

continues across the plains of Tēpētītlān, to the Hacienda of that name, (five leagues from Istlahuaca,) where the mountains of El Oro and Tlāl-pūjāhūa commence. Of the remaining nine leagues, the first four are barren and desolate; the five last extend through a succession of Pine forests, in the midst of which the Real of Tlāl-pūjāhūa stands.

The ancient village of San Pedro and San Pablo, now called Tlalpujahuā, where the officers of the Company formed in England under that name reside, is situated in North latitude  $19^{\circ} 17' 30''$ , West longitude  $100^{\circ} 1' 15''$ , upon the borders of a little stream, which winds down the valley of Tlāl-pūjāhūa into that of Tēpētōngō, where it joins the river of Tepetongo, which subsequently unites with that of Lerma. The town is environed by mountains covered with pines, the most considerable of which are Lā Sōmērā, to the North-east, Sān Lōrēnzō to the South, and the Cerro del Gallo to the East of the town: the first of these is 1,430 feet, the second 1,160 feet, and the third 851 feet, above the level of the bridge of Tlāl-pūjāhūa, which, again, is 822 feet higher than the town of Mexico, and 8,581 feet above the level of the sea.

It is upon the slope of the mountains by which the valley of Tlalpujahuā is formed that the principal mines of the Company are situated, in the hollows, (Cañadas,) of Las Animas, Los Zāpātērōs, and Lābōrdā. Their position is extremely favourable for drainage by adits; and the shafts are neither

difficult of access, nor at an inconvenient distance from the town, most of them being contained in a circle of two English miles.

The metalliferous veins of this district are found principally in the Phyllade, (Thonschiefer, or Clay Slate,) which contains in subordinate strata, 1. Le traumaté, (Grauwacke;) 2. Le traumaté schisteux, (Schieffrige Grauwacke, or Greywacke Slate;) 3. Le Calcaire, (Transition Limestone;) 4. Le Talcschisteux, (Talkschiefer;) 5. Le Feldspath Compacte, (Prismatic Feldspar of Jameson;) 6. Le Diabase, (principally composed of Prismatic Feldspar, and straight-edged Augit of Jameson; and 7. Quartz.

The veins of Laborda and Coronas vary in dimensions from  $16\frac{1}{2}$  to  $5\frac{1}{2}$ , and  $8\frac{1}{4}$  English feet: that of Las Virgenes attains in some parts, a width of  $27\frac{1}{2}$ , and even 33 English feet; nor has any diminution, or falling off, been observed at the greatest depth, to which these veins have yet been explored.

The Ores contain Native Gold, (Hexahedral Gold of Jameson,) and Native Silver, (Hexahedral Silver;) which are found in small quantities. The Rhomboidal Silverglance (*l'argent antimonie sulfuré noir*) is most abundant; and next to it the Hexahedral Silverglance, or Argent Sulfuré. The Red Silver, or Argent Antimonie, Sulfuré rouge, is less common, but may frequently be found.\*

\* Having professed my ignorance of Mineralogy, I must state that I am indebted for these details to a manuscript report drawn up by Mr. Burkart, Principal Miner of the Tlalpujahuā Com-

Of the former produce of the district of Tlälpujähua nothing certain is known. The great Cörönäs vein was discovered at a very early period, and has been worked, with occasional intermissions, for upwards of two hundred years. The Cañada which bears La Borde's name, and to which he was indebted for his first fortune, was only discovered in 1743: there are no returns of the Silver raised from it during the great Bonanza, which gave it celebrity; but in stating it at twelve millions of dollars, in the eight years, during which the mines were worked, I take only half the estimate which is usually formed in Mexico of its amount. Tlälpujähua lost much of its importance upon La Borde's removal to Tascö, but the mines of the district were worked without interruption until the commencement of the Civil War, at which time, according to a Statistical account of the State of Valladolid published in 1822, by Don Juan, José, Martinez de Lizarra, from eighteen to twenty thousand dollars were expended weekly in the purchase of ores, and in the payment of the mining labourers.

In 1824, it has likewise been ascertained, that Ores to the amount of 100,000 dollars, were raised by the Buscones (Searchers); and in 1825, before

pany, from which I should venture to make farther extracts for the information of Mineralogists, did I not conceive that the results of Mr. Burkart's investigations will, in the course of time, be laid before the world by himself.

the arrival of the Company, 60,000 dollars more were laid out in a similar way by the only miner who had a command of capital in the district. But it was not by the insulated efforts of an individual that the injuries done by the Revolution could be repaired.

The State of Valladolid was constantly the scene of action between the contending parties; and as one of the Insurgent chiefs (Räyön) occupied two fortified camps in the immediate vicinity of Tlälpujähua, (the Cerro del Gallo, and Coporo,) this district was exposed, for several years, to all the horrors of the war. To escape from these, its inhabitants abandoned their homes; and, in June 1825, Mr. de Rivafinoli found, upon his arrival, most of the houses in ruins, and the mines without a building of any kind to denote their existence.\* The population was so reduced, that one hundred and fifty workmen were procured with great difficulty, and although the surrounding country is remarkably fertile, supplies of every kind were scarce from the total ruin of the neighbouring Haciendas.

