

The Indian town Mojos formerly belonged to Peru, and was the border-town towards the kingdom of La Plata, or Buenos Ayres. But in a recent division, the southern provinces of Peru, viz. Atacama, Potosi, Caranges, and others, have been added to the kingdom of La Plata, whose limits were extended four hundred and fifty miles further, to Santa Rosa. In the argillaceous-slaty mountains around Mojos, we found a great many veins of quartz, containing gold, yellow copper-ore, lead-ore, and iron-spath. The terminations of these veins appear above ground; but few of them are worked. There is likewise near that town a considerable stratum of magnetical iron-sand, full of particles of gold, some of which are as large as a quarter of a ducat: but of this gold the American gains

but a small proportion, as he washes away into the stream all the finer particles, which are less than half the bigness of a lentil. Similar alluvial layers containing gold, and resting on the base of argillaceous slate, occur till within a short distance of Potosi; and gold is washed from them, especially at the little town of St. Jago de Cotagoita, ninety miles from Mojos, and as many from Potosi.

From Mojos to Sulipacha, twenty-four miles.

From Sulipacha to Mojara; twenty-four miles.

From Mojara to Bamada, eighteen miles.

From Bamada to San Jago de Cotagoita, twenty-four miles.

From San Jago de Cotagoita to Escobar, twelve miles.

From Escobar to Guirbe, eighteen miles.

From Guirbe to Zurupalca, eighteen miles.

After passing a high mountain, we descended towards Rio Grande, a large mountain-torrent, which we were obliged to cross more than fifty times in one day.

From Zurupalca to Caiza, eighteen miles.

At Caiza, one hundred and forty-two miles from Potosi, are found, in a hot spring impregnated with hepatic gas, small pieces of brimstone, and a friable clay full of crystals of alum; from which we may infer, that the water derives its peculiar properties from a stratum of burning sulphur in the aluminous slate, from which it bursts forth. There are similar hepatic springs twelve miles north of Potosi, and at Churin, one

hundred and fourteen miles to the north-east of Lima.

From Caiza to Potosi, thirty-six miles.

This was the most fatiguing and disagreeable post during our whole journey; having been exposed till ten at night to heavy rain, and often obliged to wade knee-deep in the bed of the Rio Grande: and from the height of this tract of country the air was most piercingly cold.

Here, on the highest plains, the water from the snowy summits of the mountain is collected, till forcing a passage through the clefts, and forming several cataracts, it flows into the Rio Grande.

Twelve miles from Potosi the ridge begins to decline to the north, so that a considerable river flows in that direction, while the Rio Grande runs towards the south.

It deserves to be remarked, with respect to the great chain of mountains stretching from Tucuman to Potosi, that till within eighteen miles of the latter place, where the Rio Grande takes its rise on the highest part of the mountain, the valleys in many places produce small trees and bushes; but further towards Potosi they are entirely destitute of wood; and on the high shelves and declivities nothing grows but patches of green spongy moss, which serves for food to the lanias, as likewise to sheep, asses and mules.

Brushwood and charcoal for fuel must therefore be brought from a distance of from thirty to sixty miles, and larger trees fit for building even from Tucuman, being dragged across the mountains by the hands of men.

A beam of timber sixteen inches

square, and thirty-four feet in length, costs at Potosi two hundred pounds.

It in a particular manner excited my astonishment here to find the highest snow-capt mountains within nine miles from Potosi, covered with a pretty thick stratum of granitic stones, rounded by the action of water.

How could these masses of granite be deposited here, as there is a continual descent to Tucuman, where the granitic ridge ends, and from Tucuman to Potosi it consists of simple argillaceous *schist*?

Have they been rolled hither by a general deluge, or some later partial revolution of nature?

The solution of this question I shall leave to systematic naturalists and geologists.

