per census returns and 2,000 Indians not civilized, thus giving a percentage of population of 5.43 inhabitants per square kilometer, this being the most populated department of the Republic.

Communications.—The principal means of communication of this department with the rest of the country is by means of wagon roads or highways, the principal being one from the capital to Oruro, 228 kilometers in length, and another connecting it with Sucre, 468 kilometers distant. From Cochabamba, capital of the department, to Oruro, the capital of Oruro, there is a regular stage line holding the concession to run the line without competition until the end of 1908. The company receives a subsidy from the Government. The time needed to cover the distance between the two capitals is two days. The Cochabamba and Sucre stage line was suspended in 1903. A large portion of the trade of the department is carried on by means of the Chaparé River and other navigable streams. There are 14 post-office stations in Cochabamba, 830 kilometers of telegraph wire, and an efficient telephonic service over the State telegraphic lines.

Trade.—Although no official figures are available in reference to the trade of Cochabamba, it may be safely stated that its import and export traffic is fair, taking into consideration the facilities afforded by river navigation and the restricted necessities of the territory.

Divisions.—The department is divided into 10 provinces, 59 cantons, and 25 vice-cantons.

Capital city.—Cochabamba, the capital of the department, was founded in 1572. Its altitude above the sea level is 2,557 meters, and its population, according to the latest returns of the census of 1900, numbers 21,886, divided into 10,377 males and 11,509 females.

[a] Sinópsis Estadística y Geográfica de Bolivia, 1904, Vol. III, p. 4.

Cochabamba lies in an extended narrow valley and enjoys a mild climate. The city streets are wide and the public parks well kept. The city has a University and several public and private educational institutions, a Public Library, various daily and periodical publications, literary associations, and charitable institutions. The city is in communication with the rest of the Republic and the world by telegraph, while interior traffic is done by means of heavy carts or road wagons. The distances between the capital and the frontiers are as follows: Distance to Peru via La Paz, 624 kilometers; to Chile via Atacama, 1,359; to Argentine via Tupiza, 941, and to Brazil, 1,365 kilometers, via Paraguay, and 1,588 by way of Beni.

The several provincial capitals are: Quillacolo, capital of Tapacari; Punata, Tarata, Totora, and Mizque, capitals of the respective provinces of the same name; and Capinota, Independencia, Sacaba, and Aiquile, capitals of the provinces of Arque, Ayopaya, Chapare, and Campero, respectively.

La Paz.

The department of La Paz was created by decree of January 23, 1826, and lies in the northwestern portion of the Republic, its boundaries being as follows: Brazil on the north, Peru on the west, Atacama and Oruro on the south, and Cochabamba and Beni on the east.

Area and population.—The area of this department measures 139,277.74 square kilometers, with a population of 445,616, according to the census of 1900, estimated as follows: From census returns, 426,930 inhabitants; not reported, 3,686; not civilized (Indians) 15,000. This shows that the percentage of population in this department is 3.19 per square kilometer, being the second as regards density of population.

Resources.—The products of this department are numerous. The animal kingdom is represented by large flocks of llamas, alpacas, vicuñas, sheep, and goats, and great droves of horses and cattle; the vegetable, by numerous products, such as cocoa, cotton, coffee, cacao, bananas, sugar cane, orange and lemon trees, cereals, potatoes, different vegetables, and building and cabinet woods. The coffee cultivated around La Paz in the "yungas"—the low, inclosed valleys north of the city on the slope of the Cordillera Real, between hills from 800 to 1,600 meters high, and whose rivers flow toward the Amazon, are designated under this name—has the aroma and delicacy of the Mocha coffee. Formerly the coffee trees were used to inclose or were planted as hedges to the agricultural properties, and it is only recently that regular coffee plantations have been set out.

In the same "yungas" is found the cocoa, at Apolobamba, from which the chocolate of the same name is produced. The sugar of this region is remarkable for its crystallization and the cotton for the

delicacy of its fiber. The same superiority is found in the fiber of the Angora wool.

The mineral kingdom is represented by gold, copper, silver, rock crystal, very beautiful marble (some of the white varieties being almost transparent), tin, etc. From a commercial point of view the department of La Paz is one of the most important of the Republic.

The development of the copper mines of Corocoro, a small Indian village, situated at an altitude of 4,025 meters, is extraordinary on account of the high prices reached recently by this metal. These mines, which have been known since the earliest times, were once abandoned on account of the low price of this metal and the difficulty of exporting the products. They are a part of a vast formation which extends almost without interruption to Atacama, passing through the provinces of Lipez, where white copper is found, Porco, and Chayanta (department of Potosi). Appearing in the provinces of Arque and Colchas (department of Cochabamba), it extends toward Turco, Poopo, and Oruro; then follows a northeast direction to Corocoro, and from Corocoro this copper formation extends through the provinces of Omasuyos, Muñecas, and Caupolican, ending at Apolobamba, in Pere. Besides these immense deposits, veins have been discovered in all the Andine spurs, extending to the departments of Chuquisaca and Tarija.

Communications.—The department of La Paz enjoys the distinction of being the first section of the country where a railway has been built with national funds. The line, which starts at the Guaqui wharf, in the Pacajes Province, department of La Paz, has a total length of 87.20 kilometers to the Alto de La Paz, a short distance from the capital. The line was officially inaugurated on October 25, 1903. This line connects with the steamers plying on Lake Titicaca, and the Puno and Mollendo Railroad.

The principal highways of La Paz connect the capital with Oruro, 273 kilometers, with Corocoro, capital of the Pacajes Province, 114 kilometers, and with Achacachi, Omasuyos Province, 111 kilometers distant. Stage lines run regularly on these roads, covering the distance between La Paz and Oruro in two days, between La Paz and Corocoro in twelve to fourteen hours, and between La Paz and Achacachi in about the same time.

River navigation is another means of communication of the department, affording excellent facilities for the development of trade.

There are 30 post-office stations in the department, kept at a cost of 45,692 bolivianos per annum. The extent of telegraphic lines is 711 kilometers, and telephonic communication is had over certain State telegraph lines.

Trade.—The most important interior customs district of the Republic is that of La Paz, as it yields the largest revenue to the State, notwith-

standing the fact that only one department supports the trade. There are several small customs districts under the jurisdiction of the La Paz custom-house. During the years 1900, 1901, and 1902 the revenues produced by the La Paz custom-house have been officially estimated at the following values:

	Bolivianos.
1900	885,825
1901	1,113,134
1902	1,069,259

The trade of La Paz Custom House for 1903 has been officially estimated as follows: Imports, 5,404,651 bolivianos, against 5,194,721 in 1902, or a gain of over 226,000 bolivianos, and exports 3,737,343 bolivianos, against 3,843,054 in 1902, or a decrease of over 105,000 bolivianos.

Divisions.—The department is divided into 11 provinces, 103 cantons, 35 vice-cantons, and 3 missions.

Capital city.—La Paz de Ayacucho, capital of the department, as well as the present seat of Government,[a] is in communication with the Pacific coast through Tacna and Arica in the south, and Mollendos in the north, the distance to Arica being 475 and to Mollendos 796 kilometers. The city of La Paz is 122 kilometers from Peru, via the Desaguadero River, and 267 via Ancomarca; 1,404 kilometers from Chile, by way of Cuevitas; 936 from Argentina, via La Quiaca, and 1,838 and 1,738 kilometers from Brazil, whether through Puerto Suarez, department of Santa Cruz, or via Villa Bella, respectively. The number of schools in the department of La Paz on December 31, 1902, was 172, with 10,165 attendants and 275 teachers.[b]

The provinces are Cercado, Sicasica, Omasuyos, Muñecas, Pacajes, Loaiza, Inquisivi, Nor-Yungas, Sud-Yungas, Larecaja, and Caupolicán.

Oruro.

Situation.—The department of Oruro, created on September 5, 1826, is situated in the western portion of the Bolivian territory, its boundaries being as follows: La Paz to the north; Atacama on the west; Potosi on the south and east, and Cochabamba to the northeast.

Area and population.—The department covers an area of 49,537.53 square kilometers, its population being, according to the official census of 1900, 86,084 inhabitants, divided into 43,698 males and 42,386 females, showing a density of population of 1.71 per square kilometer.

Resources.—The department of Oruro is one of the most important in the Republic both from a commercial and a mining point of view. Government statistics show that the exports of tin bars from the

[a] See Chapter IV, page 63.

[b] Memoria del Presidente del Concejo Municipal, en 1902. La Paz.

NEAR CHALLAPAMPA, LA PAZ.

department of Oruro during the year 1900 amounted to 81,771.28 metric quintals, as follows:

Oruro	11,350.28
Machacamarca	36,674.94
Poopo	3,665.14
Pazña	6,153,92
Challapata	22,515.99
Sevaruayo	1,411.01
Total	81,771.28

These figures do not include 850.75 metric quintals shipped in bulk from Oruro. Estimating the value of an avoirdupois ton at £111 the 82,622.03 metric quintals, or 812.41 tons, are worth £90,177 10s. 2d.

Communications.—The means of communication enjoyed by the department are in the first place the outlet to the Pacific by the Antofagasta and Oruro Railway, inaugurated on May 15, 1892. The total distance covered by the railway is 924 kilometers. It ascends from Antofagasta, situated at 5 meters above the sea level to Quegua, 3,796 meters, and then descends to Oruro, 3,694 meters altitude.

There are highways in the department leading to several of the adjoining departments, the principal being the La Paz and Oruro road where a stage line is established, covering the distance between the terminals, 273 kilometers, in two days, and the Cochabamba and Oruro, 228 kilometers in length, where there is another regular stage line covering the distance between the two capitals in two days.

River navigation also affords another means of communication. There are 6 post-office stations in the Department maintained at a cost of 23,476 bolivianos. The Antofagasta and Oruro Railway Company has a telegraph line running parallel to the railroad track, the extension of this line being 924 kilometers. The other telegraph lines in the department represent total length of 816 kilometers. Telephonic communication is obtained over some of the State telegraph lines.

Trade.—By decree of July 29, 1902, Oruro was created a National Customs District, intrusted with the special duty of classifying according to tariff all goods and merchandise imported through Antofagasta for consumption in the interior of the Republic, and also intrusted with the dispatch of all merchandise in transit to Antofagasta, and the collection of the export tax on minerals. Previous to this Oruro existed as an ordinary customs district, its trade movement for the fiscal years 1900, 1901, and 1902, being officially estimated at the following figures:

	1900.	1901.	1902.	Total.
	Bolivianos.	*Bolivianos.*	*Bolivianos.*	*Bolivianos.*
Exports	5,673,689	5,731,080	5,913,929	17,318,698
Imports	270,141	259,906	305,967	836,014

The trade of Oruro for 1903 is officially estimated at 352,834 bolivianos for imports and 8,012,544 bolivianos for exports.

Divisions.—The department is divided into 3 provinces, 23 cantons, and 17 vice-cantons.

Capital city.—Oruro, founded in 1606, is the capital of the department. The city is at an altitude of 3,694 meters above the level of the sea, and has a population according to the National Census of 1900 of 15,898 inhabitants, of which there were 7,692 males and 8,202 females, further divided into 13,575 inhabitants for the city and 2,323 for the rural districts. The city of Oruro lies in a broad plain at the foot of a small ridge of mountains. Its climate is cold, strong winds prevailing in this region. Oruro has a good public library, several fine buildings, and public squares, educational and benevolent institutions, and several daily and periodical publications. The city is connected with the Pacific coast by the Antofagasta Railway. The distance from Oruro to the frontier is as follows: To Peru, via Carangas, 284 and via La Paz, 395 kilometers; to Brazil, by way of La Paz, 2,011; by way of Trinidad and Santa Cruz, 2,741, and via Puerto Suarez, 2,150 kilometers; to Argentine, via Tupiza, 663 kilometers, and 1,131 kilometers from Chile.

The provinces and their respective capitals are: Cercado, capital Oruro; Paria, capital Poopo; and Carangas, capital Corque.

Potosi.

Situation.—This department, created by decree of January 23, 1826, is situated in the southwestern section of Bolivia, being bounded on the north by Oruro and Cochabamba, on the west and south by the Litoral de Cobija or Atacama, on the southwest by Argentine, and on the east by Tarija and Chuiquisaca.

Area and population.—Potosi covers an area of 126,390.43 square kilometers, with a population of 325,615 inhabitants as given by the latest official census, 1900. This shows a density of population of 2.57 inhabitants per square kilometer.

Resources.—Potosi is one of the richest mineral districts in the world, and its export trade consists in the shipping of mineral products either to Chile, by the Antofagasta and Oruro Railway, via Uyuni, or to the Argentine through the Tupiza customs district.

Communications.—The principal highways connecting Potosi with the neighboring departments are the one leading from Sucre to the city of Potosi, 161 kilometers in length, the Potosi and Uyuni road, 185 kilometers, and the road from Potosi to La Quiaca, 417 kilometers in length. Navigation also affords means of interior communication. There are 20 post-office stations in the department, maintained at an annual cost of over 31,000 bolivianos. The number of kilometers of

telegraph wire is about 700, and the telephonic service is also well established in the department.

Trade.—The import and export trade of the department is carried on through the custom-houses of Uyuni and Tupiza. Uyuni lies on the western section of the department, on the railway from Antofagasta to Oruro, the special duties of this custom-house being to collect the export tax on minerals and verify the operations of the Antofagasta custom-house. The exports through Uyuni consist mainly in goods in transit, as it is the nearest custom-house to the Chilean boundary.

For the years 1900, 1901, and 1902 the imports and exports through Uyuni are officially estimated as follows:

	1900.	1901.	1902.	Total.
	Bolivianos.	*Bolivianos.*	*Bolivianos.*	*Bolivianos.*
Exports	16,702,340.78	19,382,062.60	13,562,830.93	49,647,234.31
Imports	919,845.10	1,071,452.39	1,388,767.13	3,380,064.62

For 1903 the imports amounted to 2,222,390 bolivianos, while the exports were estimated at 10,936,280 bolivianos.

The Tupiza customs district is on the Pilcomayo River, in the southeastern portion of the department of Potosi. Through this custom-house are cleared all goods imported from Argentine, as well as those in transit for the departments of Potosi, Chuquisaca, and Oruro. Tupiza is principally a mining center, gold, silver, tin, bismuth, and lead being mined in this section. Trade through this customs district for 1900, 1901, and 1902 is estimated as follows, according to official figures:

	1900.	1901.	1902.	Total.
	Bolivianos.	*Bolivionos.*	*Bolivianos.*	*Bolivianos.*
Exports	540,840.41	1,173,860.80	695,848.40	2,410,549.61
Imports	1,038,910.50	523,137.89	664,517.58	2,226,565.97

The official estimate for 1903 credits Tupiza with 661,817 for imports and over 150,000,000 bolivianos for exports.

The revenue derived from both customs districts in 1902 is estimated at 87,381.29 bolivianos.

Divisions.—The department is divided into 9 provinces, 73 cantons, and 78 vice-cantons.

Capital city.—The capital of the department is the city of Potosi, founded in 1545, at an altitude of 4,146 meters above the level of the sea. During the colonial epoch this was one of the richest cities in America on account of its mineral wealth. A census taken in 1611

gave Potosi 160,000 inhabitants, while the latest official figures for 1900 show its population to number 20,910, as follows: Males, 10,366, and 10,544 females.

Of the ancient splendor and the 60 churches of Potosi only a few remains are left. Most of the temples are in ruins. The Matriz (cathedral) is considered the best in the Republic. San Francisco is another rich and handsome church. In the heights surrounding the city there still exist 36 lakes built at an expense of over $3,000,000. Among the other remarkable institutions and buildings is the Casa Nacional de Moneda (National Mint), built in 1572 at a cost of $1,148,000, with timber brought from Argentine. Up to 1846 the mint had coined $1,751,721,578. Up to 1875, $111,204,307 (*pesos*) and 7 *reales* silver and $2,621,919 gold had been coined. Coinage in 1892 amounted to 1,535,340 bolivianos, at a cost of $68,054, and in 1893 to $1,678,320, at a cost of $54,894.

In 1895 the municipality of Potosi supported 49 schools, there being besides 11 public and 1 private schools, with a class roll of 1,973 boys and 928 girls. Potosi has a public library, a metallurgical museum of no small importance, several newspapers, hospitals, a bank, and many other important institutions. The city is in communication with the rest of the world by telegraph and with all the other capitals of the Republic by means of highways.

The provinces are Frias, Charcas, Linares, Chayanta, Nor-Chichas, Sud-Chichas, Porco, Nor-Lipez, and Sud-Lipez.

Santa Cruz.

Situation.—The creation of this department dates from January 23, 1826. Santa Cruz lies in the eastern portion of the territory and is bounded on the north by the department of Beni and Brazil, on the west by Cochabamba and Chuquisaca, on the south by the latter department, and on the east by Brazil.

Area and population.—The area of this department measures 366,128.03 square kilometers, with a density of population of 0.57 per square kilometer, according to the census of 1900, which gives the following figures: Population per census returns, 171,592; not reported, 18,000; Indians not civilized, 20,000.

Resources.—The natural products of this department are in general terms similar to those of the rest of the Republic. There is quite an important export trade in sugar, rice, cacao beans, manioc, rubber, oil, tanned and raw hides, skins, vanilla, and tamarind. The principal industries are the manufacture of cigars, sugar, and spirits, tanneries, a sawmill, and other less important trades.

Communications.—River navigation is the principal means of communication. Santa Cruz has to carry on its trade with the interior, as

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well as with the neighboring departments, over the rivers Chapare, Mamore, Beni, and other large streams and their tributaries. Highways also traverse the territory, heavy carts being used in the traffic. Mail service is in charge of 12 post-office stations, maintained at an annual cost of about 24,000 bolivianos. The telegraphic lines in Santa Cruz cover a distance of over 100 kilometers, while telephonic service is efficient.

Trade.—The bulk of the import and export trade of the department of Santa Cruz, as well as a large portion of the trade of Beni, is carried on through the customs district of Puerto Suarez, situated on the western bank of the Paraguay River, on the bay of Caceres, opposite the Brazilian town of Corumba. This customs district is an important center for the trade of southeastern Bolivia.

The amount of trade done through the Puerto Suarez custom-house during the years 1900, 1901, and 1902 is officially estimated at the following figures:

	1900.	1901.	1902.	Total.
	Bolivianos.	*Bolivianos.*	*Bolivianos.*	*Bolivianos.*
Exports	118,753.21	212,488.15	382,284.45	559,485.81
Imports	484,062.35	434,549.51	213.488.83	1,096,100.69

Official figures for the trade of this port in 1903 show the following values: Imports, 303,980 bolivianos and exports 300,088.

Since the opening of Puerto Suarez in 1893, the old port of Santiago in the same department has been closed to traffic.

Divisions.—The department is divided into 6 provinces, 51 cantones, 19 vice-cantones, and 5 missions.

Capital city.—Santa Cruz de la Sierra, altitude 422 meters, is the name of the capital of the department. The city was founded in 1557. The population of Santa Cruz, according to latest census reports (1900), is 209,592, as follows: Census returns, 171,592; not reported, estimated at 18,000; uncivilized Indians, estimated, 20,000. Santa Cruz is situated in a valley, and possesses several fine buildings and wide streets. It has a University, a number of primary schools, literary associations, newspapers, religious and eleemosynary institutions, and other elements of civilization. The city is in telegraphic communication with the world, and is the starting point of several highways leading to the provincial capitals or to the large navigable rivers Beni, Madre de Dios, Mamore, and Guapay. These rivers are navigated by small craft.

Santa Cruz is distant from the frontiers of Bolivia: Six hundred and seven kilometers from Argentine, 2,022 from Chile, 1,176 from Peru via Oruro, and 1,288, via La Paz, and from Brazil 1,388 and 702 kilometers, via Trinidad and Puerto Suarez, respectively.

The provinces and their capitals are: Cercado, the chief town; Santa Cruz, the departmental capital; Valle Grande, with a capital bearing the same name; Cordillera, Lagunillas; Velasco, San Ignacio; Sara, Portachuelo; Chiquitos, and San Jose.

Tarija.

Situation.—This department was created on September 24, 1831. It is situated in southern Bolivia, having Chuquisaca to the north and east, Potosi to the west, and Argentine to the south.

Area and population.—The area of Tarija measures 183,606.16 square kilometers, and its population, according to the last census, 1900, numbers 102,887 inhabitants, divided as follows: Census returns, 67,887; not reported, 10,000; uncivilized Indians, 25,000, or a percentage of 0.56 inhabitants per square kilometer.

Resources.—The resources of Tarija are of an agricultural and mining character, lack of capital and labor being responsible in the main for their undeveloped condition.

Communications.—Highways and river navigation are the principal means of transportation in the department. There are 6 post-office stations, maintained at a cost of about 12,000 bolivianos a year. There are 3,116 kilometers of telegraph wire in the department and an efficient telephone service over the State telegraph lines.

Trade.—All the commerce of the department is carried on through the Tarija customs district, situated in the western section of the department, on one of the affluents of the Bermejo River. The trade through this customs district during 1900, 1901, and 1902 is estimated as follows by the Bolivian authorities:

	1900.	1901.	1902.	Total.
	Bolivianos.	*Bolivianos.*	*Bolivianos.*	*Bolivianos.*
Exports	27,326.16	34,323.74	31,199.18	92,849.08
Imports	299,404.84	478,556.24	316,004.05	1,093,965.13

The foreign trade of the port during 1903 has been estimated at 466,780 bolivianos for imports and 28,500 for exports.

Divisions.—The department is divided into 6 provinces, 29 cantones, 35 vice-cantones, 5 missions, and 1 colony.

Capital city.—The capital of the department is the city of Tarija, at an elevation of 1,924 meters, founded in 1574.

The population of Tarija, according to the census of 1900, numbers 6,980 inhabitants, 3,140 males and 3,840 females. On account of its situation and climatic conditions Tarija is a delightful city. It is well known for its mineral springs and fine buildings, among others the Cathedral and the Convent of San Francisco. The city is in communication with the world by telegraph, and has many fine roads lead-

ing to the other departments. The distance between the city of Tarija and the frontiers of Bolivia is as follows: Argentine, 133 kilometers; Paraguay, 1,225; Brazil, via Puerto Suarez, 1,883, and via Villa Bella, 3,031 kilometers; Peru, by way of La Paz, 1,214, and by way of Oruro, 1,103 kilometers, and 1,170 kilometers distant from Chile. Tarija has a public library, several schools, colleges, hospitals, scientific associations, and various newspapers and other publications.

The provinces and their capitals are: Cercado, chief town Tarija, also the capital of the Department; Mendez, San Luis; Aviles, Concepcion; Gran Chaco, Yacuiba; Salinas, San Luis, and Arce, Padcaya.

Territorio Nacional de Colonias.

Situation.—The Territorio Nacional de Colonias, lying to the northwest of Bolivia, was created by a decree dated March 8, 1900. At the time of the creation of the Territory its boundaries were given as follows: To the north, the boundary line with Brazil; to the west, the Peruvian boundary line; to the south, river Madre de Dios, and river Beni to the east. By virtue of the boundary treaty concluded with Brazil on November 17, 1903, the definite boundary line has been established.[a]

Area and population.—The Territory embraces the largest area of any of the divisions of the country, measuring 497,931.05 square kilometers.[b] Its population, as given by the census of 1900, consists of 7,228 inhabitants, according to census returns, 9,655 not reported, and 15,000 uncivilized Indians, making a total of 31,883 inhabitants, or 0.6 per square kilometer.

Resources.—This Territory embraces one of the richest rubber producing belts in South America, and only awaits for capital and labor to yield immense riches.

Communications.—River navigation, highways, postal facilities, telegraphs, and telephones are the means of communication with the Territory.

Trade.—The Acre National Customs District is situated at Puerto Acre, on the left bank of the river of the same name, a few kilometers south of the Brazilian frontier. According to Bolivia's official statistics the exports of Puerto Acre in 1900 to 1902 were as follows:

	Bolivianos.
1900	6,461,028
1901	6,474,090
1902	2,328,388

The only official data available in regard to imports is for 1901, when they amounted to 60,144 bolivianos.[c]

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[a] See Chapter I, p. 10–13.

[b] Sinopsis Estadística y Geográfica, Vols. I and III.

[c] Sinópsis Estadística y Geográfica, Vol. II.

Divisions.—The Territory is divided into 2 *delegaciones*, called "Aiquiri" and "Madre de Dios," respectively, and 8 cantones.

Capital city.—Puerto Acre, founded in January, 1899, under the name of Puerto Alonzo, is the chief town of the Territory. There are no official data giving reliable information as to the population of Puerto Acre. The National Census Commission, however, publishes a table[a] showing the figures obtained in February, 1902, for the population of Puerto Acre by the military authorities. According to these figures, there were 345 inhabitants in Puerto Acre, 329 of which were males and 16 females, further divided into 207 whites, 122 mestizos, 10 Indians, and 6 negroes.

[a] Censo de la Población de Bolivia en 1900. Vol. I. La Paz, 1902.

CHAPTER VI.

AGRICULTURE—REVIEW OF THE AGRICULTURAL WEALTH OF THE COUNTRY—PRINCIPAL PRODUCTS AND THEIR CULTIVATION—FACILITIES FOR OBTAINING GOVERNMENT LANDS—FOREST PRODUCTS—STOCK RAISING.

Bolivia has an estimated area of 182,233,400 hectares. Leaving aside about 30 per cent of this total as represented by forests, rivers, lakes, mountains, cities, etc., there remains over 100,000,000 hectares suitable for agriculture and stock raising, which could give occupation to 25,000,000 or 30,000,000 people. The population of the country numbers about 2,000,000, while the land under cultivation may be estimated at about 4,000,000 hectares. Of this area, however, only about one-half is under actual cultivation, as it is customary in the country to set aside a portion of the land for breeding purposes and future agricultural development. The topographical formation of the country is such that products from all the zones can be raised, the natural richness of the soil and abundant means of irrigation facilitating agricultural development. Most, if not all, of the land under cultivation is held by the whites but worked by Indians, employing the most primitive methods in the generality of cases. A great variety of crops is raised in the country, for local consumption only, the main products for export being the following:

Rubber.—This is undoubtedly the principal and most valuable of Bolivian products. The belts or districts where rubber is grown and sapped are divided into four classes, according to the natural commercial outlet of the product, the first region being that of the Acre or National Territory of Colonias, estimated to produce about 10,000 tons of crude rubber per year. The outlet for the exports of this belt, as well as a portion of the product of the upper Tahuamanu River, is Puerto Acre. The second belt is that formed by the basins of the rivers Madidi, upper and lower Beni, Orton, Maruripi, Tahuamanu, and several lesser streams, embracing such sections of Madre de Dios, Acre, and Purus as do not find a natural outlet through Puerto Acre. The exports of rubber from this belt are made through the national customs district of Villa Bella. The third belt comprises the rubber forests of La Paz, having as a natural outlet Puerto Perez, on Lake Titicaca, and via Puno and Mollendo, in Peru. The fourth and last

rubber producing zone lies in the northeastern section of the department of Santa Cruz de la Sierra, embracing the provinces of Velasco and Magdalena, the former being on the boundary line with the state of Matto Grosso, Brazil. The department of Cochabamba also has an abundant supply of rubber trees, now commencing to be developed, but promising a great future.

Production.—The production of rubber in Bolivia from 1890 to 1902, except for 1899, no data being available for this year, is given in the following table compiled by Bolivian authorities, showing the year, number of kilograms, value, and duties or taxes collected:

Year.	Kilograms.	Value.	Duty.
		Bolivianos.	*Bolivianos.*
1890	294,000	1,260,000	28,000
1891	345,000	1,350,000	30,000
1892	363,400	1,422,000	31,600
1893	394,818	1,504,940	32,235
1894	632,500	2,475,000	55,000
1895	820,410	3,070,300	71,340
1896	1,140,712	4,853,560	107,888
1897	1,674,216	6,551,280	145,586
1898	3,155,955	13,556,593	497,580
1900	3,496,240	10,403,959	808,536
1901	3,465,063	9,151,823	1,261,533
1902	1,902,993	5,910,334	1,000,781

The exports of rubber during the years 1900, 1901, and 1902, is officially valued at 10,403,959 bolivianos for 1900; 9,151,823 for 1901 and 4,910,334 for 1902.

Coca (*Erythroxylon coca or Peruvianum*).—This is one of the most valuable products of Bolivia. It is a shrub from 2 to 8 feet in height, according to the locality where it is cultivated, which has attracted the attention of the world since 1862, on account of its marvelous properties. Coca is cultivated in the lower plateaus and temperate regions of the western watershed of the Andes, in the departments of La Paz and Cochabamba, at an altitude of 650 to 1,600 meters above the sea level. The cultivation of this plant is one of the richest and most prosperous industries of the province of Yungas. A coca plantation requires an outlay of about 2,500 bolivianos at the start, and 20 months of care and cultivation. It begins to produce about the third year an income of 1,000 to 1,500 bolivianos per annum. A coca plantation, with proper care, may last from 30 to 40 years.

The total production of the coca plantations in the country is estimated at 3,500,000 kilograms per year, valued at 3,000,000 bolivianos, the State receiving 250,000 bolivianos per annum on taxes. About three-fourths of the total production comes from the province of Yungas, in the department of La Paz, the balance being the product of Larecaja, Inquisivi, Caupolicán and Yuracarez in Cochabamba.

Bolivian coca commands better prices than the Peruvian product, and has a larger demand in foreign markets, while miners and Indian

laborers use it in preference to any other. Cocaine is the alkaloid extracted from the coca leaves. The physiological effects of coca vary according to the mode of using the leaves, whether in an infusion or by simple mastication. In the first case a slight nervous irritation is produced, accompanied by insomnia, and in the second case its action is slow, steady, and invigorating, keeping up strength without need of food. Thus the resistance of the Indian is explained, who can work steadily in the fields or undertake long and exhausting trips without any food, maintaining his strength by simply chewing the coca leaves. It is mainly through the ports of Mollendo, Arica, and Antofagasta that the bulk of the coca exports leave for foreign markets, while it is exported to Argentine via Tupiza.

During the years 1900, 1901, and 1902 the total exports of coca are officially given as follows:

Year.	Kilograms.	Value.
		Bolivianos.
1900	556,275	663,713
1901	255,718	259,513
1902	156,095	223,930

The export tax levied on La Paz amounts to 0.50 boliviano per *cesto*, or basket of 25 pounds. France is the largest consumer of coca leaves.

Coffee (*Coffea arabica*).—Bolivian coffee is considered by many as finer than the Moka product, and at times it has commanded very high prices in foreign markets. Yungas coffee was once a favorite in European markets, where it was sold as high as 50 bolivianos per quintal (100 pounds). At the present moment coffee is cultivated in Yungas in a small scale, the annual production being estimated at 12,000 to 15,000 quintals, which is not sufficient for local consumption. It is believed that with better means of communication and transportation facilities coffee production will increase to the extent of making this product one of the principal items of Bolivian exports. Good coffee is also produced in Beni, and Santa Cruz, and exported to Chile and Argentine.

The cultivation of the plant is not difficult, as it only requires to clear the ground of the underbrush twice a year, the first crop being gathered at the end of the third year after planting. Each tree yields from 2 to 8 pounds every crop. In Yungas the soil is so suitable for the cultivation of the plant that coffee grows almost spontaneously. A Spanish quintal (46 kilograms, or about 101.50 English pounds) of coffee is worth on an average from 26 to 28 bolivianos. Coffee dregs or residue is an excellent fertilizer, and some use it in preference to the Peruvian guano, as it contains 85 per cent of nitrogen. The

analysis made of this residue has shown that it contains a large percentage of phosphoric acid and phosphates. The exports of coffee in 1900, 1901, and 1902 are estimated officially as follows:

Year.	Kilograms.	Value.
		Bolivianos.
1900	298,850	157,068
1901	212,358	110,237
1902	129,478	61,744

Quina (*Cinchona officinalis*).—This is classed among the most important products of tropical Bolivia, not only on account of its superior quality, but also by reason of its large production. Cinchona bark is found in all the eastern region of the Andes, especially in the departments of La Paz, Santa Cruz, Cochabamba, and Tarija. The number of trees in cultivation at present is estimated at 6,000,000. Formerly there was no system of cultivation, the trees being felled in order to strip them of their bark. Now the stripping is done carefully and according to scientific methods.

Bolivia was for a time the principal cinchona-producing country in the world, and when the cultivation and exploitation of the plant was introduced in other countries it was feared that this source of wealth would be lost. This has not been the case, however, as the Bolivian production is not sufficient to meet the existing demand for the Bolivian bark, the quality of which is considered superior to any other similar product, the analyses made by Delondre and Pelletier showing that 1 kilogram of Bolivian calisaya or cinchona bark yields from 30 to 32 grams of sulphate of quinine.

The following is the result of said analyses:

	Grams.
Bolivian calisaya bark	30–32
Curled calisaya	15–20
Carabaya (thick bark)	15–20
Carabaya (thin bark)	12
Cuzco (red bark)	4
Ecuador (red bark)	20–25
Ecuador (light bark)	15–18
Huanuco (Peruvian)	4
Colombia	30
Pitayo cinchona (Popayan)	20–25

The Challana cinchona from the department of La Paz is the highest quality of the Bolivian bark, yielding 48 ounces of sulphate of quinine to the 100 pounds. There are immense cinchona forests in the department of Santa Cruz as yet unexplored.

The quinine plantations of Bolivia, it appears, were started by German immigrants having some knowledge of chemistry and chemical products. The groves, known as "quinine quinales," are usually

found on rough and broken mountain sides, at altitudes of from 1,000 to 2,000 meters above the sea. Most of the trees have been raised from the seed, which is gathered in the early summer months and sprouted in hothouses. In five or six years the trees which have been transplanted will have reached a height of 4 to 5 meters and the trunks will be straight and slender and about 15 centimeters in diameter. In size and shape and the peculiar gloss of its leaves the tree resembles the orange. Two or three times a year three or four strips of bark about 50 millimeters wide and from one-half to 3 meters long are cut from the trunk and thrown upon a paved yard to dry, where, as the moisture evaporates, they curl up like cinnamon bark. Within a year or two nature replaces the bark that has thus been stripped off, and the tree is stripped again in other places. As the tree grows older, smaller strips are taken from the stronger branches, and the mature tree will produce an annual average of about 2 kilograms of bark. For shipment, the bark, after it has dried for a few days, is packed in rawhide bales and exported from Arica and Mollendo.

As there is no tax of any description on the exploitation of the bark, there are no statistical data in reference to the actual production of cinchona in the country. The exports of cinchona produced in the department of La Paz from 1898 to 1902 through the ports of Mollendo and Arica are officially given as follows:

Year.	Kilograms.	Value.
		Bolivianos.
1898	145,280	87,168
1899	115,041	69,024
1900	172,597	260,061
1901	328,307	328,261
1902	244,544	182,133

The total exports for the years 1900, 1901, and 1902 are valued at the following figures: 1900, 104,085 bolivianos; 1901, 127,554 bolivianos, and 81,309 bolivianos in 1902.

Cacao (*Theobroma cacao*).—The department of Beni is the largest producer of cacao, its soil being the best suited to the cultivation of the plant, especially in that portion lying between Puerto Salinas and river Madre de Dios. La Paz and Cochabamba also produce a fine grade of the bean. Bolivian cacao is considered on a par with the finest products of the world, as it is very rich in oil and has a delicate natural aroma, there being no necessity of giving it an artificial flavor. The production is sufficient for the needs of local consumption and to attend to a growing export trade.

Tobacco (*Nicotiana tabacum*).—This plant is very common in the departments of La Paz, Cochabamba, Santa Cruz, Tarija, and Beni, where several varieties are under cultivation, known as *Havana*, *black*

Havana, *lechuguilla* (*lettuce leaf*), *lengua de buey* (*ox tongue*) and *criollo* (*native*). Notwithstanding the fair quality of the product its cultivation is not equal to the facilities afforded in the country to make a good paying industry of tobacco growing. The total production of tobacco in Bolivia is estimated at 1,500,000 kilograms per annum, valued officially from 650,000 to 700,000 bolivianos. The exports of tobacco during the years 1900, 1901, and 1902 vary from 10,000 to 17,000 kilograms, valued from 5,000 to 9,000 bolivianos.

Rice (*Oriza Sativa*).—The ordinary yield of rice in eastern Bolivia is 40 to 1, or, in other words, for every *fanega*[a] of rice sown the crop is estimated at 40 *fanegas*. The first crop is gathered five months after sowing. Rice can be sown during the entire year. There are two kinds of Bolivian rice, the white and a red or pink variety. Wild rice has been found in the province of Chiquitos, department of Santa Cruz. Notwithstanding the fact that there are great facilities for the cultivation of rice, not only on account of the soil, which in many districts is peculiarly suited to this crop, but also by reason of the enormous yield and high quality of the product. Bolivia imported this grain to the amount of 1,209,195 kilograms in 1902, valued at 890,673 bolivianos. The actual rice production of the country is barely sufficient to meet the necessity of a small fraction of the population of Santa Cruz.

Sugar.—The cultivation of the cane and manufacture of its products should be one of Bolivia's principal industries. The amount of sugar cane that could be grown in the department of Santa Cruz is enormous, but the primitive methods used are a drawback to the development of this industry. The crop is gathered eight months after planting. Sugar is sold at the city of Santa Cruz at 14 to 16 cents per kilogram, according to quality, which when refined is superior to the beet product. It is believed that the increase in the cultivation of the cane, which is also grown in the departments of Potosi and Chuquisaca, and the introduction of modern methods and improved machinery would produce sugar capable of competing in quantity, quality, and price with the products of any sugar-producing country. Lack of suitable means of communication and the expensive and wasteful methods in actual use in the country are at present responsible for the small production of sugar cane, while it is a fact worthy of consideration that the production of alcohol and rum increases steadily, being estimated at over 1,000,000 liters for Santa Cruz alone. There are also heavy taxes levied on the sugar-cane industry, which have in a way prevented its proper development. Sugar exported from Santa Cruz to other Departments is taxed at the rate of 1.20 bolivianos per hundredweight, besides the municipal taxes levied at the place of consumption.

