

did not conceal their conviction that a stronger and more permanent form of government was essential to the public welfare. The latter view seems to have prevailed. In virtue of a decree, dated Bogota, the 27th August 1828, Bolivar assumed the supreme power in Colombia, and continued to exercise it until his death, which took place at San Pedro, near Santa Martha, on the 17th December 1830.

In the career of this remarkable man, which was often embittered and was perhaps shortened by the suspicions and slanders of his colleagues in the work of liberation, certain circumstances, apparently well established, stand out, which deserve particular mention. He expended nine-tenths of a splendid patrimony in the service of his country; and although he had for a considerable period

unlimited control over the revenues of three countries,—Colombia, Peru, and Bolivia,—he died without a shilling of the public money in his possession. He conquered the independence of three states, and called forth a spirit in the southern portion of the New World which can never be extinguished. He purified the administration of justice; he encouraged the arts and sciences; he fostered national interests; and he induced other countries to recognize that independence which was in a great measure the fruit of his own exertions. Bolivar's remains were removed in 1842 to Caracas, where a monument was erected to his memory; and in 1858 the Peruvians followed the example by erecting an equestrian statue of the liberator in Lima.

BOLIVIA

Plate XVII. **T**HIS name was given in honour of Bolivar (see last article) to a state in South America, formed in 1825 from the provinces of Upper Peru which formerly constituted part of the vice-royalty of Buenos Ayres. The bulk of the country extends from 10° to 23° S. lat., and from 58° to 71° W. long., and it is bounded on the N. by Peru and Brazil, on the E. by Brazil and Paraguay, on the S. by the Argentine Republic and Chili, and on the W. by the Pacific Ocean and Peru. The greater part of Bolivia is a mountainous and elevated country, more particularly at its western and central parts; but towards the east it becomes much less so, and at length terminates in extensive plains, which are bounded on the east by Brazil. From the Pacific coast the southern boundary of Bolivia runs along the 24th parallel of latitude (the limit decided by treaty with Chili in August 1866), to as far as the crest of the Andes; turning S. it follows the line of the mountains to 26° S. lat., in which parallel it crosses the plateau to the inner Cordillera, along which it lies N.N.E. to the 22d parallel. This line of latitude forms the boundary of territory which is certainly Bolivian, as far as the River Paraguay; but Bolivia, in common with the Argentine Republic and Paraguay, has claims on the unexplored territory of the Gran Chaco, which lies south of this line, and between the rivers Pilcomayo and Paraguay. From 22° on the River Paraguay, the frontier with Brazil was decided, by treaty of March 1867, to be a line following that river northward to the Bahia Negra in 20° 11', along the Negra to its termination, and thence through the midst of the lagoons of Caceres, Mandioré, Gaiba, and Uberaba (lying immediately west of the Paraguay River), to Corixa Grande; thence in a straight line to Boa Vista and the source of the Verde; down that river to the Guapore, and along the latter to where the Beni joins it in 10° 20' S.; thence in a straight line towards the source of the River Javary (in 7° S.). The present Government of Bolivia appears inclined, however, to repudiate this treaty, and to return to the older frontier, which included the tributaries of the Amazons as far as 6° 28' S. On the Peruvian or western frontier the boundary follows a more or less northerly direction from the mouth of the River Loa in Atacama, along the Cordillera, crossing Lake Titicaca, and passing north thence to the line running from the Beni to the Javary.

Before the formation of the republic, Bolivia, or the former province of Charcas, consisted of four great districts or "intendencias," which were under the rule of the viceroy of Rio de la Plata. These were—

1. Santa Cruz, formed of the districts of its bishopric—Mojos, Chiquitos, Santa Cruz, Valle Grande, Misque, and the special jurisdiction of its capital Cochabamba;
2. La Paz, consisting of the dioceses of its bishopric;

3. Potosi, comprising Tarija, Chichas, Lipez, Atacama, Porco, and Chayanta;

4. The province of La Plata, which embraced all remaining portions of the archbishopric.

At the present time the republic is divided politically into departments, provinces, and cantons. The departments, which are named La Paz de Ayacucho, Cochabamba, Potosi, Chuquisaca, Oruro, Santa Cruz de la Sierra, Tarija, Beni, and Atacama, have each one or two capital towns; the provinces and cantons have also each its chief place. Each department has a governor, who stands in direct communication with the Government; the subdivisions have their corregidores and alcaldes, who are subject to the governor.