The celebrated city of Potosi is situated in the midst of the most elevated

range of the Andes, whose summits, at the distance of nine miles to the south, are covered with snow. It contains about one hundred thousand inhabitants, including slaves. The churches are very rich in silver utensils, and the clergy are subject to the jurisdiction of the archbishop of Chuquisaca, which is the seat of the ecclesiastical tribunal for the whole kingdom of La Plata, and of an university. The militia consists of only five hundred men, of a most wretched appearance, without uniforms, and without cannon; and of whom one-half parade with wooden muskets.

The mountain Potosi, at whose foot the city is built, resembles a sugar-loaf; it is almost eighteen miles in circumference, and chiefly composed of a yellow very firm argillaceous slate, full of veins of ferruginous quartz,

in which silver-ore and sometimes brittle vitreous ore are found interspersed.

These rude ores are there called *pacos* ores ; and from experiments with more than three hundred specimens I found they contain, on an average, from six to eight ounces of silver in every *caxon*, or fifty hundred weight. They sometimes likewise meet with solid silver-ore, especially with grayish brown ore, each *caxon* of which yields twenty marks of silver. Above three hundred mines or pits are worked ; but all of them irregularly, and as if it were merely for plunder : few of them therefore penetrate to a greater depth than about seventy yards.

A main conduit which had been begun in 1779, and in the course of nine years had, at an incredible expense, been carried on two miles in length, was even at its mouth much too high, and



yet had been made to slope one yard in every thirty-two; so that it could not come deep enough into many of the pits to free them from water.

The conduit intersects eight new lodes running in a direction nearly from north to south; the best of them is galena, about two feet deep, and was said to yield eight marks of silver in fifty hundred weight of ore. The rest consist of spathose blend, with gray silver ore and yellow copper ore.

On the opposite side we inspected another old conduit, which about a hundred years ago led to many rich veins of red and gray silver ore. But they had no proper machinery; the pits became filled with water: we found all along the bottom of the conduit good red and other silver ores, mixed

with other materials, which by proper management might yield the proprietors a considerable quantity of metal: but it would be still more to their advantage if they employed skilful men to erect machinery for the purpose of clearing the bottom of the mines from water. The direction of this as well as the large conduit is nearly from east to west.

Still greater, if possible, was the ignorance of the directors of the smelting-houses and refining-works at Potosi: by their method of amalgamation they were scarcely able to gain two thirds of the silver contained in the *paco-ore*; and for every mark of pure silver gained, destroyed one, and frequently two, marks of quicksilver. Indeed all the operations at the mines of Potosi,

the stamping, sifting, washing, quickening and roasting the ore are conducted in so slovenly, wasteful, and unscientific a manner, that to compare the excellent method of amalgamation invented by baron Born, and practised in Europe, with the barbarous process used by these Indians and Spaniards, would be an insult to the understanding of my readers.

The tools of the Indian miner are very badly contrived, and unwieldy. The hammer, which is a square piece of lead of twenty pounds weight, exhausts his strength; the iron, a foot and a half long, is a great deal too inconvenient, and in some narrow places cannot be made use of. The thick tallow candles wound round with wool vitiate the air.

In the royal mint at Potosi, where

from five hundred and fifty thousand to six hundred thousand marks of silver, and about two thousand marks of gold, are annually coined, affairs were not better conducted. Every hundred weight of refined copper used for alloy in the gold and silver coin cost the king 35*l.* through the gross ignorance of the overseers of the work, who spent a whole month in roasting and calcining it, and frequently rendered it quite unfit for the purpose. I was therefore ordered by the governor, Don Fr. de Paulo Sanz, to introduce a process founded on sound principles.

For this purpose, as no chemico-metallurgic laboratory existed here, I erected one, with all the necessary apparatus, in one of the largest rooms of the mint, and in the presence of the governor and all the persons belonging to

the mint-department, proved by experiment, that it might be brought to a greater degree of fineness in four hours and a half, and at less than one-twentieth part of the expense.