[a] One fanega is equivalent to 1.58 bushels or 55.50 liters.

The exports of sugar from Santa Cruz to other Bolivian departments for ten years is given in the following table:

Year.	Kilograms.	Value.
		Bolivars.
1893	832,232	214,710
1894	1,181,962	316,170
1895	1,133,532	295,710
1896	744,050	194,100
1897	701,270	182,940
1898	718,750	187,500
1899	676,890	176,580
1900	418,600	109,200
1901	437,920	114,240
1902	448,132	116,910

Viticulture.—The cultivation of the grape is one of the flourishing industries of the provinces of Mizque, department of Cochabamba; Cinti, department of Chuquisaca, and Loayza and Cercado in the department of La Paz. There are two kinds of grapes cultivated in the country, the *criolla* or native variety from the old vineyards founded by the Spaniards, and the French or Bordeaux species imported from Peru and Argentine. The methods employed for the cultivation of the grape are primitive, except in Cinto, where modern methods have been introduced of late. There is an immense area that could be devoted to the cultivation of the grape and the manufacture of its products. There are no statistical data in regard to the production of grapes in the country, but it is known that, in the provinces of Cercado and Loayza, in La Paz, the yield per hectare is estimated at 100 to 150 quintals of the fruit, while in Cinti and Mizque the yield is far beyond these figures.

Other products.—Corn, wheat, barley, beans, malt, fruits of several kinds, chick-peas, pepper, matico (*Artanthe elongata*), a medicinal plant; over 250 kinds of potatoes, *chuño* (a preparation of frozen potatoes claimed to be highly nutritious and to preserve its qualities unimpaired for many years and in all climates); *quinua* (*Chenopodium quinua*), claimed to possess nutritious properties superior to those of wheat; manioc, oca (*Oxalia tuberosa*), olives, cotton of two varieties, one white and another purple, indigo, Campeche and Brazil woods, saffron, vegetable silk (*toborochi*), *quillai* (*Saponaria sapindus*), *tarog* (*Casalpina tara*), camphor, tolu, valerian, gentian, cinnamon, nutmeg, and a large number of medicinal plants and tanning barks.

Silkworm industry.—An attempt was made some years ago to introduce the silkworm industry in the country, the department of Cochabamba being selected for the experiment with marked success. An Italian who for several years was engaged in the silkworm culture, is quoted as follows:[a]

[a] Sinopsis Estadística y Geográfica, Vol. II, 1903.

"It is surprising to see the development and healthy condition of the silkworm, as in the fourteen years and over during which I have been engaged in the silkworm industry in Bolivia, I have never seen one single instance of disease, so that every cocoon is available. The silkworm industry has a future, and whoever should develop it in Bolivia is assured profits tenfold larger than in any other country, not only because there is no known disease in the country affecting the worms, but also because as many as six cultures can be made during the year. I have made them during three consecutive years."

LAND LAWS.

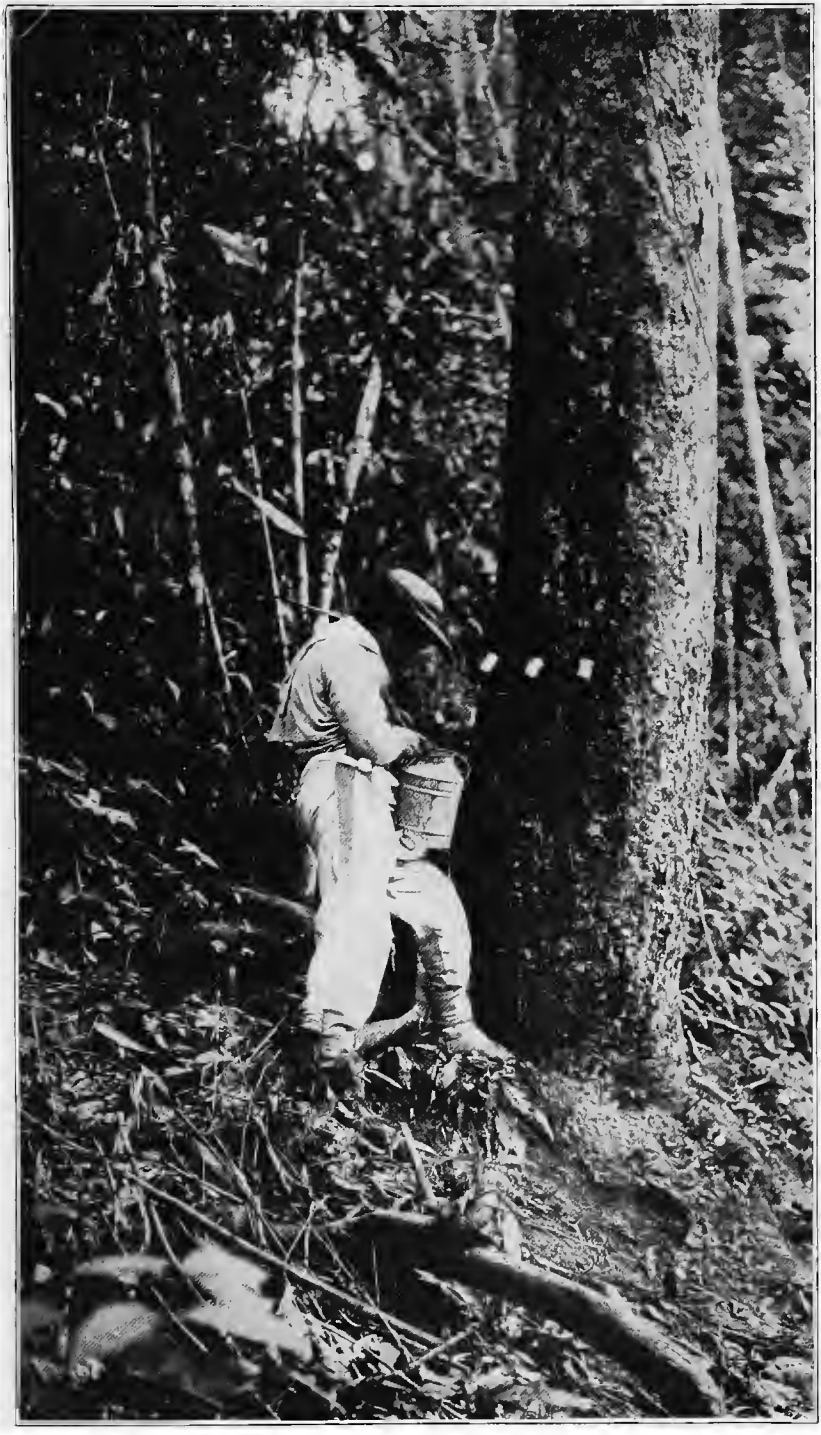
The duty of development and fostering of the agricultural wealth of Bolivia devolves upon the Ministry of Finance and Industry. Legislation in reference to public lands and the regulation of the rubber industry will be found in Chapter XIII, devoted to "Immigration and Colonization."

FOREST PRODUCTS.

The immense Bolivian forests on the eastern portion of the Republic abound with excellent timber, but no effort has been made so far to develop this industry, which will undoubtedly yield handsome profits to promoters. Ebony, mahogany, cedar, rosewood, satinwood, walnut, hemlock, beech wood, holly, boxwood, storax, *colo* (an extremely hard wood not affected by moisture of any kind), *jacarandú* (a remarkable wood of variegated colors), and the *quebracho* (species of ironwood used for sleepers on account of its extraordinary resistance) are among the few known species of forest products.

"Within the wilds of its forests and plains," states an authority, referring to the natural products of Bolivia, "are to be found a great variety of dyewoods and precious medicinal plants from which may be distilled fine essential oils, while the mountain slopes, hills, and valleys abound in valuable construction and cabinet woods. The celebrated ironwood tree of this region attains a height of 18 meters and a circumference of 80 centimeters. The specific gravity of this exceedingly compact and durable wood is 1.250, and the contents of tannin 26 per cent. This wood is used extensively for railroad ties, posts, etc., and is employed in considerable quantities in tanneries.

"Another valuable product of the Bolivian forests is the tree known as 'Corupan' (*Piptademia cebil*), which grows to a height of 20 meters and attains a diameter of 1 meter. The wood of this tree has a specific gravity of 1.141 and does not decay when immersed in water, which quality renders it exceedingly valuable for use in the construction of ships, bridges, and hydraulic works. It makes a very durable railroad tie, and the bark, which is very thick, contains about 25 per cent of tannin. The tree secretes an abundance of gum arabic, and is one of



SAPPING THE RUBBER TREE.

the most valuable and highly prized productions of the Bolivian forests. Lapacho (*Tubebuza flavescens*) is a tree noted for its great beauty and usefulness. It grows to the height of 20 meters, has a circumference of trunk of 80 centimeters and a specific gravity of 1.100. When sawed into lumber or beams it is greatly esteemed for construction purposes, and is especially suitable for use in the building of hydraulic works and for railroad ties. There are four varieties—the gray, the yellow, the red, and the black—all of which may be distinguished while in bloom by the color of their flowers. The bark is rich in tannin, and the wood is utilized in the manufacture of dyes. Mumday (*Astronium juglandifolium*) is a greatly prized Bolivian tree, which attains a height of some 20 meters and produces a trunk measuring 1 meter in circumference. The specific gravity of this wood is 1.200, and is suitable for railroad ties, telegraph poles, and general construction purposes. There are three varieties—white, yellow, and black. It is also a dyewood."

STOCK RAISING.

The country is peculiarly suited for stock breeding on account of its deep valleys, well-irrigated areas, and excellent pasture fields. Stock raising, however, is still in its infancy, although large herds of wild and domesticated stock are found in the valleys, table lands, and even in the skirts of the Andean range.

Beef cattle.—Large herds of cattle are found in the frontier of Chuquisaca and Tarija, and in the province of Chichas, in Potosi, which supply the needs of the rest of the country. In the Chacó regions of Tarija and in the eastern portion of this province there are numberless wild herds of cattle. The great breeding zone, however, extends over the entire region of Mojos, in the department of Beni, where, according to official estimates, the number of heads is over 1,500,000. Due to the natural pasture the beef of this region is said to be excellent. Beef cattle on the hoof is sold here from 10 to 20 bolivianos, according to age and size of animal. There are many salting establishments, called *saladeros*, in this part of the country, where salt, sun-dried beef is prepared under the names of *charque* and *cecina*. All of the Bolivian cattle is native stock, as no foreign breeds have been introduced to improve the race. The value of cattle on the hoof and hides exported from Bolivia during the years 1900, 1901, and 1902 is officially estimated as follows:

	1900.	1901.	1902.	Total.
	Bolivianos.	*Bolivianos.*	*Bolivianos.*	*Bolivianos.*
Live stock	100,310	99,534	87,097	287,041
Hides	97,063	154,623	120,748	372,434

Sheep.—Sheep abound in the cold and temperate regions of the country. The wool is considered of the finest quality, and its consumption in European markets is steadily growing. The meat is excellent on account of the peculiarly fine pasture grounds of these regions. Besides wool clipping and the preparation of the skins, the manufacture of cheese and salting of the meat are native industries. This salt mutton is called *chalona* and finds a ready market at home. Sheep farms, or *haciendas*, are generally valued for the quantity of the wool crop and the number of cheese and *chalonas* produced, these being the only elements taken into consideration, as the real value of the lands for other purposes is very small on account of the climatic condition of these regions.

Goats.—There are more or less large herds of goats in care of the Indians, but no effort is made to improve the stock. The meat finds a ready market, as well as the skins, the preparation of the latter giving rise to small tanning establishments. The exports of goat skins in 1902 amounted to 60,972 bolivianos, against 74,815 for 1901 and 43,000 in 1900.

Chinchilla (*Chinchilla laniger*).—The departments of Potosi, Oruro, and La Paz are the best producers of this stock, which is also found in the rest of the country. The Chinchilla fur is highly appreciated and commands a good price in foreign markets. The meat is good, but finds little consumption in the civilized markets.

Alpaca (*Auchenia alpaca*).—This stock has been the object of special investigations by several persons who have endeavored to introduce the breed in other countries, unsuccessfully however. Alpacas are found in large numbers in the provinces situated on the Titicaca plateau, toward the eastern slope of the Andes, such as Sisasica and Pacajes in La Paz; Carangas in Oruro; and Lipez, Chichas, and Porco in Potosi. Alpacas live and thrive in the coldest regions, where snow is constant, in the slopes of the loftiest ridges and in the gorges of the tallest cordilleras where a fine, small grass is found in marshy places. The breeding and care of the alpaca is entirely in the hands of the Indians, and it is believed difficult that other races would undertake to develop this industry, as the Indian is peculiarly fitted to the work on account of his habits and mode of life. Attempts made to acclimate and propagate the alpaca in other countries having proved fruitless so far, it is believed that for many years to come Bolivia and Peru will have the monopoly of this stock, which could undoubtedly be improved through proper and intelligent care. There are black, white, brown, and yellow alpacas, the latter's wool being the only rival to the vicuña wool. As a general rule alpacas are clipped twice a year, thus obtaining fibers about 12 inches in length and a fleece weighing from 10 to 14 pounds. Alpaca wool was unknown in European markets until 1835, and from that date to 1839 about 3,200,000 kilograms were imported

through the port of Liverpool. The exports of alpaca wool in 1872 amounted to 2,000,000 kilograms. At the present moment the exports of alpaca wool have decreased so much as to be practically none.

Vicuña (*Camelus vicogna*).—All efforts to domesticate this almost priceless stock have proved useless so far. It is found in large numbers and in a wild state in the same places inhabited by the alpaca. Its wool is highly appreciated, and furnishes a valuable article for home consumption and export, being used for the manufacture of hats and heavy fabrics. Vicuña meat is pleasant to the taste and nutritious. Blankets or lap rugs made of vicuña pelts are exported to Argentine and Chile, where they command high prices. The export of live alpacas, vicuñas, and chinchillas is prohibited by law.

Llama (*Camelus lama*).—This is by far the most important of all Bolivian stock, as it partakes of the usefulness of the camel and of the vicuña. It is the Indian beast of burden, and although the llama does not carry over 100 pounds, and only makes from 12 to 16 miles a day through the steepest trails, it does not cause any expense for food, as it lives on the grass and shrub leaves that grow in the mountains, and, like the camel, can go for days without drinking. Besides these advantages, its meat is nutritious and palatable; its wool is used for the manufacture of coarse fabrics, its skin for making *ojotas* (an Indian foot wear) and pack boxes, and the bones for the manufacture of several articles for weavers. The price of llamas varies from 8 to 10 bolivianos. In Lipez, department of Potosi, there are immense herds of llamas, the property of Indian breeders. The main portion of the traffic from the Pacific ports to the interior of Bolivia is carried on large droves of llamas, the freight being the lowest obtainable, and although transportation is extremely slow this method is preferred to any other for the conduction of such articles as glassware, china, and similar products.

Huanaco (*Auchenia Huanaco.*)—The habits of this stock are somewhat similar to those of the vicuña. It is, however, wilder and more difficult to hunt alive on account of its fleetness.

The exports of stock of all kinds and their products for the years 1900, 1901, and 1902 are officially given as follows:

Year.	Kilograms.	Value.
		Bolivianos.
1900	452,615	297,481
1901	443,574	373,503
1902	468,061	282,935

CHAPTER VII.

MINERAL WEALTH—DISTRIBUTION OF MINERALS—MINES AND MINING—MINING LAW.

The mineral wealth of Bolivia is such as to challenge competition with the most famous mining centers of the world. Mining is the only industry which has attained such degree of development as to become the national industry. The mountains of Bolivia hold large deposits of the finest specimens of the mineral kingdom, and only lack of suitable and rapid means of communication, labor, and capital are responsible for the still undeveloped mining wealth of the largest portion of the territory. These conditions notwithstanding, the mining of silver, copper, tin, and other ores increased considerably in 1900, the revenues derived by the Government from the exports of said minerals amounting to 775,000 bolivianos in round numbers.

The number of mining concessions awarded during the fiscal year 1899–1900 numbered 669, and covered an area of 15,295 hectares, while in the fiscal year 1900–1901 these permits numbered 1,172 and covered 31,315 hectares, or an increase of 503 permits and 16,020 hectares. Up to the year 1900, 119 concessions, embracing 596,480 hectares of land, were issued by the Bolivian Government, covering the mining of emeralds, coal, petroleum, peat, borax, calcite, sulphur, salts, etc. In 1900, there were 56 concessions granted for the exploitation of the above substances, covering an area of 471,744 hectares, all of which shows the immense natural resources of the country, and the important part these products are playing in the development of the Republic, affording at the same time a new source of governmental revenue.

The principal minerals and mineral substances found in the country are silver, tin, copper, bismuth, gold, iron ores, antimony, lead, coal, borax, sulphur, nitrate, salt, feldspar, marble, asphaltum, and wolfram.

DISTRIBUTION OF MINERALS.

Señor Gerardo Zalles, Consul-General of Bolivia in New York, in a communication to the Monthly Bulletin of this Bureau,[a] referring to the mineral wealth of the country, makes the following statement:

[a] Monthly Bulletin of the International Bureau of the American Republics, March, 1902.

"The principal mineral-producing regions of Bolivia may be enumerated as follows:

"*Department of Potosi.*—This department is exceedingly rich in silver, tin, and bismuth. Silver is found in great abundance in the provinces, or districts, of Lipez, Chocaya de Chichas, Cerro de Porco, Siporo, Ubina, Huanchaca, Macluyo, Tomave, Calavi, Andacaba, Coruña, Pulayo, Guayna Potosi, Puilcata, Malmira, San Juan, Carguacallo in Porco, Guariguari, Machacamarca, Toraci, Maragua, Ocuri, San Pedro, and Cerro de Aullagas; tin in Uncía; gold in Chilco de Chichas; red and white copper in Lipez; nitrate in San Cristobal de Lipez, and topazes, emeralds, opals, jasper, and marble in Lipez.

"*Department of Tarija.*—This Department contains an abundance of native copper in the province of Tarija; silver is found in the province of Tazcara, and gold in Cerro de la Polla. In addition to the precious metals, the Department of Tarija is rich in asphalt, marble, etc.

"*Department of Sucre.*—Silver is found in Huaillas; silver and tin in the provinces of Tomina and Padilla; lead, copper, and gold in Cinti; gold, silver, and native copper in Tarabuco de Tomina, as well as asphaltum; native copper in the province of Azero, as well as an abundance of coal of a superior quality.

"*Department of Cochabamba.*—The gold mines at Choquecamata de Ayopaya have been worked for a long time, and were famous mines during the time of the Spanish domination. Silver and marble are found at Palca; gold and silver at Sayari; silver at Mizque, Colcha de Arque, and Quioma.

"*Department of Santa Cruz.*—In the department of Santa Cruz there is a district 60 miles in length, situated in the province of Santo Corazon, containing rich gold mines that are worked by the natives only. An abundance of gold is also found in the provinces of Caparus, San Simon, and Guarayos. These rich mining districts, which contain large deposits of high-grade gold ore, were discovered and worked by the Jesuit Fathers a century ago. Immense deposits of native iron ore exist in the province of Santa Ana, and precious stones are also found in this province.

"*Department of La Paz.*—There are in operation in this department the rich mines of Chuquiaguillo, which produce considerable quantities of gold ore. Gold and silver are found at Pongo, about 25 miles from the city of La Paz. Excellent wagon roads connect this mining district with the city of La Paz. Gold is found in the sands of all the small streams in the province of Yungas, and exists also in the provinces of Coroico, Chirca, Unduavi, and Yanacache. Gold nuggets are encountered in the rivers of Zongo, Challana, Rio Cajones, and there are celebrated gold mines at Tipuani and Yani that are known in mining circles the world over. Silver and gold are also found in considerable quantities in the provinces of Muñecas and Charanzi. The provinces

of Berenguela and Pacajes contain more than 200 mines of silver, copper, and bismuth. There are rich copper mines in exploitation in the province of Corococo, and gold, silver, tin, and bismuth are mined in the province of Inquisivi. Marble, antimony, coal, tin, copper, and bismuth are found in the province of Sicasica; silver in the provinces of Mohoza, Yaco, Cavari, Choquetanca, Ichoca, and the famous mines of Araca, which are still in operation, produce gold in considerable quantities.

"*Department of Oruro.*—The Department of Oruro contains at the present time 30 mineral districts where silver and tin are mined. Gold is found at Irooco, Chuquimia, La Joya, Machacamarca, Poopo, Sepulturas, Sorasora, and Toraca; tin in Negro Pabellon, Condequi, Guanuni, Machacamarca, Bizacoma, and Carangas; silver in nearly all the mining districts of the province; tin, copper, iron, lead, silver, bismuth, antimony, and sulphur in Antequera and Ichocollo; feldspar, which is used in the manufacture of porcelain, is found in San Juanillo de Oruro; silver, borax, tin, and bismuth in Carangas; bismuth in lumps in Poopo and Coriviri, and large deposits of almost pure antimony in Poopo. Topaz and amethysts are found in the province of Candelaria."

SILVER.

For a long time Bolivia stood third among the silver producing countries in the world, the annual output of its mines being estimated at 10,000,000 ounces. This metal, which is abundantly found in almost every portion of the territory, gave a world-wide reputation to the Potosi Mountain, which, from 1566 to 1615, yielded the Spanish Crown in taxes only (the one-fifth or 20 per cent tax) the sum of 3,240,000,000 *bolivianos*. The western portion of the Republic is the richest in silver, the metalliferous belt extending from Sotalaya, department of La Paz, in the northwest, to Tupiza, in the south, embracing a zone of about 1,500 kilometers in length and 350 kilometers in breadth, with large deposits in La Paz, Potosi, Oruro, Cochabamba, Chuquisaca, and Tarija. Silver is found here above the gold-bearing belts of the plateau.

The silver-bearing region is divided into three sections, each different from the other as regards conditions and geological formation. Thus the Potosi and Oruro mines possess features very different from those of Colquechaca, which in turn have no features in common with the silver deposits found in the extreme southern portion of the territory. There are over 10,000 silver mines in the country which have been abandoned, either for lack of capital or for other obstacles connected with the means of development, though not by reason of scarcity of metal. At the present moment silver mining is not carried on in Bolivia to a great extent.

The department of Potosi is the richest in silver, the principal mining centers being the Huauchacas, Aullagas, Colquechaca, Ocuri, Porco, Guadalupe, Portugalete, Carguaicollo, Chorolque, Tomare, Lipez, Cerro de Potosi, Andacaba, Chochacomani, and Turqui. The richest ores yield from 1,000 to 8,000 *marcos* per *cajon*.[a] The ores yielding this percentage are in the first place native silver, and the silver formations known in the country under the names of *rosicler*, *cañutillo*, *fierro viejo*, *pasamano*, and other varieties classified according to their outward appearance. The *acerados* and *negrillos* yield from 100 to 1,000 *marcos*. *Rosicler* is the name given to a rich argentiferous ore yielding the highest percentage of pure silver. There are two varieties of this ore, one light and one dark. The word *cañutillo* as applied to this ore denotes that the *rosicler* is in well-defined crystals, generally prismatic in shape. The richest "rosicler" region is the mining district of Colquechaca, where this mineral is found in veins unequally distributed, there being belts where it decreases to a considerable extent, and even disappears to reappear again in deposits called *clavos* or *bolsones*, according to the shape and length of these pockets. A rich *clavo* of this metal yields immense profits, enough to pay for all expenses, leaving a substantial sum besides to continue operations on a larger scale. There have been instances when the working of one rich *clavo* has produced, in from thirty to fifty days, from 1,000,000 to 1,500,000 bolivianos. The ore called *paco* is of inferior quality, yielding only from 5 to 100 *marcos* per *cajon*, but as this ore is very abundant and easily manipulated, good profits are made by the miners. The richest ore is generally exported, and when treated in the country the methods used are the amalgamation and smelting processes. The *negrillos* and *acerados* are treated in the mines by amalgamation with quicksilver, after crushing and roasting in special crushers and ovens. The *pacos* are treated by means of very simple and inexpensive methods, the *patio* system being generally employed.

Cerro de Potosi.—This is the oldest and richest silver mine in the country. It is a mount rising to an altitude of 4,780 meters above the sea level, situated at 17° 34′ 59″ south latitude and 68° 0′ 11″ west longitude, Paris meridian. The discovery of silver in this mount by an Indian dates from 1545. The characteristics of the mount clearly show that it is of comparatively recent formation. Its shape is that of a perfect cone, measuring at the base 6,988 meters in circumference, and having at its almost circular summit 9.15 meters diameter, while its altitude over the mean level of the city of Potosi is 762 meters. The igneous rock traversing the mount is rich in metallic

[a] *Marco* is a unit for pure silver, equal to 230 grams, or about 7.40 ounces, troy; *cajon* is equivalent to 50 quintals, or 2,300 kilograms.

products running in all directions, the principal minerals being lead, tin, copper, iron, and especially silver in the shape of chlorides and sulphurets. The most remarkable among these products is the one called *plomo ronco* (kerargyriti), frequently yielding as much as 75 per cent silver, the *rosicler* and the *cochizo* yielding from 75 to 80 per cent silver. There are also other silver compounds and masses of native silver.

The Potosi veins run north and south, with an average dip of 75°. The number of veins known to have been prospected and developed in this mount is officially given at 64, and although many others have been worked there is no record of their number. The principal veins are situated between the Polo vein, east of the summit, and the San Vicente vein on the west. East of Polo, and as far as the road leading to Argentine, the Spaniards worked several veins. The Descubridora or Centeno, the Rica, the Estaño, and the Mendieta mines have given the largest profits, but at present, excepting the Real Socavon and the Rei Socavon, operations in these mines are reduced to treating the tailings left by the old miners. The degree of activity in the development of these mines in former times is clearly shown by the ruins of the long row of establishments stretching from the town of Potosi for over 3 miles, and the damming up of a large quantity of water in reservoirs at a cost of over $2,500,000. These waterworks were completed in 1621. The original number of these reservoirs or *lagunas* was 32, but at present there are only 22 in good condition.

The average production of the Cerro de Potosi from its discovery in 1545 to 1800 has been estimated as follows by several authorities:

	Bolivianos.
Average annual product	13,485,174
Royalties	779,444,057
Principal	3,897,215,286

A resumé of the output from 1801 to 1864 shows that during these sixty-four years the Banco de Rescates de Potosi redeemed 13,203,685 marcos of *piña* silver,[a] which, at the average rate of 9 *pesos* per marc, amounts to $118,833,155. An equal amount has been estimated as the value of smuggled silver. Therefore the total output of the Potosi mines in 320 years is estimated at $3,631,128,352, or a yearly average of $11,284,776. From 1801 to 1864 the highest amount of silver marcs redeemed is estimated at 338,034 marcs for 1811, while the lowest was 67,384 in 1815. The following are the only mines now under operation in Cerro de Potosi:

Real Socavon de Potosi.—An English company, under the name of "The Royal Silver Mines of Potosi, Bolivia, Limited," with a capital

[a] *Piña* (pineapple) or *pella* (mass) is the amalgam of silver and quicksilver before the separation of the latter.

of £300,000, has been operating this mine since 1886. The company has succeeded in establishing a modern mining plant near the mine, the water power necessary to the operations being obtained through two turbines developing 150 horsepower. This is the best mining plant in Potosi, its average output per month being estimated at 8,000 marcos. The company is still operating the old abandoned mines, no further progress toward the interior silver deposits having been made so far. It is believed, however, that as soon as the work advances and a new vein is struck the output of this mine will be far beyond expectations. The output of this company from 1894 to 1901 is officially given as follows:

Year.	Marcos.			Approximate value.[a]
	Silver bars.	Silver ore.	Total.	
				Bolivianos.
1894	40,526.86	623.81	41,150.67	432,082.03
1895	28,486.87	3,302.13	31,789.00	333,784.00
1896	50,063.76	11,715.25	61,779.01	648,680.50
1897	68,362.01	13,017.90	81,379.91	854,489.05
1898	45,724.25	1,423.40	47,147.65	495,049.85
1899	32,115.21	1,895.46	34,010.67	357,016.00
1900	.....	.....	42,856.00	449,788.00
1901	.....	.....	29,530.00	310,065.00

[a] Value of marco, estimated at an average of 10.50 bolivianos per marco.

Pulacayo.—This mining district, which has been held as the first mining district in South America, both by the extension of its silver veins and by the unexcelled quality of the ore, is said to be second only to the Broken Hill mine of Australia. From 1873, when the present company ("Compañía Huanchaca") was founded, to 1901 the mine produced 4,520 tons of silver. According to scientific investigation the mine still contains about 1,150 tons of silver, outside of probable new veins or deposits. In order to have an idea of what these figures represent in South American silver mining, it suffices to state that the production of silver in Chile from the seventeenth century to 1894 has been estimated at 7,032 tons, or, in other words, the production of all the silver mines in Chile for three centuries is scarcely double that of the Pulacayo mine in Bolivia during half a century.

The Pulacayo mining district is situated at 20° 26′ north latitude and 69° west longitude, Paris meridian. The mouth of the mine is at an altitude of 4,620 meters above the sea level. The property covers an area of 598 hectares. Entrance to the mine is had through a socavon or shaft 446 meters below the summit of the mount. This shaft extends 650 meters in a horizontal line, where another shaft leads down to the actual works, 456 meters deep. The general direction of the vein, called "Tajo vein," is from east to west, and the average thickness of the vein is generally 80 centimeters.

Estimating the value of the standard silver ounce (28 grams) at 48 pence for the period above mentioned (1873–1901), less 25 per cent for

depreciation in silver exported in the shape of ore and other compounds, the production of the Pulacayo mine may be safely given at £24,000,000. Huanchaca, Asiento, and Urbina were formerly the site of the principal works for this mine. At present there is a large plant at Playa Blanca, near Antofagasta, for the amalgamation and smelting of the ore. The machinery is considered one of the best plants in the world, costing 5,215,641 bolivianos.

The Pulacayo mine was worked toward the end of the eighteenth century, operations being abandoned at the beginning of the nineteenth century and resumed in 1832. In 1873 the Compañía Huanchaca de Bolivia was formed, with a capital of 6,000 shares at a nominal value of 1,000 bolivianos each. At present the stock capital is represented by 320,000 shares at a nominal value of £5 each. Besides the mine, which, in itself, constitutes the principal source of wealth of the concern, the company has large smelting works at Huanchaca, equipped with several telegraphic lines open to the public, 16 steam engines of 800 horsepower each, and a Decauville railway. The number of hands employed at these works is 3,200. The great mine of Pulacayo is connected with the railroad from Antofagasta to Oruro by a branch line 32 kilometers in length, with a terminal at Uyuni, and another branch 10 kilometers in length running through a tunnel 3 kilometers long, connecting the mine with Huanchaca. The main office of the company is in Valparaiso, Chile. The production of this mine from 1877 to 1901 is officially given as follows:

Year.	Number of cajones extracted.[a]	Marcos.	Value.				Taxes paid the Bolivian Government.	Annual net profits.			
			Bolivianos.	£.	s.	d.	*Bolivianos.*	*Bolivianos.*	£.	s.	d.
1877....	2,474.00	148,436.14	1,565,784.49	241,391	15	6	133,943.49	470,059.42	72,467	9	10
1878....	3,997.64	207,651.48	2,189,749.39	337,586	7	3	127,373.45	989,814.42	152,596	7	9
1879....	4,269.22	220,861.63	2,215,882.03	341,615	2	11	214,435.43	742,160.84	114,421	1	9
1880....	5,748.22	252,858.72	2,489,143.42	383,742	18	10	237,434.04	851,972.47	131,345	15	1
1881....	8,069.94	327,185.98	3,191,630.18	492,042	19	8	310,681.11	742,439.93	114,459	9	9
1882....	11,721.44	596,299.23	6,034,282.49	930,285	4	4	464,722.23	3,146,789.46	485,130	0	10
1883....	9,580.10	485,289.29	5,136,788.08	781,219	17	1	382,258.71	2,564,521.77	390,021	0	5
1884....	10,321.72	464,071.52	4,934,439.51	740,165	18	6	362,119.09	2,174,677.00	326,201	11	0
1885....	13,990.82	494,012.22	4,858,989.32	708,602	12	2	352,387.84	1,343,090.76	195,867	8	1
1886....	14,147.96	725,209.32	6,258,320.63	834,442	15	0	397,876.34	3,168,803.36	422,507	2	3
1887....	11,210.98	671,422.10	5,183,341.26	647,917	13	2	300,495.00	1,563,403.63	195,425	9	1
1888....	11,534.62	565,925.67	5,549,398.16	647,429	15	8	382,608.46	2,028,140.36	236,616	7	6
1889....	9,464.86	692,650.61	6,977,005.23	799,448	10	3	390,247.43	3,050,076.93	339,487	19	7
1890....	12,109.78	736,439.05	7,698,326.44	1,026,443	10	6	448,493.27	3,791,829.54	505,577	5	5
1891....	12,986.94	792,249.48	7,440,085.17	961,011	00	3	511,164.37	3,434,340.04	443,602	5	1
1892....	13,376.54	895,683.26	7,453,935.06	869,625	15	2	551,618.14	3,388,226.60	395,293	1	10
1893....	15,996.50	1,363,127.53	10,750,008.93	1,097,396	14	11	737,449.66	4,542,021.68	463,664	14	3
1894....	16,539.20	1,217,238.02	12,512,063.73	1,042,671	19	6	675,392.35	5,094,378.85	424,531	11	5
1895....	17,922.62	1,687,088.30	7,891,099.78	690,471	4	7	418,100.93	929,205.38	81,305	9	5
1896....	20,535.78	637,379.10	4,387,321.38	383,890	12	5	255,791.14	.....	.....		
1897....	22,662.26	731,418.46	4,724,527.27	354,339	10	11	267,619.13	.....	.....		
1898....	21,037.51	566,206.07	5,751,439.37	431,357	19	1	179,335.20	386,918.30	29,018	17	6
1899....	30,294.22	799,609.21	6,382,150.92	531,845	18	2	208,847.16	680,206.57	56,683	17	7
1900....	37,673.69	988,751.39	6,313,043.82	453,788	8	1	288,245.56	1,574,943.50	112,495	9	6
1901....	28,653.11	702,005.10	6,050,102.06	432,150	1	4	216,833.60	2,198,702.87	157,050	2	0
	366,319.57	16,769,093.78	143,938,858.12	16,140,884	5	3	8,815,473.13	48,856,753.58	5,855,769	16	10

[a] Cajon equivalent to 2,300 kilograms, or about 5,000 pounds.

Deducting from this total the losses sustained by the company in 1896 and 1897, amounting to 2,979,962 bolivianos, the total net profits can be estimated at 45,876,791 bolivianos.

Colquechaca.—The town of Colquechaca, capital of the province of Chayanta, Potosi, is another important mining center. This region, as well as the Aullagas, is famous for the richness of the silver ore it produces. There are several works in these districts, the Compañía Colquechaca-Aullagas de Bolivia being the most notable, as it operates the richest veins. The Embudo and Gallofa veins are remarkable for the prodigious wealth of their ores. The former runs across the San Matias Mount, embracing a longitudinal area of 2.50 kilometers, while the latter, which is famous for the profits yielded since its discovery, starts at the Ulicante Mount, and passing through the slopes of the Hermoso in a southeasterly direction, ends at the Gato Mount, a distance over 1 kilometer in extent. There are no reliable statistics for the production of these mines when they were first worked, the only figures available being those for the last quarter of a century, the production being estimated at over 80,000,000 bolivianos. The company now operating these mines is composed of several small organizations, incorporated as stock companies in 1892. The stock capital of the Colquechaca-Aullagas Company consists of 12,600 shares, representing a nominal value of 12,600,000 bolivianos. The company has six *socavones*, or shafts, several kilometers of railroad, two mining plants, and four steam engines, the San Bartolomé plant with a powerful Cornish pump being the most expensive and better equipped of the works. This plant was erected at a cost of £29,000. The Rosario and La Polca smelting works belong to this mine.