The westerly departments of La Paz, Oruro, and Potosi are situated in the highest regions of the plateau of Bolivia, and are more valuable on account of their mineral riches than for their vegetable products, of which a coarse grass is characteristic. The first consists of a series of high ranges and deep valleys, in which the climate and production vary with the elevation; the second lies also in the high table-land or Puna region; both are rich in veins of gold, silver, and tin, but the mining of these has not yet been fully developed. The third, Potosi, belongs entirely to the highest regions of Bolivia, and is bare and dry, with a cold and rude but healthy climate; this is the greatest mining region of the country.

The central departments of Cochabamba, Chuquisaca, and Tarija lie partly on the high plateau, partly on the lower slopes and plains eastward, and pass thus through the whole series of changing climates and zones of production, from the bare high land to the tropical regions of the low lands. The first is eminently the granary of Bolivia and southern Peru, excelling in the cultivation of wheat; the industries of woollen and cotton manufactures are also most highly developed in the department, but its mines are not worked. Chuquisaca, of which only a third part lies in the high land, is also a vegetable growing region, in which wheat, barley, rice, peas, vines, and all sorts of vegetables are cultivated; cattle and horses are also numerous. The forests of this department and of Tarija, which slope down to the wooded and pastoral plains of the tributaries of the Paraguay, afford many species of valuable timber.

The departments of Beni (or Veni) and Santa Cruz de la Sierra lie altogether in the low lands of the east, stretching to the Rio Maderia and the Paraguay. The former is as yet little explored, but is a land of tropical forests, rivers, and swamps, with an unhealthy climate. Santa Cruz is also characterized by a hot, damp atmosphere, but produces garden and field fruits in astonishing richness,—coffee, cocoa, vanilla, sugar-cane, maize, and cotton. The forests of both of these departments afford an infinity of valuable

timber trees, and in the latter there is much pasture land well fitted for cattle breeding.

The department of Atacama, which belongs geographically either to Peru or Chili, forms the only part of Bolivia which comes into contact with the ocean, and is situated between the Andes and the Pacific coast. It is almost entirely desert and sterile, has many volcanoes, and is characterized by rapid changes of temperature; it is almost destitute of population, and is only inhabited in those parts of the coast in which valuable guano deposits are found, or where the nitrate deposits and silver mines in the interior are worked. Near its northern limit is situated the small port of Cobija, the only avenue by which foreign articles of commerce can enter the Bolivian Republic without the payment of transit duties. It has obtained peculiar and valuable privileges as an encouragement to the introduction of merchandise by this route, in preference to the more convenient routes by the Puertos Intermedios, belonging to the Republic of Peru. But the arid nature of the surrounding country, and the great scarcity of water, must greatly retard its advancement, since not only are the inhabitants scantily supplied with this necessary of life, but the mules employed in transporting goods into the interior are exposed to great hardships.

Western Bolivia is the highest and most mountainous country of the two Americas. Five separate systems of mountains, curving from Peru in the north-west and passing south into Chili, may be distinguished as forming its high land. Nearest the Pacific is the range of the outlying *coast mountains*, which does not exceed 5000 feet in altitude. The range of the true *Andes* rises farther inland, forming part of the vast chain which extends along the whole of America; in Bolivia it attains an average height of 15,000 feet, and has a general width of 20 miles, having its highest known point here in the volcano of Sahama, 23,000 feet in elevation. Next follows the central system of the *Cordillera Real*, also named the eastern Cordillera, presenting a succession of sharp, rugged peaks, reaching up into the region of eternal ice and snow, higher generally than the Andes, but less massive: the peaks of Illimani (21,300 feet) and Sorata (24,800 feet) are its culminating points. Between the Andes and the Cordillera Real there are various *Serrania* or isolated groups of mountains, and single cerros of less altitude, rising from the enclosed plateau to 17,000 feet in some instances. The last system is that of the numerous minor Cordilleras, which run south-eastward from the Cordillera Real into the lowlands of eastern Bolivia, of which the most important is that of Cochabamba, stretching out to 62° 40' E. long. The elevation of the snow line in the highlands of Bolivia appears to vary between 16,000 and 18,000 feet, modified in many cases by the aspect of the mountains and the nature of the country surrounding them, being raised where heat is powerfully reflected from the surface of the bare high plains, or lowered where the mountains are exposed to cold southerly winds. Volcanoes are frequent in the Andes and coast ranges; those of Sahama and Isluga, with Tua, Olca, and Ollagua farther south, are constantly smoking.