These various evils the German commissioners endeavoured as much as possible to remove. Mr. Weher, one of my colleagues, dug two deep conduits (to free the mines from water) in the mountain of Potosi; Baron von Nordenflycht erected proper machinery; amalgamation works, according to Baron Born's plan, were erected under my superintendance, and lessons in metallurgy were given by me to six pupils. As soon as the water in the pits can be got under, the mines of Potosi will be in a more flourishing condition than ever. However, the total want of tim-

ber on this naked ridge of mountains very much retards the work.

The revenue to the king from the mines in the kingdom of La Plata is said to amount annually to four millions and a half of piastres; and if they possessed more knowledge and œconomy, it might easily be doubled. If all the veins of ore, &c., were sought for, and wrought with but moderate skill and diligence, this kingdom alone might yield every year twenty, and even thirty, millions of piastres.

From Buenos Ayres to Potosi, one thousand six hundred and seventeen geographical miles.

As Baron Nordenflycht was obliged to stay some time longer at Potosi, to superintend the finishing of the machinery for the mines, I set out for

Lima on the 30th of January 1790, with the greater part of our German miners, and travelled to Jocalla, nine miles.

Twelve miles to the south of Potosi there is a hot sulphureous bath, with a boiling hot spring. Near it is a village whither the invalid Potosians resort for the recovery of their health. The waters possess the same qualities and virtues as the springs near Caiza.

Argillaceous slate is here, likewise, the chief component part of the mountain, with a stratum of sandstone upon it.

Further on we again find on both sides alluvial hills, with rounded masses of granite, extremely bad roads, and the mountain very much weather-beaten and broken.

From Jocalla to La Lenna, eighteen miles.

Not far from Jocalla a mass of granite, many miles in length, rises in huge weather-beaten rocks, which threaten every moment to roll adown the precipices. At Lenna the granite masses are succeeded by a stratum of deep red rough-grained sand-stone.

From La Lenna to Las Lagumillas, fifteen miles.

We now entered a valley, which, with little variation, extends above six hundred miles to Cusco.

From Tolapalca to Guilcapuzico, twelve miles.

Thence to Ancacato, fifteen miles.

Here again argillaceous slate interspersed with masses of granite appears.

From Ancacato to Las Pennas.

A layer of red sandstone on the substratum of argillaceous slate. The



soil becomes more fruitful, and population and the number of villages increase.

From Pennas to Condor-Apacheta, fifteen miles.

The sandstone succeeded by argillaceous slate, mostly covered with thin moss.

From Condor-Apacheta to La Venta de en Medio, fifteen miles.

From La Venta de en Medio to Oruro, twenty-seven miles.

The valley becomes more even and agreeable.

Four miles from Oruro it is covered with a saline incrustation, mixed with saltpetre.

Oruro, a town in this valley, was formerly the residence of wealthy capitalists, who derived their riches from the mines in the adjacent ridge of

mountains. But in the dreadful insurrection of the Christian Indians of La Plata and Peru, in the year 1779, here, as in most other towns of these extensive kingdoms, the greatest and richest part of the Spaniards were murdered, and the town plundered and almost totally destroyed. Those who escaped, and had concealed their money and valuable effects in the monasteries, mostly emigrated to Europe\*. And hence the mines here are in a state of decay and neglect, from the want of pecuniary resources. Intelligent miners might certainly derive great profit from working these mines : one active individual, by the old Potosi mode of amalgamation, has obtained weekly a clear gain of

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\* Mr. Helms says nothing further concerning this insurrection, of which a circumstantial account would have been highly interesting.

about 80% from the residuum formerly thrown away; and in future his profits will be still more considerable, as one of my colleagues has made for him a machine with eight casks, by the use of which he will no longer be subject to such losses of quicksilver, which amounted to about half of the quantity employed.

From Oruro to Caracollo, twenty-seven miles.

The summits of the ridge, the direction of which is still northerly, continue to be covered with snow.