During the first few years the company produced on an average from 17,000 to 18,000 marcos per month, but the output has decreased of late. From 1895 to 1901 the production of the mine has been officially estimated as follows:

Year.	Marcos.	Approximate value.
		Bolivianos.
1895	80,981	850,301
1896	91,939	963,359
1897	130,016	1,365,168
1898	70,955	745,027
1899	83,265	874,282
1900	71,880	754,740
1901	50,123	526,291

Compañía Gallofa and Consolidada.—These two companies operate on the Colquechaca district. The production of the Gallofa mine from 1895 to 1901 is estimated as follows:

Year.	Marcos.	Value.
		Bolivianos.
1895	21,650	227,325
1896	27,820	292,110
1897	16,289	171,034
1898	7,740	81,270
1899	3,036	31,878
1900	7,057	74,098
1901	5,560	58,380

The Compañía Consolidada from 1899 to 1902 is credited with the following production:

Year.	Marcos.	Value.
		Bolivianos.
1899	9,762	102,601
1900	8,273	86,866
1901	8,309	87,244
1902	5,965	62,632

Portugalete.—This mine was successfully operated in the eighteenth century and during the first twenty-five years of the nineteenth century, until the depth attained by the works was such that the presence of water prevented further operations unless heavy expenses were incurred to drain the mine. In 1856 a company was formed to exploit the mine, and subsequently others were incorporated with the same object, but lately the Guadalupe Company consolidated all the other concerns and is the only company at present operating this rich vein. Unfortunately the argentiferous ore in this mine is crossed by several streaks of nonmetallic substances, very expensive to clear so as to reach the ore. The Basualdo vein, now under operation, is very rich. A steam pump, the first to be erected in Bolivia, is used to drain the works. Other veins have been surveyed down to a depth of 150 meters. The operating plants are established at Guadalupe and Tatase, the former using the amalgamation process, while in the latter the ore is treated by lixiviation. The value of the mining and other property of the Guadalupe Company is estimated at 3,000,000 bolivianos. The quantity of metal extracted during 1902 amounts to 25,787 quintals, at a total expense of 58,270 bolivianos, or at the rate of 113.07 bolivianos per *cajon*. During the same year 109,679 quintals of ore were treated, yielding 23,019 marcs pure silver. The production of this mine from 1895 to 1902 is given as follows:

Years.	Marcos.	Approximate value.
		Bolivianos.
1895	48,923	513,691
1896	42,745	448,822
1897	42,263	443,716
1898	32,523	386,491
1899	21,115	221,707
1900	30,619	321,499
1901	26,022	273,531
1902	23,019	251,699

Chorolque.—This mount, well known in Bolivian mining history, rises on the boundary line of the provinces of Nor-Chichas and Sur-Chichas, Department of Potosi, its highest peak reaching an altitude of 6,450 meters above the sea level. The Chorolque mount contains rich silver veins, tin, bismuth, wolfram, lead, copper, kaolin, and other minerals. Mining is carried on at an altitude of 5,700 meters above the sea level. The difficulties to be surmounted for the operation of this mine are immense. It is situated in the snow region, exposed to the cold winds, and in order to reach the opening it is necessary to climb over enormous bowlders which sometimes roll down at the least pressure, imperiling the lives of the miners. The ascension is made by means of hanging cables, which also serve to lower the ore, but the risk of life and limb and of the loss of the mineral and the expenses connected with these operations have always been so great as to prevent the proper development of the mine. An elevated railroad from the mouth of the mine to the San Bartolomé shaft has been built, thus minimizing danger and expenses. This mining district is 150 kilometers from the Uyuni railroad station. There are several mining companies in operation, the principal being the Aramayo Franke y Compañía, with a plant at Quechisla, 16 kilometers from Chorolque. This company has another plant at Poopo, department of Oruro—silver, tin, and bismuth being the principal output of both plants. The net profits yielded to the company by the Chorolque plant in 1901 is estimated at 191,320 bolivianos, and by both plants in 1900, 7,989 marcos, valued at 83,884 bolivianos.

Andacaba.—This mining district in the province of Linares, is operated by a stock company with a capital of 5,000,000 bolivianos, at a nominal value of 1,000 bolivianos per share. The company owns 350 claims. Andacaba Mount is 5,060 meters above the sea level. The mine is 4,750 meters high, and the mining plant is 14 kilometers from the mine. The fuel used in these works is peat from deposits about 10 kilometers from the plant. There are no trustworthy statistics of the production of the Andacaba mines, but it is known that the annual production is, on an average, 1,000 *cajones*, with an average output of 28 marcos per *cajon*.

The provinces of Nor and Sur Lipez also contain rich silver mines, which were operated first by the natives and later by the Spaniards.

The most important of the present mining plants in this region is that of the Nueva Compañía Lipez, whose claims are in Santa Isabel, a canton of Sur-Lipez province. The vein under operation is very rich. The smelting plant is at Candelaria. There is no official data available in regard to the output of this mine, but it is known that the works yield a fair profit.

There are several other mines in the department of Potosi, the output of which has been officially estimated as follows, from 1895 to 1901:

Year.	Marcos.	Approximate value.
		Bolivianos.
1895	296,260	3,110,730
1896	250,000	2,625,000
1897	196,000	2,058,000
1898	180,000	1,890,000
1899	140,000	1,470,000
1900	265,200	2,782,500
1901	110,000	1,155,000

For the years 1900, 1901, 1902, and the first six months of 1903 the number of hectares granted for mining purposes in the department of Potosi was as follows:

Province.	1900.	1901.	1902.	1903 (6 months).
Frias	103	115	110	311
Linares	60	.....	35	14
Porco	119	16	51	36
Chayanta	206	75	45	215
Charcas	172	70	86	191
Nor Lipez	.....	.....	36	15
Sur Lipez	40	.....	.....	.....
Nor Chichas	.....	18	70	.....
Sur Chichas	170	42	179	1,014
Total	870	336	612	1,796

The department of Oruro, as a silver-producing region, is second only to Potosi. The Oruro chain is composed of a series of hills of varying heights extending from north to south. The city of Oruro, or San Felipe de Austria, as it was formerly called, situated at an altitude of 3,694 meters, had in the seventeenth century a population estimated at over 75,000 inhabitants, the mines in this region having been discovered in 1575. During the three years preceding independence the Oruro department paid for mining taxes to the Crown the amount of $40,000,000, equivalent to a production valued at $200,000,000. There was a time when as many as 5,000 mines were in operation in the department. In the city of Oruro and surrounding country there exist at present over 20 silver and tin mines yielding good profits, the principal being the Socavón de la Virgen and the San José mines.

Socavón de la Virgen.—This mining property, discovered in 1595, is situated in the city of Oruro, at the foot of the mountain, and is at

present the property of the Compañia Minera de Oruro, formed by Chilean capitalists. This is considered the wealthiest and most progressive of all the industrial establishments in the department. The plant is equipped with the newest and best mining machinery and is connected with the Oruro-Antofagasta Railroad by means of a branch line. The production of this mine from 1895 to 1901 is officially as follows:

Year.	Marcos.	Value.
		Bolivianos.
1895	225,196	2,364,558
1896	220,947	2,319,943
1897	238,474	2,503,977
1898	158,968	1,669,164
1899	107,404	1,127,742
1900	73,425	770,962
1901	80,565	819,932

The plant which is considered the best in the Department is situated at Machacamarca. Until 1898 the system in use was amalgamation, which was substituted for the lixiviation system, thereby obtaining a saving of 30 to 40 bolivianos per cajon.

San José.—The San José mine, about 3 kilometers distant from Oruro, is operated by a Bolivian company, which has established the necessary working plant. Tin has been lately discovered in this mine. and a suitable plant erected for its treatment. San José is a prosperous mining town of about 2,000 inhabitants. The amount of silver extracted from the mine for the years 1895 to 1901 is officially quoted as follows:

Year.	Marcos.	Value.
		Bolivianos.
1895	188,420	1,978,410
1896	144,787	1,520,263
1897	232,283	2,438,971
1898	271,277	2,848,408
1899	216,465	2,272,882
1900	148,238	1,556,499
1901	130,825	1,373,662

Antequera.—Another important mining district in this Department is Antequera, in the province of Paria, 4,004 meters above the sea. The San José, Copocabana, and Pomabamba mines are considered the richest lodes, the last mentioned having yielded in less than five years over $6,000,000, the output being 5,000 marcos per cajon. In colonial times these mines were under exploitation until 1781, when they were abandoned by reason of an Indian uprising. In 1855 an effort was made to continue the operation of the Pomabamba mine, and a company was formed for the purpose. At first the product of the mine was so large that the stock issued by the company had a premium of 1,000 to 3,000 per cent, but this output decreased gradually, due to

faulty methods of exploitation. Another company was formed a few years later and is still operating the mine. The production of the Antequera mining district, and others of lesser importance in the department of Oruro is estimated, as shown in the accompanying table, from 1895 to 1901:

Year.	Marcos.	Value.
		Bolivianos.
1895	110,600	1,161,300
1896	160,000	1,680,000
1897	120,000	1,260,000
1898	75,000	787,500
1899	78,261	821,742
1900	75,500	792,750
1901	70,000	735,000

In the department of Chuquisaca the principal mining districts are San Lucas, province of Cinti, and Huata and Pojpo, in the province of Yamparaez. These mines are operated on a small scale because of the lack of means of communication and difficulty in transportation.

In the department of Cochabamba the principal mines are those of Arque and Choquemata, which are under the same conditions of those above mentioned.

In the department of La Paz, the Colquiri mines are the most important.

The total production of silver in Bolivia from 1895 to 1901, is officially given as shown in this table:

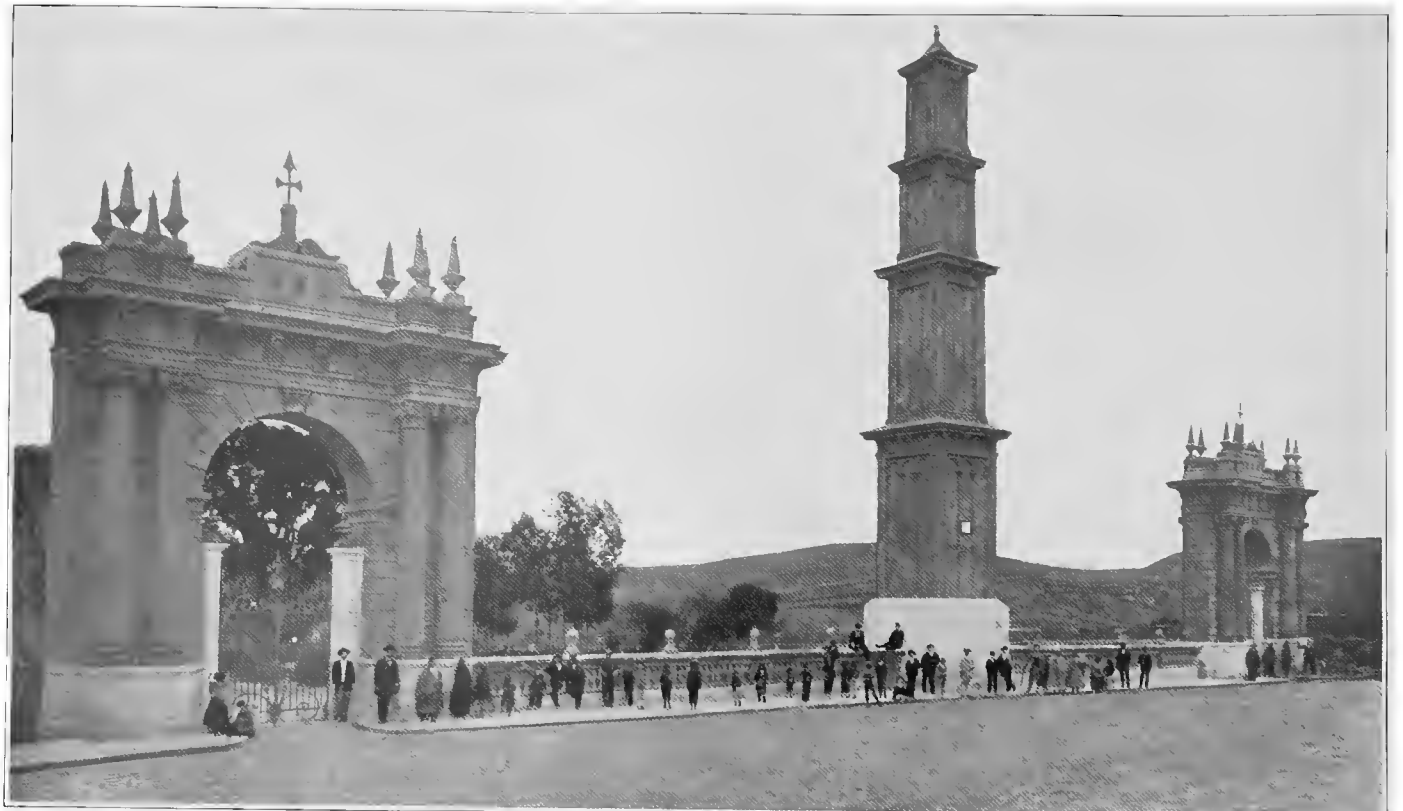
Year.	Marcos.	Value.
		Bolivianos.
1895	2,690,907	18,431,198
1896	1,637,396	14,885,498
1897	1,788,122	15,819,927
1898	1,409,816	14,654,348
1899	1,292,927	13,662,000
1900	1,820,238	15,043,454
1901	1,212,941	11,389,207
Total	11,851,767	130,885,632

The total production for 1902 amounts to 1,120,861 marcos, valued at 11,769,040 bolivianos, the grand total from 1895 to 1902 being 12,970,628 marcos, or about 96,000,000 ounces troy, valued at 115,654,672 bolivianos.

The exports of silver bullion for the years 1900–1902 is officially estimated as follows:

	Bolivianos.
1900	13,691,267.54
1901	14,566,660.66
1902	10,832,700.28

Taxes.—By act of October 31, 1889, miners are required to send to the mint, in silver bullion, one-fifth or 20 per cent of their total output, under penalty of a fine of 30 cents per marc. The pri.. of such



SUCRE PARK, IN THE CITY OF SUCRE.

silver bullion is paid in silver coins at the rate fixed monthly by the prefect of Potosí and the Director of the National Mint.

Up to 1902 the export tax on silver ore and bullion was one of the most important sources of revenue for the country. By act of December 13, 1902, the export of silver ore and bullion from the mines of the Republic was declared free, the only tax assessed being called *statistical duty*, amounting to 8 cents on each marco of silver contained in the silver bullion, ore, or any other mineral containing silver exported. There is also a tax of 6 per cent on the profits of all companies or associations engaged in silver mining in the country. Ore and bullion destined to the mint are exempt from taxes. The export tax on silver from 1882 to 1902 has been a steady source of revenue to the Government, as shown in this table:

Year.	Export tax.	Year.	Export tax.
	Bolivianos.		*Bolivianos.*
1882	802,123.81	1892	928,603.62
1883	760,405.47	1893	1,164,166.21
1884	741,628.36	1894	1,006,297.23
1885	729,833.90	1895	815,659.21
1886	816,569.30	1896	603,889.78
1887	791,083.56	1897	675,638.47
1888	841,167.10	1899	415,790.64
1889	905,161.10	1900	421,540.10
1890	833,839.19	1901	404,235.67
1891	912,570.81	1902	376,147.90

TIN.

Bolivia's wealth in tin mines is marvelous. Tin is abundantly found along the eastern belt of the plateau, from the vicinity of Lake Titicaca to the southern frontier of the Republic. This belt measures about 500 kilometers in extent, and is the richest and most important portion of the tin region, lying between 17° and 19° south latitude. The general formation of this region consists in slate and gravel, having a great inclination and interrupted by trachytic porphyry and other igneous rocks, tin being found in the latter. There is no uniformity in the species of minerals with which tin is found, being sometimes associated with iron pyrites or silver ore, while in certain cases it is found in a more or less pure state. These tin deposits sometimes cover a large superficial area, but are also found at a depth of over 300 meters. The width of the lode also varies from 25 to 50 millimeters to 2 or 3 meters. Ore containing from 40 to 65 per cent pure tin is frequently found in veins not exceeding 60 centimeters in width.

A writer on Bolivian tin mines[a] makes the following statements in regard to the tin deposits found in the country:

"The more important deposits at present known are those of Huaina Potosi and Quimsa-Cruz, in the department of La Paz; of Colqueri,

[a] Mr. J. B. Minchin in Engineering and Mining Journal, January 3, 1903.

Negro Pabellon, Morococala, Huanuni, Antequera, and Avicaya, in the department of Oruro; of Llallagua, Uncia, Potosí, and Chorolque, in the department of Potosí.

"The lodes, dipping usually at angles of from 50° to 70°, are almost invariably met with traversing highly inclined metamorphic shales, and occasionally passing into the adjacent igneous rocks. They are generally at altitudes of from 13,000 to 15,000 feet above sea level—sometimes, as at Quimsa-Cruz and Chorolque, running still higher. At Avicaya and Uncia the rocks are polished and grooved on the surface by ancient glacier action.

"The climatic conditions of the Bolivian table-land must have undergone a great change. The old watermark, a calcareous deposit on the hillsides, shows that a vast sheet of water formerly existed, covering more than 20,000 square miles. This has dried up in the course of ages, nothing now remaining but the lakes of Titicaca and Poopo.

"The conditions of the tin deposits vary greatly as regards width; every gradation is encountered, from the narrowest veins up to lodes of 2 and 3 meters. These lodes usually carry streaks of more or less pure tin ore, the rest of the lode matter being composed of compounds of silica and alumina, and of iron oxide with tin ore intermingled. In some cases the lodes are filled with soft clay carrying a large percentage of tin oxide in the form of grains and nodules; and occasionally rich pockets are found in which the whole lode is filled with nearly pure tin ore as a coarse sand. In these cases it is, of course, mined with great ease, but, as a general rule, the lode matter is solid and the country rock unusually hard.

"Little or no progress was formerly possible in this industry, chiefly on account of the great difficulties of transport, more especially of machinery, but during recent years more attention has been paid to it, owing to the comparative facilities offered by the Antofagasta-Oruro Railroad and to the present favorable price of the metal. Improved grinding and concentrating machinery is in operation or in course of erection for various enterprises.

"The concentration mills are usually at altitudes of from 12,000 to 13,000 feet above sea level, or from 1,000 to 2,000 feet below the mines. Until recently the transport of ores to these mills was carried on exclusively by means of llamas and donkeys, and constituted one of the miner's chief difficulties, owing to the insufficient number of animals available and the considerable cost, amounting to $1.25 per ton-mile. The Avicaya, Huanuni, and Chorolque enterprises have lately put up ropeways for carrying their ores. These lines, supplied by the ropeways syndicate of London, are giving great satisfaction. They have each a capacity of 8 tons per hour and work by gravity, the cost of transport being reduced to about 12 cents per ton-mile. The

most important of the lines is that at Avicaya, with an approximate length of 3 kilometers.

"The fuel question is another difficulty encountered, as no coal exists on the Bolivian plateau, and the imported article from England, the United States, or Australia costs $30 per ton. Native fuel, '*yareta*,' or llama dung, is efficient for steaming and is comparatively cheap, but in many districts it is becoming scarce.

"At the amalgamation works belonging to Señor Avelino Aramayo, at Bella Vista-Poopo, a Deutz anthracite suction gas motor was recently erected of 80 horsepower at sea level. Brake trails at Poopo gave from 50 to 55 horsepower, a result considered satisfactory in view of the altitude of 12,300 feet. The consumption of anthracite was 0.7 kilogram per horsepower-hour, but it is expected that this will be reduced to 0.6 kilogram. Similar motors are in course of erection for the Avicaya and Huanuni enterprises, which will then be enabled to run their concentration plants with regularity. Petroleum motors are employed at Avicaya for electric lighting and for running Wilfley tables.

"The average contents of the ores in Huanuni and Avicaya, as they come from the mines, is from 10 to 12 per cent of metallic tin. The degree of fineness to which they are ground depends on their quality. They are pulverized as little as possible, so as to avoid the formation of slimes. At Avicaya No. 4 to No. 8 sieves are employed in the stamp and ball mills, while at Huanuni, owing to the tin oxide being more disseminated through the gangue, a 25 mesh is necessary in the batteries.

"The ground ore passes through hydraulic separators which, with an upward current of water, carry off the slimes to settling tanks, whence they are treated in round buddles and Wilfley tables, while the coarser material is classified in trommels and concentrated in automatic jigs. The concentrates undergo a final treatment by washing in sieves, after which they are dried and sacked for export. At Avicaya the average lye of the finished product, or "barrilla," is over 70 per cent of fine tin, while at Huanuni, in spite of the finer grinding, it does not usually exceed 67 per cent. The Huanuni tailings still contain 2 per cent of tin, and though they admit of good concentration to 10 per cent the tin oxide can not be separated without further pulverizing. Huntington mills have been ordered for this purpose.

"The Llallagua-Uncia mines occupy another important tin region, but as they have been more recently opened up and are about 45 miles distant from the railroad, with which they are not yet connected by a coal road, the ores are still treated in a primitive manner, being ground under hand-worked rockers and concentrated in simple buddles.

"The Potosi production is so far chiefly derived from the old silver amalgamation tailings, which are roughly concentrated and then reduced with charcoal in small water-jacket furnaces and run into bars for export, on accunt of the higher freight from this district.

"The Quimsa-Cruz region appears to be promising, though it has as yet been but little investigated, owing to its distance from the railroad, to bad roads, scarcity of labor, and the great elevation at which the lodes exist. Many of them are on the level of the perpetual snow line. This has, however, the great advantage of affording ample water supply for power purposes.

"In addition to the tin mines proper, many of the silver ores, as in the case of the Oruro mines, contain a small percentage—2 to 4 per cent—of tin, which is, however, advantageously extracted by the inexpensive concentration of the lixiviation tailings.

"The depth to which the tin ores extend in the Bolivian mines has not yet been clearly established. Some of the principal lodes in Huanuni and Avicaya are still rich at 300 to 400 meters below the tendency for the value to fall off in depth, the tin ore being replaced by more or less poor iron pyrite.

"Reliable statistics of Bolivian tin production are not readily obtainable. Those of the principal enterprises may, however, be very approximately given as follows, in tons per month, of black tin ('barrilla'):

	Tons.
Huanuni Tin Mining Company, Huanuni	65
Teller Hermanos, Huanuni	60
Other mines, Huanuni	75
J. Juleff, Antequera	50
Totoral Mining Company	65
Avicaya	100
Llallagua	45
Compañía Minera Uncia, Uncia	35
S. Patiño, Uncia	80
Chorolque	90
Silver ore tailings, Oruro	130
Total	795
Equivalent to metallic tin	525

"To this may be added a monthly production in bar tin from the Potosi mines, 135 tons, making a total of 660 tons monthly.

"Estimating the production from all the smaller workings, including some stream tin as equivalent to 140 tons monthly of bar tin, a total production for the whole Republic of 800 tons, or about 9,600 tons yearly, is obtained."

The tin-producing portion of Bolivia may be divided into four regions or belts: La Paz on the north, Oruro in the center, Chorolque in the south, and Potosi in the east. Oruro is the most important tin-

mining district, as one-third of the total production of this metal comes from that department.

The following mines are under operation in the northern or La Paz tin belt:

Huaina-Potosi.—This mining district is 25 kilometers distant from La Paz. Although the veins carry silver and other minerals besides tin and bismuth only these latter are worked at present.

Milluni.—This district lies about 10 kilometers from the Huaina-Potosi mines. The width of the lodes which run to the east, north, and south varies from 60 centimeters to 4 meters. Operations in this mine have so far been devoted to the treatment of the outcroppings and superficial works, there being only one shaft 70 meters deep. This mine and the Huaina-Potosi are operated by a French company.

Chacaltaya.—The general features of this mine, 19 kilometers from La Paz, are similar to those of the two already described. These three mines are in fact one single lode about 9 miles in length. The Vilaque and Japajopo mines, yielding a small amount of gold, also belong to this district. The proximity of this mine to La Paz facilitates its operation.

Inquisivi.—The entire province of this name is rich in tin lodes, especially at the Cordillera de Tres Cruces, 5,546 meters above the sea. The number of claims granted during the first six months in 1903 amounts to 6,700. A large company is now being organized for the purpose of operating this mine by the most approved methods.

Colquiri.—The main vein of this mine was under operation in colonial times. There still exists two tunnels about 1,000 feet in length. The vein extends 80° to the north and 80° east and south. According to old records the Spaniards shipped over 500 tons of *barrillas* or concentrate.

Sayaquiri.—The lode in this mine measures about 25 feet in width, tin being found associated with iron pyrites and wolfram. The tin found in this mine is inferior to the product of the others.

The output of the tin mines of the department of La Paz from 1897 to 1902 is officially given as follows:

Years.	Metric quintals.[a]	Official valuation.
		Bolivianos.
1897	6,198	495,840
1898	6,632	530,560
1899	8,097	698,760
1900	9,948	806,704
1901	10,780	819,040
1902	9,536	696,988
Total	51,191	4,047,892

[a] One metric quintal is equal to 100 kilograms or about 220 pounds avoirdupois.

The most important of the tin-producing districts is Oruro, the following being the mines in actual operation:

Huanuni.—This is the richest tin-mining district, the principal deposits being found in the Pozoconi mount. The principal veins run from east to west and thence in a southerly direction. Stratification is very irregular. Four of the principal veins extend in an almost parallel direction, with a dip of about 50° south, through a hill of slate. The vein under operation by the Compañia Huanuni is called "Catari-cagua," its width varying from 2 to 8 feet. The Spaniards, who were the first to work this mine, found rich pockets down to a depth of 1,000 feet. Tin ore is richer near the vein, although its quality is uniformly fair. Selected ore from the vein generally contains 50 per cent oxide, and the poorest quality of ore yields 20 per cent. This mine has produced over 100 tons of concentrate per month. As a general rule the selection of the ore is done by women, who pick out the best quality of mineral, leaving the inferior ores, which yield about 10 per cent, to be subsequently treated. The company has ten crushers and other machinery necessary to the treatment of tin by the improved Cornualles system, which has been very successful. The washings, containing about 5 per cent oxides, are put aside to be treated anew. Selected ore has yielded as much as 65 per cent tin without concentration, and the washings about 15 per cent. There are, near Huanuni, other tin deposits under operation. Huanuni is 30 kilometers from Machamarca. Transportation of ore is done by carts, pack mules, and llamas. There are several prosperous mining companies in this district.

Morococala.—About 16 kilometers north of Huanuni the Morococala mines are found, producing ore which yield as much as 20 per cent oxide. The principal mine is operated through a shaft sunk in the vein, which measures from 12 to 15 feet in width in some places, and contains pure oxide in large quantities.

Vilacolo.—This mine is a short distance from Morococala. Formerly it yielded large quantities of silver and tin. Milling and washing are the systems used in operating the mine at present.

Negro Pabellón.—This mine, although situated in the same region as Morococala and Vilacolo, has its peculiar characteristics, which make it different from the others. The vein extends from north to south in a vertical direction, the dip of the strata being 45°. Tin from this mine is of superior quality and easy operation. The main vein, 3 feet in width, is crossed by several smaller veins, forming rich pockets at the points of intersection. The ore is soft and easily washed, the concentrates or *barrillas* yielding over 70 per cent tin. The Morococala and Negro Pabellón mines are at an elevation of 4,500 meters above the sea.

Challa-Apacheta.—These mines lie at about 16 kilometers south of Huanuni. One of the tin veins in this mine is remarkable for the fact that it is from 25 to 30 feet in width, but the ore is so mixed with gravel and clay that the yield of the mine is on an average no more than 20 per cent. There is another vein from 12 to 18 inches in width which appears to be the continuation of the former.

Avicaya.—About 5 kilometers south from Challa-Apacheta the Challe Grande mountain rises, containing the mines of Avicaya, Totoral, and Chuncho, the first mentioned being the only one worthy of consideration. The veins extend from east to west in an almost parallel direction, with a varying dip of 60° to 40° north and an average width of 1 to 5 feet. Tin extracted from this mine yields from 20 to 40 per cent.

Antequera.—This is an important mine, yielding good profits. Aramayo y Compañia, the owners, have a contract to deliver 2,000 quintals a day to the railroad to be carried to the Bella Vista smelting works.

Berenguela.—This mineral district lies 45 miles east of Oruro. It was formerly worked by the Spaniards for silver, which was extracted in good paying quantities. The tin found in these mines is said to be superior to any other found in Bolivia.

Besides the above-mentioned mines there are several other less important deposits. The number of hectares granted in the district of Oruro during 1902 is officially given as 2,866, while the total production of tin from 1897 to 1902 is as follows:

Year.	Metric quintals.	Official valuation.
		Bolivianos.
1897	14,256	1,140,480
1898	17,215	1,377,200
1899	44,256	2,414,734
1900	82,269	3,565,210
1901	100,206	4,380,768
1902	96,981	4,301,304
Total	355,183	17,179,696

The Chorolque Mountain, in the department of Potosi, is also a large tin-producing district, the treatment of this metal being made under the same conditions of silver. The vein runs in the main from east to west, with an average width of about one meter. The richest deposit is at the deepest point in the mine, about 100 meters from its mouth. The ore sent from the mine to the mill contains, on an average, 25 per cent metallic tin. The alluvial deposits, which are abundant in this region, are worked by private parties in a primitive manner. The tin-bearing clay is taken away by hand, to be treated at a short distance from the mine. A portion of this clay is crushed and picked

by hand, yielding as much as 60 per cent. The balance, after being crushed, is ground by hand in a mill and washed in jiggers, thus obtaining from 50 to 60 per cent tin. During seven months in the year operations are practically suspended, by reason of scarcity of water. The total monthly production of the Chorolque district is estimated at about 350 tons of *barrilla*, or 210 tons of tin in bars. The total production for the years from 1897 to 1902 is the following, according to official statistics:

Year.	Metric quintals.	Official valuation.
		Bolivianos.
1897	8,680	694,400
1898	10,960	765,000
1899	20,615	1,349,200
1900	29,979	1,796,707
1901	39,175	1,244.954
1902	13,365	924,113
Total	122,774	6,774,374

The following are the principal tin mines in the department of Potosi:

Llallagua.—The mountain where these tin mines are found has an elevation at its base of 3,800 meters above the sea and 4,400 at the summit. Ore is rich and abundant, and the principal vein now under operation is at a depth of 210 meters from the summit of the mountain. The general direction of this veiu is 36° north, while three other smaller veins run in a westerly direction, the mean dip being estimated between 11° and 14°. Lack of good roads is responsible for the present state of development of these mines, but a wagon road 80 kilometers in length is being built to connect the works with the Challapata station of the Oruro-Antofagasta Railroad. The actual production of this mine does not exceed 75 quintals of *barrilla* tin per day, containing 70 per cent pure tin. It is expected that the output will soon increase to 100 quintals per day of twenty-four hours. Some important work is being done at the mine in order to erect a first-class mining plant. The district is 60 kilometers from the Challapata station, and 90 kilometers distant from Oruro.

Uncia.—There are several companies engaged in the exploitation of these mines, which are situated at 6 kilometers from Llallagua. There is a good plant now in operation and another is to be erected in a short time.

Potosi.—In these mines, as in some of the Oruro district, silver is associated with tin. The product is not as fine as that of other mining districts, because of its mixture with antimony and other metals. The railroad line is about 240 kilometers from the mine.

Porco.—The operation on a large scale of these mines was abandoned because of the poor quality of the ore.

Maragua and Ocuri.—Both of these mines yield a fair quality of tin, that of Ocuri being superior to the Maragua product, both in the quality and quantity of the mineral. They are over 140 kilometers distant from the railroad.

There are many other tin mines in Potosi, but their output is insignificant. The number of hectares granted in the Chorolque and Potosi districts for tin-mining purposes from 1900 to 1902 and the first six months of 1903 is officially given as follows:

Province.	1900.	1901.	1902.	1903 (six months).
Frias	914	146	470	2,100
Linares	274	34	260	2,620
Porco	242	413	202	75
Chayanta	640	49	21	290
Charcas	324	599	426	540
Nor y Sud Lipez	.....	.....	10	.....
Nor Chicas	138	868	580	33
Sud Chicas	436	403	40	487
Total	2,968	2,512	2,009	6,153

The total production of tin in Potosi from 1897 to 1902 is shown in the following table:

Year.	Metric quintals.	Official valuation.
		Bolivianos.
1897	8,361	655,780
1898	9,153	732,240
1899	19,826	1,268,256
1900	40,146	2,410,918
1901	68,998	2,935,952
1902	56,201	2,860,898
Total	202,685	10,864,044

These are the principal tin mines under operation for the exclusive extraction of tin, which is also found associated with silver, especially in the departments of Oruro and Potosi. As a general rule this tin is of inferior quality. Tin mines are also found in other departments, such as Santa Cruz and Cochabamba. The development attained of late years by tin mining is due in a large measure to the construction of the Oruro Railway in 1892, which has made a considerable saving in freight and time. On an average the cost of production of tin is 20 bolivianos per metric quintal; freight to Europe costs 35 bolivianos per metric ton, and freight from Oruro to Antofagasta, by rail, 4.89 bolivianos per metric quintal, while other transportation and shipping expenses may be estimated at 3 bolivianos per metric quintal.

Ore from the districts of Oruro, Potosi, and Inquisivi, La Paz, are shipped from Oruro to Antofagasta by rail. Ore from Huaina Potosi is shipped in road carts to Puerto Perez, on Lake Titicaca, thence to Mollendos. Freight per metric quintal to Puerto Perez is, on an

average, 1.50 bolivianos, and from said port to Mollendos 2.10 *soles.*[a] Chorolque ore is exported either via Uyuni and Antofagasta or Tupiza and the Argentine Republic. The largest portion of Bolivian tin goes to London.

The total production of tin in Bolivia from 1897 to 1902 is officially the following:

Year.	Metric quintals.	Official valuation.
		Bolivianos.
1897	37,495	2,986,500
1898	43,960	3,405,000
1899	92,794	5,730,950
1900	162,342	8,579,539
1901	219,159	9,380,714
1902	176,083	8,782,703
Total	731,833	38,865,406

The exports of tin from 1900 to 1902 are officially estimated as follows:

	Bolivianos.
1900	8,579,539.21
1901	9,380,714.00
1902	8,782,703.93

Taxes.—By act of May 26, 1899, the following tax is levied and collected on all tin exported: Barrilla, 1 boliviano per quintal of 46 kilograms; tin in bars, 1.60 bolivianos per quintal.

BISMUTH.

The geographical distribution and geological formation of the bismuth belt in Bolivia follow the direction of the tin lodes, as these two metals are very frequently found intimately associated. The direction of the bismuth deposits is in the main that of the cross strata of the Andes, as far as the Apolobampa Mount, it being found at Palca, Chacaltaya, Huaina-Potosi, Sorata, Chorolque, Tazna, and other points. The Chorolque deposits contain silver and tin, besides bismuth. The several silver and tin veins are very thick and their lower strata contain bismuth either in the state of chlorides or sulphurets. It is also found in its native state and in other forms, particularly at Coribiri, where bismuth nuggets, weighing from 3 to 4 *adarmes*,[b] are frequently found in a small stream at the foot of the mountain. Chloride of bismuth is also found near the surface in these deposits, changing to sulphurets at a slight depth. The Chorolque lode is confined to the mountain and its slopes. Copper and iron sulphurets are also found associated with bismuth in its several forms. In the Tazna Mountain, 5,000 meters elevation, the main formation is a slaty rock

[a] *Sol* is the Peruvian monetary unit, equivalent to about $0.48 U. S. Currency.

[b] The *adarme* is equivalent to about 1.80 grams, or 27.73 grains.

traversed by lodes over 1 meter thick, where chlorides are predominant, sulphurets being found at a short depth.

The Bolivian bismuth lodes are both rich and valuable, lack of capital being at present the only drawback to its fullest development. In the latter part of 1903 very rich bismuth veins have been discovered in the Inquisivi Province.

The total production of bismuth in Bolivia from 1895 to 1902 is shown in the following table. The price of the product per metric quintal has fluctuated between 160 and 200 bolivianos.

Year.	Metric quintals.	Official valuation.
		Bolivianos.
1895	1,504	298,300
1896	1,334	275,500
1897	1,840	380,000
1898	2,760	570,000
1899	4,600	950,000
1900	3,520	871,702
1901	4,925	1,463,088
1902	3,450	791,500

Exports of bismuth for the years 1900 to 1902 are officially given as follows:

	Bolivianos.
1900	271,702.28
1901	1,463,088.43
1902	303,736.06

Taxes.—By act of December 13, 1902, the tax at present in force on all bismuth exports is 5 bolivianos per quintal of 46 kilograms.

GOLD.

The distribution of the metallic belts in Bolivia has always been a matter of wonder to geologists, Raimondi having made the statement that the Bolivian plateau is "a silver table supported by gold columns." The gold-bearing belt of the country is divided into three regions, the first extending from the western boundaries of the Republic, in the Inambari basin, to the eastern frontier on the littoral of Upper Paraguay. This region embraces the whole of the mountainous section of the provinces of Caupolican, Muñecas, Larecaja, Cercado, Yungas, Inquisivi and Loayza, in the department of La Paz; thence it continues through the department of Cochabamba and ends at the Santa Cruz-Paraguayan boundary. The second region starts in Atacama and Lipez, extending south through the provinces of Chayanta, Sur Chichas (department of Potosi), Mendez (Tarija), Cinti and Acero (Chuquisaca), as far as the Santa Cruz plains. The third region, which is perhaps the richest of all, extends toward the northwest of the Republic as far as Carabaya, Peru, and the headwaters of the Madre de Dios, Acre, and Puru rivers. This rich region, however, is

exclusively inhabited by wild Indians, so that nothing has been done to develop the mines. The number of mines under operation in the other regions is very small.

The only gold-bearing districts under development in the first auriferous region are the following:

San Juan del Oro.—This deposit takes its name from the San Juan River, in the Inambari basin. The streams flowing through this region have been covered with alluvial formations. This is a *lavadero* (washing place), yielding very little, and it is believed that it will soon be exhausted.

Suches.—At the headwaters of Suches River gold is found in conglomerates and placers; along its bed gold-bearing gravel exists in paying quantities, there being about 100,000,000 cubic meters of gravel yielding gold at the rate of 40 cents per cubic meter. The town of Suches is about 140 kilometers from Juliaca Station, on the Puno and Mollendo Railroad, 33 kilometers from Mojo, a port on Lake Titicaca, and 338 kilometers from La Paz. The roads are good, pack trains making the trip to Mojo in two days. Freight from Mollendo to the mines is about 8 bolivianos per quintal, and from La Paz about 4 bolivianos. Freight on heavy machinery is reasonable.

