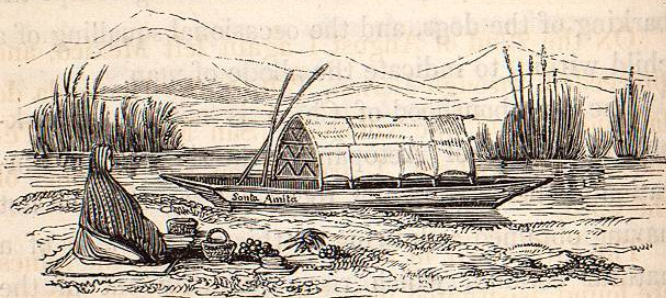


justice. But I was not accompanied upon any of my first journeys by Mrs. Ward, and was consequently unable to ascertain whether her efforts would have been attended with more success.

After our return from the Interior, it was my intention to have visited Real del Monte again; but it was so late in the season before we quitted Mexico, and the vomito was already so prevalent upon the Coast, that we did not think it prudent to allow the beauties of the scenery to tempt us into a delay, the risk of which every day tended to increase.



SECTION VI.

VISIT TO THE MINES OF TEMASCALTEPEC, AN- GANGEO, TIALPUJAHUA, AND EL RANCHO DEL ORO.

ON the 22nd of August I again left Mexico, and proceeded, through Lerma, Toluca, the Hacienda de la Huerta, and the village of San Miguel, to Tē-māscāltēpēc, where I arrived on the evening of the 23rd.

The little town, in the vicinity of which the mines are found, is situated in the State of Mexico, thirty-two leagues to the South-west of the Capital, on the declivity of the Cordillera towards the Pacific, into which some of the rivers, that rise in the neighbourhood of Tē-māscāltēpēc, actually flow. The mines of this district enjoyed formerly a great reputation for the richness of their ores; (the finest specimen in the King of Spain's collection was brought from the mine of San José;) but, as the works increased in

depth, the difficulty of draining them augmented so much, that they were gradually abandoned; and, for some time before the Revolution, their produce was very inconsiderable.

By a sort of fatality, Temascaltepec, although it could never rank higher than a sixth-rate district, appears to have possessed peculiar attractions for the foreigners, whom mining speculations have brought to Mexico. The beauty of the climate, and the advantages of the vicinity to the Capital, have probably tended more to influence their choice, than the character of the mines themselves, which, I fear, will be found to present very uncertain prospects. But whatever be the cause, in 1826 five Companies were established there, two English, two American, and one German: not a single mine was worked by a Mexican, although Mr. Seption, (of the Tribunal of Minería,) is the proprietor of one, San Francisco de Paula, for which he is still seeking an Aviator.

The two English Companies, are the United Mexican, and that formed by Mr. Bullock.

The United Mexican Company possesses three mines, Los Santos Reyes de la Sierra, La Magdalena, and La Guitarra.

They have likewise two Haciendas de beneficio, Guadalupe and San José. Of the mines, the Magdalena alone was producing ore at the period of my visit. It is situated to the East of the town, upon a hill, the lower part and centre of which is occupied by the mines of the North American Companies;

the shaft was undergoing considerable repairs, and when they were completed, the quantity of ore was expected to increase; but I should not think it likely to do so in a ratio sufficient to cover the expence of keeping up an establishment, with haciendas, horses, and a responsible officer, for the sake of working this mine alone. The two others have been subsequently abandoned.

The Company likewise possessed two Mines at the Real del Cristo, about twelve leagues South of Temascaltepec, (San Diego and San Antonio,) and was about to contract for another, La Golondrina. All these are known to produce rich ore; but the veins are small, and the system of multiplying and subdividing establishments in a country where personal inspection is so necessary, can hardly be made to answer. The Cristo is too far from Temascaltepec for the ores raised there to be reduced in the Haciendas of Guadalupe or San José; and a new Hacienda must consequently be built, at an expence which few isolated mines, if small, can support.

About 150,000 dollars have been sunk in these enterprises, from which it is generally thought that very little is to be expected.