Caracollo to Panduro, fifteen miles.

From Panduro to Sicasica, twenty-four miles.

Near the river the valley is very fertile.

From Sicasica to Tambillo, twelve miles.

Two miles from the post-station we found two important amalgamation-works belonging to the Indians, which, from the richness of the ore, are very productive.

From Tambillo to Ayoayo, twelve miles.

Near Ayoayo I found the ground strewn with small shining pure quartzose crystals, partly consisting of half six-sided pyramids of half the size of a lentil. The mountains to the west contain many veins of this rich quartz.

From Ayoayo to Calamarca, fifteen miles.

The same kind of brilliant quartzose crystals, among which small topazes are sometimes found.

From Calamarca to Ventilla, eighteen miles.

From Ventilla to La Paz, twelve miles.

The rich town of La Paz likewise suffered considerably through the revolt of the Indians ; but still is said to contain four thousand hearths, and twenty thousand inhabitants, whose chief source of opulence is the *coca*, or tea of Paraguay, as it is called—a greenish, tart herb, which the Indians chew mixed with calcined lime. This article is as indispensable to them as tobacco is to our seamen ; and the town of La Paz carries on a lucrative trade with it to the extent of two hundred thousand piastres annually.

The mountain at whose foot La Paz is built is the highest Cordillera in this part of the country, and covered with everlasting snow.

This mountain, and the whole ridge as far as Sicasica, where the Indians collect gold by washing, abounds in

rich gold-ore; and when, about eighty years ago, a projecting part of it tumbled down, they severed from the stone lumps of pure gold weighing from two to fifty pounds. Even now, in the layers of sand, &c. washed from the mountain by the rain-water, pieces of pure gold are found, some of which weigh an ounce. From the ignorance, however, of the inhabitants, most of these treasures lie totally neglected.

There are likewise in the argillaceous slate many veins of rich silver-ore.

The province of Tiupani, which is one hundred and twenty miles from La Paz, is said to abound more with gold than even the latter.

From La Paz to La Laja, eighteen miles.

From La Laja to Tiaguanaco, twenty-one miles.

There is upon the whole an ascent from Potosi to this place, and further to Puno, which is the highest point of the Cordilleras of the kingdom of La Plata.

Here likewise the west side of the mountains consists of fine argillaceous slate, and the Indians formerly found much rich ore in it.

From Tiaguanaco to Guaqui, twelve miles.

Here begins the large lake of Tituaca, the first I had seen in South America; and on whose western shore rise the highest Cordilleras of the kingdom of La Plata. Since we left Buenos Ayres and the river de la Plata, we had not passed through so picturesque a country as that bordering on this lake; and were charmed with the alternation of hills and dales, intermixed with the richest meadows depastured

by numerous herds of cattle, mules, horses, and sheep.

From Zepita to Chesta, twelve miles.

From Chesta to Pomata, which has a church, and is pleasantly situated, nine miles.

From Pomata to Juli, twelve miles.

We still continued to travel for the most part along the shore of the lake, which we were told is eighty miles in length, and in some parts equally broad.

From Pomata to Juli, a small populous Indian town, with four rich churches, which is governed by an Indian Governor (Cazica) and an Indian Judge (Alcalde), twelve miles.

From Juli to Uabe, (or Uave) fifteen miles.

At the distance of six miles from Uave, the road diverges from the lake, along the shore of which we had hi-



therto been travelling with much inconvenience and fatigue, during the rainy season: but, just before we arrived at the post-house, we were ferried over an arm of it, about one hundred and twenty feet in breadth, in an Indian canoe, made in a very neat manner of a kind of reed and grass, on which timid people might be afraid to trust themselves, as they are only one ell and a half in breadth, and quite flat like a raft.

From Uave to Acora, fifteen miles.

From Acora to Chucuito, nine miles.

The mountains contain many rich veins of gold and silver ore.