Tipuani.—The auriferous wealth of this river, in the province of Larecaja, is far beyond that of any other in the Republic. The gravel deposits are so enormous that at a depth of 100 meters no rock bottom has been found, the production of gold increasing with the depth of the gravel. This is one of the oldest gold-mining districts in the country. In 1571 gold mining was at its height in this district, the Portuguese miners being compelled to introduce negro slaves to satisfy the demand for the metal. Gold was so abundant that in 1780 one of the promoters had over 13,000 kilograms in stock. A company who worked this mine from 1818 to 1867 reached a total output of 150,766 ounces of gold, at a cost of $1,500,000. Tipuani gold is from 22 to 23.50 carats.

Yani.—The Yani and Tacacoma placers are also important. Among the mines of this section the "Elsa" property is considered the best. According to an authority the "Elsa" contains 61,000,000 English tons of gravel yielding 36 cents gold per ton. In the course of the experiments made by said authority (Stumpf) to ascertain the value of this mine, the larger portions of the washings yielded $2.70 gold, while other samples gave from $4 to $10 gold. Twelve cubic meters were washed in each section

Chuquiaguillo.—The mines of this name in the neighborhood of La Paz have been worked from time immemorial. Gold in this section is generally found in the form of nuggets, yielding on an average 50 cents per cubic meter. Since their discovery these mines have always produced gold in paying quantities, and many miners have made for-

tunes working them. The most remarkable nuggets from this mine are one weighing 95 marcos, 21 carats fine, sent to Madrid in 1718; another, 22 marcos weight, found sometime ago, and, finally, one weighing 18 marcos recently found. In 1887, there were 254 Spanish ounces, 2.50 *adarmes* (about 257 ounces avoirdupois, 69.35 grains) extracted from this mine at a cost of 2,319 bolivianos, being sold at 24.50 and 25.60 bolivianos, making a total of 6,246 bolivianos, or a net profit of 3,926.20 bolivianos. Until very recently work was carried on in this mine in a most primitive way. Since 1901, however, modern practical methods have been introduced. According to official statistics the exports of gold from Chuquiaguillo through the La Paz custom-house since 1900 has been as follows:

Year.	Kilograms.	Official valuation.
		Bolivianos.
1900	5	9,821.00
1901	16	21,481 28
1902	53	69,759.06

Araca.—This gold district is in the province of Loayza, in a creek at the foot of the Tres Cruces range. The auriferous wealth of this section has been well known since colonial times. Mining engineers who have examined the mines of Araca agree that they are one of the richest in Bolivia, lack of capital being the only drawback to its full development. The excellent quality of the gold produced by these mines is a well-known fact, the quartz vein being very wide, the output being from 5 to 12 grams per ton, when treated by amalgamation, a method rather unsatisfactory, as there is a loss of about 30 per cent, due to the extreme minuteness of the gold particles. Notwithstanding this, miners have extracted as much as 6 kilograms per month, with a profit of over 5,000 bolivianos, and others have made 10,000 bolivianos per month, at a cost of 2,500 bolivianos. The present works are in a region producing free milling ore. Tests made with different specimens have yielded from 4 to 5 grams of gold per metric ton. This mining district has not been wholly surveyed. The Rosario belt contains 1,000,000 cubic meters of auriferous quartz. According to estimates it would take seventeen years to exhaust this mine working it at the rate of 100 tons a day. It has been estimated that at least there could be worked in this mine 625,000 tons of quartz, which at an average rate of 5 grams, would yield 3,225,000 grams of gold.

Choquecamata.—This rich deposit, 75 miles from Cochabamba, was discovered in 1750. It is situated in the ridge called "Tetillas," the loftiest of the region. The central portion of this ridge consists of granite and quartz. There are several small creeks rich in auriferous gravel, besides the Choquecamata River. This is an excellent mining

region, as on account of its special features there are no serious difficulties in the work. The deposits of auriferous gravel are about 6 miles in length. According to tradition, during colonial times over $20,000,000 in gold were gathered in this region from superficial gravel and the high banks of the river. The *Cocopata* or *Santa Catalina* Mountain, not far from this mining region, also contains gold in large quantities.

Chiquitos.—From colonial times this has been one of the richest auriferous belts in the Republic. It measures over 900 square kilometers in area, and its situation is unexcelled by reason of climatic conditions and fertility of the soil. The *Santa Rosa* mine in this district yielded from 1847 to 1877, 2,500 pounds of gold.

Other gold deposits in this region are: *Rio de la Paz* or *Chuquiyapu*, where the capital city is built, according to tradition the site of very rich gold mines; the mountain of *Illimani*, known to contain rich gold deposits, the auriferous gravels of river Palca being under actual exploitation, and the *Cavari* district, rich in gold, but as yet unexplored.

The second auriferous belt has been known from the earliest times as the richest in Bolivia. For a time the city of Chuquisaca was a large mining center. The principal gold region in this belt is the Poconota Mountain.

Poconota.—This mountain, which is one of the oldest mining districts in the country, belongs to the province of Nor-Chichas, department of Potosi. The mountain is composed of a series of parallel lodes of yellowish ferruginous quartz running north and south and crossed by numerous other veins. Mining was carried on here by the Spaniards on a large scale, as shown by the works still existing, which prove that the output of the mines must have been of considerable value to pay for the expense involved in the erection of such works, at a time when miners lacked the most necessary elements to such an undertaking. The Poconota gold yields 360 grams per ton of 1,600 kilos. The vein measures 64,000 cubic meters, and the density of the quartz being 2.50 per cubic meter, the vein represents 469,000 tons, which at the rate of 0.30 grams per ton, a rate far below the average obtained at the tests made, shows a wealth of 4,800 kilos gold.

The other principal mining regions in the south of the Republic are the following:

Caiza, in the province of Linares, where the Indians wash a large amount of the yellow metal. *Yura*, province of Porco, where there are immense gold veins not yet surveyed, while auriferous gravel is abundant in the Yura River, *San Juan* river, *Esmoraca* and *Chilco*. *Lipez*, *Tupizo*, and *Sud Chichas*, yielding at present about 400 ounces gold per month. A company with a capital of $375,000 has been

formed in Buenos Ayres for the development of these mines. At *Suipacha* there exists a gold vein about 67 kilometers in length by 2 meters in width. *Coremayo* is another mine in the vicinity of Portugalete. There are numberless creeks where gold is found in varying quantities. The largest portion of these gold-bearing deposits have been abandoned and are idle at present for want of capital and labor.

According to official estimates, which agree with those of Humboldt, Sotbier, and other European authorities who have made a special study of the matter, Bolivia's gold mines have produced from 1540 to 1750, a lapse of 210 years, the sum of £420,000,000. From the latter year to the beginning of the nineteenth century the mines and *lavaderos* of the provinces of Larecaja and Caupolican alone, in the department of La Paz, produced $14,000,000. From 1818 to 1868 the product was 150,776 ounces of gold. The product of the other mines and *lavaderos* in the Republic from the latter part of the seventeenth to the last years of the nineteenth century is estimated at £250,000,000. If the primitive methods employed in mining have yielded such splendid results, an idea may be had of what could be attained by the use of modern methods.

There are no official statistics of the production and export of gold in Bolivia, as the largest portion of the exports is made clandestinely, notwithstanding the fact that the only tax levied upon this mineral, on way bills only, is 20 cents per ounce. A careful investigation of all the mines and *lavaderos* at present under development, and reliable private information show that the annual production of gold in Bolivia may be conservatively estimated at 550 kilograms, valued at 275,000 bolivianos. Upon this data the following official estimate of gold production in Bolivia from 1895 to 1902 has been based:

Year.	Kilograms.	Official valuation.
		Bolivianos.
1895	450	225,000
1896	500	250,000
1897	685	342,000
1898	550	275,000
1899	546	273,000
1900	550	275,000
1901	550	275,000
1902	580	290,000

The exports of gold from 1900 to 1902 are given as follows in Bolivian statistics:

	Bolivianos.
1900	9,821.00
1901	21,487.28
1902	69,759.06

The nations of the world to which gold is exported, and the percentage of exports is officially estimated as follows:

	Per cent.
England	4.0
France	2.5
Germany	2.5
Belgium	.4
North America	.4
Other countries	.2

COPPER.

Copper is one of the most important minerals found in Bolivia, the abundance and purity of the metal insuring good profits to the development of this industry. The cupriferous regions are extensive, and follow in the main the trend of the eastern chain of the Andes. Copper formations are almost uninterruptedly found from Atacama, through the province of Lipez, where white copper is found, to Porco, Chayanta, department of Potosi, Arque, Colchas, in Cochabamba, to the department of Oruro, towards Corocoro, thence to the department of La Paz, and to the boundary line with Peru. Besides this general belt there are ramifications extending throughout the Andes slopes. The geological formations of copper are peculiarily characteristic in these regions. The purity varies, being in the principal veins higher than in the ramifications. The dip of these two strata varies in the main veins from 60° to 80°, while in the ramifications it is from 30° to 60°.

Copper is most generally found in small, irregular grains, called *barrilla*, yielding from 70 to 80 and sometimes up to 92 per cent pure metal. Native copper is abundant and constitutes the real wealth in this metal, being found under different forms, from the *barrilla*, or small grains, to the large masses of almost pure metal called *charquis* by Bolivian miners. *Charquis* in the shape of large plates 3.50 inches thick have been found in the Carangas and Titicaca regions. Native silver has been found in these cupriferous formations either in a granulated form or in small nodules. Silver, however, is never found in the copper, but under the cupriferous strata. In the Corocoro mines, for instance, there have been times when copper has disappeared to give place to the silver formation. Zinc and nickel have also been found in these copper veins. The analysis made in Hamburg of a specimen of this mineral showed the following proportions:

Copper	0.329
Nickel	.175
Silver	.009
Zinc	.117
Other matter	.370
	1.000

GOVERNMENT PALACE, SANTA CRUZ.

Miners in Bolivia only extract the native copper, as it is easily treated by the primitive methods of milling and concentration.

Corocoro district.—This is the richest and most active copper-mining center, being only second in abundance and purity of the mineral to the Lake Superior mines in the United States. Corocoro is situated in the plateau 4,023 meters above the sea level, being the capital of the province of Pacajes, department of La Paz. This mining center is easily reached from the Pacific coast by way of Arica, 425 kilometers distant, and by way of Mollendo through Desaguadero, Lake Titicaca, and Puno, 245 kilometers. Corocoro is connected with La Paz by a good wagon road, 110 kilometers in length. The cupriferous strata of Corocoro extend about 50 kilometers from northeast to southwest, a belt about 600 meters in width, where the Pucara and Chacarrilla mines are found. Native copper is uniformly found throughout this belt under different forms, such as *charquis*, red copper, gray copper, or *panabasa*, and several other combinations. Native silver has been found below the copper formations, as stated.

The only method of extracting the copper in use at present is the treatment of the gravel or other matter wherein it is contained, so as to obtain a product no less than 70 per cent pure for export. When the metal is found in the shape of *charquis*, or serrated crystals, smelting is resorted to in order to obtain bars easily transported on pack trains. The principal mining companies of Corocoro are the following:

Compañía Corocoro de Bolivia was established in 1873, with a capital of 1,250,000 bolivianos in cash. This is a Chilean company with main offices at Santiago de Chili. The Remedios and Socavón Corocoro are under actual development. The weekly output is estimated from 600 to 800 metric quintals of copper. Work is carried on at a depth of 460 meters with powerful steam engines. The company employs in the mine 500 men.

Guallatiri.—This mine is under development by the firm of Noel Berthin. Work is carried on in two shafts distant about 500 meters, at a depth of 300 meters. The mineral is treated at Acoruni, in the vicinity of the mine.

Santa Rosa, the property of Carrera Hermanos, employs about 300 men. The depth of the mine is 280 meters; steam power is used. The annual amount of copper produced is estimated from 7,000 to 8,000 tons of the raw product, yielding from 3 to 4 per cent in *barrilla*, about 82 per cent pure.

Viscachani, under operation by the firm of J. K. Child & Co. The work is carried on by means of twin shafts 270 meters deep, the daily output of the mine being estimated at 25 to 30 quintals of *barrilla*. The capital of this company is 160,000 bolivianos.

The cost of development and treatment varies according to the facilities of the mining company, but it can be safely estimated at 10

bolivianos per quintal of 80 per cent *barrilla*, leaving a net profit of about 3.25 bolivianos per quintal. Exports of *barrilla* are made through Tacna and Mollendo, the latter route being less expensive. The cost via Tacna is estimated at 3.24 bolivianos per quintal, while via Mollendo it is only 2.87 bolivianos. Freight to Europe on an average costs 2.78 bolivianos per quintal. The richest copper-producing district besides Corocoro is found in the department of Atacama or Litoral, now occupied by Chile by virtue of a treaty. According to Chilean statistics, the output of these mines during 1901 is estimated at 24,751,642 kilograms of copper. Other copper mines in Bolivia are not developed for want of labor and capital.

In 1850 the total output of the copper mines of Bolivia amounted to 113,000 Spanish quintals or 51,980 metric quintals. This production, however, has decreased steadily because of the low price the metal has commanded in European markets. At present the Corocoro are the only mines under operation, the others having been abandoned. The output of the Corocoro mines from 1890 to 1902 is officially estimated as follows:

Year.	Metric quintals.	Approximate value.
		Bolivianos.
1890	21,133	1,014,384
1891	29,316	1,407,168
1892	28,980	1,391,040
1893	29,440	1,413,120
1894	33,288	1,597,824
1895	25,254	1,312,192
1896	34,163	1,639,824
1897	27,902	1,339,290
1898	33,580	1,621,840
1899	29,440	1,413,120
1900	25,636	1,025,030
1901	29,498	1,112,599
1902	42,014	2,059,510

The exports of copper for the years 1900, 1901, and 1902 is officially given as follows:

	Bolivianos.
1900	1,025,030.22
1901	1,112,598.90
1902	2,059,510.10

Taxes.—The export tax now in force since 1898 amount to 1 boliviano per Spanish quintal of *barrilla*.

OTHER MINERALS.

There are large deposits of *borax* in the country, the principal being that of Chilcaya, department of Oruro, covering an area of 10,000 to 12,000 hectares. This product is considered among the best of its kind in the world. Chilcaya borax is exported through Arica, 190 kilometers from the mines. *Coal* and *petroleum* are also found, especially in the vicinity of Lake Titicaca.

From 1900 to 1902 the following mineral substances were exported from Bolivia according to official statistics:

Mineral.	1900.	1901.	1902.
	Bolivianos.	*Bolivianos.*	*Bolivianos.*
Borax	50,489.37	199,279.00	.....
Lead	36,378.40	13,848.99	144.00
Wolfram	33,996.50	207.00	16,461.50
Antimony	24,150.68	88,404.00	17,080.00
Zinc	2,120.00	.....	.....
Lime	180.00	.....	445.20
Cobalt	.....	637.80	.....
Alum	.....	.....	124.60
Other minerals	2,590.50	8,200.00	998.30
Total	149,905.45	310,576.79	35,253.60

MINING LAWS.

Under Spanish rule the mining legislation framed for Peru and Mexico under the name of "Ordenanzas del Peru," was in force in Bolivia, then known under the name of Upper Peru (Alto Peru). The first mining code prepared by Bolivia as a sovereign State dates from 1834, and was repealed two years later. A new code was framed and adopted in 1853, until 1880, when the law now in force, with subsequent amendments, was promulgated on the 13th of October. Other legislation has been enacted since tending to regulate mining, the last being a decree bearing date April 11, 1900, on the subject of exploitation of nonmetalliferous inorganic substances, and the regulations thereof issued on the 8th of January, 1901.

The mining law contains 27 articles under 5 titles, viz, (1) Ownership of mines; (2) Prospecting and surveying; (3) Concessions and mining properties; (4) Working of the mines and forfeiture of the concessions; and (5) Rights and duties of miners. Briefly stated the main points of the law are the following:

Under the general title of "Ownership of mines" it is established that all kinds of metalliferous substances of whatever origin, lying either on the surface or in the interior of the ground belong primarily or originally to the State.

Soil and subsoil, for the purposes of the law, are two different and separate things. The soil is the outward or surface layer of the ground to the depth the owner has reached in agricultural work, or in building or laying foundations, but not in mining operations, and the subsoil is all that lies beneath the soil to an indefinite depth. The ownership of the soil, whether it is the property of private individuals or of the State, is never lost or impaired, except in cases of condemnation proceedings, the owner being always entitled to the use of the thing. The subsoil, however, remains under the control of the State which has the right to abandon, grant, or convey said right as provided by law.

Mines, as real property, are estates different and apart from all ground or surface property, even when both the mine and the soil belong to the same owner. The right of ownership, possession, use, and enjoyment of mines can be transferred or conveyed as in the case of any other property, subject, however, to the provisions of the law. Mining claims or property are indivisible units, but the capital representing their value may be divided into shares.

Prospecting without previous permission from the authorities is allowed on lands belonging to the public domain, as well as on private lands that have not been protected by a fence. Prospecting is forbidden in improved lands, whether public or private property.

All persons in the enjoyment of their civil rights are entitled to one or more mining claims on a single grant or concession in mineral lands already known, but no more than 30 claims in lands recently discovered. All claims constituting a single concession or grant must be grouped together, so that all adjoining claims have a common side. Preferential rights to a claim is acquired by priority in filing the respective petition.

The claim or unit to be used in granting mining concessions is a prismatic body of indefinite depth forming a square having 100 meters a side, measured horizontally in any direction selected by the petitioner.

Gold and tin bearing sands or gravel or any other metallic product found in rivers or placers, veins, pockets, outcroppings, or deposits, whether in public or private lands, are subject to concession to be granted with the same formalities applying to any other mines. Tailings, washings, slag, and refuse found in lands not protected by a fence or wall shall be granted to the first applicant. These shall be considered abandoned or vacant when no work has been done on them for six months.

Upon the concession of a mining claim, and when it is shown that the ground is free, the demarcation and survey of the property must immediately follow, even when no ore has been found, nor works of development have been executed.

The survey may embrace all kinds of buildings, roads, etc., and the mining work must be done in accordance with the police and other regulations for the safety of the mines. The point where a claim begins may be marked inside or outside the property upon discovery or find of metalliferous deposits, but the demarcation shall be done as plain as possible to prevent confusion.

Miners are at liberty to use in the development of their respective claims any methods they deem proper, subject, however, to the regulations in the premises, which will be strictly enforced by the respective authorities.

Grants of mining claims are made in perpetuity, the grantee becoming bound to pay a tax of 4 bolivianos per hectare every year. Payment is to be made semiannually in advance, and becomes due from date of concession. Placer and other claims pay only a tax of 2 bolivianos, while tailings, washings, etc., are exempted from this taxation. Mining claims shall be deemed abandoned when payment of tax has been in default for a year and the miner fails to pay the same within fifteen days after execution proceedings have been instituted against him.

Miners wishing to abandon their claims must notify the proper authorities of this fact, thus being relieved from payment of tax since date of notification.

The duties and rights of miners are established in title 5, articles 21 to 27, inclusive, of the law. Miners are under obligation to permit ventilation of adjoining mines, to suffer the waters from said mines to pass through their property to the general outlet, and to comply with all police regulations. In these and all cases of easements an indemnification must be paid after proper appraisement of damages. Miners are free to enter into agreements with the owner of the surface as regards the area necessary for their dwelling houses, stores, shops, and offices, etc. Should there be no possible agreement in regard to area or price, then the mine owner may ask that expropriation or condemnation proceedings may be resorted to.

Surface roads made for one mine are free to all mines situated in the same mining locality. In such cases expenses for the maintenance of the road must be paid *pro rata* among all owners. Miners are the owners of all the waters found within their works, as well as of all veins or lodes of mineral substances found within the limits of their respective claims. The ownership of the veins or lodes extends to the full depth of the same, but miners can not develop or follow such veins or lodes into another's claim. In case that miners should encroach or trespass into the property of another they are under obligation to refund to the rightful owner the value of the mineral extracted according to expert valuation. In cases of fraud or bad faith trespassers shall be guilty of larceny.

Besides the 27 articles mentioned, the law contains also 10 transitory articles, establishing certain provisions relative to the general subject.

The regulations of the foregoing law were promulgated on the 28th of October, 1882. They form a code containing 9 chapters divided into 75 articles. The principal provisions of the regulations are the following:

Persons desiring to obtain one or more mining claims (*pertenencias*) must file a petition or application for said claims, either personally or through a duly appointed agent, with the *Prefecto* of the respective

Department. The application must state as clearly as possible the following points:

1. Name, residence, and profession or trade of applicant.
2. Name under which the claim or grant is to be known.
3. The starting point of the claim, which must be plainly marked either inside or outside the claim, as the case may be, establishing as far as possible the direction and distance to a given fixed point.
4. Number of claims for which application is made.
5. Mining district within which the claim or claims are situated, stating whether it is a known district or one recently discovered. For the purposes of this regulation a "known mining district" is that where at the time of the application at least one mine is under development or has been previously worked, or where two or more applications for registry within their limits have beeen filed by different persons.
6. The names of the adjoining mine owners, if any, and the relative position of their claims and that of the applicant.
7. Name of the owner of the ground, in the case of private lands.

Upon the filing of the application a memorandum shall be entered thereon stating the exact time, hour and minute, when it was received. This memorandum must be signed by the prefect and his secretary in the presence of the applicant. The prefect shall keep a book or record called "Applications for Mining Claims," wherein a record is to be made in strict numerical rotation and chronological order of the day, hour, and minute when the application was filed, this memorandum to be signed by both the prefect and the applicant. This record book is always open for inspection. The prefect shall then cause a grant or concession to be issued in the name of the applicant, in accordance with the terms of the law, such grant to be made public for thirty days by publication or otherwise, as provided by the regulations. At the same time a notification of this fact shall be made to adjoining mine owners. If within the thirty days of publicity no objection or opposition is made to the grant of the application, then the property is to be surveyed and possession taken by the applicant by virtue of the concession. Should there be any opposition, this can only be based upon two facts, viz, priority of application, or that no vacant claims exist.

Within sixty days after the expiration of the thirty-day term, if there is no opposition, or in the contrary case after execution proceedings, as the case may be, the applicant must file another application requesting to be allowed to proceed to the survey and delimitation of the claim or claims, and to take due possession of the property. In case of failure to file such petition as provided, the grant shall be void.

Mining taxes are to be paid half yearly in advance during the first month of the first quarter, no exceptions being made to this rule. If

the tax is not paid as provided, a surtax equal to 2 per cent per month shall be assessed and accrue during such time as the principal remains unpaid. Failure to pay the tax for a year entails forfeiture of the concession, as provided by law.

Executive decree of May 8, 1900, in reference to the exploitation of nonmetalliferous inorganic substances, establishes in general terms that all kinds of nonmetalliferous inorganic substances of whatever origin and lying either on the surface or below the ground belong originally to the State, but inorganic substances of a clayey or earthy nature, such as limestones, building stones, sands, gravels, and similar or analogous substances, are of free exploitation.

CHAPTER VIII.

MANUFACTURING INDUSTRIES.

Manufacturing industries are of little or no importance in the country, notwithstanding the fact that raw material is most abundant. This peculiar condition is explained in part by reason of the geographical position of the territory, situated as it is in the very heart of the South American continent, surrounded by the Andes Range on the one side and by impenetrable forests on the other, and having no direct outlet to the ocean. Under such conditions means of rapid communication are necessarily lacking.

With the exception of the Antofagasta and Oruro Railroad, 924 kilometers, and the Guaqui and La Paz line, 87 kilometers, all traffic is carried on on pack trains or in heavy, slow road carts. River navigation is still in its infancy, notwithstanding the enormous facilities afforded by this method of communication in certain portions of the country.

This explains why the industrial development of Bolivia has not passed beyond the primitive stage and is confined to the production of some staple articles and a few of the most necessary commodities of life, depending on the import trade for almost every luxury, and even for provisions for everyday consumption.

Bolivians are naturally clever in the production and manufacture of most delicate works of art, made without appropriate tools or technical education. The principal native industry is the weaving of cloth, and with the exception of a modern factory in the city of La Paz, primitive methods are resorted to all over the country. The products of these native weavers, generally Indians and mestizoes, range from the coarser fabrics made from the llama wool to the finest product from the vicuña, or the alpaca wool and silk, still using the looms imported by the Spaniards into Peru at the time of the conquest. In the provinces of Mojos and Chiquitos, in the departments of Beni and Santa Cruz, respectively, a certain kind of cotton cloth called *makana* is made, as strong and good as the best imported product of the kind. This fabric is used for clothing, towels, sheets, hammocks, and *ponchos* or blankets, and is said to have wonderful lasting qualities.

Coarse and fine baize of different colors and excellent quality is manufactured in Oruro, this being the goods used for clothing the army. Cashmere of a superior quality is made in the provinces of Cinti (Chuquisaca) and Chichas (Potosi). This product seems to compete most favorably with similar foreign fabrics, being similar to the English product in pattern and general appearance, while the color is more lasting and the stuff wears better. These domestic cashmeres are used in preference to the imported goods not only on account of the excellent quality of the fabric, but also because they cost one-half less than the German or English imported product.

Woolen ponchos, mufflers, blankets, and white and black baize used by the Indians for their garments are manufactured in the department of La Paz. A fabric called *barracá*, a very coarse cloth, is made in the departments of Cochabamba and Santa Cruz, the most remarkable products in this line being the water-proof ponchos used by the miners, made of the brightest colors and a mixture of silk and merino wool. The material generally used for the manufacture of these coarse fabrics is llama and lamb's wool, both very abundant in the country, while the vicuña and alpaca wool is only employed in the finer fabrics.

From 1900 to 1902 the exports of cotton and woolen goods from Bolivia is officially estimated as follows:

Year.	Kilograms.	Value.
		Bolivianos.
1900	1,908	5,788
1901	6,071	17,191
1902	9,044	37,400
Total	17,023	60,379

Saddlery and the preparation of skins and furs is another important native industry. The alpaca and vicuña lap robes made in the country always command good prices abroad. In order to satisfy the demand for this article alpacas were crossed with *vischacas*, another member of the same stock, the breed resulting therefrom having a coarser wool.

Cigars and cigarettes, sugar, soap and candles, chocolate, starch, wines, straw and woolen hats, gloves, furs, hides, skins, sole leather, cheese, and pottery are among the industrial products of the country, besides the preparation of sulphate of quinine, the silk-worm culture. Such industries where the home products enter exclusively are the most flourishing.

Although there are no official statistics on the subject, the exports of Bolivia's industrial products, an estimate based upon custom-house figures for 1900 to 1902, shows the following total:

Year.	Kilograms.	Value.
		Bolivianos.
1900	133,260	227,040
1901	161,072	535,937
1902	153,291	300,569

The Bolivian Government is desirous to develop the industrial wealth of the country, and with this end in view an act was passed November 20, 1895, guaranteeing 4 per cent interest on the capital invested on any steam plant, provided the plant worked steadily and regularly during one year in the manufacture of sugar. A bonus was created, by the same act, of 4,000 bolivianos for the sugar manufacturer producing 4,000 quintals of refined sugar per annum, and premiums of 2,000, 1,000, and 500 bolivianos for the three best sugar refineries. There was also a premium of 3,000 bolivianos for the person or corporation establishing in the country the best condensed-milk factory.

INDUSTRIAL FACILITIES.

The cities of Sucre, La Paz, Cochabamba, and Potosi afford positive advantages for the establishment of electric-light plants operated by hydraulic motors. The first of these cities can utilize the currents of the Cachimayo River, which is but a short distance from the town; the city of La Paz can use the Choqueyapu River, which flows through its center; the city of Cochabamba can utilize the waters of the Rocha River, and especially those of the Colomi River which, at a distance of 30 kilometers from the city has a fall of more than 100 meters; and the city of Potosi can use the waters of the neighboring lakes. The rights of the companies which may establish this class of industries are duly protected by law.

In 1888 an electric-light plant was established in La Paz, and the power house was located in the upper part of the city in order to utilize the current of the river. The contract now in force between the municipal council and this company contains the following clauses:

The company agrees to light the city, using for this purpose 425 incandescent lamps of 16 candlepower each, and 8 arch lamps of 3,000 candlepower each. On moonlight nights the company furnishes no light to the city, and on other nights only until 1 o'clock in the morning. The municipal council pays an annual subsidy to the company of 26,000 bolivianos, payable monthly in advance. The duration of the present contract is eight years, five of which have already expired.

By decree of May 8, 1858, importers of machinery for any manufac-

ture or industry unknown before in the Republic are guaranteed an exclusive privilege for ten years. This term may be extended by legislative enactment.

Municipal governments pay subventions only for public service, leaving the companies free to contract with private individuals in such terms as they may deem most convenient.

In addition to the points already mentioned where water could be utilized as power, responsible companies or individuals desiring to establish new industries in the country have the right to select any other place for the erection of the plant, with the privilege of extending its operations to other parts of the country. A concession would be granted permitting the use of the national waters, provided that, after generating power from the same, the waste waters be returned to the streams from which they were originally taken. In case of a joint stock company, organized for the purposes mentioned, it would have to pay to the State 2 per cent per annum of its net profits. At the expiration of the concession, the Government may grant other companies desiring to engage in the same line of business concessions equal to the original, and, all things being equal, no preference is given to any particular company.

The subsidy of 26,000 bolivianos paid by the city of La Paz to the electric light company can not, perhaps, be paid by other municipalities having smaller revenues.

CHAPTER IX.

COMMERCE, DOMESTIC AND FOREIGN—STATISTICAL DATA—CUSTOMS LAWS—TAXES.

Domestic trade.—Bolivia's domestic trade consists in the interdepartmental exchange of products, subject to the natural drawback created by the lack of rapid means of communication. There are no official statistics giving the extent and valuation of this trade. The foreign trade is subject to the provisions of certain treaties and agreements entered into with several European and American countries, and special reciprocity treaties and conventions with Peru, Chile, and Paraguay, whereby certain native products enjoy in those countries the same privileges granted by Bolivia to other products from said countries. Although there is no written law on the subject Bolivia is a free-trade State, thus affording foreign products a good market, offsetting the difficulties of transportation by the low rate of its customs tariff.

Foreign trade.—Bolivia's import and export trade is carried on through the following national customs districts and their dependencies: Villa-Bella on the north; Puerto Suarez on the east; Uyuni and La Paz on the west; Oruro in the central portion of the country, and Tarija and Tupiza on the south. There are customs agencies established at Mollendo, Arica, and Antofagasta on the Pacific coast. The Mollendo customs agency is simply an office for the dispatch of goods in transit to Bolivia, merchandise being classified and duties collected at the La Paz and Pelechuco districts. The Arica customs agency, which for a time was leased from Peru for the sum of $600,000 per annum, was in 1879 declared a free port for Bolivia, in consideration of a 40 per cent tax on the value of invoice. But in 1885, after the war, it was transferred to Chile during its occupation of the territory, it being agreed by the Treaty of Truce of 1884 that out of the total of the customs receipts 25 per cent should go to Chile for certain specified purposes, 40 per cent to be applied to the settlement of certain claims, and the remaining 35 per cent to go to Bolivia. Duties on foreign goods direct for Bolivia are collected in Chilean currency according to the Chilean tariff and no other duties are levied upon them. Foreign goods introduced in Chile through Arica and then

exported to Bolivia are assessed Chilean import duties on their introduction and deemed foreign goods for the purposes of importation into Bolivia. The customs agency of Antofagasta is a collection district. By the Treaty of Truce natural and manufactured Chilean products are admitted free of duty in Bolivia.

STATISTICAL DATA.

Bolivian official statistics date from 1895, and show the following figures for the value of imports and exports from that year to 1902:

Year.	Imports.		Exports.	
	Value.	Percentage.	Value.	Percentage.
	Bolivianos.[a]		*Bolivianos.*	
1895	13,897,404.89	39.93	20,914,140.11	60.07
1896	12,952,483.46	36.95	22,047,330.51	63.05
1897	12,457,242.25	32.65	21,990,455.24	67.35
1898	11,897,244.85	30.23	27,456,676.76	69.77
1899	12,839,961.81	31.94	27,365,746.65	68.06
1900	13,344,114.47	37.43	35,657,689.96	62.57
1901	16,953,223.75	31.08	37,578,210.97	68.92
1902	14,143,342.31	33.52	28,041,578.74	66.48

[a] On Oct. 1, 1904, the boliviano was quoted by the Director of the United States Mint at $0.422 United States currency.

These figures show the official customs valuation of the imports and exports, the actual or commercial value not being given. It is estimated, however, that the real value of these items is double the official valuation. Notwithstanding the fact that according to the preceding table exports exceed imports, the financial condition of the country is not as flourishing as it would seem, because the larger portion of the profits remain abroad, as the majority of producers are foreigners, resident in Bolivia. On the other hand, the bulk of these exports is made up of silver, tin, and rubber, the only products Bolivia can export in large quantities, while other native productions which could have a good demand in foreign markets are practically unknown. These facts must be borne in mind in order to fully understand Bolivia's position as a commercial country.

EXPORTS.

The value of exports by customs districts for the years 1900 to 1902, according to Bolivian official figures, are shown in this table:

Customs district.	1900.	1901.	1902.
	Bolivianos.	*Bolivianos.*	*Bolivianos.*
Puerto Acre	6,461,028.00	6,474,090.40	2,328,388.00
Villa-Bella	3,057,148.90	1,600,843.72	1,284,044.00
Puerto Suarez	118,753.21	212,448.15	382,284.45
Tarija	27,326.16	34,323.74	31,199.18
Tupiza	540,840.41	1,173,860.80	695,848.40
Uyuni	16,702,340.78	19,382,062.60	13,562,830.93
La Paz	2,976,563.44	2,969,501.59	3,843,054.86
Oruro	5,673,689.06	5,731,079.97	5,913,928.92
Total	35,657,689.96	37,578,210.97	28,041,578.74

The figures corresponding to Mollendo, Arica, and Antofagasta are included in the La Paz, Oruro, and Uyuni returns.

These exports are divided into five large classes in Bolivian statistics, i. e., *mining*, embracing all mining products of whatever nature exported from the country; *agriculture*, all products of the soil, including forest products; *manufactures*, all manufactured products of the country; *cattle, etc.*, embracing live stock, hides, skins, wool, bones, etc., and *miscellaneous*, such products as can not be classified among the other divisions or are not specified. For the three years before mentioned the value of exports by classes is officially given as follows:

Class.	1900.	1901.	1902.
	Bolivianos.	*Bolivianos.*	*Bolivianos.*
Mining	23,727,265.70	26,855,425.76	22,083,653.09
Agriculture	11,249,295.18	9,688,512.82	5,291,288.03
Manufactures	227,040.63	535,937.46	300,569.70
Cattle, etc	297,481.68	373,502.85	282,935.42
Miscellaneous	156,606.77	124,832.08	83,132.50
Total	35,657,689.96	37,578,210.97	28,041,578.74

The value of free and dutiable exports during the same period is officially estimated as shown in this table:

Year.	Free.	Dutiable.
	Bolivianos.	*Bolivianos.*
1900	1,512,305.55	34,145,384.41
1901	1,425,287.52	36,152,923.45
1902	1,020,191.97	27,021,386.77
Total	3,957,785.04	97,319,694.63

The value of the principal exports by articles, according to above classification for the same period, is represented in these tables:

1.—MINING.

Articles.	1900.	1901.	1902.
	Bolivianos.	*Bolivianos.*	*Bolivianos.*
Silver	13,691,267.54	14,566,660.66	10,832,700.28
Tin	8,579,539.21	9,380,714.00	8,782,703.93
Bismuth	271,702.28	1,463,088.43	303,736.06
Copper	1,025,030.22	1,112,598.90	2,059,510.10
Gold	9,821.00	21,481.28	69,759.06
Borax	50,489.37	199,279.00	.....
Antimony	24,150.68	88,404.70	17,080.00
Lead	36,378.40	13,848.99	144.00
Wolfram	33,996.50	207.00	16,461.50
Miscellaneous	4,890.50	9,142.80	1,558.16
Total	23,727,265.70	26,855,425.76	22,083,653.09

INDIAN COCA GATHERERS.

II.—AGRICULTURE.

Articles.	1900.	1901.	1902.
	Bolivianos.	*Bolivianos.*	*Bolivianos.*
Rubber	10,403,959.16	9,151,823.61	4,910,334.31
Coca	563,713.38	259,513.50	221,322.22
Cinchona	104,085.47	137,554.24	81,309.87
Coffee	157,068.16	110,236.89	61,744.37
Tobacco	5,643.43	9,028.94	9,043.36
Corn	1,062.68	6,336.46	1,770.20
Flour	4,268.57	5,838.58	3,772.60
Matico	502.00	2,046.50	55.00
Cacao	1,706.00	1,208.00	536.00
Miscellaneous	7,386.33	4,926.10	1,400.10
Total	11,249,296.18	9,688,512.82	5,291,288.03

III.—MANUFACTURES.

Footwear	3,052.00	3,049.30	.....
Manufactured copper	812.90	1,232.00	16,017.00
Vicuna bed blankets	59,323.00	37,502.50	28,438.00
Alpaca blankets	93.00	.....	3,536.00
Cigarettes	214.02	5,113.35	2,755.25
Chocolate	3,638.82	4,162.10	14,368.90
Soap	241.50	678.65	147.00
Woolen hosiery	5,125.80	6,580.00	6,145.20
Saddlery	2,628.70	9,051.00	6,969.40
Furniture	1,280.00	108.80	2,387.00
Woolen blankets	1,891.40	2,286.60	82,830.00
Ready-made clothing	4,091.60	4,108.70	.....
Hats	179.00	1,181.50	1,191.80
Leather, sole	3,546.10	11,980.80	38,156.30
Various fabrics	653.00	11,001.56	18,224.95
Wines and liquors	5,072.00	4,596.80	1,564.00
Miscellaneous	135,297.79	483,293.80	67,838.90
Total	227,040.63	535,937.46	300,569.70

IV.—CATTLE, ETC.