Mr. Bullock's Company, which has since been dissolved, was denominated "The Mexican Mine Company," and was formed by Mr. Baring and Sir John Lubbock, in order to work the Mina del Vado, denounced in 1823 by Mr. Bullock, as a Mexican citizen, with all the formalities described in the

account of his Visit to Mexico, which is already before the public. The only circumstances which he has not given to the world, are the data by which he was first induced to direct his attention to this unfortunate speculation. Some there must have been, for Mr. Bullock was a real enthusiast about his mine; but upon this subject I have never been able to obtain any authentic information.

Had the mine been really valuable, there would have been nothing injudicious in the manner in which the gentlemen, to whom Mr. Bullock transferred his rights as proprietor, proposed to work it; but in August 1826, the state of their affairs was very unpromising. Mr. Bullock had been appointed Director of the works of the Company, with a salary of 700*l.* The expence of his journey to Mexico, with his family, fourteen Irish miners, a smelter, a gardener, and every thing necessary for a large establishment, had been defrayed in the most liberal manner, and he had been allowed to build a house in a very beautiful situation, with a Hacienda de beneficio, and a garden *à l'Angloise*, attached to it; but in the mine itself there were not only no vestiges of a vein, but no appearance of its ever having been of any sort of importance.

In order to ascertain its situation, a new shaft was sunk at about ninety yards from the old one, upon much lower ground, at which a very ingenious water-wheel was erected by an American engineer, in order

to drain the upper levels: from this a cross cut was driven in the supposed direction of the vein, which, however, only demonstrated its non-existence, by traversing the whole distance between the two shafts without cutting it. Upon this the enterprise was abandoned; but not until fifteen or twenty thousand pounds had been thrown away upon a mine, from which the natives had all pronounced, at the very outset, that not one ounce of silver would ever be extracted. The loss, fortunately, fell upon persons to whom it was of little consequence; but it is much to be regretted, that in a country where, by the judicious application of the same capital, so much might have been effected, the choice of the managing agent should have been influenced rather by the beauties of the scenery, than by the intrinsic value of the mine which it was intended to work. All Mr. Bullock's preparations seemed to be calculated upon a certainty of success, that not even the command of a whole district can give, although its probability increases in proportion to the number of different points upon which a vein is explored. Where the vein is of known goodness, and the possibility of draining it, by the application of a given mechanical power, ascertained, the interval may be employed usefully, as it has been in most of the great negotiations, in the completion of surface-works; but where the very existence of the vein is questionable, to commence operations by a large

investment in these, is, to say the least, contrary to the practice, which an experience of three centuries has induced the Mexican miners to adopt.

The two North American Companies established at Temascaltepec, are those of Baltimore, and New York.

Of the first, Mr. Keating is director; a gentleman who has studied at Freiberg, and was Professor of Mineralogy in the United States.

The Company possesses the Mines of San José, San Luis, and Santa Brigida, situated, one above the other, at small intervals, upon the slope of the mountain, with six Pertinencias extending laterally from the last. In August 1826, very little had been done at any of these mines; and Mr. Keating was living in a wretched hovel close to San José, where a water-wheel, thirty-four feet in diameter, was constructing by American millwrights, by which the drainage was to be effected. This wheel commenced working about a year after the date of my visit (July 1827); up to which time Mr. Keating had seen no reason to change the opinion that he had originally formed respecting the mines under his inspection, namely, that they would pay an interest of from fifteen to twenty per cent. upon the very small capital invested in them. This opinion was founded upon the returns of produce for several years before the Revolution; and as no expence whatever has been incurred in surface-works, with the exception of a leat, or watercourse, by which the wheel is to

be supplied from a spring at a considerable distance, there is no reason to suppose that these expectations will be disappointed.