These mountain systems divide Bolivia into a high region, containing many very elevated plains stretching between the enclosing heights of the west, and a low land forming the eastern side of the country, beneath the mountains, and at a comparatively small elevation above the sea. The high plains or basins of the plateau enclose a continental water system, from which there is no outlet to the ocean, the rivers terminating in lakes, of which Lake Titicaca is the chief, or in swamps, or in vast dried up salt fields,—rapid evaporation disposing of and balancing the supply of water flowing to these by the mountain streams.

The valley or plateau which is occupied by the Lake of Titicaca and the Rio Desaguadero forms the most ele-

vated table-land in the globe, with the exception of that of Thibet, which presents only mountain pastures, covered with sheep; while this table-land of the New World presents towns and populous cities, affords support to numerous herds of cattle, *llamas*, *guanacos*, and sheep, and is covered with harvests of maize, rye, barley, and wheat, at an elevation which has nothing to equal it in any other part of the world. The Lake of Titicaca or Chuquito, which occupies its northern extremity, is 12,600 feet above the level of the sea, and its extent is equal to fourteen times that of the Lake of Geneva, or 3220 square miles, the greatest depth being upwards of 700 feet. It is surrounded by numerous towns and villages, and a rich and fertile country, and contains several islands, the largest of which is called Titicaca, and was long held in great veneration by the Peruvian Indians, in consequence of its having been the place whence Manco Capac and his consort Manco Cello Huaco, the great founders of the empire of the Incas, issued, to spread civilization, industry, and good government among the surrounding nations. The Lake of Titicaca is very irregular in its form. It admits of extensive navigation for small vessels, though not unattended with danger, as it is subject to sudden storms and violent gusts of wind from the neighbouring mountains. This lake communicates with the smaller Lake of Pansa, or of the "Pampa Aullagas," situated at the southern extremity of the valley, by means of the Rio Desaguadero, which flows out of the Lake of Titicaca, and has a breadth of from 80 to 100 yards. This river and lake form part of the western boundaries between the Republics of Bolivia and Peru. Over the river was formed, in the time of the Incas, a suspension bridge, composed of cables and cords made of the grass and rushes which grow on its borders; and the work was constantly renewed from time to time, to obviate the effects of decay, as it constituted the only line of communication between the opposite sides of the valley. These lakes, with the Desaguadero, form the only receptacles for the water of those rivers and streams which descend from the surrounding mountains and enter this extensive plain, which has no visible outlet whereby its contents can escape otherwise than by evaporation.

Those rivers which take their rise from the western *Rivera*, declivity of the Andes, and flow into the Pacific, are so inconsiderable in magnitude, and so short in their course, as scarcely to merit observation, and are only useful in supplying the means of a partial irrigation to the arid plains which separate these mountains from the Pacific. But those numerous rivers taking their origin on the eastern declivity of the Cordillera Real, which is the main water-parting of Bolivia, present a very different aspect, and are of much greater importance, since they communicate with large navigable rivers, which terminate in the Atlantic Ocean.

The River Paro or Beni, which takes its origin in the neighbourhood of the city of La Paz, and the Guapey, which rises near Cochabamba, and, sweeping round the southern and eastern bases of the Cordillera of Cochabamba, unites itself to the Mamore, flow to the north-east to mingle with the waters of the Madeira and the mighty Marañon or Amazons; while the Pilcomayo, which rises near Potosi and Chuquisaca, and the Vermejo, from the valley of Tarija, bend their courses, at a considerable distance from each other, to the south-east, until they join the Paraguay, which terminates in the Rio de la Plata. Possessing only a small extent of sea-board, and that in a perfect desert difficult of passage, and behind which the lofty range of the Andes forms a huge barrier, the whole of the rich provinces of eastern Bolivia are land-locked and almost isolated from communication with the outer world. The most natural outlets of the country appear to be in the