Hides	97,063.00	154,623.00	120,748.40
Live cattle	100,310.00	99,533.90	87,097.00
Goat skins	42,993.48	74,815.20	60,972.20
Chinchilla skins	6,892.00	22,143.00	9,129.20
Lambs' wool	18,784.00	13,717.70	1,025.00
Alpaca wool	6,893.00	3,885.00	.....
Vicuna skins	.....	2,332.00	.....
Live sheep	12,300.00	1,400.00	1,000.00
Other skins	47.00	992.65	859.00
Chalonas	2,677.50	33.00	535.00
Miscellaneous	10,521.70	27.40	1,669.62
Total	297,481.68	373,502.85	282,935.42

V.—MISCELLANEOUS.

Specie	.....	[a] 20,228.67	.....
Baggage	1,615.00	16,499.00	41,296.21
Antiquities	400.00	200.00	1,311.00
Miscellaneous	154,591.77	87,904.61	40,526.29
Total	156,606.77	124,832.08	83,132.50

[a] Pounds sterling.

The origin of these exports by departments is officially estimated as follows:

Department.	1900.	1901.	1902.
	Bolivianos.	*Bolivianos.*	*Bolivianos.*
Potosi	15,891,236.41	16,514,910.54	14,017,115.83
Oruro	9,675,298.49	9,147,982.35	5,987,953.60
La Paz	3,066,671.05	3,296,369.82	3,892,437.96
Santa Cruz	589,750.95	215,322.95	366,762.35
El Beni	369,103.10	17,232.99	97,347.10
Cochabamba	70,142.15	123,037.06	27,742.20
Chuquisaca	50,213.41	165,585.20	24,852.00
Tarija	29,171.89	22,835.94	14,935.80
Territorio de Colonias	5,916,101.51	8,074,934.12	3,612,432.00
Total	35,657,689.96	37,578,210.97	28,041,578.74

Should the total exports for 1902 be distributed among the population of Bolivia according to the latest census returns (1900), the pro rata would be at the rate of 15.43 bolivianos per capita. This proportion, however, is not accurate. as neither the uncivilized nor the civilized Indians can be counted as factors in this branch of trade, so that only the white and mestizo portions of the inhabitants (668,185) are the actual producers and exporters, the proportion being, then, 41.96 bolivianos per capita among these races, as shown in the following table:

Department.	Producing and exporting population.	Percentage.	Exports.		Exports per capita.
			Value.	Percentage.	
			Bolivianos.		*Bolivianos.*
Beni and Territorio Nacional de Colonias	13,000	2.33	3,709,779.10	12.72	285.37
Oruro	22,053	3.35	5,987,953.60	21.34	271.52
Potosi	110,872	15.11	14,017,115.83	50.55	125.06
La Paz	70,028	11.51	3,892,437.96	13.87	55.58
Santa Cruz	60,000	8.98	366,762.35	1.30	6.11
Tarija	49,783	7.46	14,935.80	.05	.30
Chuquisaca	112,683	16.87	34,852.00	.08	.23
Cochabamba	229,766	34.39	27,742.20	.09	.12
Total	668,185	100.00	28,041,578.74	100.00	41.96

Lack of own ports precludes the possibility of obtaining, in the majority of cases, accurate data in regard to the ultimate destination of Bolivian exports. For instance, goods exported to foreign markets through the port of Antofagasta are shown in the Oruro and Uyuni custom returns as "exported to Antofagasta," and as there is no record of such exports at this port the actual destination is unknown. Foreign statistics of Bolivian exports are no better in this respect, as it is a well-known fact that Bolivian products exported through Chile, Argentine, or Peru are credited to these countries instead of the actual country of origin. The following table shows the official approximate valuation of exports by countries from 1900 to 1902:

Country.	1900.	1901.	1902.
	Bolivianos.	*Bolivianos.*	*Bolivianos.*
Germany	3,969,157.30	524,750.78	3,667,676.60
Argentine	180,241.20	155,238.70	157,870.58
Belgium	96,251.40	.....	82,587.30
Brazil	3,191,678.35	6,494,076.30	2,383,058.00
Colombia	1,200.00	236.00	.....
Chile	896,241.30	794,919.65	229,288.26
United States	110,269.80	22,580.18	187,078.10
France	1,360,531.90	1,174,928.30	1,102,777.86
England	6,191,162.01	6,580,365.11	5,447,296.93
Italy	93,241.00	.....	80,161.09
Litoral or Atacama	8,561,293.70	5,576,491.24	13,918,850.58
Paraguay	4,121.10	3,875.99	2,395.40
Peru	329,195.74	331,754.66	341,422.60
Uruguay	13,183.30	8,727.38	29,766.13
Venezuela	318.60	646.00	.....
Unknown destination	10,659,602.26	15,899,618.55	411,349.31
Total	35,657,689.96	37,578,210.97	28,041,578.74

A large portion of the exports is credited in this table to the "Litoral" or Atacama region, as Antofagasta is the port to which such exports are forwarded to be ultimately shipped to foreign markets. Lack of proper declaration in shipping explains why the valuation of exports to "unknown destination" is represented by such large sums.

The export duties collected during the same years is officially estimated at the following figures:

Articles.	1900.	1901.	1902.
	Bolivianos.	*Bolivianos.*	*Bolivianos.*
Bismuth	10,085.00	13,442.83	6,242.34
Copper	54,220.88	56,086.21	80,184.45
Tin	288,423.00	397,131.68	400,826.06
Rubber	808,536.00	1,261,533.00	1,000,781.00
Gold	83.03	99.15	343.51
Silver bullion	421,540.10	404,235.67	376,147.90
Silver coin	2,624.23	13,553.26	2,669.75
Total	1,585,512.24	2,145,781.80	1,867,195.01

IMPORTS.

Imports into Bolivia consist in the main of hardware and machinery, provisions, woolens, furniture, wines, spirits and liquors, cottons, drugs, chemicals and medicines, ready-made clothing, live stock, and general merchandise. Bolivian statistics at hand for the years 1900 to 1902 do not give in detail the items making up this important branch of trade, but the official valuation of imports through the several customs districts, as represented in this table:

Custom districts.	1900.	1901.	1902.
	Bolivianos.	*Bolivianos.*	*Bolivianos.*
Puerto Acre	(a)	60,144.48	(a)
Villa Bella	268,690.00	210,765.33	84,027.30
Puerto Suarez	484,062.35	434,549.51	213,488.83
Tarija	299,404.84	478,556.24	316,004.05
Tupiza	1,038,910.60	523,137.89	664,517.58
Uyuni	919,845.10	1,071,452.39	1,388,767.13
La Paz	3,647,641.76	5,988,028.88	5,194,727.56
Oruro	270,141.20	259,905.96	305,967.12
Arica	890,250.97	865,939.78	860,906.76
Antofagasta	5,525,367.75	7,060,743.29	5,114,935.98
Total	13,344,114.47	16,953,223.75	14,143,342.31

a No data available.

The countries importing into Bolivia, according to original bills of lading and consular invoices, is shown in the following table:

Country.	1900.	1901.	1902.
	Bolivianos.	*Bolivianos.*	*Bolivianos.*
Germany	3,109,521.13	3,248,090.33	2,516,315.17
Argentina	1,028,613.93	604,802.17	755,017.46
Belgium	551,723.33	1,305,957.86	917,444.42
Brazil	2,010.00	33,799.86	48,093.83
Central America	7,763.40	.....	12,319.00
Colombia	7,685.50	.....	1,716.76
Cuba	4,294.60	4,632.10	13,118.32
Chili	666,951.60	960,921.93	805,159.15
China	15,723.66	.....	68.58
Ecuador	10,921.40	4,760.42	789.34
Spain	93,322.14	364,460.77	154,001.70
United States	815,455.07	1,674,254.57	1,091,617.23
France	777,881.10	1,912,274.54	1,100,612.08
Holland	.....	.....	231.00
India	3,205.75	1,850.60	.....
England	2,265,306.61	2,291,851.18	2,409,228.84
Italy	448,622.18	679,367.72	290,633.52
Paraguay	.....	16,588.24	10,935.00
Peru	1,710,305.09	1,543,232.84	1,293,590.94
Portugal	2,219.30	3,777.60	1,783.00
Switzerland	326.00	88.20	.....
Uruguay	4,584.06	14,618.71	17,383.66
Other countries	1,817,478.62	2,292,884.11	2,702,467.31
Total	13,344,114.47	16,953,223.75	14,143,342.31

There are no official figures showing the relative valuation of the free and dutiable imports by countries for 1900 and 1901, but the following table is the official estimate for 1902:

Country.	Dutiable.	Free.	Total.	Percentage.
	Bolivianos.	*Bolivianos.*	*Bolivianos.*	
Germany	2,141,857.89	374,457.28	2,516,315.17	1.78
England	2,189,204.86	220,023.98	2,409,228.84	1.76
Peru	569,851.12	723,739.82	1,293,590.94	.92
France	933,452.64	167,159.44	1,100,612.08	.78
United States	843,561.57	248,055.66	1,091,617.23	.77
Belgium	729,133.02	188,311.40	917,444.42	.65
Chile	195,143.10	610,016.05	805,159.15	.57
Argentina	739,182.87	15,834.59	755,017.46	.54
Italy	270,343.57	20,289.95	290,633.52	.13
Spain	125,742.61	28,259.09	154,001.70	.11
Brazil	43,973.79	6,120.04	48,093.83	.04
Uruguay	15,658.06	1,725.60	17,383.66	.01
Cuba	13,118.32	.....	13,118.32	
Central America	12,319.00	.....	12,319.00	
Paraguay	10,409.00	526.00	10,935.00	
Portugal	1,783.00	.....	1,783.00	.05
Colombia	1,716.76	.....	1,716.76	
Ecuador	789.34	.....	789.34	
Holland	231.00	.....	231.00	
China	68.58	.....	68.58	
Other countries	1,030,553.99	1,671,813.32	2,702,467.31	1.89
Total	9,866,094.09	4,277,248.22	14,143,342.31	10.00

Conditions relative to exports per capita are also applicable to the consumption of imports, the white and mestizo population, representing 36 per cent of the total number of inhabitants in 1900, being the chief consumers, as the Indian element scarcely buys foreign goods. Under these circumstances the per capita consumption is for both races 21.16 bolivianos, instead of 7.78, should the Indian population

be included as a consumer. The following table shows the per capita consumption by departments in 1902:

Department.	White and mestiza population.	Percentage.	Imports.		Consumption per capita.
			Value.	Percentage.	
			Bolivianos.		*Bolivianos.*
La Paz	70,028	11.51	5,840,408.23	41.29	83.40
Potosi	110,872	15.11	2,897,750.42	20.49	26.22
Oruro	22,053	3.35	521,193.21	3.69	24.08
Chuquisaca	112,683	16.87	2,565,491.61	18.14	22.76
Cochabamba	229,766	34.39	1,704,978.66	12.06	7.42
Beni and Territorio Nacional de Colonias	13,000	2.33	84,027.30	.58	6.46
Tarija	49,783	7.46	316,004.05	2.24	6.34
Santa Cruz	60,000	8.98	213,488.83	1.51	3.55
Total	668,185	100.00	14,143,342.81	100.00	21.16

The total customs receipts from 1900 to 1902 is officially estimated at the following figures:

Customs district.	1900.	1901.	1902.
	Bolivianos.	*Bolivianos.*	*Bolivianos.*
Villa Bella	111,973.85	70,837.39	27,286.39
Puerto Suarez	143,859.54	115,578.72	78,963.03
Tarija	123,123.87	126,969.18	119,603.57
Tupiza	12,231.58	8,776.15	8,493.97
Uyuni	87,076.51	74,780.87	78,887.32
La Paz	885,825.54	1,113,134.12	795,692.74
Oruro	34,623.87	36,341.46	21,841.79
Arica	418,190.44	488,244.77	379,441.52
Antofagasta	2,221,580.94	1,813,221.34	1,139,449.18
Total	4,038,486.14	3,847,884.00	2,649,659.51

The per capita tax for customs duties in 1902 is given at 3.66 per cent, estimating that only 36 per cent of the economic population of the country is a consumer.

Commerce in 1903.[a]—Bolivian official statistics for 1903 show in detail that in said year the trade movement of the country is represented as follows:

Customs districts.	Imports.		Exports.	
	Quantity.	Value.	Quantity.	Value.
	Kilos.	*Bolivianos.*	*Kilos.*	*Bolivianos.*
Antofagasta	15,932,237	5,980,826.36		
Arica	2,353,473	811,632.12		
La Paz	16,910,956	5,404,651.90	4,982,355	3,602,318.25
Oruro	1,845,233	352,834.48	12,486,645	8,012,544.81
Puerto Suarez	481,667	303,979.95	131,523	300,088.02
Tarija	573,698	466,787.74	200,106	28,463.34
Tupiza	142,196	661,817.03	2,639,098	1,509,845.60
Uyuni	37,414,760	2,222,390.55	48,314,939	10,936,279.58
Villa Bella	59,401	31,286.33	354,265	644,584.00
Pelechuco	38,946	16,678.84	46,575	135,024.96
Total	75,751,967	16,252,885.30	69,155,506	25,169,148.56

[a] Memoria que presenta el Ministro de Gobierno y Fomento ante el Congreso ordinario de 1904.—La Paz, 1904.

Figures for the Villa Bella customs district only cover the first half of the year.

Imports.—Imports are divided into three large groups, according to tariff, as follows:

	Quantity.	Value.
	Kilos.	*Bolivianos.*
General merchandise	71,611,744	14,757,053.17
Liquors, etc.	3,495,378	1,262,204.39
Drugs	644,845	233,627.74

These imports are subdivided into free and dutiable, showing that the amount of dutiable goods imported was 18,502,737 kilograms, valued at 9,925,243 bolivianos, and 57,349,230 kilograms free imports, valued at 6,327,642 bolivianos.

Imports by countries as compared with 1902 are represented in the following table:

Countries.	1902.	1903.	Increase.	Decrease.
	Bolivianos.	*Bolivianos.*	*Bolivianos.*	*Bolivianos.*
Germany	2,516,315.17	2,982,099.17	465,784.00	.....
Argentina	755,017.46	840,789.93	85,772.47	.....
Belgium	917,444.42	736,875.21	.....	180,569.21
Brazil	48,093.83	18,378.20	.....	29,715.33
Central America	12,319.00	2,765.00	.....	9,554.00
Colombia	1,716.76	157.60	.....	1,559.16
Cuba	13,118.32	1,088.20	.....	12,030.12
Chile	805,159.15	1,074,710.27	269,551.12	.....
China	68.58	.....	.....	68.58
Ecuador	789.34	3,868.02	3,078.68	.....
Spain	154,001.70	100,816.94	.....	53,184.76
United States	1,091,617.23	1,080,620.02	.....	10,997.21
France	1,100,612.08	463,323.62	.....	637,288.46
Holland	231.00	.....	.....	231.00
England	2,409,228.84	2,749,871.46	340,642.62	.....
Italy	290,633.52	406,107.46	115,473.94	.....
Paraguay	10,935.00	3,911.35	.....	7,023.65
Peru	1,293,390.94	3,165,266.37	1,871,875.43	.....
Portugal	1,783.00	1,118.10	.....	664.90
Uruguay	17,383.66	36,440.43	19,056.77	.....
Unknown origin	2,702,467.31	2,584,781.95	.....	117,685.36
Total	14,143,342.31	16,252,885.30	2,109,542.99	.....

The percentage of imports, by countries, was as follows:

Peru	19.48	Belgium	4.54
Germany	18.35	France	2.86
England	16.92	Italy	2.49
United States	6.65	Other countries	16.91
Chile	6.62		
Argentine	5.18	Total	100.00

The customs districts showing an increase of imports over the preceding year are, Antofagasta, 865,890.38 bolivianos; Uyuni, 833,623.42 bolivianos; La Paz and Pelechuco, 226,609.18 bolivianos; Tarija, 150,783.69 bolivianos; Puerto Suarez, 90,491.12 bolivianos; Oruro, 46,867.36 bolivianos; while a decrease was shown in the imports through

Arica, 49,274.64 bolivianos; Tupiza, 2,700.55, and Villa Bella (six months) 52,740,97 bolivianos.

Exports.—The export trade for the same year shows that the quantity and value of dutiable goods exported from Bolivia amounted to 66,189,471 kilograms, valued at 23,894,104.26 bolivianos, and 2,966,035 kilograms free goods, valued at 1,275,044.20 bolivianos.

The following table shows the share of the several departments in the export trade:

Department.	Quantity.	Value.	Percentage.
	Kilos.	*Bolivianos.*	
Potosi	50,638,701	12,137,092.18	48.32
Oruro	12,203,275	7,635,199.33	30.39
La Paz	5,100,073	3,877,821.71	15.51
Colonias Territory	354,265	644,584.00	4.24
Beni	247,049	424,571.70	
Santa Cruz	144,389	312,477.42	1.24
Tarija	394,977	85,026.34	.13
Chuquisaca	36,126	30,320.00	.09
Cochabamba	36,651	22,056.88	.08
Total	69,155,506	25,169,148.56	100.00

The destination of exports according to the customs reports were as follows:

Destination.	Quantity.	Value.	Percentage.
	Kilos.	*Bolivianos.*	
Littoral	48,627,826	11,448,699.53	45.48
England	9,844,953	6,314,783.15	25.08
Germany	3,701,895	2,553,997.49	10.14
Not specified	4,243,897	2,507,045.52	9.96
Peru	2,060,162	1,695,982.65	6.74
Argentina	328,496	198.117.14	.79
Chile	203,614	169,529.03	.67
Belgium	55,888	130,106.00	.52
Uruguay	41,043	69,275.50	.28
France	23,000	34,511.14	.14
Brazil	10,765	33,503.02	.14
United States	13,967	13,599.39	.06
Total	69,155,506	25,169,148.56	100.00

Exports by customs districts show the following figures for 1902 and 1903:

Customs district.	1902.	1903.	Increase.	Decrease.
	Bolivianos.	*Bolivianos.*	*Bolivianos.*	*Bolivianos.*
Acre	2,328,388.00	.....	.....	2,328,388.00
La Paz	3,843,054.86	3,737,343.21	.....	105,711.65
Oruro	5,913,928.92	8,012,544.81	2,098,615.89	.....
Puerto Suarez	382,284.45	300,088.02	.....	82,196.43
Tarija	31,199.18	28,463.34	.....	2,735.84
Tupiza	695,848.40	1,509,845.60	813,997.20	.....
Uyuni	13,562,830.93	10,936,279.58	.....	2,626,551.35
Villa Bella	1,284,044.00	644,584.00	.....	639,460.00
Total	28,041,578.74	25,169,148.56	.....	2,872,430.10

According to the Bolivian official source from which the foregoing table is taken, although there is apparently a decrease in exports, in reality it does not exist, as the Puerto Acre custom-house passed under Brazilian control at the beginning of the year, and the Villa Bella returns only represent the first six months of 1903. Such being the case, and estimating the Villa Bella trade during the second half of the year at the same figures quoted in the table in reference, the export trade may be said to have been stationary during 1903.

Customs receipts during the same year, as compared with 1902, show that there was an increase of 219,934.84 bolivianos, as shown in detail in this table:

Customs district.	1902.	1903.	Increase.	Decrease.
	Bolivianos.	*Bolivianos.*	*Bolivianos.*	*Bolivianos.*
Antofagasta	1,139,449.18	1,375,404.29	235,955.11	.....
La Paz and Pelechuco	795,692.74	854,020.10	58,327.36	.....
Arica	379,441.52	271,205.02	.....	108,236.50
Tarija	119,603.57	109,683.44	.....	9,920.13
Puerto Suarez	78,963.03	74,869.67	.....	4,093.36
Uyuni	78,887.32	115,198.26	36,310.94	.....
Villa Bella	27,286.39	36,968.04	9,681.65	.....
Oruro	21,841.79	24,434.56	.....	.....
Tupiza	8,493.97	7,810.97	.....	.....
Total	2,649,659.51	2,869,594.35	219,934.84	.....

TRADE WITH THE UNITED STATES.

According to data furnished the Bolivian Government by the Consul-General of Bolivia in New York, the value of the merchandise shipped from the ports of New York, San Francisco, and Philadelphia to Bolivia was in 1896, $234,012.43; in 1897, $151,524.93; in 1898, $179,206.99, and in 1899, $177,696.45. The value of the merchandise shipped from San Francisco to Bolivia in 1900 is shown in the following table:

Month.	Value.	Month.	Value.
January	$3,684.32	October	$4,014.00
February	3,704.00	November	13,763.59
April	7,584.56		
May	5,903.42	Total	49,982.31
June	11,328.42		

The value of the merchandise shipped from New York to Bolivia during the years 1900 and 1901 is as follows:

Month.	1900.	1901.	Month.	1900.	1901.
January	$19,251.69	$26,646.77	August	$41,304.06	$22,741.53
February	34,242.63	30,921.75	September	20,634.51	16,642.51
March	32,287.95	21,482.15	October	29,241.40	24,477.98
April	8,541.68	40,931.25	November	34,706.02	33,739.04
May	31,133.21	9,110.45	December	57,742.86	34,228.32
June	34,649.54	28,122.51			
July	35,754.70	19,772.66	Total	379,490.25	308,826.92

And for 1902 the following figures show the number of packages and their official valuation:

Month.	Packages.	Official value.
		Gold.
January	3,922	$41,369.72
February	1,664	10,671.29
March	4,111	25,660.56
April	1,038	10,588.38
May	1,395	20,034.26
June	1,760	18,216.38
July	1,604	36,230.81
August	1,104	22,519.94
September	298	6,586.16
October	1,034	15,088.37
November	1,333	15,389.64
December	1,143	12,029.25
Total	20,406	234,384.76

United States official figures[a] for the fiscal year 1903 give the total imports from Bolivia during that period at $1,500, and the exports to Bolivia at $49,107, as follows:

Chemicals, drugs, dyes, and medicines	$1,483
Clocks and watches, and parts of	1,592
Cotton, manufactures of	9,777
Gun powder and other explosives	119
Iron and steel, and manufactures of	20,825
All other articles	15,211
Total	49,107

CUSTOMS LAW.[b]

The Organic Customs Law of Bolivia still in force bears date of November 25, 1893, and establishes the basis of the customs legislation of the country. The principal points established by said law are the following:

All goods which may form the subject of a commercial transaction shall be admitted into the territory of the Republic, with the sole exception of articles the free circulation of which is prohibited by penal laws, public surety, and morality laws, and by regie laws affecting goods subject to monopoly.

Exportation is allowed of products of the soil and industry of the country, in any form, except live vicuñas, alpacas, and chinchillas.

To be legally considered as imported into the country, merchandise of any description must pass through a national custom-house for the

[a] Commerce and Navigation of the United States, 1903.

[b] The full text of the Organic Customs Law of Bolivia, as well as the General Customs Regulations, the General Regulations for the Application of the Valuation Tariff, and the complete Tariff are printed in the Monthly Bulletin of the International Bureau of the American Republics for January, 1903.

purpose of being examined and assessed with any customs duties chargeable thereon. The classification of goods is strictly subject to the stipulations of the tariff; no alteration can be made to the established duties, under the joint and several responsibility of the appraising officer and of the examiner, whose bond will be held liable for any under-charged difference, without prejudice to criminal proceedings.

No exemption from or reduction of duty can be granted in favor of any industry, public establishment, company, or person whatsoever, except in cases expressly authorized by laws or legislative decisions. Exemptions enjoyed by diplomatic agents are granted in accordance with the respective treaties and international usage, and are subject to the provisions of the customs regulations.

Goods admitted into custom-houses of the Republic shall remain therein under protection of the laws, and in no case, not even in the event of war with the country of which the owners, shippers, or consignees of the goods are subjects, can the goods be seized or any measures of reprisal resorted to. In no case nor under any circumstances can the goods referred to be subject to any new State or municipal taxes, beyond the duties established in the tariff under special laws or municipal orders duly sanctioned by the Senate.

Every importation shall be effected in the form prescribed by law, and the consular invoices relative to imported goods must be produced, except as otherwise specially provided for in the regulations.

Exports of products of the country, transshipments and reshipments, coasting-trade business, imports of duty-free or specially taxed goods shall all be subject to the formality of valuation and clearance in conformity with the regulations.

Metals and ores of all kinds must, prior to being exported, pay the tax applicable thereto. As to argentiferous ores, the payment of the export tax shall only be provisional. The degree of silver percentage declared by exporter shall first be taken as a basis, but on final settlement of duty he shall be required, within the time limit of one hundred and eighty days from date of export certificate, to exhibit his trade account of sales effected abroad, showing amount of silver, gold, tin, copper, or bismuth contained in the exported ore. In default of production of such accounts within the term specified, the person concerned shall be condemned to pay the duty chargeable on ore containing the most silver.

Cases of contraband and fraud shall be adjudicated upon administratively by the head of the custom-house concerned, with the assistance of the public prosecutor, but the decision of the Chief of the Customs may be referred to the Minister of Finance, whose award may be impeached in the Supreme Court, the disputed goods remaining meanwhile in the custody of the customs authorities, without prejudice to

any such common-law judgments as may be rendered in respect of other offenses committed in connection with the foregoing.

The General Customs Regulations in force contain 415 sections, and were promulgated on the 21st of January, 1901. The principal general provisions in regard to shipping and import and export trade generally are as follows:

Masters of merchant vessels shall, in exchange for a receipt, deliver to the officer charged with the inspection of the ship a general manifest of everything on board, especially showing samples, provisions, and stores of the vessel. The provisions must be in proportion with the number of the crew, and this item is not to include such articles as are not assimilable thereto nor such provisions as in the opinion of the collector of customs appear in excessive quantity. If the vessel is in ballast and has no goods to discharge in the port, the master will make a written declaration of the fact and hand the same to the inspecting officer for transmission to the customs.

The general manifest may be written in any language, made out on ordinary paper, and shall specify:

1. Place from which the ship departed, and the character, name, and nationality of the vessel.
2. Tonnage.
3. Marks, numbers and quantities, and kinds of packages; names of consignees and, as far as possible, nature of the goods contained in the packages.
4. Samples.
5. Provisions and stores on board.
6. Date of production of manifest.

Should it be impossible to furnish this document forthwith, the official in charge of the inspection shall request the master to produce it in the course of the day, and will withdraw, leaving an assistant on board in order to prevent that goods or persons be taken on board, landed, or transshipped until the production of the manifest referred to.

It shall be the duty of owners or consignees of portions of a vessel's cargo to produce itemized manifests. These documents shall be delivered to the customs authorities in duplicate, within six days from date of deposit of the general manifest or from the date when the unloading is completed, if the vessel entered the port under stress of weather. In land custom-houses this term shall run from the date on which the goods entered the custom-house.

If after the expiration of the six days the itemized manifest has not been exhibited, the defaulter shall incur a penalty of from 50 to 300 bolivianos in the judgment of the Customs Collector, without prejudice to the right of suspending the clearance of merchandise, which are the property of persons who have failed to manifest them, or, in default of such persons, of the ship's consignees.

Consignees of goods entered in the general manifest, or the persons claiming in that capacity under an indorsement on the itemized manifest, or on the lists presented shall be deemed to be the owners of the goods.

Packages declared "to order" in the general manifest, the actual addresses of which should be unknown shall be declared in detail by the consignees of the vessel. These manifests shall be accepted at the customs without any further declaration as to the contents of the packages, and at the time of clearance the real owner of the goods shall exhibit new manifests in detail to take the place of the former.

Every detailed manifest presented to the customs authorities shall be drawn up in duplicate and shall state exactly the number and kind of packages, the marks, and numbers thereon, the denomination and class of goods contained in such packages, and their classification according to tariff. No abbreviations, erasures, or alterations either in words or figures are permissible, and every manifest so presented shall be refused and the person concerned must prepare a clean and correct copy of said manifest. In case of error in the wording of the manifest, the person concerned shall report to the collector, who will order a notification to be annexed to the detailed manifest. In no case can a detailed manifest be rectified after the interested party has handed in his lists of goods.

Every detailed manifest is to be viséed by the consignee of the ship; otherwise it shall not be accepted by the customs authorities.

Should it be impossible to manifest in detail the contents of one or more packages, the person interested will apply in writing to the chief of the customs to have the goods contained in such packages examined. This application shall state the name of the transshipping vessel and also the marks, numbers, and kind of packages of merchandise. As soon as the permit has been granted, the application shall be transmitted to the examining office, so that the interested party may, in the presence of the warehouse keeper or any other customs official designated by the collector for this purpose, make the invoice under his own responsibility. The application shall then be filed with a note describing the transaction and the party interested will draw up his detailed manifest in duplicate and in the form prescribed by law. The expenses in connection with the moving of the packages subjected to examination shall be borne by the applicant.

If the same package contains goods of different kinds, this fact shall be noted in the detailed manifest in the form of "Miscellaneous goods," but in the case of inflammable articles, or liquids, the contents of the package must be declared in full.

Packages containing explosives or inflammable materials shall be declared, with their marks, numbers, and weight, together with a description of the goods contained in such packages.

It is unnecessary to declare separately packages of goods, the contents and marks of which are identical. These packages can be declared jointly, but must be cleared on the same document.

Packages containing or inclosing other parcels provided with similar or different marks or numbers may be declared jointly if required to be cleared in bulk, and separately if convenient to importer to clear them in this manner.

Should it appear that the general or detailed manifest has been altered by the owner or consignee of the goods, or that words, marks, or numbers have been erased or substituted therein, the goods contained in the package or packages so altered shall be forfeited, and the owner or consignee will thereafter be refused admission to the custom-house. If the attempt to defraud was committed by persons other than the owner or consignee of the goods, such goods shall not be forfeited, but the offender shall be liable to a fine of 500 bolivianos, and refused admission to the custom-house.

By *samples* is meant parts of fabrics or other merchandise of no commercial value. Samples shall also include articles completely manufactured and having a commercial value when imported in reasonable quantities, should it be clearly proved that the sample is only intended to advertise the quality of the goods. Samples may be landed immediately after production of the general manifest. They can also be cleared prior to the delivery of the detailed manifest, if entered in the general manifest. After the detailed manifest has been delivered, and the goods or packages containing the samples have been found specified therein, the samples shall be treated like any other goods.

Applications for clearance of samples shall be filed at the custom-house on a form made out in triplicate. As to samples of no value, it will be sufficient to declare them as "*samples of no value.*" If, however, the samples are liable to duty, the marks, numbers, and contents of each package shall be stated. It will be unnecessary, however, to enter the number of the different samples, which duty devolves upon the examining officer superintending the clearance and valuation of the goods. If, under the designation of "samples of no value," there should be packages containing articles having a commercial value and being of a kind different to that provided, such samples shall be liable to double the duty.

Appraising officers shall only classify as samples such goods as unquestionably have the character of samples. Samples of goods stored in customs warehouses can only be taken once. In order to be allowed to draw samples, an application must be made to the collector, who, after granting his permit, will transmit the application to the appraiser's office. The appraiser, who is to be present at the withdrawal of the samples, will fix the duty chargeable thereon and the warehouse keeper will note the condition of the packages after the sampling.

The application shall be subsequently delivered to the liquidating office, and the controlling department will affix the corresponding note to the detailed manifest. The expenses incurred in moving the packages shall be borne by the applicant.

Owners of goods are permitted to examine same at the customs warehouses, either with the view of showing to their buyers articles of which they can not or do not wish to take samples, or for some other reason. Persons wishing to do so shall make application to the collector to that effect.

By baggage or luggage is understood wearing apparel, boots and shoes, jewelry, and other articles of personal use, including printed books, in a quantity proportioned to the importer's station in life, exclusive of furniture and household utensils of foreign origin, even if used. Baggage shall not be landed until after the captain of the vessel has delivered the general manifest of his cargo.

Any parcel of baggage must be submitted to examination on entry. Prior to clearance the owner shall be called upon to declare the contents, and if found to contain dutiable articles they shall be entered in the corresponding list. If, however, after examination, articles not declared should be detected, which can not be considered as articles of personal use, they shall be seized.

Baggage of diplomatic agents accredited to the Government of the Republic, as well as of foreign public ministers of any power crossing the Bolivian territory, and of ministers of the Republic returning to the Republic after completing their mission abroad, shall be exempt from customs examination and other formalities prescribed by these regulations.

Foreign diplomats may, on arrival in Bolivia, and during their stay in the Republic, import free of duty for their personal use and consumption all kinds of articles, after first complying with the customs formalities.

Foreign goods imported for consumption in the country shall pay at the custom-house of entry, and in the form prescribed by the regulations, such import duties as are fixed in the tariff.

The following goods, when entered for consumption, shall be admitted free of duty, viz:

1. Articles included in the free list of the import tariff in force, also the articles covered by the law of December 12, 1900.

2. Products the growth of Chile, as well as articles manufactured therefrom, upon proof of their origin and identity being furnished. (Article 5 of armistice signed with Chile on April 4, 1884, and article 7 of additional protocol of May 30, 1885.)

3. Products of the soil and industry of Peru in accordance with the special provisions governing their importation.

GOVERNMENT PALACE, SUCRE.

4. Personal baggage within the meaning of the regulations.

5. Articles intended for personal use of diplomatic agents.

6. Articles belonging to Bolivian ministers on their return from their mission.

7. Articles for State use and service subject to the previous orders of the Government.

To secure importation into the Republic of goods from countries not included in any special provision of the customs regulations it will be necessary to prepare four copies of an invoice, certified by the Bolivian consul in the port of shipment of the goods. This invoice shall specify the name of the shipper, port of shipment, the Bolivian custom-house to which the goods are consigned; name of consignee in the Bolivian port of discharge or in a foreign port in case of transit; name of persons in Bolivia ordering goods; the marks, numbers, quantities, and kinds of packages, quantity and kind of goods contained therein, their weight, total value of invoice, and date of entry, and the signature of the shipper.

The consul will immediately forward the first copy of the invoice to the custom-house of destination, under sealed cover; the second copy he will forward to the Minister of Finance, the third to be returned to the shipper, and he shall file the fourth in his archives as voucher.

Consular offices will supply printed blanks for the invoices at the rate of 10 *centimes* of a *franc*, or equivalent thereof in other currency, per copy.

For the purpose of verifying invoices submitted for legalization consuls will in all cases require the production of the corresponding invoices of the factories or venders. In the event of these documents not agreeing, they will refuse to legalize them.

Invoices of foreign goods destined to Bolivia will not be considered as genuine, and shall be of no legal value, when it is proved that they have not been presented to the consul of the Republic in the port of shipment and have not been certified by him. In such case the merchandise shall be deemed imported without consular invoice.

If the goods to be imported come from ports where there is no Bolivian consul to certify the invoices, importation may be made without this formality, but the legalization fees shall be charged at the Bolivian custom-house of destination.

Consuls are not allowed to legalize invoices relating to packages directed to different custom-houses of the Republic.

The consular fee for certifying invoices shall be at the rate of 1 per cent of the amount of the value of the same.

Goods imported without consular invoice shall be charged double duty.

Importers of foreign goods shall forward said goods by the roads

indicated to them to the customs station nearest to the custom-house of destination. Goods shall be seized if found outside the roads so designated or if imported without having passed a customs post at the corresponding frontier.

Products of the soil or industry of Bolivia, goods upon which customs duties have been paid and foreign merchandise in transit exported overland must be accompanied by a pass issued by the respective custom-house. This pass shall be issued in triplicate, and show the route adopted for export, the marks, numbers, quantity, and kind of packages, as well as the kind, quantity, and class of goods or articles contained in each package.

Goods paying export duties, and foreign-transit goods must leave the country via the same routes and roads as were assigned for their importation. Goods found to be outside of the routes or not accompanied by the required pass or way bill shall be seized.

Fruits, metals, ores, and other native products and also nationalized goods or goods upon which customs duties have been paid may be freely transported from one point of the Republic to another without any formality beyond obtaining a customs pass, which shall be issued free of charge and is intended to serve for the carrier to show which is the place of origin and that of the destination of the goods.

Trade between ports of the Republic may be carried on by any vessel whatsoever, and it shall be lawful—

(1) To transport from a principal port to another of the same class and to import through a principal port all nonprohibited merchandise.

(2) To convey from a principal to a secondary port and import through the latter domestic or nationalized goods.

(3) To transport from a secondary to a principal port or from one to secondary port to another all domestic or nationalized goods.

CUSTOMS DUTIES.

The general regulations for the application of the valuation tariff, promulgated November 28, 1900, which entered into operation January 1, 1901, are in substance as follows:

1. The tariff only includes ordinary and standard types of merchandise; goods appearing to be of materially lower or higher quality than the generality, or imported in receptacles of higher quality than those generally in use, shall be appraised in accordance with the provisions of article 15 of the regulations.

2. In every case where the valuation of a tissue is based on the number of threads, the latter shall be reckoned, by means of the thread counter, in a square of 6 millimeters per side.

3. If the length, width, or surface of goods exceeds the maximum or is less than the minimum fixed in the tariff, such goods shall be

assessed by taking the dimensions as a basis. But when the maximum only is mentioned the assessment shall be made on this latter basis.

4. By "gross weight" is understood the weight of the package as made up for transporting the goods. Appraisement by gross weight shall also be adopted in the case of goods generally conveyed loose, in bulk, or bound together in bundles.