The New York Company cannot yet be said to exist, none of its agents having reached Mexico during my residence in that country. Of the four mines, the contracts for which have been assigned to it by Mr. Wilcox, the American Consul General, but little is known, and that little is by no means of a favourable character. The importance of San Juan de las Quebradillas, is inferred from the fact, that, fifty years ago, when the upper levels fell in, one hundred and fifty men were buried in the ruins; and the Mina de Aguas is, in like manner, supposed to be valuable, because 200,000 dollars have been recently expended, by the Tribunal de Minería, in a fruitless attempt to drain it.

The Germans hold at Temascaltepec, in the Real de Arriba, or upper town, the mines called Del Rincon, which were ceded to them by the same Revilla from whom they purchased the Arevalo mine at Chico.

These mines are ten in number, or rather, there are ten shafts upon the same Vein, drained by one adit, driven at the depth of 120 varas, and upwards of 2,000 varas in length. Their former produce is known to have been considerable,* but the works below the adit are full of water, and the

* Twelve Bars of Silver were raised weekly before the Revolution.

adit itself is inaccessible from the extreme foulness of the air. A new shaft must be sunk in order to create a free circulation, before the possibility of draining the mines, at all, can be ascertained; so that it is probable, that the enterprize, if persevered in, will, for some years, rather increase the outlay, than augment the receipts of the Company.

I was deterred by the little interest which the mines of Temascaltepec possessed, from visiting the neighbouring districts of El Cristo and Sũltēpēc, in which some mines have been taken up, both by the Germans, and the United Mexican Company, as a sort of dependency upon those of Temascaltepec. Both places are situated in the *Tierra Caliente*; and at El Cristo, which is a narrow valley, shut in, on all sides, by lofty mountains, the heat is said to equal that of Veracruz.

The mines of Tēpāntītlān, which lie far to the South, in the vicinity of the Rio Bolsas, were at much too great a distance for me to think of reaching them. They are held by the Catorce Company, and are celebrated for having given to the Conde de Contramina his title and fortune. The road to this district lies through the very heart of the Western branch of the Sierra Madre; the climate is unhealthy, and there is a great want of timber in the immediate vicinity of the mines. But these disadvantages are compensated by the extreme richness of the ores, some of which produce five and six marcs of Silver per carga, while the *metales comunes*, (inferior ores,) average one marc and a

half. The principal shafts, upon the two great veins of Guadalupe and Santa Ana, contain little or no water, (from eight to ten varas;) and it is known that the works were only suspended during the Revolution, in consequence of the seizure, by General Guerrero, of ores, to the amount of 500,000 dollars, (which were undergoing the process of reduction in the Hacienda,) in order to pay his troops. A splendid Adit, six hundred and thirty varas in length, and four varas broad, by three high, likewise attests the former importance of the mines; and notwithstanding the drawbacks of climate and distance, and the difficulty of effecting even the most ordinary repairs, there can be little doubt that, if properly conducted, this negotiation may become highly advantageous.

It now only remains for me to add, that the mining terms in use at Temascaltepec differ considerably from those adopted in other districts, and explained in the preceding Section.

In the Haciendas, the quantity of ores submitted to the process of amalgamation, is estimated by *Tareas*. The Tarea consists of one hundred Quintals, or five Montones, of twenty Quintals each. This is inconvenient, both because the terms differ from those more generally in use, and because the *Tarea* does not contain an exact number of *Cargas*, as is the case with the *Tortas* and *Montones* in other districts.*

* Torta, fifteen Montones of ten Cargas, each of three Quintals, or twelve Arrobas—four hundred and fifty Quintals in all.

With regard to the process of amalgamation, there seems to be no general rule. The mines vary, not only in the quantity of quicksilver which their ores require, but in the time necessary for the process, and in the loss of quicksilver during the course of it. For instance, the ores of Santa Ana, (a small mine worked by the Administrador of the United Company,) can be reduced by amalgamation in ten days; but with a loss of twenty-five per cent. of quicksilver.

The ores of San Bernabé require sixty days.

Those of La Guitarra and La Magdalena vary from twenty to twenty-eight days, with a loss of only eight per cent. of quicksilver.

The costs of the process may be estimated in the following manner:—

The Tarea, requires 30lbs. Quicksilver.