From Chucuito to Puno, the chief town of the province of the same name, nine miles.

Puno suffered likewise by the above-mentioned insurrection. The silver ores

in the neighbourhood are very rich: but the mines are filled with water, and the proprietors have neither the capital nor the skill requisite for draining them.

From Chucuito to Caracato, twenty-four miles.

From Caracato to Calapuja, twenty-one miles.

The ores obtained from a soft porphyritic ridge, extending eighteen miles, are very rich, yielding about ten marks of silver per cwt.

From Calapuja to Pucara, twenty-four miles.

From Pucara to Aguaviri, fifteen miles.

From Aguaviri to Santa Rosa, eighteen miles.

From Santa Rosa to Larucachi, twenty-seven miles.

The ridge of the Cordilleras, whose summits are covered with eternal snow, extends far beyond Larucachi. From the badness of the roads, the continual rain, and the dreadful storms of thunder and hail, travelling over the Cordilleras at this season of the year is attended with almost intolerable hardships. The proper time for such a journey is during the months of March, April, May, June, and July.

During the three months of the rainy season among the mountains, the traveller may proceed along the sea-shore, under a serene sky, and without a single drop of rain, as far as Lima; but, on the contrary, he there is exposed to excessive heat, troublesome vermin, and dangerous fevers.

From Larucachi to Concha, eighteen miles.

The valley becomes wider, and we were obliged frequently to ford a large rapid river. Three miles from Larucachi lies a neat Indian town called Cicuani, the residence of Colonel Manuel Vilalta, governor of Tinta, a very obliging polite gentleman, who gave us a very friendly reception. The Colonel, who has been many years engaged in the working of mines in the neighbourhood, listened with great attention to the improvement I suggested for obtaining the metal from the ore.

From Cacha to Chiacupi, twelve miles.

The country becomes more pleasant, fertile and populous. We passed the broadest arm of the river on a flying bridge, made of basket-work.

From Chiacupi to Quiquijani, fifteen miles.

From Quiquijani to Hurcos, twelve miles.

From Hurcos to Oropceza, nine miles.

The road begins gradually to ascend again, and diverge from the large river which had accompanied us along the valley from Purta, but which now takes another direction towards the south.

From Oropceza to Cusco, formerly the capital of Peru, and the residence of the Incas, twelve miles.

Cusco, like most of the other large cities of Spanish America, is built in the Gothic style. The population is considerable: but no one could give me an exact statement of the number of inhabitants. A governor and a commander of the regular troops and militia reside here. In the palace of

the former, a court of appeal decides upon all the law-suits and processes in the province.

The cathedral is a fine stone building in the modern style, and contains many pictures and rich ornaments.

Although the mountains in the neighbourhood of Cusco contain many rich metallic ores, yet only one person, a French merchant of the name of Grace, is engaged in mining; on which he has already spent without any advantage, in works after the Indian method, about 5000*l*. He seemed inclined to adopt our new mode of amalgamation; and if his capital should be sufficient to enable him to put that purpose in execution, he will, no doubt, soon realize a large fortune.

From Cusco to Zurito, twenty-one miles.

From Zurito to Limatambo, eighteen miles.

From Limatambo to Carretas, twelve miles.

The base of argillaceous slate is covered with an affluvial super-stratum, which consists of marle, gypsum, limestone, sand, a large quantity of rock-salt, and of fragments of porphyry, &c. in which pure silver and rich silver ores occur in abundance. There are few instances in Europe of such mountains so generally abounding with the precious metals, or their ores, as in this quarter of the globe. The whole ridge appears to be full of affluvial veins of heavy silver-ores, in which pieces of pure silver, solid copper, and lead-ore, occur, intermixed with a great quantity of white silver ore, and capillary virgin silver. Thirty-six miles before we reach

Guancavelica, behind Parcos, lie mountains of weather-beaten argillaceous slate, mixed with sand. The sections of these mountains consist entirely of separate more or less sharp-pointed pyramids of a flesh-coloured sand-stone.