5. The expression "including packages" applies to goods appraised according to their actual weight, together with the weight of containers and packages in which they are inclosed or wrapped, but not including barrels, casks, cases of wood, tin, or sheet iron, with the cross pieces and outside packing cloth necessary for transportation. This rule shall not be applicable to goods for which the mode of weighing has been expressly stipulated in the tariff.

Should goods dutiable including the weight of packages be imported loose, in bulk, or fastened together in bundles, they shall be appraised according to their net weight.

6. "Net weight including receptacles" means the weight of the goods including the receptacle containing them, and attached to the goods even if only used for safe transportation.

7. Merchandise for which the tariff does not expressly stipulate another mode of weighing shall be appraised by its net weight.

8. When goods dutiable on their gross weight are imported in the same package with other goods assessed or classified under some other rule, the weight of the goods, including interior receptacles and packages, shall be increased by 30 per cent if imported in boxes and by 6 per cent if imported in bales; save that in both cases the exterior receptacle referred to in article 5 shall not be taken into consideration.

9. Fractions of a *centavo* amounting to 50 *centimos* and over shall be considered as a full *centavo* and fractions of less than 50 *centimos* shall be disregarded.

10. The denomination appearing at the head of each group consisting of one or more subdivisions shall be deemed repeated at the commencement of each subdivision.

The expressions "the same" or "as above" which are frequently omitted in the different subdivisions of an item shall be also sufficiently understood and indicated by the denomination appearing at the head of each group.

11. For "unfinished and untrimmed hats" shall be understood hats which are not provided with linings, ribbons, etc., notwithstanding that they may have been ironed; this expression shall embrace hats furnished with a gauze or paper wrapper for the sole purpose of protecting them from damage.

12. In the tariff, "common metal" shall be held to be any metal except gold, silver, or platinum.

13. The threads or material of which tissues are composed shall be considered as of higher or lower appraisement, according to the following order:

1. Silk.
2. Wool or hair.
3. Linen.
4. Cotton or ramie.
5. Hemp, jute, and other vegetable fibers.

14. By "warp" must be understood the joint number of threads and filaments which form the length of the tissue, and by "weft" or "woof" the joint threads or filaments crossing the warp.

15. Articles subject to "appraisement" and "not specified in the tariff" shall be appraised at the custom-house according to their wholesale price. In order to arrive at this estimate the original invoice shall be referred to and its amount increased by 20 per cent for freight and other charges affecting the goods from market of origin, provided these incidental expenses have not already been charged in the invoice. In default of the original invoice, or in case of doubt as to the genuineness thereof, the goods shall be appraised by taking for basis the wholesale price of the article on the nearest market to the custom-house, subject to a deduction of 30 per cent.

TAXES.

According to law no compulsory taxes exist in the country, except when duly established by the legislative power. Municipal taxes are obligatory only when duly approved by the Senate. Taxes affecting commerce are of two kinds, national and local, the former being collected by the State through the respective customs districts, and the latter by the respective department or municipality, either through the custom-house or through special bureaus created for that purpose.

Import taxes.—Import taxes are national, departmental, and municipal. The national taxes on imports are such fees as are collected on the value of consular invoices, payable at the Bolivian consulate at the port of shipping, and from 10 to 40 per cent *ad valorem* payable at the custom-house upon importation of foreign goods into the country, according to the tariff. According to the consular law now in force fees charged by consuls for the certification of shipping documents to Bolivia are as follows:

1°. For legalization of the manifest of the cargo of a ship, 2 cents for every ton over the net tonnage; the tonnage shall be estimated according to the laws of the different countries.

2°. For registration of consular invoices, 2 bolivianos when the amount of the invoice does not exceed 200 bolivianos. Invoices for higher values shall be paid at the rate of 1½ per cent, estimated in the money of the country where they are made.

There shall be no charge on invoices relating to the importation of gold coin in Bolivia.

3°. For viséing certificates of the merchandises in transit, 2 bolivianos.

Certain articles, such as spirits, wines, liquors, tobacco, and sugar, are subject to an additional octroi tax (*estanco*) ranging from 0.30 to 10 bolivianos, according to tariff. Warehouse dues are from 5 cents per package weighing up to 30 kilograms, to 1 boliviano for packages weighing from 581 to 610 kilograms. Foreign and domestic merchandise are subject to both departmental and municipal taxes, according to the respective tariffs, besides a tax of 10 cents per metric quintal (46 kilograms) on all foreign merchandise, except as specified.

Export taxes.—Bolivian products subject to export tax are given in the following list:

Product.	Export tax.
	Bolivianos.
Bismuth.....per metric quintal..	5.00
Copper (manufactures).....do....	1.00
Copper ore.....do....	.01
Tin in bars.....do....	1.60
Tin barrilla.....do....	1.00
Rubber, exported through the Acre customs district.....per cent..	15.00
Rubber, exported through other customs districts.....do....	8.00
Gold, bars or dust.....per ounce..	.20
Silver, bars or ore.....per marco..	.08
Silver coins.....per cent[a]..	3.00

[a] By act of Congress, 1903, this tax has been increased to 6 per cent.

Departmental and municipal taxes are also levied on exports according to the tariff.

Commercial travelers.—Commercial travelers are required to pay a license tax at the capital of every department, such license being only valid within the respective department. This license tax varies according to departments and the class of goods carried as samples.

CHAPTER X.

FINANCIAL ORGANIZATION—REVENUES, BUDGET—DEBT.

Bolivia's finances, both as regards its resources and administration, have undergone a radical change from colonial times, when mining was the only source of revenue to the State. In 1800 the total revenues of the country were estimated at $2,304,060, collected both in cash and in goods. Decrease in mining and the war of independence produced a heavy depression in the finances of the country, until the development of the cinchona bark industry gave a new source of revenue to the State.

In 1826, when the Republic was formally established, the first budget amounted to $2,349,763, and in 1850 revenues were estimated at $2,093,016, and expenditures at $1,919,984, leaving a balance of nearly $200,000. After this there came a crisis in the mining and cinchona industries, crippling the financial conditions of the country, which have been slowly improving of late years.

Revenues in Bolivia are divided into three classes—national, departmental, and municipal.

National revenues.—The national revenues consist in the main in the fees charged for consular invoices, customs duties, octroi or excise tax on alcohol and other spirits; taxes on mining products, rubber, stock companies, mortgages, mining claims, and rubber claims (*estradas gomeras*); stamped paper, revenue and postage stamps, telegraph, and other minor dues.

According to official figures national revenues from 1890 to 1902 have yielded the following sums:

	Bolivianos.		Bolivianos.
1890	3,624,200.00	1897	5,564,350.00
1891	3,321,280.00	1898	5,194,509.50
1892	3,860,823.00	1899	5,939,580.50
1893	4,153,823.00	1900	6,462,931.53
1894	4,211,599.00	1901	6,434,925.34
1895	4,115,700.00	1902	5,969,652.73
1896	4,434,312.10		

The State's property consists in public lands, forests, mines of all kinds, and real property called fiscal property, valued at 10,468,906 bolivianos. Part of this, over 5,000,000 bolivianos, is national property, over 3,000,000 municipal, and the balance departmental property.

Customs.—The customs revenues for 1902 amounted to 4,383,000 bolivianos, as follows:

	Bolivianos.		Bolivianos.
La Paz	1,280,000	Oruro	30,000
Pelechuco	20,000	Tupiza	12,000
Puerto Suarez	140,000	Customs agency in Antofagasta	2,050,000
Villa Bella	100,000	Custom agency in Arica	450,000
Tarija	120,000	Total	4,383,000
Storage at Tarija	1,000		
Acre	100,000		
Uyuni	80,000		

Tolls.—Bridge and road tolls, 50,000 bolivianos.

Excise or octroi.—Alcohol and other spirits. The revenues produced by this branch of the service amounted to 605,000 bolivianos. The octroi or monopoly for the sale of alcohol and other spirits was under direct Governmental supervision until 1900, when it was sold to private parties. The grantee pays the State 8 bolivianos per can of spirits imported weighing 1 quintal. Alcohol and spirits are sold from 20 to 25 bolivianos per can of 6 gallons, of alcohol 40° Cartier, net weight 23 kilograms.

Exports.—Revenues through this branch of the service for 1902 amounted to 2,285,150 bolivianos (direct collections), as follows:

	Bolivianos.
Silver ore and bullion	500,000
Tin	500,000
Copper	80,000
Bismuth	10,000
Silver coin	5,000
Gold	150
Rubber:	
Acre customs district	1,000,000
Purus customs district	30,000
Villa-Bella customs district	160,000
Total	2,285,150
Miscellaneous revenue:	
Consular invoices	180,000
Grants of rubber lots	50,000
Stock companies and mining companies	120,000
Tax on mortgages	45,000
Trade-marks	200
Mint	110,000
State telegraphs	60,000

Miscellaneous revenue—Continued.	Bolivianos.
Post-office boxes	8,000
Postage stamps	120,000
Stamped paper and revenue stamps	20,000
Subsidy from the departmental treasury of La Paz for the construction of the Guaqui and La Paz Railroad	70,000
Total	783,200
Contingent and extraordinary receipts:	
Increase on the storage dues at La Paz custom district for the construction of a railway and for other purposes	20,000
Extraordinary receipts	16,000
Coinage of nickel money	500,000
Oruro Railroad	6,000
Coinage of nickel for the National Territory of Colonies and Beni Department	500,000
Total	1,042,000

The sum total of these different sources of revenue amounts to 9,148,350 bolivianos for 1902.

Departmental revenues.—These revenues are made up of taxes and real estate property. The valuation of departmental property is estimated at 1,021,430 bolivianos. The other sources of revenue are several kinds of taxes and other contributions, amounting in 1902 to 2,395,602.97 bolivianos, as shown in this table:

Department.	Valuation.
	Bolivianos.
Chuquisaca	236,869.22
La Paz	754,652.84
Cochabamba	278,259.60
Potosí	444,864.91
Oruro	217,608.40
Tarija	104,080.00
Santa Cruz	180,692.00
El Beni	178,000.00
Total	2,395,602.97

The several departmental sources of revenue are excise tax, rural land tax, Indian Territorial tax, tithe, university degrees and fees, indirect succession, export and import tax, stamped paper and revenue stamps, fines, mining grants, tolls, national subsidies, and several minor taxes.

Municipal revenues.—The revenues of the municipalities consist in the tax on lighting, lease of municipal properties, cemetery dues, personal taxes, ground rents (censos), tax on hides and skins, tax on articles of consumption, market stalls, city land tax, fines, industrial, commercial, and professional taxes, tolls, sale of public lands, and other minor dues. Municipal revenues for 1902 were estimated at 2,317,669.88 bolivianos, and the expenditures at 2,379,179.88, showing a deficit of 61,510 bolivianos.

NATIONAL BUDGET.

The fiscal revenues of the country have suffered a serious drawback since 1902, due in part to the enormous rate of exchange with Europe and the United States, and in part to the heavy decrease in custom revenues because of the depreciation of Bolivian currency in foreign markets.

The national budget for the fiscal year 1903 estimates the revenues at 7,013,350 bolivianos and the expenditures at 7,461,860.91, a deficit of 448,510.91 bolivianos. The budget in detail is as follows:

ESTIMATED RECEIPTS.

	Bolivianos.
Customs:	
Import duties	3,512,000.00
Export duties (silver, tin, copper, gold, bismuth, rubber)	1,881,150.00
Taxes:	
Spirits, toll, consular invoices, stock companies, trade-marks, mortgages, etc	995,200.00
Miscellaneous:	
Railways, telegraphs, mails, rubber claims, and other sources	625,000.00
Total	7,013,350.00

EXPENDITURES.

Legislative service	165,564.00
Foreign Relations and Worship	527,251.51
Government and Justice	647,054.00
Finance and Industry	1,419,513.00
Improvements and Instruction	925,040.00
War	2,366,866.40
Colonization	1,410,572.00
Total	7,461,860.91

The budget for 1904 has been estimated at 7,241,700 bolivianos for revenues and 9,126,295 for expenditures.

DEBT.

The financial obligations of the Republic are of two classes—the internal and the external or foreign debt.

Internal debt.—This debt covers the following obligations:

First series. Debt contracted during the war of independence, called "Deuda Patriotica Española."

Second series. Annual accumulated dues arising from contracts and loans made by the Republic during Melgarejo's administration.

Third series. Refund of the value of certain lands sold, such sale being made void by the Assembly in 1871.

Fourth series. Indemnification for damages to property during the civil wars.

Fifth series. Obligations entered into by the Government during the war of the Pacific.

Sixth series. "Deuda consolidada," under which name are included various obligations dating prior to 1840.

The amount of these obligations acknowledged by the State up to 1899 was 3,934,250.57 bolivianos, as follows:

	Bolivianos.
First series—Spanish war debt	611,190.87
Second series—Accumulated dues	1,564,226.02
Third series—Refund of land values	528,888.42
Fourth series—Indemnities	336,335.03
Fifth series—War loan	763,391.17
Sixth series—Consolidated debt	130,219.06
Total	3,934,250.57

The State's assets, arising from debts due the national and departmental treasuries, post-offices, mint, and other public institutions are estimated at 2,000,000 bolivianos, out of which sum only 817,593 bolivianos has been duly acknowledged.

By decree of May 16, 1903, the Government of Bolivia ordered the issuance of treasury scrip, for circulation in Colonias Territory and the department of Beni, to the amount of 1,000,000 bolivianos. This scrip will be issued from time to time in such amounts as may be required, in denominations of 50 cents, 1, 5, 10, and 20 bolivianos, and is receivable in all the Government and custom-house offices in the northeastern portion of the Republic and the department of Beni. The gradual withdrawal and amortization of this scrip is provided for by applying 10 per cent of the customs receipts of the Territory of Colonias and the department of Beni for this purpose.

The National Bureau of Public Credit at La Paz is in charge of all matters connected with the internal debt of the country.

Foreign debt.—This debt covers the following obligations recognized by the Government in favor of Chilean citizens, as indemnity for damages sustained during the war of 1879, for seizure of their property:

	Bolivianos.
Compañia Huanchaca de Bolivia	2,207,032.56
Compañia Corocoro de Bolivia	2,818,000.00
Compañia Minera de Oruro	286,956.50
Bondholders of the Chilean loan (1867)	1,238,841.60
Total	6,550,830.66

To the payment of these obligations, which are the only recognized foreign debt of Bolivia, 40 per cent of the product of the Arica custom-house revenue is devoted exclusively in conformity with the stipulations of the Treaty of Truce made with Chile. The amount paid from 1885 to 1903 was $6,042,453.10 Chilean currency.

CHAPTER XI.

BANKING AND CURRENCY—BANKS—COMMERCIAL INSTITUTIONS—EXCHANGE.

The banking and commercial institutions of Bolivia are all in good standing, and substantially established in the principal cities of the Republic. Conditions governing exchange, however, are such that prompt foreign payments are frequently difficult, long credits being the prevailing rule, as in the case of other South American countries. The best system is the use of bills of exchange or better still letters of credit on London, which not only facilitate transactions, but also relieves the Bolivian purchaser of unnecessary additional expense in settling his foreign credits.

Currency.—Prior to 1856 there were five classes of gold coins made at the National Mint, ranging in value from $17.80 to $1.10. These coins, however, do not exist at present as a token of exchange. Bolivian currency is on a silver basis, the legal unit being the silver boliviano, worth 100 centavos, weighing 25 grams, 900 fine. At par it is equivalent to 5 francs. This coin is now practically out of circulation, the only fractional silver pieces used being the 50, 20, 10, and 5 centavos.

Silver coinage.

Coin.	Value.	Weight.	Fineness.	Pure silver.
	Centavos.	*Grams.*		*Grams.*
Boliviano	100	25.00	0.900	347,220
Medio boliviano	50	12.50	.900	178,670
Peseta	20	5.00	.900	62,500
Real	10	2.50	.900	29,444
Medio real	5	1.25	.900	14,722

The value of the silver boliviano is subject to fluctuation, and on the average is equivalent to 40 cents United States currency. The latest official quotation of the Treasury Department, October 1, 1904, assigns the boliviano a value of $0.42.

Other subsidiary coins are made of nickel and copper, in 5 and 10 centavos pieces of the former and 1 and 2 centavos copper pieces. The

only legal currency of the country, according to law, is that lawfully issued by the State, except the pound sterling, which has been admitted as such since 1895 in payments not exceeding 2,000 bolivianos, at the London rate of the price of silver, plus a premium to be fixed by the Chamber of Commerce.

Coinage.—The amount of money coined and placed in circulation by Bolivia from 1890 to 1899 is officially quoted at the following figures:

	Bolivianos.		Bolivianos.
1890	887,390.79	1895	1,744,210.45
1891	1,473,048.80	1896	1,508,087.60
1892	1,518,480.00	1897	1,189,282.20
1893	1,678,320.00	1898	1,650,535.80
1894	1,286,371.55	1899	1,839,442.62

For the ten years 1892–1903 the operations at the mint are shown in this table:

Year.	Silver redeemed.	Expenses.	Coinage.	Profit.	Loss.
	Bolivianos.	*Bolivianos.*	*Bolivianos.*	*Bolivianos.*	*Bolivianos.*
1892	1,437,916.07	96,648.00	1,518,480.00		16,084.07
1893	1,575,586.32	63,385.96	1,678,320.00	39,347.72	
1894	1,206,096.79	64,838.57	1,286,371.55	15,436.19	
1895	1,575,645.87	72,732.42	1,744,210.43	95,832.16	
1896	1,447,772.40	70,650.06	1,508,087.60	10,379.24	
1897	1,132,544.18	67,392.37	1,189,282.20		10,854.35
1898	1,198,064.07	75,650.20	1,369,135.59	95,421.32	
1899	1,783,081.39	73,691.84	1,839,442.62	27,669.39	
1900	1,688,008.68	76,880.00	1,881,024.68	116,136.00	
1901	953,002.00	30,474.00	885,820.84		
1902	881,410.61	66,911.84	766,480.00		
1903	866,595.42	23,711.22	881,176.00		

For the first five months of the calendar year 1904 the figures are 307,413.21 bolivianos for silver redeemed, at an expense of 8,865.37 bolivianos, the coinage amounting to 282,137 bolivianos.

Bank notes.—Bank notes are issued by four institutions in the country, the face value of the bills being 1, 5, 10, 20, 50, and 100 bolivianos, at par with silver. On the 30th of June, 1903, the amount of notes in circulation was officially estimated at 9,144,254 bolivianos, the following being the banks of issue:

	Bolivianos.
Banco Nacional de Bolivia	4,208,554
Banco Francisco Argandoña	3,145,700
Banco Industrial de La Paz	1,040,000
Banco del Comercio, Oruro	750,000
Total	9,144,254

CATHEDRAL, SUCRE.

BANKS.

The following is a list of the principal banking institutions of Bolivia:

Name.	When established.	Legal residence.	Business.	Authorized capital.	Paid up capital.
				Bolivianos.	*Bolivianos.*
Crédito Hipotecario de Bolivia.	1870	La Paz	Mortgages and loans	1,600,000.00	102,428.70
Banco Nacional de Bolivia.	1871	Sucre	Issue, loans, deposits, and discounts.	4,500,000.00	3,000,000.00
Banco Hipotecario Garantizador de Valores.	1887	do	Mortgage bonds	1,000,000.00	100,000.00
Banco Hipotecario Nacional.	1890	Cochabamba	do	1,800,000.00	100,000.00
Banco Francisco Argandoña.	1893	Sucre	Issue, loans, deposits, and discounts.	4,000,000.00 2,000,000.00	2,200,000.00 800,000.00
Banco Industrial de La Paz.	1899	La Paz	Issues, loans, and deposits.		
El Ahorro del Hogar	1900	do	Issue of cumulative bonds, loans, deposits, and discounts.	200,000.00	50,000.00
Banco del Comercio de Oruro.	1900	Oruro	Issue, loans, deposits, and discounts.	2,000,000.00	500,000.00
Banco Agrícola	1903	La Paz	do	2,000,000.00	500,000.00

Crédito Hipotecario de Bolivia.—This bank was legally established in 1870 with a capital of 1,000,000 bolivianos in stock—of which 100,000 bolivianos had been paid up—and a reserve fund of 20,000 bolivianos. During the first six months of 1903 the bank made 32 loans to the amount of 165,700 bolivianos, or 2,097 loans since its foundation to the value of 12,613,100 bolivianos. The value of the mortgage bonds in circulation was at the time 4,054,500 bolivianos.

Banco Nacional de Bolivia.—The first bank of issue established in Bolivia was the "Banco Boliviano," which in 1871 transferred all its rights and privileges under its charter to the present Banco Nacional. The cash capital of this bank in 1903 amounted to 3,000,000 bolivianos, its reserve fund being 145,845, and its emergency fund of over 5,000. The net profits of the Banco Nacional during the first six months of 1903 is estimated at 157,900 bolivianos.

Banco Hipotecario Garantizador de Valores.—This banking institution, founded in 1887, has an authorized capital of 1,000,000 bolivianos, its paid up capital being 100,000 bolivianos and a reserve fund of 122,738 bolivianos. The net profits of this bank during the first six months in 1903 are estimated at 12,828 bolivianos.

Banco Hipotecario Nacional.—This bank, originally established at La Paz in 1890, transferred its legal residence to Cochabamba in 1903. Its nominal capital amounts to 1,800,000 bolivianos, out of which 100,000 bolivianos have been paid up. Its reserve and guaranty fund amounts to 17,918 bolivianos.

Banco Francisco Argandoña.—Has an authorized capital of 4,000,000 bolivianos, over one-half of which has been paid up. Reserve fund in cash, £50,000. Net profits during the first six months 1905, 126,000 bolivianos.

Banco Industrial de La Paz.—Established in 1899. Nominal capital, 2,000,000 bolivianos; paid up capital, 800,000 bolivianos. Profits during first six months in 1903, 81,658 bolivianos.

El Ahorro del Hogar.—Savings bank established in 1900 with an authorized capital of 200,000 bolivianos, of which 50,000 bolivianos were paid up. Profits during the first six months 1903, 5,900 bolivianos.

Banco Agrícola.—Bank of issue established by act of November, 1902. Paid up capital, 500,000 bolivianos, with the right of increase to 2,000,000 bolivianos.

All these banks have offices at the capitals of the Departments. The banking law in force was enacted September 30, 1890.

Commercial institutions.—The principal commercial institutions in the country are the chambers of commerce in La Paz, Sucre, Oruro, and Tarija, the Board of Trade and Industry of La Paz, and the Cochabamba Board of Trade.

Insurance companies.—There are several agencies in the Republic.

Rate of exchange.—The fixed rate of exchange used by the Department of Finance of Bolivia in making estimates is the following since 1901:

	Bolivianos.
Dollar	= 2.40
Pound sterling	=11.40
Franc, lira, or peseta	= .45
Reichsmark	= .57

These quotations are on the basis of 21 pence per boliviano. The fluctuation on exchange at La Paz on London and Paris during 1902, has waved between 16 and 18 pence on London and 1.71 to 1.93 francs on Paris.

CHAPTER XII.

MEANS OF COMMUNICATION—INTERIOR COMMUNICATION—LAND AND WATER WAYS—RAILROADS—COMMUNICATION WITH FOREIGN COUNTRIES—MAIL, TELEGRAPH, AND TELEPHONE SERVICE.

As Bolivia is an inland or Mediterranean country, possessing peculiar topographical features, its domestic and foreign traffic has to traverse long distances, precipitous mountains, and arid plains to reach either its destination within the territory or any of the outlets leading to the outside markets of the world. Mountain passes or bridle paths, wagon roads or highways, waterways and railroads are the channels of traffic through which Bolivia carries its home and foreign trade.

INTERIOR COMMUNICATIONS.

Highways.—Public highways in Bolivia are either national or municipal property, the former being built and maintained by the Government from appropriations made by Congress, and the latter being built and maintained under municipal control. The topography of the country is such as to admit few wagon roads east of the plateau in western Bolivia. The most expensive of the national roads, both as regards cost of construction and maintenance, are those built by Indian labor, in the highest sections of the Andean Range, for the sole use of pack trains. The amount of traffic carried on on mule back or on the backs of llamas and donkeys over these precipitous, narrow, winding paths is very valuable, according to Bolivian authorities. There being no statistics on the subject no accurate estimation can be made of its importance. The industry is exclusively in the hands of the Indians, who take such good care of the freight intrusted to them that rarely, if ever, there is a cause of complaint for the loss by breakage, even of the finest crystal ware, after one of those long and tedious journeys.

In such sections of the country where there are neither railroads nor navigable rivers bridle paths are found skirting the mountains, crossing the valleys, using the dried-up beds of creeks and other streams, and connecting the principal towns of the several departments. These roads are provided by the Nation with sheltered places called "postas," built at the end of a day's journey, where travelers

may rest. There is no charge for the use of the place, and only a nominal price is collected for food for men and mules. Fresh mounts for hire are always found at these *postas*, to be left at the next station, where fresh mules can be had. The State's charge for this service is invariably 20 cents of boliviano for each mule per league (3 miles) and 10 cents for the guide or *postillón* per league also. These guides are remarkable for their endurance, always walking before the traveler, chewing coca leaves, and making from 80 to 90 kilometers a day over such rough and difficult roads.

Bolivian roads as a rule connect the principal cities with the adjacent towns and settlements, and for the most part are well built and kept in good condition.

The following table shows the distance covered in kilometers by the roads connecting the several departmental capitals:

Capital.	Trinidad.	Cochabamba.	La Paz.	Oruro.	Santa Cruz.	Cobija.	Tarija.	Potosi.
Sucre	1,742	360	688	415	688	935	448	160
Potosi	1,903	522	632	360	850	790	455	.....
Tarija	2,231	850	1,088	816	1,176	980	.....	455
Cobija	2,505	1,125	1,165	920	1,555	.....	980	790
Santa Cruz	1,055	660	1,160	888	.....	1,555	1,176	850
Oruro	1,942	227	272	.....	888	920	816	360
La Paz	2,214	500	.....	272	1,160	1,165	1,088	632
Cochabamba	1,715	.....	500	227	660	1,125	850	522
Trinidad	.....	1,715	2,214	1,942	1,055	2,505	2,231	1,903

Wagon roads.—The topographical conditions of the country make it almost impossible to build a net of wagon roads connecting all the departments among themselves. The few wagon roads open to traffic are only serviceable during eight months in the year, as the rainy season makes traffic almost impossible. To build these roads in a more substantial manner would be as expensive as the building of a railway, and would not give the same results.

The most important wagon roads in the country are the following:

La Paz to Oruro.—Over this road, 273 kilometers in extent, there is a regular stage line for the conveyance of passengers between the two cities. The trip is made in two days, leaving La Paz at 6.30 a. m. on schedule days, Sicasica, intermediate station 150 kilometers distant from La Paz, is reached at 5.30 p. m. the same day. The stage leaves next morning at 6 a. m. and reaches Oruro at 6 in the evening. The same itinerary applies to the return trip. There is a fixed tariff for the price of seats in the stage coaches and for freight. The concession for this line lapses on December 31, 1905. The Government has a rebate of 50 per cent on freights and passages.

La Paz to Corocoro.—Distance, 114 kilometers. A stage line makes regular trips between the two cities. Time consumed in the journey, twelve hours. There is a regular freight and passenger tariff estab-

lished for the service. The same company owns a freight line to Nacazara for the transportation of minerals and general merchandise.

La Paz to Achacachi.—The distance between the two terminals is 111 kilometers, covered by the stage in from ten to twelve hours. This line belongs to the same company, Yonares & Cia., operating the La Paz and Corocoro line. Congress, in order to foster the permanent establishment of the stage line over this road, has granted the company a subsidy of 2,000 bolivianos per annum.

Cochabamba to Oruro.—This line covers the distance of 228 kilometers between the terminals in two days, traveling only in the daytime. The supreme Government, in view of the increased traffic over this road and the efficient service rendered by the "Empresa Tunari," the concessionaire of the stage line, extended their concession for four years, from January 1, 1905, and has granted the company an annual subsidy of 12,000 bolivianos.

A new wagon road is under construction in this section from Cochabamba to Oruro, following another itinerary.

Cochabamba to Sucre.—The distance between the two terminal cities by this road is 468 kilometers, and it takes six days to make the trip by stage. As there were no facilities for the comfort of passengers along the road, because traffic was not heavy enough, the Government rescinded in 1903 the contract with the company operating the stage line. At present there is no regular stage running between the two points.

Sucre to Potosi.—The concession for a regular stage line over this road expired in 1902, and nothing has been done for the renewal of the contract, as traffic was not important enough to maintain the service. The distance between the terminals is 161 kilometers.

Sucre to Challapata.—This line belongs to a Bolivian company, called "Empresa Zamora," and enjoys a subsidy of 12,000 bolivianos per year from the Government. The distance between Sucre and Challapata is 340 kilometers, covered in four and a half days.

Uyuni to Potosi.—This is one of the most important land routes in Bolivia, 185 kilometers in length.

Potosi to La Quiaca.—This road is 417 kilometers in length. Traffic is carried on on heavy road carts.

There are other roads connecting with those described leading to the interior towns and to the frontier States.

Waterways.—The principal waterways in the country are, in the first place, Lake Titicaca, having an area of 6,200 square kilometers. Two steamers ply on this lake between Puerto Perez in Bolivia, and Puno, Peru, touching at intermediate points. Small vessels on Lake Aullagas supply local needs, and the Desaguadero River, connecting both lakes, is navigable by large steamers for a considerable distance.

All the Bolivian affluents of the Amazon are navigable, while rivers Yutay, Yurua, Alto Purus, Acre, Orton, Madre de Dios, Inambari, Beni, Madidi, Itenez, and Mamore, and their affluents admit steam launches having from 4 to 6 feet draft. The navigable area of Bolivian streams for steam launches is estimated at 9,000 kilometers.

The Pilcomayo is navigable for vessels measuring up to 200 tons, and the Paraguay for a distance of about 1,200 kilometers.

The navigable zones of Bolivia may be divided into four regions, viz, one on the north, embracing the Territory of the Colonies, the department of Beni, and a section of that of La Paz; another region on the east, embracing the departments of Santa Cruz and Cochabamba; a third region to the southeast, comprising the Paraguay, Pilcomayo, and Bermejo rivers, and a fourth section, embracing lakes Titicaca and Poopo or Aullagas, and the Desaguadero River, which connects them.

Navigation on the river Mamore, Chapare, Itenez, and their affluents is in the hands of a native company, Barriga & Cia, while Barber, von Berks & Co. operate on the Magdalena (Beni). Another native concern, Maciel & Cia, has a steam launch plying on the Mamore and Guapore.

Lakes Titicaca and Poopo are connected by the Desaguadero River, the total length of this waterway being over 590 kilometers, as follows: Lake Titicaca, 172.73 kilometers; Desaguadero River, 300.88; and Poopo Lake, 117.01. Vessels of 500 tons burden can sail over the Desaguadero River. There are several steamers and steam launches operating in the river. Among the latest concessions made by the Government to foster navigation in Bolivia there is one granted to Mr. Juan E. Hulman, to navigate the Desaguadero up to Lake Poopo.

The concessionaire has the exclusive privilege of navigating the stream mentioned with steam vessels, subject to the rights acquired by the Peruvian corporation in that part of the route between Lake Titicaca and Puente of Concordia. By the terms of the concession the concessionaire is granted an annual subsidy of 10,000 bolivianos ($3,610 gold), for a period not exceeding ten years, which subsidy shall cease as soon as the net profits of the enterprise amount to 6 per cent on the capital invested. No duties, either Federal or municipal, shall be levied on the machinery, tools, and other supplies imported for use in the construction, maintenance, and operation of the vessels, buildings, wharves, etc., necessary for the navigation of the Desaguadero River, for a period of twenty years, provided the original bills covering the materials mentioned are presented to the Government for verification and approval.

The State grants to the concessionaire such Government lands as may be required for the erection of buildings, offices, warehouses, etc., and

gives to the company the right to use such private lands as may be necessary for the purposes mentioned. The concessionaire also has the authority to construct and erect bridges over the streams and highways tributary to the Desaguadero River, and to charge a toll for the use of the same. This privilege shall last while the franchise remains in force. The tariff for passengers and freight shall be fixed by the Government, taking as a basis for the freight rate 1 cent, approximately, per metric quintal for each kilometer of distance hauled. The concessionaire agrees to open to public traffic the navigation referred to within a period of twelve months from the signing of the contract, using for this purpose a number of steam vessels or launches sufficient to meet the needs of the public. Government employees, troops, freight, and postal business shall be carried at one-half the tariff rates. The concessionaire is required to deposit 5,000 bolivianos as a surety for the faithful performance of the contract. On the expiration of the contract the entire property of the enterprise passes to and becomes the property of the State.

Another important concession has also been granted for the establishment of a line of steamers on Lake Titicaca. The concessionaire is Mr. Federico G. Eulert, a merchant of La Paz, who has been authorized to organize a joint stock company, composed either of home or foreign capitalists, to establish a weekly steamer service in the Bolivian section of Lake Titicaca. This company will be known as the "Compañía Nacional de Remolcadoras" (The National Towage Company), having its legal residence in the city of La Paz. The company will commence the service with one steamer of less than 50 tons capacity, conveniently arranged for the transportation of passengers, and four iron launches, said service to be inaugurated within eighteen months after the approval of the concession by the Bolivian Government. As a guaranty for the faithful execution of the contract the concessionaire is required to deposit 2,000 bolivianos in one of the banks in La Paz, subject to the order of the Government. The company is to increase the number of the vessels from time to time, in accordance with the demands of the traffic. The steamers will make stops at the Bolivian ports and landings of Lake Titicaca, there remaining long enough to load and unload freight and to comply with the customs regulations of the Republic. Each vessel shall be provided with a manifest of the freight it carries, approved and certified to by the proper authority at the port of shipment. At Guaqui the freight consigned to La Paz shall be unloaded in the warehouses of the railway, to be transported by rail to the city of La Paz. On domestic products the Guaqui Railroad is to charge only one-half the lowest freight tariff rates.

The company shall transport the Government mails to and from the port of Guaqui and to and from the other ports of the lake free of charge, and will make a reduction of 50 per cent from the regular tariff rates for Government freight. The Government will admit free of duty the material and tools necessary for the construction of the steamers and launches. The company is also exempt from the payment of wharfage, storage, port, and light-house charges. The Government agrees to make no other similar concession on Lake Titicaca to any other company for a period of five years.

RAILROADS.

At the end of the calendar year 1903 the number of kilometers of railway in operation in Bolivia was 1,129, as follows:

	Kilometers.
From Tocopilla to Toco	93
From Antofagasta to Oruro	924
Branch line to Pulacayo	25
From Guaqui to La Paz	87
Total	1,129

Commissioner Charles M. Pepper, appointed to carry out the resolution of the Second International Conference of American States in regard to railway development in Latin America in connection with the intercontinental railway project, in his report to the Secretary of State, March 12, 1904, says in part as follows in reference to Bolivia's railroad facilities and future development:[a]

"The national railway policy of Bolivia is intimately identified with the intercontinental project. The sections which would be formed in this line are regarded as essential to the Republic's development. * * *

"A momentous event, and one which makes probable the early realization of Bolivia's ambition for wider railroad intercourse, is the treaty with Brazil for the settlement of the controversy over the Acre territory. This provides for a cash payment within two years of £2,000,000, or nearly $10,000,000, by Brazil to Bolivia, the stipulation being that the sum shall be expended chiefly for railway purposes. Even before the treaty had been ratified the declared purpose of the Bolivian Government was to apply this indemnity to railway construction, securing the lines which will give it a through system from the Argentine border on the south to the boundary of Peru on the north, thus forming the great midway artery of through railroad communication between Buenos Ayres and Lima, as well as enlarging the means of commercial intercourse with the Amazon region of Brazil.

[a] Pan-American Railway. S. Doc. No. 206, 58th Cong., 2d sess. Washington, 1904.

"*President Pando's policy.*—The intercontinental route is so clearly considered a part of the national system, and the preference for it is shown so strongly, that your commissioner quotes from the message of His Excellency the President, Gen. José Manuel Pando, to the Bolivian Congress, December 27, 1903. President Pando in his message said:

If, as is expected, the treaty with Brazil is perfected and put in practice, it should be taken into account by the nation that the sum provided as the stipulated indemnity should be applied in the construction of railway lines. * * *

It is necessary for us to install railroad lines in the greatest possible extension of our territory, consulting the probability of assuring, with the returns sought, the interest on the capital invested; the necessity of putting into communication among themselves the distant centers of population in order to foster the national unity and give impulse to internal commerce and local industries, and finally the convenience of opening a highway by distinct routes to our international communication. * * *

It is clear that the first lines to be constructed should be that from La Paz to Oruro; that from Oruro to Cochabamba; that from Uyuni to Tupiza, and that which joins these places with the very important one of Potosi.

The railroad from Uyuni to Tupiza would be important to complete the network of international highways which will form the grand intercontinental system proposed by the United States of America. And since the Argentine Government is actually building the prolongation of the Central Northern to Tupiza, the line which is to be constructed to Uyuni would complete that work, giving us an outlet to the Atlantic, to the great advantage of the people of our southern districts.

Other lines of vital importance, whose realization should be procured, are those from the Paraguay River to Santa Cruz, from Cochabamba to the Chimore, and from La Paz to the Beni River.