rivers flowing to the great mediterranean navigation system of the Amazons in the north, or to the Rio de la Plata. More than forty years ago the importance of opening up a river highway from eastern Bolivia to the Rio Paraguay had impressed itself strongly on the Government, and large grants and privileges were offered in encouragement of this object, the rivers Otuquis, Tucabaca, and Latirequiqui, flowing to the Paraguay about the 20th parallel, being looked to as probably affording the desired navigable way. As yet, however, though this plan has been frequently revived, no definite progress has been made in this direction. An expedition sent down the Rio Pilcomayo in 1844 reported it innavigable. On the side of the Amazons, the rapids of the River Madeira, 18 in number, and extending over a distance of 230 miles, form a great natural barrier; to overcome this and to connect the navigable upper tributaries in Bolivia with the navigation of the lower Madeira, a company was recently formed for the construction of a railroad along the interrupted portion of the course of the Madeira: this scheme also is for the present in abeyance. It seems probable, however, that the recent opening of regular navigation on the Rio Vermejo from the Paraguay to the upper Argentine province of Jujuy on the southern frontier of Bolivia may to some extent afford an outlet, and tend to develop the resources of that part of the country.

Climate and vegetation. Bolivia lies, as has been noticed, for the most part within the tropical zone; but from its peculiar formation, its climate and productions are dependent rather upon the elevation of different parts of the land than upon its geographical situation. In descending from the highest region of snow and ice to the low plains of rich tropical vegetation several zones or stages are distinguished. The name *Puna brava* is given to the uppermost mountain regions which rise above 12,500 feet to the snow limit: these are scarcely inhabited by man, and are characterized by mosses and hardier grasses,—the animal kingdom being represented by the vicuña, guanaco, llama, alpaca, viscacha, chinchilla, besides the condor and other birds of prey. The region between an elevation of 11,000 feet and the lower *Puna brava* is termed the *Puna*; less cold than the former, it is suited for the growth of potatoes, barley, and rush-like grasses, upon which sheep, llamas, vicuñas, &c., may feed. This division embraces the whole of the high plains of Bolivia, which are but scantily peopled or cultivated. Several species of cactus are found in these elevated regions, and especially the *Cactus peruvianus*, which sometimes grows to a height of from 20 to 30 or even 40 feet, and is serviceable for many purposes. Under the general name *Cabezera de Valle* are grouped the heads of the valleys descending to the lower lands, between 9500 and 11,000 feet in elevation, where the climate is temperate. These cultivable districts produce wheat, maize, and the ordinary vegetables. The *Valle* or *Medio Yunga* is the general name of the deeper portions of the valleys, between 9500 and 5000 feet, with warm climate, affording field and garden fruits in abundance. The *Yunga*, lastly, is the low tropical region, comprising all beneath 5000 feet, and producing all kinds of tropical fruits and vegetation.

In the punas the air is always dry and perceptibly cold, though the temperature may rise high in the sun, and cold, cutting blasts of air from the mountains are of frequent occurrence. In the Valle and upper Yunga a perpetual spring seems to reign, and night frosts are rare. The western side of the Andes is completely rainless, all moisture-bearing clouds rolling up from the ocean being quickly evaporated, or condensed in the higher mountain regions in snow or hail; but the whole of the remaining eastern region of Bolivia has a rainfall. In the lowlands this is irregular in season; but in the upper regions of the

Puna and the Cabezera de Valle, a rainy season generally begins in the middle of November and concludes in the beginning of March, often accompanied by furious thunderstorms, with hail and snow in the higher regions. The climate of Potosi, at an elevation of 13,300 to 13,600 feet, is so various that in one day it frequently exhibits the vicissitudes of the four seasons of the year. Thus, during the night and the early part of the morning it is piercingly cold; in the forenoon it resembles our fine weather in March; in the afternoon the rays of the sun in so pure and attenuated an atmosphere are very powerful and scorchingly hot; while towards evening the air usually becomes mild and serene. Strangers on first arriving in these higher plains are usually affected with difficulty of breathing, owing to the extreme rarity of the atmosphere; they are likewise sufferers from dysentery, which, however, for the most part soon disappears, and in general the highlands are by no means unhealthy. Travellers in the higher regions are exposed to great danger and hardships owing to the storms which occasionally prevail, especially snow storms, which frequently produce the *surumpi*, or snow blindness, an affection which has proved fatal to some travellers. An infectious fever called "fiebre amarilla" sometimes breaks out in the Indian villages of the Puna, causing great loss of life; coughs and lung diseases are prevalent among the children in the punas, and do much injury among grown people in the Valle and Yungas. In descending through the eastern provinces towards the plains of Mojos and Chiquitos, all the gradations of climate are experienced down to that which characterizes the equinoctial regions of America, where intermittent "terciana" or cold fevers, dysenteries, and other diseases peculiar to warm climates prevail.