The ridge of mountains covered with snow, over which the road to the Pacific Ocean passes, consists of simple sand-stone, through which metallic veins, in some places with quartz or feld-spath, in others with steatite and shoerl, &c. openly appear. On the contrary, the chain of mountains to the north of Guamanga and Guancavelica is said to consist, to the extent of one hundred miles, of simple lime-stone, and equally abounds with metallic ores, especially in the province of Tarma.

From Carretas to Carahuasi, eighteen miles.



We were again obliged to pass a river on a flying bridge. This river is much more rapid and broad than that mentioned above: near Carahuasi it turns off at an angle towards the east, till it enters the kingdom of Curaquin, and is said to run through a space of about three thousand miles. This, however, is doubtful: and the more probable opinion is, that it falls into the Maranon.

About sixty miles to the west of Carahuasi some gold mines are worked; and at Carahuasi, two persons extract silver from a horizontal stratum of ore.

From Avancay to Cochacajas, eighteen miles.

From Cochacajas to Pincos, eighteen miles.

Soon after we left this village, and ascended by a ziz-zag road for eight

miles, on one of the highest shelves of the highest Cordilleras; and descended with the greatest danger on the other side to the river which we crossed, and arrived at Pincos, after having been exposed during seven hours to incessant rain: truly pitiable is the lot of the poor traveller who is obliged, during this season of the year, to pursue his journey by such steep and slippery roads, and over almost impassable mountains. Even the most thoughtless free-thinker, who denies the existence of a Providence, would here be obliged to confess, that an Almighty and benignant power evidently watches over the daring steps of mortals; otherwise, both men and beasts would inevitably perish.

Sixty miles westward from Pincos, in the province of Almaray, there are rich

veins of gold-ore in quartz; and gold is obtained by washing. Some of the Indians here, notwithstanding the rude unskilful process used by them, obtain monthly as much as is worth from nine to eleven hundred pounds, which they send to Lima in exchange for piastres. In this, as indeed in most of the provinces of the kingdom, rich veins of silver and other metallic ores occur, of which no use is made.

From Pincos to Andaguaylas, eighteen miles.

Twenty-one miles beyond the latter place there is a silver mine, which was found to yield one hundred marks of silver for every hundred pounds of ore. This mine, however, which is called Santa Maria, has long been full of water.

From Andaguaylas to Uripa, thirty miles.

From Uripa to Tambo de Ocros, thirty-six miles.

Soon after leaving the Uripa, we again climbed to the summit of a vast ridge composed of horizontal strata, and we consumed as much time in the descent towards a rapid river, with a dangerous Indian hanging-bridge, which is about one hundred and twenty feet in length, and suspended by badly-made hempen ropes. Here we were obliged to stop till the bridge was repaired, and pass the night in a dark mountain cave; where, besides suffering from excessive heat, we were so dreadfully stung by musquitoes, that we scarcely knew one another the next morning.

We had before become acquainted with this little bloodthirsty insect in the province of Tucuman : its sting is much more painful than that of the European gnat ; it leaves a caustic fluid, which causes the flesh to swell, if the sufferer scratches the part affected ; and the itching lasts more than eight days.

The musquitoes are not larger than a flea, but winged, and exactly resembling a young fly. They are very numerous in all the hot low districts of this country.

From Ocros to Congallo, eighteen miles.

From Congallo to the town of Guamanga, the residence of the governor, eighteen miles.

In this district, they dig from a horizontal bed, silver-ore ; fifty hundred weight of which are said to yield five

hundred marks of silver. The ore, as appears from the specimen of it in my possession, contains some virgin silver.

But this mine, like most of the rich mines of Peru, is overflowed. The proprietor, however, endeavours to free it as much as possible from water, by means of common pumps.

From Guamanga to Guanta, eighteen miles.