The plan which should be proposed to effect these projects should be as follows: To send a commission to confer with the most solid and well-established firms of Europe and the United States engaged in railway construction in regard to the construction of railroads in Bolivia, the commission to agree to provide from Bolivian funds the additional capital on fixed interest. This capital would be guaranteed by all the lines constructed and their incomes and, besides, by the national revenues in case of deficiency. * * *

The general administration of the lines should be turned over to the capitalists or company, the Government reserving the immediate supervision and the intervention necessary to protect their interests. * * *

"The treaty between Brazil and Bolivia has been ratified by both Governments so that the plans outlined by President Pando can be carried out. Substantially, Bolivia has a cash capital of $10,000,000 available for railway building and as a basis for securing further credit and the cooperation of private capital. The treaty provides that the first installment of £1,000,000 shall be paid within three months from the exchange of ratifications and the balance by March 31, 1905. * * *

"*Prime importance of Pan-American sections.*—It will be observed that the President places emphasis on the lines from La Paz to Oruro and from Uyuni to Tupiza, which will complete the Bolivian links in the intercontinental system.

"The following summary of present and prospective railway construction was prepared for your Commissioner by Mr. T. Clive Shepperd, the efficient director of public works:

Puno is the terminus of the Mollendo, Arequipa, and Puno line, worked by the Peruvian corporation, 4 feet 8½ inch gauge. From Juliaca, near Puno, the line proceeds north toward Cuzco, and is completed as far as Sicuani.

Puno to Guaqui, 110 miles (179 kilometers).—Lake navigation across Lake Titicaca, worked by the Peruvian corporation.

Guaqui to Viacha, 40 miles (65 kilometers).—Meter gauge line owned and worked by the Bolivian Government. Distance from Viacha to Alto de La Paz, 14 miles (22 kilometers).

Viacha to Oruro, 128 miles (206 kilometers).—Proposed meter gauge line.

Oruro to Uyuni, 195 miles (314 kilometers).—Two feet 6 inches (75 centimeters), line owned and worked by the Antofagasta (Chile) and Bolivian Railway Company. The scheme includes a proposition to acquire this part of the line and change the gauge to 1 meter.

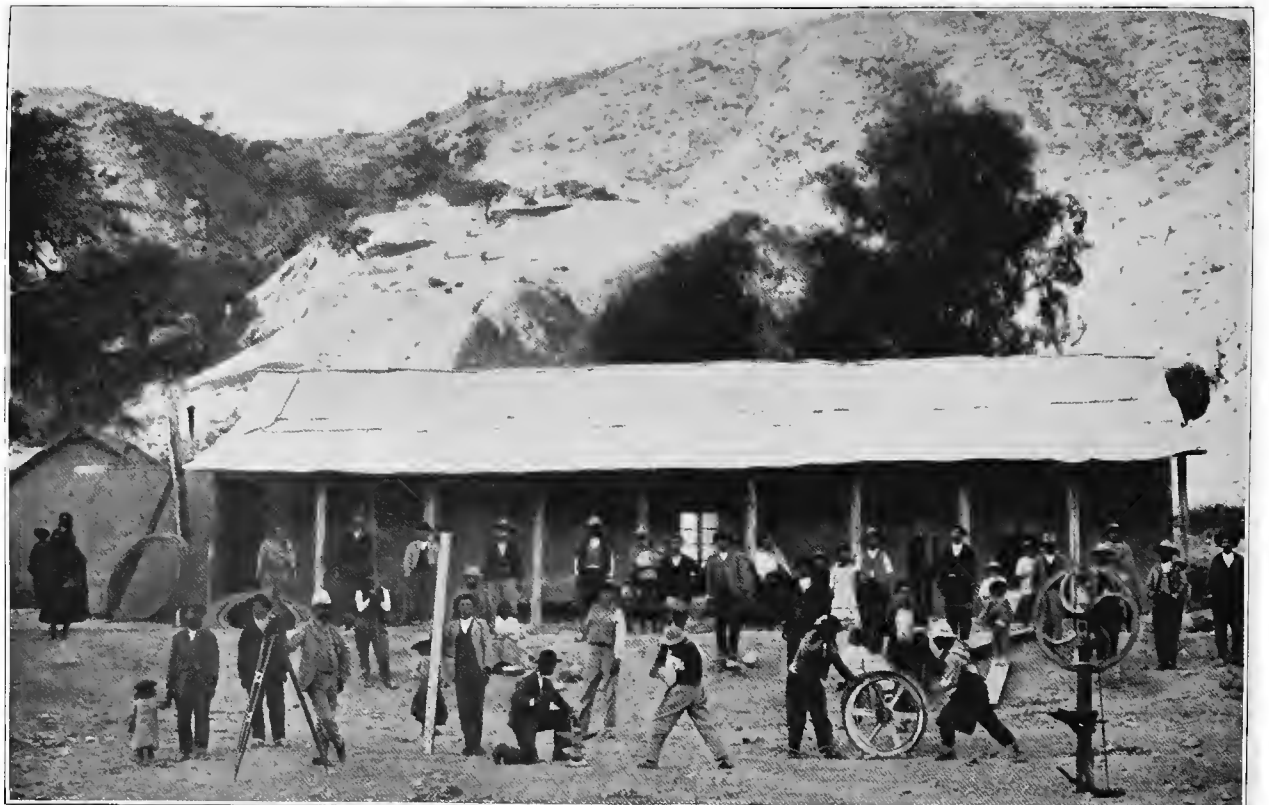
Uyuni to Tupiza, 147.5 miles (236 kilometers).—Not yet surveyed.

"The distance between Uyuni and Tupiza usually is accounted as less than that estimated above. The Argentine engineers, who made a preliminary study, and the members of the Intercontinental Survey fixed it at 125 to 130 miles. This line presents engineering difficulties, yet it would traverse an immensely rich mineral region, not only causing the reopening of mines which have been abandoned for lack of transportation facilities, but also leading to the development of new ones. The lowering of freight rates from the mines which now depend on pack animals for their transport was estimated for a term of years. This calculation showed that the average charge for minerals transported from Tupiza to Uyuni by pack animals was $24 gold per ton. For the intervening points it was not much less. * * *

"Since the second conference progress has been made in Bolivia in the intercontinental scheme. The capital, La Paz, has been joined by rail with the port of Guaqui, which is the head of navigation on Lake Titicaca. This line was built by the Peruvian corporation, but was taken over by the Bolivian Government, which has since operated it and is paying the mortgage held on the property by the company.

"*Present projects and concessions.*—At the present time only one railway concession is in force in Bolivia. This is for the line known as 'L'Africaine,' and the franchise is held by French and Belgian capitalists. The line is projected from Santa Cruz to the Paraguay River through what is known as the Chaco or tropical agricultural area. The company was given a large grant of public lands for colonization, and provision was also made for a subsidy from the national revenues on the completion of the first 200 kilometers.

"Some preliminary studies have been made, and the engineers of the company went over the ground in the summer and fall of 1903, but not much progress has been realized, and the prospect for early work is not encouraging. The corporation also has the franchise for con-



WORKSHOP AT PUENTE SUCRE, ON THE PILCOMAYO RIVER.

structing a fort and canal at Bahia Negra, which is the confluence of the River San Rafael with the Paraguay, and which was to be the terminus of the railroad.

"Other projects are for the prolongation of lines of the Argentine system from Lake Ledesma to Oran and to the interior of Bolivia via Yacuiba. The distance is 300 miles (500 kilometers) from Santa Cruz to the frontier of Argentina. There are also plans for lines through the Chaco of Tarija and the provinces of Azero and Cordillera to join the Bahia Negra Railroad. They do not indicate early results.

"An enterprise which has received support is for a railroad from La Paz through the copper fields of Corocoro to Tacna, from which point a railroad runs to Arica on the Pacific. A large traffic is now carried on over this route by means of pack animals. No franchise has been granted by the Bolivian Government for this proposed railway, and definite surveys have not been made.

"*Opening up the rubber region.*—The plans for connecting the heart of Bolivia with its tropical territory, which give promise of the earliest realization, are those for a railway from the heights of La Paz to Yungas, which is the center of the coca-leaf production and other tropical products, as well as of lumber and firewood. By this project the navigable waters of the Beni River will be reached and the capital thus placed in communication with the rubber region by means of railways and river navigation to Villa Bella, which is the customs-house and port of northeastern Bolivia.

"The proposition is for an electric railway from the heights of La Paz by utilizing the hydraulic power in the river Undavi. The estimate is that one section, 78 miles (125 kilometers), would cost $2,500,000, and the other section, 31 miles (50 kilometers), $750,000, making a total of $3,250,000. The Government has had the route carefully studied and the detail plans have been completed. This project comes within the immediate view of the Brazilian treaty, and presumably the funds for carrying it out will be supplied from the indemnity. It is to be carried forward in conjunction with other plans for electric traction from the Heights (El Alto), which is now the terminus of the railway from Lake Titicaca, down to the city proper, as ordinary railroad construction is too difficult and too expensive to carry a steam railroad from the Heights to the basin in which the city lies.

"*Mines the basis of Bolivian railway growth.*—The foundation of Bolivian railway development lies in its mineral resources. This is particularly true of the sections between Uyuni and Tupiza and Viacha and Oruro, which are the links lacking in the intercontinental location. Viacha is a few miles from La Paz on the railroad that connects the capital with Lake Titicaca. Concessions have been given at various times for building the line to Oruro and surveys have been made, but nothing practical has resulted. * * *

"*Liberal legislation probable.*—Bolivia has a general railway law providing for a guaranty of 6 per cent on capital invested in railway construction and also conceding other security, but its terms have been too vague to induce capital to engage in these enterprises. There is State regulation of the private lines both as to fixing freight and passenger tariffs and as to other subjects. They are similar to the regulations enforced on the Government line between Guaqui and La Paz.

"It is probable that as a consequence of the more definite policy which has been adopted by the present administration, and in order fully to utilize the advantages of the Brazilian indemnity, legislation will be enacted which will be more specific and will meet the conditions that are necessary in order to induce investments. A new general railway law was submitted to the Congress at the session of 1903, but owing to lack of time for full consideration no action was taken."

Railways in operation.—The following is a brief description of the railways in actual operation in Bolivia:

Tocopilla-Toco Railway.—In 1886 Mr. W. Stirling, of Tacna, formed in London a company under the name of "Anglo-Chilean Nitrate Railway Company," for the purpose of operating a railroad in connection with the nitrate deposits of River Loa. Work on the line was begun in 1888, the railroad being open to the public in May, 1890. Like all railroads in Bolivia this line is of the narrow-gauge system, and is considered a remarkable piece of engineering because of its sharp curves and other features. The general gradient of the line is 4 per cent, the road ascending to 1,634 meters up to Ojeda Station, 54 kilometers from Tocopilla. From this point the descent begins to 1,200 meters. The cost of construction is estimated at £209,404, and at £6.8 per mile the cost of maintenance.

Antofagasta-Oruro Railway.—The concession for this line was first granted to the representative of the "Campañía Huanchaca de Bolivia," in 1888, for the construction of a railroad and a telegraph line from the Bolivian frontier to the city of Oruro, passing through Huanchaca. The rights acquired by the company were subsequently transferred, in 1889, to the Antofagasta and Bolivia Railway Company, Limited, which operates the line. The company has a guarantee from the Government of 6 per cent per annum for twenty years on the capital invested on the construction of the line, said guaranty to become effective upon the delivery of the railway at Oruro. The line was officially inaugurated at Oruro, May 10, 1892.

The distance covered by the railroad between both terminals measures 924 kilometers. It is a single-track, narrow-gauge line, the maximum gradient being 2.98 per cent. The road ascends from 5 meters above the sea level at Antofagasta to 3,956 at Ascotan, descending thence to 3,694 meters, which is the altitude of Oruro. The maximum speed of the trains is, according to the regulations, 40 kilometers an

hour. The locomotives used on this line are all of American make, Baldwin, Rodgers, and Stevenson being represented.

The line is divided, according to the territory over which it extends, into Chilian and Bolivian sections, the former from Antofagasta to Ascotan, 360 kilometers, and the latter from Ascotan to Oruro, 564 kilometers. The revenues and expenditures of the Bolivian section from 1898 to the end of the first six months of 1903 are estimated by Bolivian authorities as shown in this table:

Year.	Revenues.	Expenditures.	Net earnings.
	Bolivianos.	*Bolivianos.*	*Bolivianos.*
1898	950,456.39	611,047.27	339,409.12
1899	1,048,740.94	583,939.23	509,801.71
1900	1,227,017.91	516,649.46	710,386.45
1901	1,158,480.59	564,700.22	594,140.37
1902	1,138,255.30	599,937.44	583,319.86
1903	612,614.87	317,870.49	294,744.38

From 1900 to the end of the first six months of 1903 the revenues of this line have been as follows:

Year.	Fares.	Baggage.	Other freight.	Other revenues.	Grand total.
	Bolivianos.	*Bolivianos.*	*Bolivianos.*	*Bolivianos.*	*Bolivianos.*
1900	138,967.55	27,480.68	1,074,683.72	21,886.06	1,227,017.91
1901	139,203.30	19,838.15	986,442.90	13,357.14	1,158,480.59
1902	149,142.30	19,828.43	986,012.18	28,272.39	1,183,255.30
1903	78,059.34	9,188.44	520,424.80	4,942.29	612,614.87

In 1897 the Engineer Corps, under instructions from the Executive, made a thorough investigation of the capital invested in the construction of the Bolivian section of the railroad, in order to ascertain the amount of the 6 per cent Government guaranty. The investigation showed that the cost of the Bolivian section of the line was £750,000, the annual guaranty being, therefore, £45,000. As the revenues derived from the operation of the line are larger than the amount fixed as the State guaranty, this is only nominal as far as the Bolivian Government is concerned.

Passenger trains only travel by day, covering the distance between Antofagasta and Oruro in three days. Special fast trains, however, have made the run in 23 hours.

Uyuni-Huanchaca Branch.—The Huanchaca Company owns and operates for its exclusive benefit a branch road from Uyuni to Huanchaca, a mining region 15 kilometers distant. This branch road was built in five years at a cost of 544,550 bolivianos.

Guaqui and La Paz Railway.—This is the first railroad built in the country with public funds, and owes its existence to the personal efforts of President Pando, who in 1900 directed the survey of the line to be made. By act of Congress, October, 1900, the construction

of the railway was authorized, setting aside to defray building expenses the whole of the revenues from the alcohol tax or monopoly on spirits and the rubber tax in the department of La Paz. The construction of the road has been under the direct supervision of Engineer M. Bustamante y Barreda, appointed by the Executive as Chief Engineer of the line. Work was commenced at Guaqui at the end of 1900.

The total length of the line from Guaqui to Alto, near La Paz, is 87 kilometers, the track ascending from 3,813 meters at Guaqui to 4,160 at Viacha to descend thence to the Alto station 4,085 meters above the level of the sea. The gauge of the line is 1 meter; the rails weigh 18 kilograms per meter and the total number of tons of rails used in the construction of the line is 3,398. The road is equipped with three locomotives of American make, and has a telegraph line running along the track for 38 kilometers. The total cost of the line was estimated by Mr. Bustamante at about £170,000 (2,398,700 bolivianos, at 17 d. per boliviano), or about £2,000 per kilometer. The amount expended in the road up to September 30, 1903,[a] reaches the sum of £141,741, or 1,931,035 bolivianos.

A sudden fall in the price of silver in London and other causes determined, in 1901, certain conditions which terminated in an agreement of the Peruvian Corporation, Limited, June 30, 1902, to loan the Government £10,000 and become responsible for certain obligations, having as a guarantee a first mortgage on the railroad and its appurtenances. Later on, March, 1903, it was stipulated between the Government and the company that the former agreed to establish traffic and operate the line to Guaqui upon the fulfillment of certain obligations on the part of the company, and to pay the Peruvian corporation during 1903 the amount of £21,000, and from the 1st of January, 1904, on no less than £2,000 a month until the full and complete settlement of the mortgage had been effected.

The revenues set aside for the construction of this road have produced the following sums during the last four months of 1900, and the calendar year of 1901, according to the "Sinópsis Estadística" before quoted:

Year.	Alcohol tax.	Rubber tax.	Total.
1900	140,683.04	15,418.92	156,101.96
1901	463,838.56	69,601.36	533,439.92
Total	604,521.60	85,020.28	689,541.88

Under date June 9, 1904, Mr. William B. Sorsby, the American Minister at La Paz, reports as follows in regard to this railway:[b]

[a] Sinópsis Estadística y Geográfica, Vol. III, 1904.

[b] United States Consular Reports, No. 2010, July 22, 1904.

"The Peruvian corporation owning and operating the Southern Railway of Peru, from Mollendo on the Pacific to Puno on Lake Titicaca, and operating lake steamers in connection therewith between Puno and Guaqui, has acquired control and taken possession of the Guaqui-La Paz (Bolivian Government) Railway from Guaqui, the Bolivian Lake Titicaca port of entry, to the city of La Paz, for the term of seven years from June 1, 1904, under a contract or lease.

"The corporation lends the Government £50,000 ($243,335), at 6 per cent interest, for the completion of the extension of the Guaqui-La Paz line from the Alto to the city of La Paz, and the Government recognizes its present indebtedness to the corporation of something more than £23,000 ($111,930), which, with the £50,000 loan, and the cost of the permanent improvements that may hereafter be bought and made, will be charged against an amortization fund of 40 per cent to be reserved from the revenues of the railway; and if at the end of the seven years the total obligation has not been covered by this amortization fund, the Government will extend the lease or pay to the corporation such balance as may then be found to exist. The corporation will retain 60 per cent of the revenues of the railway for operating expenses during the term of its lease.

"The extension from the Alto (the present terminal of the Guaqui-La Paz Railway), for which the £50,000 ($243,335) loan was made, will be an electric line, 8 kilometers (4.97 miles) in length, with a 6 per cent grade and 1 meter (39.37 inches) gauge (the same gauge as that of the main line), and will be completed within about twelve months. All of the material and equipment for the construction and operation of this extension will be obtained from the United States.

"Thus it will be seen that by the acquisition of the Guaqui-La Paz Railway the Southern Railway of Peru secures a continuous service from Mollendo, Peru, to La Paz, Bolivia.

"In this connection I further have to report that it now seems probable that the Peruvian corporation will also be given a concession for the construction of the proposed railway from Viacha, on the Guaqui-La Paz line, to Oruro, on the Antofagasta-Oruro line, under a fifty years' lease and with a guaranteed interest of 6 per cent on £550,000 ($2,676,575), the estimated cost of its construction and equipment. The length of the line will be 220 kilometers (136.6) miles), and it will be level, except for a few rises and falls the grade of which will not exceed 2 per cent. It is to be completed within three years after the final aceeptance of the lease by the Peruvian corporation and the Bolivian Government, through the Executive. The interest will be guaranteed for the term of the concession by the alcohol tax."

Other projected railway lines, either under construction or actual survey, are the following:

	Kilometers.
La Paz to Yungas	140
Viacha to Oruro	220
Oruro to Cochabamba	222
Cochabamba to Chimore	200
Cochabamba to Santa Cruz	555
Aiquile to Sucre and Potosi	333
Santa Cruz to Puerto Pando	777
Branch line to Florida	333
Oruro to Wara (from Iquique and Pisagua)	312
Potosi to Cariquima	288
Potosi to the Argentine frontier	444
Tarija to Tupiza	150
La Paz to Huaicho and Pelechuco	325

These lines cover an extension of 4,400 kilometers, the total cost being estimated at about 300,000,000 bolivianos. There are besides these lines other new concessions granted by the Executive.

COMMUNICATION WITH FOREIGN COUNTRIES.

Bolivia's communication with foreign countries is necessarily ha through the territories of Brazil, Argentina, Chile, and Peru. The Amazon and its tributaries in Brazilian territory afford ready means of communication with the Atlantic coast, while river Plate offers an outlet farther south. The Pacific coast trade is carried on through the Peruvian port of Mollendo and the ports of Arica and Antofagasta, under Chilian control. In detail, these commercial routes are as follows:

Amazon route.—This route leads from Acre and Villa Bella, Bolivian ports and customs districts, on the Brazilian frontier, to Para, Brazil, on the Atlantic, a distance of 4,085 kilometers from Acre and 3,471 kilometers from Villa Bella, covered in 244 and 216 hours, respectively. Return trips are made in double the stated time. The trip is made as far as the Para River in small boats. The largest portion of the trade of the department of Beni and the northern region of the Republic is carried on through the Amazon route. Freight and incidental expenses on a metric quintal of rubber exported from Villa Bella to Para on an average amounts to 112 bolivianos, while freight and expenses for imports from Para to Villa Bella on an average cost 130 bolivianos.

Paraguay route.—The foreign trade of the department of Santa Cruz and a large portion of that of the Beni and Chuquisaca departments is made by the Paraguay River, via Puerto Suarez, through the upper and lower Paraguay, Parana, and River Plate, to either Montevideo or Buenos Ayres, covering the distance of about 300 kilometers

in 7 days. The total freight on a metric quintal of rubber from Esperanza, Beni, to Montevideo by the Paraguay route is 79 bolivianos. Freight per ton from Montevideo to Corumba, Brazil, 11 kilometers from Puerto Suarez, is $8; from Buenos Ayres, $7, and from Rosario de Santa Fe, $6. Average expense from Corumba to Puerto Suarez, $3. There are several steamship companies plying between Corumbá, Rosario de Santa Fe, Buenos Ayres, and Montevideo, touching at intermediate points.

Argentine route.—This is the longest route between Bolivia and the South Atlantic coast, via Argentine. The total distance between the Tupiza and Tarija customs districts and Buenos Ayres is about 2,997 kilometers, or 1,829 miles. The commerce of the department of Tarija and a portion of those of Potosi and Chuquisaca find an outlet through this commercial route. From Tupiza and Tarija to Salta, terminus of the North Central Argentine Railroad, the distance is about 1,200 kilometers, thence to Rosario on the Parana, by rail, 550 kilometers, and thence by steamers to the Atlantic coast, 270 kilometers. Freight on a metric quintal from Esperanza, Beni, to Buenos Ayres, via the Cordillera and Yacuiba, is quoted at 92 bolivianos. Freight on a metric ton of mineral products from Tupiza to Buenos Ayres, via Jujuy and El Rosario, 109.50 bolivianos.

Antofagasta route.—This, the most direct route to the port of Antofagasta, now under Chilean control, starting at Oruro, terminus of the railroad, passing from Uyuni and ending at Antofagasta, a distance of 925 kilometers, covered in 3 days. The largest portion of the trade of the departments of Chuquisaca, Potosi, Southern Oruro, and Cochabamba finds an outlet through this route. Freight and incidental expenses on a metric quintal of rubber from Beni to Antofagasta is quoted at 92.40 bolivianos. The Oruro-Antofagasta railroad is divided for freight purposes into two sections, the Bolivian section from Oruro to Ollagüe, 489 kilometers, and the Chilean section from Ollagüe to Antofagasta, 435 kilometers. Each section has its own tariff, payable in the currency of the respective country. Freight per metric ton from Antofagasta to Europe is quoted at £4, or about 55 bolivianos.

Arica route.—This is the shortest route to the Pacific, either from Oruro or La Paz, being the commercial outlet for the products of the departments of Oruro, Cochabamba, and a portion of La Paz. The distance from La Paz to Arica measures 544 kilometers. The trip is made by rail from La Paz to Viacha, 28 kilometers; by pack train from Viacha to Tacna, a distance of 452 kilometers, and from Tacna to Arica, 63 kilometers, by rail. Pack mules take 7 days to make the trip from Tacna to La Paz, pack donkeys 10 days, and llamas from 15 to 20 days.

Mollendo route.—The bulk of the trade of the department of La Paz goes by rail from La Paz to Guaqui, thence by steamers on Lake

Titicaca to Puno, Peru, and thence by rail to Mollendo, passing through the city of Arequipa, a total distance of 848 kilometers, covered in 42 hours as follows:

From La Paz to Alto (highway), 6 kilometers, 1 hour; Alto to Guaqui, by rail, 87 kilometers, 3 hours; Guaqui to Puno, by steamers, 180 miles, 16 hours; Puno to Mollendo, by rail, 575 miles, 22 hours.

There are three other routes besides, one from Pelechuca and Juliaca to Mollendo, another from Rio Desaguadero, Lake Titicaca, Puno, and Mollendo, and a third from Riberalta to La Paz, 1,554 kilometers. The Guaqui and La Paz Railroad, which was opened to the public in May, 1903, facilitates the means of communication. The freight tariff on exports is from 15 centavos to 1.10 bolivianos for merchandise belonging to the first class of the tariff, or mining and manufactured products, except specie, value declared; and from 10 centavos to 1 boliviano on second-class goods or agricultural and cattle products. Specie, jewelry, gold dust, silver bars or piña, and kindred articles, pay from La Paz to Guaqui at the rate of two-fifths of 1 per cent on value declared. Imported merchandise for freight purposes only is divided into five classes, paying per metric quintal from 2.20 to 5.65 bolivianos, according to class.

The main portion of Bolivia's foreign commerce is done through the ports of Mollendo and Antofagasta. English and German steamers touch regularly at these ports, while there is a direct steamer from San Francisco to Mollendo and Antofagasta, sailing every two weeks. There are also two other lines of direct steamers from New York, sailing monthly, while weekly shipments may also be made via Panama from New York. Shipments from New York to La Paz, via Mollendo or Antofagasta direct, take about 60 days, and 40 days if sent via Panama. Shipments from San Francisco to La Paz take from 45 to 50 days.

MAILS, TELEGRAPHS, AND TELEPHONES.

Postal service.—Bolivia entered the Universal Postal Union in 1885, so that all rules and regulations applying to mails within the Union govern all mail matter destined to the Republic; domestic mails are subject to a special tariff. By reason of certain diplomatic conventions entered into with Ecuador, Peru, and Chile, Bolivia's mails enjoy special privileges in those countries. Bolivia's foreign mail is sent through Chile, Peru, and Argentine, according to special agreement and on the payment of certain fees. The laws of the country establish severe penalties for violation of the postal code.

A parcel-post and a money-order convention exists between Bolivia and the United States. The prescriptions governing the parcel-post convention stipulate that parcels shall not measure over 3 feet 6 inches in length, nor exceed 6 feet in length and girth combined, nor weigh

over 11 pounds. The rate for parcels not exceeding 1 pound is 20 cents, and 20 cents additional for every pound or fraction thereof above such maximum weight. The exchange post-offices in the United States are New York and San Francisco, and La Paz in Bolivia.

The Secretary of Government and Justice in his report to the Bolivian Congress of 1903 states with respect to the foreign service that the branch dealing with foreign orders or parcels post was operated in a satisfactory and creditable manner during 1902. The distributing offices of Uyuni and Oruro received in 1902, 1,836 orders, representing a total weight in merchandise of 3,680.127 kilograms. There were 368 orders issued from the same stations representing merchandise weighing 566.710 kilograms, the postage on which amounted to 447.62 bolivianos ($161.14). As compared with 1901, there was an increase in 1902 of 209 orders. The interchange of orders with the Republic of Chile is now well established and is constantly increasing.

The money-order service with the United States, continues the report, is working most satisfactorily. From May, 1902, to June, 1903, the number of money orders issued by Bolivia was 59, amounting to $1,789, and those received at La Paz amounted to $853.

The mail received in 1902 amounted to 516,967 pieces of foreign mail, while that dispatched aggregated 228,866 pieces, making the total quantity of foreign mail handled during that year amount to 745,833. The number of pieces of mail handled in the domestic mail service in 1902 rose to 1,275,843 pieces. Compared with 1901, the number of pieces of mail handled in 1902 increased more than 100,000.

The receipts from the post-office in 1902 amounted to 137,654.12 bolivianos ($49,555.48), and the disbursements 179,606.59 ($64,658.37), leaving a deficit of 41,952.47 bolivianos ($15,102.89). The postal receipts are yearly increasing, and in the course of time this deficit will doubtless disappear. The receipts of the post-offices of La Paz and Oruro exceeded the expenses of those two offices in 1902 by about 12,000 bolivianos. There was a deficit, however, in some of the other offices.

The general postage rates from the United States to Bolivia are those governing mails sent to any foreign country except Mexico, Canada, and Cuba. The rate of postage charged in Bolivia on mail matter sent to the United States is as follows:

	Via Panama.	Other routes.
	Centavos.	*Centavos.*
Letters, per 15 grams (one-half ounce) or fraction thereof	22	20
Single postal cards, each	8	6
Double card (reply paid)	16	12
All other mail matter, per 60 grams (2 ounces) or fraction thereof	6	4
Registration fee	20	20
Fee for return receipt	10	10

On money orders to the United States the charges, according to the convention, are on amounts from $1 to $100, United States currency, 2 per cent, plus the rate of exchange in force at the time the order was issued.

The total number of post-office stations in the country in 1900 was 328, distributed as follows: La Paz, 83; Potosi, 73; Santa Cruz, 38; Cochabamba, 36; Chuquisaca, 33; Oruro, 21; Tarija, 21; Beni, 16, and Cobija, 7.

Telegraphs.—Telegraphic service in Bolivia dates from 1880. The total number of kilometers of telegraph lines in the country in actual operation is 5,013, of which 3,116 kilometers belong to the State and 1,897 to private concerns. The State telegraph lines are the following:

	Kilometers.
La Paz to Yungas	166
La Paz to Desaguadero	106
La Paz to Sorata	150
La Paz to Oruro	295
Oruro to Cochabamba	200
Cochabamba to the east	603
Oruro, Challapata, and Uyuni	321
Challapata to Potosi	350
Coquelchaca to Sucre	170
Sucre to Pilcomayo	50
Potosi to La Quiaca	370
Tupiza to Tarija	335
Total	3,116

The private lines are:

	Kilometers.
Antofagasta railroad	924
Huanchaca Company	765
Bolivia's Telegraph Company	208
Total	1,897

The report above quoted of the Secretary of Government and Justice for 1903 makes the following statement in regard to telegraphic development in the country:

"The internal telegraph service in 1902 consisted of 90,995 messages forwarded and 94,852 received. In 1901, 66,895 messages were sent and 69,554 received. The receipts from the telegraphic service in 1902 was 69,011.02 bolivianos, or 16,145.01 bolivianos more than the receipts from the same source in 1901.

"In 1902 a double wire was strung between La Paz and Oruro. This line has greatly improved and increased the telegraphic service between the two cities and has worked admirably from its inception to the present time. The work on the line which is being built into the eastern portion of the Republic has progressed satisfactorily, and some

THE CINCO PASS, ON THE VOPI RIVER.

of the physical difficulties encountered in that region have been successfully overcome. A telegraph line has also been completed between Chulumani and Irupana, and the line between Sucre and Colquechaca has been reconstructed. These lines have been opened to the public and are working satisfactorily."

Through the lines above mentioned Bolivia is in communication with Peru, Argentina, and Chile, and by cable with the rest of the world, via Antofagasta, Argentina, the West Coast of America Telegraph Company, and the Central and South American Telegraph Company via Galveston. Rates vary according to the company.

Telephones.—This service is quite efficient and is in the hands of private companies. Some of the State telegraph lines have also a telephone attachment for public use.

CHAPTER XIII.

IMMIGRATION AND COLONIZATION—LAWS AND REGULATIONS.

Lack of population and capital have always been, and for many years will still be, the main obstacle to the development of the natural riches of Bolivia and the establishment of profitable industries in the country. It is the unanimous opinion of those who have explored the territory and investigated its resources that Bolivia, by reason of its peculiar mediterranean position, its topographical and climatic conditions, and its rich hydrographic basins, is an emporium of wealth that only waits to be developed by the hand of man. The Indian, which is naturally indolent and conservative, is not an element to be reckoned with as a factor in Bolivia's progress, nor is the white and foreign population large enough to give a decided impulse to the introduction of progressive industrial methods. There is not a single department in the country where the immigrant can not find abundant means of profitably developing the natural resources of the land and making a pleasant home, where life is simple and inexpensive, due to the feracity and climatic conditions of the territory.

Bolivia offers excellent inducements to the immigrant who, if so willing, may in a short time become a citizen and a landowner in the country. For those bringing even a small capital the advantages are greater, as by the judicious investment of the funds in lands or in the exploitation of the rubber tree or in any other native industry the capital may be made to produce an income far beyond the ordinary rates of interest.

For some time past the Bolivian Government has endeavored, though not as successfully as it was to be expected, to establish a steady current of immigration, most liberal legislation being enacted to that effect. To the end of facilitating and spreading broadcast all necessary information in regard to the advantages offered immigrants, the National Bureau of Immigration, Statistics, and Geographical Propaganda was created in 1896.

Several attempts have been made at different times to found colonies in Bolivia, but all efforts in this direction have been fruitless, due to various causes, among others lack of sufficient capital of the promoters and of a thorough knowledge of the requirements of the case. The Bolivian Government has always been most liberal in the terms and

concessions granted colonization companies. At present the colonization companies established in the country are the Compañía Arming and L'Africaine, the latter having also several projected schemes for the construction of railroads, the exploration and the development of the eastern and southeastern sections of the country, in connection with its colonization work.

The best sections of the country for immediate colonization are those where rubber (*siphonia elastica*) grows in abundance, and the foundation of agricultural and pastoral industries in these localities in connection with the exploitation of the rubber forests can not fail to be very profitable. The territories of the Guarayos and Otuquies in the southeast are unexcelled for colonization, as they are easily reached through the Paraguay River, and traffic can be carried on over this waterway. In the department of Beni and in the province of Caupolican, department of La Paz, there are two distinct regions, which may be called the "rubber and gold belt" and the "pastoral belt." In the departments of La Paz, Beni, Santa Cruz, Chuquisaca, and Tarija there are also large tracts of land which only wait to be opened up to colonists. Agriculture, stock raising, the extraction of forest products, and other kindred and profitable industries could be established here and developed on a large scale.

LEGISLATION.

The law relating to immigration and colonization in force in Bolivia bears date of November 13, 1886, and the regulations thereof March 10, 1890. The principal points of interest to immigrants are, in general terms the following, from the law of 1886:

All public lands in the departments of Chuquisaca, Santa Cruz, Beni, Tarija, La Paz, and Cochabamba are opened up to colonization.

The Executive may either grant gratuituously or sell at public auction, after due valuation and survey, any public lands to the extent prescribed by law: First, to Bolivian or foreign corporations whose object is to found settlements; second, to the religious missions of the Propaganda Fide; third, to such Bolivians as may desire to establish or settle themselves in such lands.

Should the lands referred to lie within a radius of 12 leagues[a] (37.28 miles) from any populated agricultural district of any canton or vice-canton, then the grants or sales shall be subject to the following rules:

1. Lands shall be apportioned in lots or parcels of 25 hectares each.

2. Lands acquired either by grant or purchase can not exceed three lots in any one belt or zone for each father of a family and one for each male child over 14 years of age still under paternal control.

[a] The standard league used for the allotment of public lands in Bolivia is equivalent of 5 kilometers, or about 3.107 miles.

3. Such grants or sales are made under obligation on the part of the grantee or purchaser to cultivate at least one-sixth of the area of each lot within the first four years, under penalty of forfeiture to the State of such portions of land not under cultivation as prescribed by law. The dispossessed owner is entitled to the refund of any sums he may have paid, out of the proceeds of the public sale should the State sell the forfeited lands.

4. The Executive shall fix the selling price of the lots according to the conditions and character of the lands.

5. Payments of the purchase price of the lands may be made as follows: One-fifth of the purchase price in cash and the balance in four equal installments at the end of each succeeding year, or the lands may be paid for in public bonds, as specified by the law.

In such sections as may be found suitable for the erection of towns the necessary number of lots shall be set aside for that purpose.

No sale or grant of lands can be made until the territory set aside for colonization purposes shall have been surveyed, divided into lots, and these properly measured. This provision notwithstanding, the Executive is authorized, subject to the approval of Congress, to grant companies applying for them such areas of unsurveyed and undivided public lands as may be needed to establish or found colonies.

Any and all companies or corporations to which public lands are granted for the purpose of colonization before obtaining the concession are bound to give sufficient bonds to guarantee that they will duly perform all their obligations.

Other prescriptions contained in the regulations enacted on March 10, 1890, establish the following rules:

The sale of public or State lands shall be held at auction, proposals to be made under seal and to be based upon the just valuation of the land. Official notice of the contemplated sale shall be made public one hundred and twenty days before the date set for the opening of the bids, the notice to contain full particulars in reference to the location, area, climate, and other conditions of the lands. The sale or grant of lands suitable for cultivation situated within a radius of 60 kilometers from any town, village, or settlement shall be made in lots of 25 hectares each, subject to such regulations and limitations as described above.

Other lands may be assigned to corporations upon application when such lands are to be devoted to cultivation and settlement, subject to the following conditions:

Assignments by sale not to exceed from 1 to 10 square leagues in extent, the maximum grant to any one person or corporation to be ten portions or concessions. Applications for grants of ten portions or 100 square leagues shall be submitted to Congress for action. Persons or

corporations acquiring such lands are under obligation to cultivate one-tenth of each portion or allotment within the first four years, otherwise the concession becomes null and void.

Conditions governing the cultivation of lands shall be deemed fulfilled whenever the following work has been done:

I. Tillage of the lands selected by the promoters or corporations.

II. Erection of works for the exploitation of the forest products.

III. Erection of houses for the colonists and their families.

IV. Works in connection with stock raising.

V. Introduction of machinery, engines, agricultural tools and implements, erection of sheds for materials, opening of irrigation canals, roads, and in general all work deemed necessary for colonization purposes.

The price of the lands may be paid at the rate of one-fifth part in cash and the balance in four equal annual installments, or payment may be made in Government bonds, as provided by law. It is a necessary condition to all allotments of land that within four years five families shall be established per square league, thus laying the foundation of a colony or settlement in different parts of the whole area of the concession. The minimum extent of land to be devoted to culture and other agricultural persuits is 4 per cent of the lands.