Animals. The animals which distinguish the more elevated parts of Bolivia are the *guanaco*, the *llama*, the *alpaca* (the first supposed to be the original from which the second and third varieties have been domesticated), and the *vicuña*. These animals, in their structure and habits, are all closely allied to the camel of Africa. Thus, an examination of the structure of the stomach shows that they are capable of existing during a considerable time without any supply of water, and in fact they are seldom seen to drink from the streams of their native mountains. The camel seems peculiarly well calculated to live in the arid and burning deserts of the Old World, and the form of its feet is singularly adapted for traversing rapidly these extensive plains; whilst, on the other hand, the guanaco and the llama have their feet so constructed as to enable them with facility to ascend and descend the abrupt declivities, and to traverse the rugged and uneven passes which abound in these mountains. They seem likewise to frequent particularly those parts of the Cordillera of the Andes which are the most dry and arid, and which are least clothed with forests and shrubbery. Thus, in the Cordillera which separates the Argentine Republic from Chili, the guanacos are found in great numbers on the summits and eastern declivities, which are exceedingly arid and bare when compared with the western or Chili side, where the Andes in their whole extent are clothed to a certain elevation with a broad belt of forest trees and evergreens, and where, at certain seasons of the year, there are heavy and continued rains. On this side guanacos are of comparatively rare occurrence. Their flesh is savoury when young, but not very palatable when full grown; their wool, however, is very valuable to the Indians, who manufacture it into hats and various kinds of woollen stuffs; and their skins, when tanned, are useful in making shoes and harness. The number of these animals in the country is estimated at not less than three millions; about a third part of them, the full-grown males, are employed as

beasts of burden, all the traffic of Bolivia being carried on by means of them.

The vicuña (*Camelus vicugna*) is a smaller animal than the guanaco or the llama, and only useful for its fleece. The wool is long and fine, and forms a valuable article of commerce; it is of a brownish colour, somewhat resembling that of a dried rose leaf; it has a soft, silky, and close texture, and is well adapted for the manufacture of hats and warm clothing. The vicuña very much resembles the llama and guanaco in its habits and dispositions, but cannot be usefully employed as a beast of burden. It usually frequents the highest parts of the mountains, is extremely timid, is gregarious, and runs very swiftly. The chinchilla (*Chinchilla lanigera*) is also an inhabitant of the mountainous parts of Bolivia. The skins, however, are of an inferior quality, although larger than those obtained from the northern parts of Chili; but still they form a very valuable article of commerce, on account of the great fineness and delicacy of their furs.

The sheep pasturing in the highlands of Bolivia are supposed to number about seven millions, and in the lower regions of the east horned cattle are very numerous. The eastern or more thickly-wooded parts of Bolivia are inhabited by a variety of wild animals, such as the jaguar and the tapir, which are more or less common in Brazil and the other parts of intertropical America of considerable elevation.

Geology. The geological structure of the colossal mountains situated in Bolivia has hitherto been very imperfectly examined. We learn from Humboldt, however, that the metalliferous mountains near Potosi are principally composed of trachytic porphyries; and Mr Pentland discovered trachyte also in the mountain of Pichu, one of the most elevated of the western Cordillera. In the same chain there likewise exist various volcanic mountains, some of which are in an active state. There is perhaps no part of the world which affords a more interesting field for the investigations of the geologist than Bolivia, not only on account of the great elevation which it attains, but also from the exhibitions of internal structure presented by volcanic agency and otherwise,—not to mention the aid afforded by such inquiries in the prosecution of mining enterprises.