It was gratifying to behold the change which ten

\* The shaft of a mine is always surrounded by a *Galera*, in which the tools, candles, powder, &c. are kept, and an account taken of the labourers, who enter or quit the mine, as well as of the ores raised by them. In the *Galera* the *Mäläcätés* (horse-whims) are likewise placed; so that where two or more of these are at work, the space covered in is very considerable.

months had produced in all these respects. In May 1826, Tlälpujähua presented one of the busiest scenes that it is possible to imagine: the population had increased from one to five thousand; above eighty houses had been repaired, or rebuilt; shops for the sale of English manufactures were opened in the Plaza; there was a market most abundantly supplied with all the necessaries of life four days in the week; and twelve hundred labourers found constant employment in the mines. Twenty-seven of the principal shafts had been already put into a thorough state of repair, and surrounded with the necessary buildings. In the Mines of San Ęstevän, Cölörädillä, Los Olivos, Cäpülín, Concepciön, Santos Märtirés, and Öcötes, the works had already reached the Vein, and ore was raised in considerable quantities. In the others, Malacates had been fitted up upon the most improved plan, and the drainage was conducted with the utmost activity.

Of the extent to which the works of the Company are carried, some account has been given in the Second Section of the preceding Book: it is, however, necessary to add, that their contracts are mostly for the terms of thirty and thirty-five years; that in all their mines they have a full half share, or twelve Barras; that the Alimentos (or allowance made by the Company to the proprietors) are small, and are in every instance to be discontinued if a mine does not become productive within three years; and that although amongst the many contracts held

by the Company, there are undoubtedly some, from which no advantage can ever be derived, the command of all the mines in the district was indispensable in order to exclude competition, the ruinous effects of which, in other parts of Mexico, have been very severely felt.

Tlälpujähua enjoys many advantages as a mining district. It is situated at a moderate distance both from the Capital and the Coast, in the midst of a country so fertile, that maize, which in Guanajuato and Mexico, sells for four and a half or five dollars the carga, (of 300lbs.) seldom rises there above two and a half or three dollars. Wood is equally abundant and cheap. Mining labour of all kinds is lower than in any of the neighbouring States. Few of the mines exceed one hundred and fifty varas in depth, and almost all are so situated as to facilitate their drainage by a single Adit, for a very considerable space below the deepest of their present workings. The ores of some contain a Ley de Oro, so considerable as to raise the value of the Marc to twelve and sixteen dollars; and in reducing these ores, the assistance of water power is almost always to be obtained.

At the period of my first visit, two Haciendas de beneficio (Santa Rosa and el Chimal) were completed, in each of which twelve stamps were at work, capable of pulverizing twenty-five cargas of ore, (of twelve Arrobas, or 300 lbs.) in the twenty-four hours. Another large Hacienda (San Rafael) was

in progress, with forty-eight stamps, and twenty-four Arastres, (crushing mills,) which it was thought would reduce from 600 to 800 cargass of ore in the week. I was very much struck with the appearance of all these works, which were planned by Mr. Moro, the engineer to the Company, and executed entirely by Mexican workmen, under the superintendence of another officer, (Mr. Enrico,) whose patience and assiduity triumphed over all the obstacles which the inexperience of the natives at first created. The water-wheel of San Rafael is twenty-seven feet in diameter, yet not a single European has been employed upon it, or upon the machinery connected with it, which now sets in motion forty-eight stamps, with a power that was thought insufficient in former times, to work more than six.

But both in this and in every other respect the Tlalpujahu Company has been admirably served. The director, Monsieur de Rivafinoli, possesses not only an active and indefatigable spirit himself, but the art of communicating a portion of this spirit to those by whom he is surrounded. I never saw more order and regularity than is shown in every part of his system; and although the gentlemen employed in superintending the works are natives of many different countries, there is an *esprit de corps* amongst them, which it is really pleasing to witness.\* The

\* The only place where I have ever seen any confusion at Tlalpujahu is at Mr. Rivafinoli's most hospitable table, where

Mexican proprietors, many of whom are entrusted with the superintendence of the works in their own mines, have become most useful assistants; and as the authority of the Church is employed wherever a change of machinery is contemplated, a solemn blessing being pronounced by the Cura, (a man of great talent and influence) upon the new machine, before it begins to work, each innovation is looked forward to by the natives as a *fête*, at which those who have been employed in the construction of the new works, receive a public reward.

Some of these details may be thought trifling; but as long as human nature remains constituted as it now is, more may be effected by attention to such trifles, than by the most beneficial projects when introduced without it. The conciliatory system adopted by Monsieur de Rivafinoli has given him an almost absolute authority in his district, and this, as long as the prospects of a Company are liable to be affected, (as they always must be) by the power which its agents possess of carrying into execution their projects, may always be regarded as an essential step towards success.

Doubts have been expressed with regard to the goodness of the mines of Tlalpujahu, and these, as there are no records of former produce, it is impossible for me to remove. It is difficult however to Spanish, English, French, German, and Italian are spoken in such rapid succession as to convey a lively idea of the tower of Babel.

suppose, that in a district abounding in metalliferous veins, none of which have been worked to any considerable depth, whilst all are known to have been productive in earlier times, a Company which is in possession of every mine of any importance in the Real, and which is about to push its workings through a great extent of virgin ground, should not be amply repaid for its present advances. Its chances of success increase in proportion to the extent of its operations, as the veins are explored upon all the most essential points at once; while the mining works, which are under the direction of an active, cautious, and scientific man, Mr. Burkart, are sure to be conducted with economy, and executed with the greatest possible precision. With regard to time, a few months more or less are of little importance in an enterprise of such magnitude; and I should think even more highly than I now do of the prospects of the Tlalpujahua Company, were the Directors in England to forego for a year the hope of immediate returns, and to devote the whole of that time to the completion of the great Adit, by which the drainage of two-thirds of the district would be effected at once, and an immense saving made in the ultimate expences of the Association.

I remained at Tlalpujahua nearly a week, during which I visited all the mines which had been brought into activity up to that time, as well as the Haciendas, the most distant of which, San Rafael, is

situated about three leagues from the town. It was at that time unfinished, but in one of my subsequent visits I had the pleasure of seeing it completed, for I returned to Tlalpujahua both in September 1826, and January 1827, on my way from other districts to the Capital.