Corporations or private individuals who succeed in establishing families in their lands, for every family so settled are entitled to a rebate of 5 per cent of the value of a square league of land, to be deducted from the annual dues. If the price of the land has already been paid, the rebate shall be made either in cash or in new lands.

As a general rule, alloted lands can not be disposed of until the full purchase price has been paid, and four years have elapsed since the allotment was first made.

Corporations or individuals having gratuitous grants of public lands shall upon signature and delivery of deed make a deposit at the National Treasury of an amount equivalent to 20 per cent of the value of the lands, as a guaranty of their good faith in the discharge of their obligations. When not specifically stated otherwise, said bond or guaranty runs for four years and draws an interest of 6 per cent per annum, payable at the end of the four-year term. Railroad companies are not required to make such deposit, the stipulations contained in their respective contracts governing their particular cases. Religious missions are also excepted.

Rubber concessions.—The exploitation of the rubber forests of Bolivia is the subject of special legislation, the law on the matter bearing date of December 10, 1895, and the regulations thereof June 30, 1896.

The salient features of the rubber law and its regulations are as follows:

Rubber (*siphonia elastica*) and other trees of industrial value are the property of the State, which has authority to grant or transfer said property rights to private persons, in accordance with the law.

All persons, whether natives or foreigners, may freely explore or prospect the national forests for rubber trees, no permit being necessary to that effect. The discoverer of rubber trees in the national or public forests establishes a preferential or priority right upon the trees, provided he files before the proper authorities, within 180 days from the date of discovery, a petition or claim for a grant covering such discovery. After the expiration of the alloted time preference shall be given to the first claimant or applicant.

All persons desiring to obtain a grant or concession for the exploitation of the rubber forests may either in person or through a duly appointed agent file a claim with the prefect or the national delegate, as the case may be, stating the following facts:

(1) Name, residence, and trade or profession.

(2) The fact of the discovery and the date thereof, if the applicant is the first occupant of the trees.

(3) Number of lots (*pertenencias*) in the concession and their area as approximately as possible.

(4) Such points as will be the basis of the boundary lines and the delimitation of the property.

(5) Cantonal or provincial jurisdiction within which the property lies.

(6) The names of the adjacent owners, if there be any, and their respective boundary lines. A chart or map of the property may also be filed.

The National Delegate in the Territory of Colonias and the prefects in their respective localities are authorized to grant no more than 500 rubber *estradas*[a] to every individual applicant and no more than 1,000 *estradas* to every company legally incorporated. Grants in excess of these figures are made by Congress exclusively.

The trees and the ground upon which they grow are granted in fee simple, upon compliance with the terms and regulations governing the case. Every grantee is to pay for each *estrada* granted the sum of 15 bolivianos, in fifteen annual installments of 1 boliviano each, in order to perfect his title to the property, under penalty of forfeiture of the concession.

Payment in full in order to perfect the title can be made at any time within the fifteen-year term. Until the full value of the *estradas* granted is duly paid up, the National Treasury holds a special lien upon

[a] *Estrada* is a lot of ground containing from 100 to 150 rubber trees.

the property, and no assignment by sale or otherwise of such property is valid unless full and complete payment has been previously made. The proper authorities are empowered, however, to permit the assignment, sale, or transfer of an unpaid grant, whenever the purchaser or assignee becomes bound to pay the balance due the State.

Traffic upon all roads leading to the rubber forests or plantations, river navigation, and the use of the forests on the banks of these rivers is free and open to all. The introduction of food and all staple products into the rubber camps and settlements is free, the introduction and sale of liquors being prohibited.

Promoters or bosses are strictly forbidden by law, under penalty of a fine from 50 to 200 bolivianos: (1) To curtail the liberty of the laborers in regard to the acquisition of food and provisions; (2) to retain their wages under any pretext whatsoever, or to pay for their work in checks, articles of consumption, or any other articles of trade; (3) to compel the laborers to work by force or actual violence.

Tax on rubber.—In 1899 the National Convention established a proportional tax on rubber, amounting from 8 to 15 per cent ad valorem.

CHAPTER XIV.

EDUCATION—SCHOOL SYSTEM.

Public instruction in Bolivia is divided into three grand branches or departments, viz, primary, secondary, and superior instruction. The schools belonging to the primary division are entirely under the immediate control of the municipalities to which they severally belong, by virtue of section 3, article 126 of the constitution, directing municipalities "to create and control institutions of public (primary) education, administer their funds, enact proper regulations therefor, and to appoint teachers and assign them their respective salaries. When such institutions are under the direct control of the State, municipalities shall have the right of inspection only."

Primary education.—Primary or public education is gratuitous and compulsory, the number and location of the schools being determined by the respective municipal councils. In 1900 there were, according to official data, 692 primary schools in the country, with 36,418 pupils and 1,020 teachers, the appropriation for the maintenance of these free schools being 140,000 bolivianos. Primary education embraces three terms in three years.

The only available complete data in reference to the expansion of primary education in Bolivia is for 1899, and shows the following figures:[a]

Department.	Schools.								Teachers.		Pupils.		Total teachers.	Total pupils.
	Males.	Females.	Both sexes.	Fiscal.	Municipal.	Parochial.	Private.	Total.	Male.	Female.	Male.	Female.		
La Paz	32	23	57	10	69	4	29	112	112	106	4,339	2,526	218	6,865
Cochabamba	93	35	33	16	130	3	13	162	189	115	8,481	3,507	304	11,988
Sucre	52	23	15	8	44	17	21	90	72	42	3,012	1,924	114	4,936
Potosí	73	22	18	20	64	8	21	113	99	43	2,911	1,029	142	3,940
Oruro	18	11	3	6	25	....	1	32	25	20	788	556	45	1,344
Santa Cruz	....	....	....	....	....	....	....	78	....	....	....	....	85	3,117
Tarija	53	17	4	....	46	....	28	68	56	21	2,302	1,094	77	3,396
El Beni	17	12	2	20	3	1	6	31	22	13	432	280	35	712
Total	338	143	132	80	881	34	119	586	575	360	22,265	10,919	1,020	30,298

[a] Sinópsis Estadística y Geográfica. La Paz, 1903. Vol. I.

On the 31st December, 1902,[a] public education in the capital city was represented by 24 municipal schools, 13 for males and 11 for females, the total number of registered pupils being 2,463, of which 1,471 were male and 991 females, with an average attendance of 1,255 and 834, respectively. The number of public schools for both sexes on the same date was 22, with 2,417 pupils. At the time there were besides 400 or more boys and girls being educated in private primary schools. A large number of Indians receiving education under the religious orders is not included in the above figures.

Secondary Education.—This branch of instruction embraces such colleges and other institutions of learning as are under the direct control of the universities, and consists in one year of preparatory studies and six more years of instruction embracing several topics of a general character. The highest degree attained at the end of this term is that of bachelor of arts, entitling the graduate to enter any of the professional courses given at the universities. Secondary instruction was represented in 1900 by 8 official colleges, 4 seminaries, 1 religious school, and 4 private lyceums. Statistical data for the year 1899—only data available—show the following figures for secondary instruction in the several departments of the Republic:

Department.	Colleges.	Classes.	Professors.	Pupils.
La Paz	4	22	31	588
Cochabamba	3	13	21	712
Sucre	2	13	16	342
Potosi	1	6	9	137
Oruro	1	6	9	114
Santa Cruz	2	12	14	235
Tarija	1	6	9	61
Beni	1	4	6	32
Total	15	82	115	2,221

Secondary education is mainly supported by the State, at an expense of about 100,000 bolivianos per annum.

Superior education.—Superior or professional instruction embraces three courses, viz, law, 5 years; medicine, 7 years, and theology, 4 years. This branch of education is served by the universities situated at La Paz, Chuquisaca, Cochabamba, Potosi, Tarija, Santa Cruz, and Oruro, respectively. Instruction in law is given at all the universities; in medicine at Chuquisaca, La Paz, and Cochabamba, and theology at the latter institutions and Tarija. For the better administration of the educational system and to encourage education in the country this branch of civilization is under the direct control of the Secretary of Public Instruction, a member of the Cabinet.

[a] Memoria del Concejo Municipal en 1902. La Paz, 1903.

The accompanying table shows the standing of all branches of instruction in Bolivia in 1901, according to official estimates:

Department.	Institutions.				Professors.				Students.			
	Superior.	Secondary.	Primary.	Total.	Superior.	Secondary.	Primary.	Total.	Superior.	Secondary.	Primary.	Total.
La Paz	3	3	109	115	16	28	138	182	140	563	10,315	11,018
El Beni	.....	.....	22	22	....	4	22	22	.....	.....	329	529
Oruro	1	1	29	31	1	11	48	60	11	105	1,881	1,997
Cochabamba	3	2	177	182	9	13	293	315	226	793	10,537	11,556
Santa Cruz	1	2	93	96	2	8	68	78	33	238	4,018	4,289
Potosi	1	1	128	130	3	10	148	161	29	239	5,471	5,739
Chuquisaca	3	3	93	96	18	32	141	191	195	556	5,621	6,372
Tarija	2	1	82	85	5	9	80	94	43	59	3,215	3,317
Total	14	13	133	760	54	115	938	1,108	677	2,553	41,587	44,817

The total cost of instruction to the State is officially estimated at the following figures:

Department.	Superior.	Secondary.	Primary.		Grand total.
			Municipal appropriation.	State appropriation.	
	Bolivianos.	*Bolivianos.*	*Bolivianos.*	*Bolivianos.*	*Bolivianos.*
La Paz	30,320	24,780	121,782	9,846	186,628
El Beni	.....	6,840	9,846	15,830	32,516
Oruro	1,680	14,276	41,190	2,800	59,946
Cochabamba	2,824	12,072	145,096	5,200	165,192
Santa Cruz	1,850	13,460	18,762	5,780	39,852
Potosi	2,740	11,016	123,030	28,740	165,526
Chuquisaca	31,870	8,940	34,601	600	76,011
Tarija	1,742	7,168	10,962	3,500	31,172
Total	73,026	98,552	513,069	72,296	756,943
			585,365		

OTHER INSTITUTIONS.

Besides the private schools, colleges, and lyceums devoted to education, special instruction is also given at the military school of La Paz, the commercial schools of Sucre and Trinidad, the agricultural school of Umala, department of La Paz, the mining and civil engineering school of Oruro, the school of painting at Cochabamba, and several manual-training schools established at different points under the care of the religious orders.

SANTA ANA MISSION, EL BENI.

CHAPTER XV.

PATENT AND TRADE-MARK LAWS AND REGULATIONS—ARMY—WEIGHTS, MEASURES, AND VALUES.

PATENTS.

Article 89 of the Constitution of the Republic, among other provisions, establishes that the President of the Republic shall have power "to grant according to law exclusive privilege for a certain time to inventors, improvers, or importers of useful processes or methods applicable to sciences or arts, and to order, in case that the secret of the invention, improvement, or importation be given to the public, the proper indemnification therefor to be paid."

In compliance with the foregoing provision the patent law of Bolivia was enacted on the 8th of May, 1858, and by act of January 10, 1903, the Secretary of Industry was vested with the necessary authority "to grant patents of inventions and trade-marks."

The patent law in force provides:

ARTICLE 1. The law secures for all inventors the full and undisturbed enjoyment of their inventions, provided that said inventions are not against law or good morals.

ART. 2. The methods or processes discovered for the improvement of any industry or manufacture shall also be considered inventions.

ART. 3. Devices or discoveries tending only to change the proportions of things already known, or to produce articles which are merely ornamental, shall not be deemed inventions.

ART. 4. The Government shall have the power to purchase, for the benefit of the people at large, the secret of any useful invention.

ART. 5. To secure to an inventor the exclusive enjoyment of his invention, a patent of privilege shall be issued in his favor, said privilege to last for not less than ten years nor more than fifteen.

ART. 6. It is hereby forbidden to grant patents of privilege to the inventors of secret remedies. The publication of these secrets is a matter of duty for the inventors, who shall receive in consideration thereof a just indemnification.

ART. 7. Importers of machinery, or of methods of fabrication or industry not known in the Republic, shall also be entitled to patents of privilege, the concession of which shall be subject to the rules set forth in the following article.

ART. 8. If the establishment of the imported machinery or industry requires the expense or the disbursement in advance of $25,000, the privilege shall be granted for three years. If the amount to be spent or advanced is $50,000, the privilege shall last six years. If it reaches or exceeds $100,000, the privilege shall be granted for ten years.

ART. 9. Privileges granted to importers of machinery, or of new methods of fabrication or industry, known and used in foreign countries, shall be limited to the district wherein the said machinery is to be set at work, or to the territory necessary to insure its benefits.

ART. 10. Applicants for patents of privilege of the two classes aforesaid shall file a petition explaining the nature of the invention or improvement, but the methods, materials, ingredients, or instruments to be used may be kept secret. The petition shall be accompanied by a sample of the article, smelted metal, or product to which the invention or improvement refers.

ART. 11. Applicants for patents for imported inventions shall file with their petition drawings or models of the machinery to be introduced, or a statement in full of the principles, methods, or processes of the industry to be introduced in the territory of the Republic and of the product which is sought to be obtained.

ART. 12. The Government shall appoint a committee of three competent persons, whose duty it shall be to examine the process or secret constituting the invention or improvement to which the application refers.

ART. 13. This committee shall be always presided over by the Political Chief of the respective locality. Two members of the Municipal Council of the same locality shall be added to it and shall aid in the examination referred to in the preceding article.

ART. 14. The two members of the Municipal Council and the three members of the committee appointed by the Government shall take an oath, to be administered by the Political Chief, not to reveal the secret of the invention or improvement and to faithfully perform their duties.

ART. 15. The members of the committee and those of the Municipal Council added to it shall meet forthwith and confer without the interested parties being present about the report to be made by them. Any difference of opinion which may arise shall be recorded.

ART. 16. The report to which the foregoing article refers shall be forwarded to the Secretary of "Fomento," enclosed in an envelope marked "confidential." It shall be accompanied by a description of the method, machinery, process, etc., constituting the invention, improvement, or importation under consideration.

ART. 17. Three months, at the latest, after the receipt of the report above referred to the Government shall cause the proper patent to be

issued, said patent to be written on stamped paper of Class No. 1.[a] It shall order, furthermore, that the sealed package containing the explanation of the secret, or the statement spoken of in article 11, be preserved in the Department of "Fomento."

ART. 18. In order to prevent the patentees from misusing their patents the Government shall set forth on the latter that it does not guarantee either the truth, the merits, or the advantages of the invention, improvement, or importation, and that the whole responsibility therefor is left to the patentee.

ART. 19. If the patentee desires to make some changes in his invention, or in his original application, before obtaining the patent, or at any time thereafter within the period of the concession, he shall make a declaration in writing to that effect accompanied with a description of the novelties to which he refers, the whole thing to be done in the manner and form established in article 10. The variation of the privilege shall not entail any extension of the time of the patent.

ART. 20. Patentees shall enjoy the exclusive right of using the invention or improvement to which the patent refers and of receiving the benefits thereof.

ART. 21. Patentees shall have the right to found establishments for the working of their patents, either at any place in the Republic, if the privilege extends to the whole of it, or at the locality to which the patent may have been circumscribed. They shall also have power to authorize other persons to make use of their methods and to dispose of their patents as personal property.

ART. 22. Patentees shall not assign or transfer their patents, wholly or in part, except by means of a public instrument; otherwise their privilege shall be forfeited.

ART. 23. The priority in the application for a patent, if any dispute or doubt arises in case that two applications are made, shall be proven by the certificate of the Secretary of "Fomento," who shall make a record of the day and hour on which the petitions are filed.

ART. 24. The period of the privilege of invention, improvement, or importation begins at the date of the decree by which it was granted.

ART. 25. Patents shall be recorded in special books kept for this purpose at the Department of "Fomento." The original petition, the specifications, and all other papers spoken of in article 10 shall be kept on file in the same Department until the expiration of the patent.

ART. 26. The granting of patents shall be officially communicated by the Secretary of "Fomento" to the Political Chiefs of the different districts and published in the official newspaper. The patents shall be also inserted in the Collection of laws and decrees.

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[a] Stamped paper of this class was worth at the date of this decree 2 bolivianos per sheet. Now it belongs to Class No. 6.

ART. 27. At the expiration of the time of a patent, the invention, improvement, or privilege to import some new industrial method shall become public property.

ART. 28. At the expiration of the time of a patent, the petition, specifications, and all other papers referred to in article 10 of this law shall be published and kept on file in the Public Library of the National Capital.

ART. 29. Whenever a privilege becomes forfeited for any of the reasons set forth in this law, the publication of the papers and the filing thereof in the Public Library, for the purposes of article 27, shall be likewise made.

ART. 30. The Government shall cause the descriptions and specifications, as well as all drawings accompanying them, to be printed and circulated in sufficient number through the Political Chiefs of the districts, so as to make the general public acquainted with the methods of the extinct patent.

ART. 31. Patentees shall have the right, upon giving the proper bond, to ask for the seizure of the machinery and instruments with which their patents have been or are infringed, and of the products obtained through their use.

ART. 32. Infringers shall be punished, upon conviction, by the confiscation to the benefit of the patentees of all the property seized. They shall also be bound to pay damages in proportion to the amount of the fraud.

ART. 33. If the fraud is not proved, the patentee shall be condemned to indemnify the supposed infringer for the losses and damages sustained by him in consequence of the seizure, and to pay a fine equal in amount to that which the latter might have had to pay if convicted.

ART. 34. Whenever a patentee is disturbed in the exercise of his exclusive rights as such, he shall have the right to apply for protection to the courts of justice and request that the infringers be punished according to the preceding articles. But in case that a dispute on the validity or invalidity of the patent should arise, the question shall be decided by the tribunal designated by law to take cognizance of cases against the Government.[a]

ART. 35. In case of question or dispute between two patentees as to the true ownership of the invention, if the similarity of the two patents is absolute, recognition shall be given to the one first granted.

ART. 36. The patent subsequent in date shall be, in the case of the preceding article, considered as a patent of improvement.

ART. 37. Patents granted for an invention or improvement, or for the importation of foreign inventions or improvements, which the

[a] This special tribunal having been abolished, the ordinary courts and tribunals of justice shall take cognizance of these cases.

tribunals may condemn as contrary to law, public security, or police regulations, shall be void. Patentees in this case shall have no right to indemnification.

ART. 38. Patents shall be forfeited, not only in the cases already explained, but also in the following:

1. When the patentee is convicted of having concealed, in his specification, the true manner of putting his invention into practice.

2. When the patentee is convicted of having employed secret methods not mentioned in the specification, or in the declaration under article 19 of the intention to amend it.

3. When the patentee is convicted of having concealed the fact that the invention for which he applied and obtained a patent was at the time of his application known and described and published, through the public press, within or without the Republic.

4. When the patentee has allowed one year and a day to pass since the day on which the privilege was granted to him, without having put his invention into practice, and has not given sufficient reason under the law to excuse his negligence.

5. When the patentee, or the assignee of his rights, fails to comply with the obligations imposed by the patent.

ART. 39. In all cases of nullification or extinction, for whatever reason, of a patent, the provisions of article 27 of the present law shall be carried into effect.

On the 11th September, 1877, a decree was issued enlarging the scope of the original patent law and providing that as the decree of May 8, 1858, does not contain certain provisions which should be added, in order to insure in favor of the industry the good effects which must be expected from the granting of patents, and at the same time prevent this business from being turned into reckless speculation, tending to increase fruitlessly the burdens of the Government, the following was decreed:

ARTICLE 1. No patent shall be granted in any of the cases mentioned in the decree above named, except upon proof of the truth of the claims made by the applicant, and of the usefulness of the invention, and the advantages which are promised to be derived from it to the national industry.

ART. 2. The examining committee shall report upon these points, setting forth all the facts and circumstances which may be conducive to form an exact idea about them.

The applicant shall furnish to this effect the committee with all documents and proofs which may be needed, and shall give all the explanations, and make all the experiments which may be required.

When the application refers to the importation of new machinery, or industrial methods, the applicant shall submit an itemized schedule,

duly supported by proof, of the expense he shall have to incur for this purpose. The report of the committee shall also embrace this point.

ART. 3. When the explanation of the invention or improvement can not be made without revealing the secret of the same, the applicant shall be permitted to refrain from making it; but he shall be bound to give such experimental proof of his invention as to convey the full knowledge thereof which is desired.

ART. 4. Applicants who, upon fulfillment of the requisites set forth in the preceding articles, succeed in securing their patents, shall pay a fee of 100 bolivianos, and deposit, furthermore, in the National Bank of the Republic, the sum of either 100, 200, or 300 bolivianos, according to the duration of the patent, which may be for three, six, or ten or more years, as security that the patent shall be put into practical operation. At the expiration of one year, granted for this purpose, without the patent having been put into practice, the amount deposited shall become the Government's property and shall be transferred to the National Treasury.

ART. 5. The present decree shall be considered as supplemental to the decree above cited of May 8, 1858, which, as now amended, shall remain in force.

On the 17th of January, 1902, the Secretary of the Treasury and Industry issued an order establishing that, upon examination of the case of José Szendy, applicant for a patent for the manufacture of felt hats in the Republic, it was decided, the decision to be taken as a general rule, that in the cases mentioned in article 7 of the decree of May 8, 1858, the fact that the machinery or industrial method to be imported from abroad has not been previously used, within or without the Republic, is indispensable for the granting of patents.

By order of the Secretary above mentioned, bearing date of March 26, 1903, it was established that the concession of exclusive privileges to importers of machines or methods of manufacture or industry, being subordinated to the indispensable condition that the imported machines or methods are not known or have not been used or put into practice previous to the concession, within or without the Republic, the application of Matias Talamas, asking for a patent of privilege for a machine to manufacture cigars and cigarettes, which is known and used in the country, is against article 4 of the political Constitution of the State, which guarantees industrial liberty and restricts the power of the Executive in granting patents, excluding from it machines already known; and whereas no new invention for the manufacture of the articles aforesaid is herein involved, thereupon the application for the patent referred to is rejected.

Trade-marks.

By law of November 25, 1893, the following provisions were established:

ARTICLE 1. A tax of 5 bolivianos per year, to be collected through the Department of the Treasury and Industry, shall be hereafter levied on every trade-mark which may be filed for registration at the proper office.

ART. 2. The Executive power shall make the proper rules for the execution of this law.

In compliance with the foregoing provisions, on the 27th of March, 1897, the following rules for the execution of the Trade-mark Law were enacted:

Whereas the law of November 25, 1893, which ordered a tax on trade-marks to be levied and paid, gave authority to the Executive to make rules for the proper execution of its provisions:

Therefore, I, the Chief Magistrate of the Republic, by virtue of the power vested in me by item 5, article 89 of the Constitution, do hereby decree:

ARTICLE 1. An annual tax of 5 bolivianos shall be levied on each trade-mark filed for registration under the present rules.

ART. 2. The following shall be considered as trade-marks, namely: Engravings, monograms, vignettes, stamps in relief, letters and numerals with a special design, casks or wrappings of articles, and any other signs intended to distinguish from all others the products of a factory.

ART. 3. The trade-mark secured through the process established in the present decree shall be the exclusive property of the manufacturer or business man who obtained it, and he shall have the right to oppose its being used by other manufacturers or business men. He may enforce before the courts his exclusive rights, which he may also assign or transfer to others by contract or last will.

ART. 4. The sale of the business house, or industrial enterprise to which the mark belongs, shall carry with it, unless provided otherwise by the contracting parties, the transfer of the mark.

ART. 5. The transfer of the mark shall be, for the purposes of this decree, recorded at the proper office.

ART. 6. All applications shall be accompanied by two copies or samples of the engraving, emblem, letter, stamp in relief, etc., which is to be used. One copy shall be filed at the registration office and the other forwarded to the Department of 'Fomento.'

ART. 7. The application shall also be accompanied by a description of the mark, made in duplicate, said description to specify the article or articles for which it is intended. If the owner of the mark does not personally attend to the business of this application, the power of

attorney authorizing the applicant to act in his behalf shall also accompany the application.

ART. 8. No application shall be admitted if it is not accompanied with a receipt issued by the Department of the Treasury showing that the tax established by article 1 of this decree has been paid. Failure to comply with any of the provisions of this article shall cause the respective functionary to be responsible for the value of the patent.

ART. 9. The application shall be filed before the notary of the Treasury, who shall make at the foot of the document a short statement of its contents, and the day and hour on which it is filed, as well as of the fact that the duplicate copy of the mark was also filed.

ART. 10. The Prefects, after having complied with all the requisites established in the foregoing articles, shall grant in the name of the nation the exclusive right to use the trade-mark. The decree by which this grant is made, as well as the application itself with all its exhibits, shall be published in the Official Bulletin, and if there is no such Bulletin, in any newspaper to be designated for that purpose, the publication to be made three separate times, ten days intervening between each, at the cost of the interested party.

ART. 11. After the publication is made as directed in the foregoing article, the applicant shall request, if no opposition has been shown to the granting of the trade-mark, that the whole record should be forwarded to the Secretary of "Fomento," in order that he, upon the proper report of the law officer of the Department, may approve the concession.

The decision of the Secretary with all the papers of the case shall be recorded in a book specially kept for this purpose by the notaries of the Treasury. The entry shall be signed by the Prefect, the District attorney, the interested party or his attorney, and the notary. Copies of this entry shall be given to the interested party and to the Department of Fomento.[a]

ART. 12. If any opposition is made after the expiration of the time of publication, the Prefect shall refer the whole record to the District attorney, who shall decide about the priority of rights according to law.

ART. 13. If the decision of the Prefect is against the granting of the trade-mark, an appeal may be taken against it within eight days, to be counted from the date of notification, to the Secretary of "Fomento," who, after hearing the opinion of the Attorney-General, shall affirm or reverse the decision. The decision of the Secretary of "Fomento" shall be final.

ART. 14. The samples of marks, or emblems, and their descriptions shall be faithfully kept, duly inventoried, and methodically classified, by the notary of the Treasury. They shall be exhibited for public inspection in well-arranged cases.

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[a] The text of this article has been amended by decree of March 13, 1900.

ART. 15. Counterfeiters of trade-marks, adulterators of articles of commerce of a business house which makes use of a trade-mark, and sellers of counterfeited articles shall be punished with a fine of from 20 to 200 bolivianos, independently of the penalties mentioned in article 302 of the Penal Code.

ART. 16. Articles of merchandise bearing counterfeited trade-marks shall be confiscated to the benefit of the Departmental Councils.

Art. 17. Business men who prior to the enactment of this decree have been making use of a trade-mark which proves to be identical with another trade-mark granted under the new provisions shall be bound to adopt some change or modification of their distinctive sign or emblem. Their failure to do so shall render them liable to be punished as counterfeiters.

ART. 18. Business men who make use without the proper authority of a trade-mark shall be punished with a fine of from 5 to 50 bolivianos, for the municipal fund, without prejudice to their being compelled to secure in the proper way the authority required by this decree.

ART. 19. Joint stock companies are entitled to the use of their names without any restriction.

ART. 20. Foreign trade-marks shall not enjoy the guaranties granted by the present decree unless they are registered with the same formalities as are established for the domestic ones.

ART. 21. Business men who fail to pay the taxes due on account of their trade-marks shall be subject to the process of coercion established by law against delinquents of this kind. If the payment is not made after the first notice a sufficient number of the articles of commerce protected by the mark shall be seized and sold at public auction. The amount of the tax and a penalty of 2 per cent per month shall be collected by this process. The concession of the trade-mark may be also canceled.

ART. 22. Business men who, after having been punished as provided in the foregoing article, should continue to make use of the trade-mark, shall be prosecuted as counterfeiters.

As the formalities established in article 11 of the decree of March 27, 1897, on the subject of trade-marks, are apt to delay the prompt transaction of this business, the following amendment was ordered by Executive Decree bearing date of March 13, 1900:

SOLE ARTICLE. Article 11 of the decree of March 27, 1897, is hereby amended so as to make it read as follows:

ART. 11. The publication provided for in the foregoing article having been made, and no opponent having appeared, the interested party shall ask that the whole record of his case be forwarded to the Secretary of "Fomento," who, after hearing the opinion of the Attorney-General, shall approve the concession and issue in consequence thereof the respective patent. The record shall then be returned to the Prefect for the purposes set forth in article 14.

The following decree of May 30, 1902, establishes further rules for the proper registration of trade-marks:

Whereas it is imperative to supplement the Rules for the registration of trade-marks by explaining the manner in which they must be numbered, designating the offices from which they are to be issued, and the manner in which they shall be recorded, and to establish also a rule that will protect merchants who have acted in good faith and who have ordered merchandise bearing a trade-mark subsequently registered by others;

Now, therefore, I, José Manuel Pando, constitutional President of the Republic, decree:

ARTICLE 1. Certificates of trade-marks shall bear the number which corresponds to them in the order of their registration in the Department of "Fomento," and shall have attached on the reverse side thereof the drawing that represents the trade-mark, sealed with the seal of the Department and signed by the Chief Clerk of the division.

ART. 2. The Department of "Fomento" shall keep a book for the registration of the certificates issued, recording the number and the nature of the article, and attaching to each entry a copy of the drawing of the trade-mark, sealed and signed by the patentee or his attorney. The same formalities of guaranty shall be observed in the register kept by the notaries of the Treasury.

ART. 3. Merchandise of a particular trade-mark, ordered from abroad prior to the date of the filing of the application with the Prefect for registration of the same trade-mark, shall not be considered articles of commerce bearing a counterfeited trade-mark.

ART. 4. The Department Prefects shall order the publication in the Department Bulletin, or in some other newspaper of greater circulation, of the application for registration of trade-marks, so as to cause merchants who have ordered goods in advance covered by the trade-mark whose registration is solicited to be duly advised.

ART. 5. Certificates already granted shall form Series A and shall be numbered in the order of their being filed in the Department. Series B shall commence with No. 1 and shall apply to trade-marks registered on and after this date.

ART. 6. These provisions supplement those given by Executive decrees of March 27, 1897, and March 13, 1900.

ARMY.

The Bolivian constitution establishes the fundamental character of the army, and declares it to be "an essentially obedient body, which in no case can hesitate or deliberate, being always subject to such regulations and military orders as are issued for its guidance." The army is divided into two branches of service, the regulars and the national guard, both subject to special regulations.

THE MUNICIPAL AND GOVERNMENT PALACES, POTOSI.

All male Bolivians, sound in mind and body, are under obligation to serve in the army from their twenty-first to their fortieth year, as follows: Two years in the regular army, from 21 to 25 years of age; from 25 to 30 in the ordinary reserve, and from 30 to 40 in the extraordinary reserve. The clergy and persons of unsound mind and body are exempt from military service, and after six months active service, upon payment of certain dues certain persons specified in the regulations are also excused from further service. Foreigners who have become Bolivians by naturalization, having resided for five years in the country, are entitled to promotion to offices of high rank in the army.

Regular army.—The military organization of the country has been subject to many reforms, until it has attained a high degree of efficiency. Congress fixes every year the number of troops in the regular army, which at present consists of 5 battalions of infantry, 1 of artillery, and 1 of cavalry. Official statistics show that in 1903 the regular army of Bolivia was made up as follows: Eight colonels, 14 lieutenant-colonels, 13 commanders, 6 majors, 9 surgeons, 55 captains, 41 first lieutenants, 49 second lieutenants, 89 sublieutenants, 7 bandmasters, 132 first sergeants, 152 second sergeants, 274 corporals, 174 musicians, 1,906 rank and file, giving a grand total of 2,933 men, including commissioned officers of all classes.

The military division of the country consists in 9 *comandancias generales* (general commander's post) in the departments of La Paz, Beni, Cochabamba, Chuquisaca, Oruro, Potosi, Santa Cruz, Tarija, and Atacama or the Litoral. The Territorio of Colonias is under special military administration.

National guard.—For the purpose of increasing the efficiency of this branch of the service, the country has been divided into 5 military zones, respectively called northern, central, southern, eastern, and northwestern zones, embracing, the first, the department of La Paz; Cochabamba and Oruro, the second; Potosi and Tarija, the third; Santa Cruz, the fourth, and Beni, the fifth.

War Department.—The War Department consists in the following bureaus and divisions: Secretary's office; Bureau of Ordnance; Bureau of Inspection, Aides and Adjutants; General Army Inspection; Court-martial; Board of Examiners for Military Service.

The General Staff is composed of 1 Chief of the staff, 3 colonels, chiefs of the regimental staffs; 3 majors, 3 European officers under contract, 2 captains, 2 first lieutenant and 3 sergeant orderlies. The Academy of War, Military College, School for Classes, Superior War School, Commissary department, and the Quartermaster's department are all under the War Department.

Arsenals.—The principal arsenal is at the city of La Paz, with deposits at the cities of Oruro and Potosi. The principal firearms in

use by Bolivia are Remington, Mauser (the old and the Argentine models), mitrailleuses, field and mountain guns.

Forts.—In order to prevent Indian incursions, several small forts have been built and are well garrisoned. The principal forts are Caiza, Yacuiba, and Creveaux, in the province of the Gran Chaco, department of Tarija, and Camacho, Murillo, and Quijarro on the Pilcomayo River.

Fighting force.—The total fighting force of Bolivia may be safely estimated at the following figures in round numbers:

	Men.
Regular army	2,560
First reserve (Cuerpo de depósito)	30,000
Second reserve	40,000
Territorial guard	15,000
Total	87,500

The first reserve is a part of the regular army, being substituted for the second reserve, and this in turn for the territorial guard.

The cost of maintenance of the army in all its departments and branches is estimated in round numbers to amount to 3,500,000 bolivianos per annum.

WEIGHTS AND MEASURES.

Although the metric system of weights and measures is the only legal system in the country some of the old Spanish and Bolivian units are still in constant use in the domestic trade.

Measures of length.

Legua	=6,666 varas	= 5.5727 kilometers	= 3.4627 miles.
Cuadra	= 150 varas	=125.3857 meters	=136.7041 yards.
Vara[a]	= 3 pies	= 0.836 meters	= 2.7427 feet.
Pie	= 12 pulgadas	= 27.8635 decimeters	= 10.9711 inches.
Pulgada	= 12 lineas	= 2.3219 centimeters	= 0.9142 inches.
Linea	= 12 puntos	= 1.9349 centimeters	= .07618 inches.
Punto		= 0.1627 millimeters	= .0064 inches.

Measures of capacity.

DRY.

Fanega	=55.5 litres	=1.5799 bushels.
Almud or celemín	= 4.62 litres	=4.2069 quarts.
Cuartilla	= 1.15 litres	=1.0519 quarts.

LIQUID.

Arroba or cántara	=16.1329 litres	=4 gallons.
Cuarta	= 4.33 litres	=1.64 gallons.
Azumbre	= 2.02 litres	=2.12 quarts.

[a] The vara is subdivided into one-half vara (42 centimeters), one-fourth vara (21 centimeters), one-eighth vara (10.50 centimeters), one-third vara (28 centimeters), and the *sesma*, equivalent to 14 centimeters.

Measures of weight.

Tonelada	= 20 quintales	= 920 kilos	= 2,028.63	pounds.
Quintal	= 4 arrobas	= 46 kilos	= 101.43	pounds.
Arroba	= 25 libras	= 11.5 kilos	= 25.358	pounds.
Libra	= 16 onzas	= 0.460 kilos	= 1.014	pounds.
Onza	= 16 adarmes	= 28.75 grams	= 1.014	ounces avoirdupois.
Adarme	= 36 granos	= 1.797 grams	= 27.734	grains.
Grano		= 5 centigrams	= .7653	grains.
Fanega	= 135 libras	= 62 kilos	= 136.93	pounds.

FOR MINERALS.

Marco	= 8 onzas	= 230 grams	= 7.3945 ounces troy.
Cajón	= 50 quintales	= 2,300 kilos	= 5,071.55 pounds.

Fineness of gold.

Ley de 24 quilates (carats)	= 1,000 thousands.
Ley de 23 quilates (carats)	= 958.33 thousands.
Ley de 22 quilates (carats)	= 916.66 thousands.
Ley de 21 quilates (carats)	= 875 thousands.
Ley de 20 quilates (carats)	= 833.33 thousands.
Ley de 19 quilates (carats)	= 791.66 thousands.
Ley de 18 quilates (carats)	= 750 thousands.

Fineness of silver.

Ley de 12 dineros	= 1,000 thousands.
Ley de 11 dineros	= 916.66 thousands.
Ley de 11½ dineros	= 925 thousands.
Ley de 10 dineros	= 832.33 thousands.
Ley de 9 dineros	= 750 thousands.
Ley de 8 dineros	= 666.66 thousands.
Ley de 7 dineros	= 583.33 thousands.

Average market price for tin ore.

Fineness.	Price.	Fineness.	Price.	Fineness.	Price.	Fineness.	Price.
	Bolivianos.		*Bolivianos.*		*Bolivianos.*		*Bolivianos.*
14	1.20	29	6.00	44	12.00	59	18.60
15	1.40	30	6.40	45	12.40	60	19.20
16	1.75	31	6.70	46	12.80	61	19.80
17	2.00	32	7.10	47	13.20	62	20.40
18	2.35	33	7.45	48	13.60	63	21.10
19	2.65	34	7.85	49	14.00	64	21.85
20	2.90	35	8.15	50	14.70	65	22.60
21	3.20	36	8.60	51	15.10	66	23.30
22	3.50	37	9.00	52	15.50	67	24.00
23	3.80	38	9.40	53	15.90	68	25.50
24	4.10	39	9.80	54	16.30	69	26.70
25	4.40	40	10.30	55	16.70	70	29.00
26	4.80	41	10.70	56	17.10		
27	5.20	42	11.10	57	17.60		
28	5.60	43	11.50	58	18.10		

CHAPTER XVI.

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