From Guanta to Parcos, thirty miles.

From Parcos to Paucara, twelve miles.

From Paucara to Guancavelica, twenty-four miles.

Behind Guancavelica, the mountains gradually become composed of less various materials, and at last consist only of simple sand-stone, with layers of marle, lime-stone, and spath; or of simple lime-stone; they continue, how-

ever, equally rich in gold, silver, quick-silver, rock-salt, &c.

In short, so much do rich ores abound here, that the mines, if worked with a moderate industry and knowledge of metallurgy, might yield considerably more than the quantity necessary for the supply of the whole world: and it is perhaps a fortunate circumstance, that the ignorance of the miners and the oppressive measures of the Spanish government have prevented more from being drawn from this inexhaustible source than actually has been obtained, and from general experience appears to be required, as a circulating medium in commerce and for other purposes: otherwise, gold and silver must long ago have been depreciated to an inconvenient degree. Indeed, this effect would be produced by the introduction of the

fifty or more millions of piastres, that are annually brought to Europe from the Spanish colonies in America, were it not counter-balanced by the immense exportations of silver to China. As none ever finds its way back, it has been conjectured that these treasures are buried by the avaricious Chinese.

The royal mine-town Guancavelica was formerly celebrated on account of its rich quicksilver-mine. But, as this mine was not worked in a proper and regular manner, the pit fell in; and they now dig only in places less abounding with ore; which annually yield about fifteen hundred cwt. of quicksilver: but, owing to the wretched manner in which the mines and smelting furnaces are conducted, each hundred weight of quicksilver costs one hundred and sixty-six piastres. The



king sells it to the proprietors of the gold and silver mines at the rate of seventy-three piastres; and annually loses by his traffic to the amount of two hundred thousand piastres.

The vein of cinnabar was eighty Spanish ells in extent; and the cinnabar was found partly solid and crystallised with galena, calcareous spath, ponderous spath, quartz, manganese, arsenic, &c.; partly intersprinkled in a sand-stone of a very fine grain, or in lime-stone.

So long back as two hundred years ago, the mine was worked with great profit by mining companies; and is said to have been sunk six hundred fathoms deep.

A thick stratum of red arsenic and yellow orpiment, which lay contiguous to the mass of quicksilver-ore, was by

the ignorant superintendant taken for cinnabar: and some hundreds of the workmen perished in the operation of smelting it. For extracting the quicksilver from the cinnabar they employ the ill-contrived old Spanish Almadena furnace, which is heated from below with mountain-straw. There are seventy-five such furnaces here: instead of which I proposed to construct sixteen on the plan of those of Idria; but was prevented by the viceroy from executing this purpose.

From Guancavelica to Cotay, thirty miles.

The road ascends towards the snow-covered Cordilleras, and in consequence the air is so cold, that the traveller may wear furs without any inconvenience.

Here we again met with large flocks of lamas. The biscache, a small ani-

mal resembling in shape the European rabbit, likewise inhabits these mountains : its fur is uncommonly soft and beautiful. There are likewise large flocks of the well known Vicunna sheep.

From Cotay to Turpo, eighteen miles.

We continued to climb over the snowy summits of the highest ridge since we left Potosi. The cold was more intense than yesterday, and affected me more sensibly than the winters of Germany ; although it be still summer here in the month of March.

From Turpo to Vinnas, twenty-four miles.

Having passed, amidst severe frost and snow, the highest Cordilleras of this part of the country, we descended by a very steep road to Vinnas, situated

in a narrow valley. During this day's journey, we observed extraordinary large flocks of Vicunna sheep, more numerous than had been seen by us in the other cold regions of South America.

From Vinnas to Jangas, eighteen miles.

During this day's journey we were frequently in the greatest danger, as the path which leads down the steep side of the mountains towards the river, steering from south to north, is in many places scarcely a quarter of an ell broad; and if the mule make a single false step, both he and his rider are precipitated into the abyss, and dashed to pieces. About an hour after our arrival at the post-house, we learned that one of the king's pack-asses had been thus killed.