Magistral, thirty Quartillos. (Six to the Arroba.)

Salt from Ahāhuīstlān, fifteen Arrobas, or ordinary Salt, twenty-two Arrobas.

The Mexican amalgamators explain this difference by their favourite terms of *Minerales frios*, (cold or sluggish Minerals,) and *Minerales calientes*, (hot ores, easily acted upon,) and they attempt no more scientific solution of the changes which occur. Nor is it probable that any will be given until, by analyzing all the different ores of Mexico, some general principles are established, upon which a theory may hereafter be founded, and improvements successively introduced. I mention these

facts merely, in order to demonstrate the necessity of subjecting to the test of experience, upon a large scale, those secrets for expediting the process of amalgamation, which have been offered to the Companies as invaluable discoveries, in London, but by which I am not aware that any beneficial effect has yet been produced in New Spain. Where so great a difference exists between the ores of two mines belonging to the same district, and situated sometimes upon the same vein, there is little reason to suppose that any general system can be adopted. At all events it should be tried by the inventor upon the spot; for an experiment made with chymical nicety upon a very small quantity of ore, may not prove successful when applied to the masses, upon which the Amalgamator must act in Mexico, where it is in the abundance, and not in the quality of the ores, that the riches of the mines consist.

Road to Angango.

From Temascaltepec I proceeded on the morning of the 26th of August to Ängängēō, a Mining district in the State of Valladolid, about seven leagues from Tlālpūjāhūa, and twenty-seven from Tēmāscāltēpēc.

The road is excessively varied from the circumstance of its bordering constantly upon *Tierra Caliente*, into which almost every deep ravine or valley conducts you. In these you find sugar-plantations, Bananas, Chirimoyas, and all the tropical fruits;

while the sides of the adjacent hills are covered with a fine growth of Northern forest-trees. The luxuriance of the vegetation surpasses even that which I remarked between Zimápān and the Encarnacion, and the variety is certainly greater.

Yet this magnificent tract of country is, with the exception of a few farms and villages, uninhabited, from the total want of a market for the produce.

From the Hacienda of Hoconusco, where I slept on the night of the 26th, and which is fourteen leagues from Temascaltepec, and forty-six from Mexico, wheat, which might be raised to almost any extent, must be sent to the Capital in order to be disposed of. The revival of the Mines at Temascaltepec can alone give any importance to the agriculture of this part of the country, and this may account for the eagerness with which their progress is watched by the inhabitants.

From Hoconusco the road passes through Zitācuarō, which was formerly a flourishing town, but was destroyed entirely by the King's troops, under General Cällējā, during the Revolution; having acquired a fatal distinction by being selected as the residence of the first Independent Junta. It is now nearly in ruins, and will probably never recover its former importance.

Angangeo is about eight leagues from Zitacuaro. The greatest part of the road consists of a steep ascent. I never saw a town that presented more thoroughly the appearance of a Mining district than

Angangeo. For upwards of a league, the ravine which leads to the town is full of Arrastres, (mills for grinding ore,) worked by horizontal water-wheels, and little Patios, (open sheds,) wretchedly constructed, it is true, in which the process of amalgamation is carried on.

The German Company is the only Foreign establishment in the Real; but there are several Mexicans who work mines in a small way, with capitals, (if they may be called so,) of from five hundred to two or three thousand dollars each, with which, by constant personal inspection, they manage to earn a sufficiency to support themselves and their families.

Angangeo contains four principal veins, running nearly parallel to each other, and separated by valleys or ravines, in one of which the town is situated. The direction of the veins is from North to South. Two only of the four have names,—the Veta del Carmen, and the Veta Descubridora, (so called from the principal mines upon each,) which vary in breadth from two to five, and even nine varas.

On these veins there is a multitude of mines, worked, as I have already observed, by small Mexican proprietors, who contrive to earn by them a scanty subsistence.

Few exceed one hundred, or one hundred and twenty varas in depth, the oldest mine in the place not having been worked above sixty years.