Minerals. The great variety, extent, and value of the mineral productions of the mountainous districts of Bolivia have given to this part of America an importance and celebrity which it would not otherwise have obtained, and have caused large and populous cities and towns to be built at elevations where the rigours of the climate and the deficient vegetation would otherwise have afforded very few inducements for fixing the abodes of industry. Mining is, however, at the present time in a ruinous state.

Gold. Gold is found in considerable quantities in the mountainous parts of Bolivia; but, owing to the expense of extracting the metal from the ore, the mines which produce it have not been worked to the extent of which they are capable. In these it is usually found in the form of grains or nodules, or intermixed with antimony, silver, and other substances, and is separated by reducing the whole to a fine powder, and by amalgamation with quicksilver. The mountain of Illimani is believed to contain great quantities of gold, in consequence of that metal having been found in a native state in considerable quantities in the lake of Illimani, situated at its base. In the 17th century, likewise, an Indian found here, at a short distance from the city of La Paz, a mass of native gold, which was said to have been detached from the mountain by the agency of lightning, and which, having been purchased for the sum of 11,269 dollars, was afterwards deposited in the cabinet of natural history at Madrid. But by far the greater part of the gold procured in Bolivia is obtained by means

of the *lavaderos* or gold-washings, in the beds of rivulets, where it is found in the form of grains. The most productive of these are the celebrated *lavaderos* of Tipuani, consisting of streams descending from the snow-capped summits of the Cordillera of Ancuma, situated about sixty leagues to the north-east of the city of La Paz, in the province of Larecaja. The gold is found in the form of grains or *pepitas*, at the depth of 10 or 12 yards below the surface, embedded in a stratum of clay of several feet in thickness. The gold-washings at Tipuani were worked in the time of the Peruvian Incas, as is evinced by their tools, which are occasionally found embedded in the alluvial soil, and almost invariably in such situations as prove the most productive. The gold-washings and quartz veins of Choquecamata, in the province of Ayopaya in Cochabamba, are also famous, and their yield up to 1847 was valued at £8,000,000. Several districts of the departments of Potosi, Chuquisaca, Santa Cruz, and Tarija, are also rich in gold, but the greater part of the mines formerly worked have now been abandoned, or the known veins have not been explored.

Silver, however, has hitherto been the staple metallic Silver production of Bolivia, and has given to it that celebrity which it has long possessed. In the rich mountains of Potosi alone, according to the records kept at Potosi of the *quintas* or royal duties from the year 1545 to the year 1800, no less than 823,950,509 dollars were coined during that period; and if the other produce of the mines, be taken into account, it is estimated that not less than 1,647,901,018 dollars must have been obtained from this source alone during those 255 years.

The Cerro de Potosi, or argentiferous mountain of Potosi, has a somewhat conical form, resembling a colossal sugar-loaf; its base being about three leagues in circumference, and its summit 15,977 feet above the level of the sea, and 2697 above the level of the great square or *plaza* of the city of Potosi, which is situated at its base. At the foot of the Cerro is a smaller mountain called Huayna Potosi, or the Younger Potosi, likewise containing silver, but in less abundance than the other, and less accessible, from the numerous springs which there impede the operations of mining. The principal mountain has been worked as high up as within 125 feet of its summit. The labours of the miners have been principally confined to the upper half of the mountain, which has been perforated by numerous excavations, with at least 5000 openings of mines, the greater number of which are however abandoned. The upper part of the mountain is exhausted to a considerable extent of its valuable contents; but the lower part is still in a great measure untouched, as the springs are there more numerous, and the water accumulates in such quantities as materially to interrupt the further progress of the miners. The mines of Potosi, according to Humboldt, rank next in importance to those of Guanaxuato in Mexico. The existence of silver in this place was first accidentally discovered by an Indian in the year 1545, and ever since that time its mines have been worked. In 1858, twenty-two companies were working 46 silver mines and 4 tin shafts in the province of Potosi, and the yield in 1856 amounted to a value of nearly a million dollars.

The silver mines of Portugalete, in the province of Chichas, have acquired considerable celebrity on account of the richness as well as quantity of their ores, which yield from 60 to 80 merks of silver to the *caxon*, while those of Potosi only afford about 10 merks from the same quantity of ore. Besides these there are various other silver mines in the province of Chichas, but their value is much diminished by the scarcity of water, and by their being situated in an almost desert and unproductive country. The mines of Laurani, in the province of Sicasica in La Paz, once famous,