From Jangas to Lunaguana, eighteen miles.

The narrow valley through which we travelled to-day has a sandy soil, which produces pomegranates, figs, citrons, oranges, ananas, chirimoyas, grapes, and a variety of other fruits, in abundance.

From Lunaguana to Cannette, eighteen miles.

About a mile and a half from Cannette we at last reached the extremity of the Cordilleras, and entered a sandy plain, through which we continued our journey towards Lima.

From Cannette to Asia, eighteen miles.

From Asia to Mala, twelve miles.

From Mala to Chilca, twelve miles.

Near Chilca I found the flat valleys,

between the sea-shore and the hills to the westward, with an incrustation of salt above an inch in thickness. This salt, formed by the heat of the sun, and half crystallized, is carried for sale to Lunaguana.

From Chilca to Lurín, twenty-one miles.

From Lurin to Lima, eighteen miles.

Total—From Potosi to Lima, one thousand two hundred and fifteen miles.

Lima, the capital of Peru, and the residence of the viceroy, lies in a sandy plain, only two miles in breadth, between the Cordilleras and the sea; which, it is probable, extended formerly above a mile further inland towards the mountains. This, at least, would seem evident from the sea-sand and shells with which the flat ground is co-

covered to the extent of two miles, and from the numerous small hillocks wholly composed of such shells.

Lima is a large city ; but on account of the frequent earthquakes, the houses are only one story high, and very slightly constructed with planks, laths and reeds, plastered over with mortar ; the flat roofs being covered with small light shingles. On the outside they have, indeed, a mean appearance, but within they are magnificent and convenient. The streets are very regular, straight, broad, clean, and well paved ; and in almost all of them are palaces of the rich nobles ; some of which are built in the modern style of architecture. Alleys shaded with rows of high lime trees, country-houses, and gardens, embellish the environs of the city ; which would certainly be a most charm-

ing place of abode were it less subject to diseases and earthquakes, and if the inhabitants suffered less from the excessive heat and swarms of every kind of vermin.

The whole coast on the South sea is here subject to frequent earthquakes : one of which about fifty years ago destroyed Lima, and the extensive seaport Callao, the latter of which was overwhelmed by the waves of the raging ocean. The ruins of Callao are still visible ; but the citadel, which was on an eminence considerably higher than the city, remains standing.

The rich commercial city of Arikúipa has likewise been converted by earthquakes into a heap of ruins ; on which, however, fresh inhabitants have been tempted to build, on account of its advantageous situation. With regard to



earthquakes, the month of October is the most dangerous season.

The population of Lima was formerly estimated at seventy thousand. At present, owing to the total decay of trade in Peru, it is said to have decreased one-third, and to have sunken so low as fifty thousand Spaniards, people of colour, and negroes. So late as thirty years ago, Lima was one of the richest and most flourishing cities in Spanish America. But since that time the markets have been so over-stocked with European goods, that the capitals of most of the commercial houses became invested in piece and other goods, and all the ready money by degrees emigrated to Cadiz; which necessarily occasioned an excessive fall in the value of European articles of merchandize. A pair of French silk-stockings,

which then cost forty piastres, may be now purchased for six ; and in like manner all European goods have sunken to one-third of their former price, and even lower. Thus the merchant gradually lost the capital which he had risked in trade, and was totally ruined. The same is said to be the case in all the other commercial cities of the Spanish colonies in South America. The consequent scarcity of money caused an almost total stoppage in the working of the mines ; and it seemed as if this source of wealth in Peru would be wholly dried up. To prevent this, the viceroy, La Croix, an intelligent, disinterested, and generally beloved Netherlander, had requested of the king to send over to Peru skilful German miners and mineralogists possessed of the requisite talents and know-