

consequently, according to the quality of the Monton, which is determined by the eye.

In the amalgamation of a large *Torta*, the same proportions are always observed; and the mass is repeatedly worked up by men and mules, (*repasadores*,) in order to promote the incorporation of the silver with the mercury, which it requires six weeks in winter, and one month in summer, to effect. When the amalgamator supposes the *Torta* to have "rendido," i. e. to have yielded all the silver that it contains, it is washed in large vats, (*Tinas*,) until all the earthy particles are got rid of, when the amalgam, which remains at the bottom of the vat, is strained in leather bags until no more quicksilver can be separated from the silver by pressure. The remainder is cut into wedges, which are conveyed to the *Quemädērö*, (burning-house,) and arranged in a circular pile round a copper-plate called the *Vaso*, with a hole in the centre, and a receptacle for water beneath, care being taken to make the hollow left in the centre of the pile of amalgam correspond exactly with the hole in the *Vaso* below. The whole is then covered by a large iron bell, called *Capella*, or *Capellina*, which is strongly luted down; a wall of mud bricks is raised round it, and the intervening space filled with charcoal. The fire is kept up for twelve hours, in which time the quicksilver is sublimed, and afterwards condensed in the water, where it is subsequently collected. The pure silver (*Plata quemada*) is then cut again into wedges, or



melted down into bars, (containing 135 marcs each,) in either of which shapes it may be transmitted to the mints.

The loss of quicksilver at Salgado in the whole process, in the year 1825, amounted to nine ounces on each marc of silver; but this was thought to be an instance of very successful management on the part of Mr. Bělaūzārān, as the proportion is, in other Haciendas, from ten to eleven ounces. He attributed the difference to the excellence of the "Molienda," which he always caused to be continued until there was nothing harsh, or gritty, in the mass upon which the mercury was to act. He added, that the residue of the *Torta*, when washed, might contain some small portion of silver, but it had not been found that the quantity was sufficient to repay the cost of any farther process, as at Chico; (*Vide* Section IV. of preceding Book,) and it was consequently thrown away.

The best of the "mōntōnēs" which I saw at Salgādō, were expected to produce fourteen marcs of silver; and those of an inferior quality, eight marcs. Two marcs and a half pay the costs of reduction, which amount to twenty dollars on the mōntōn. Allowing as much more for raising the ore, and the share in the general expences, there would remain a profit of three marcs, or twenty-five and a half dollars, on each monton of the poor "Azogue" ores; while on the richer "montones" it would amount to seventy-six and a half dollars, in-





*Drawn by Mr. H. C. Ward.*

*Pub. by H. Colburn, London, 1828.*

*J. Clark sculp.*

PATIO OF THE HACIENDA DE SALGADO.



cluding the loss of quicksilver, which, in 1826, was worth six reals per pound.

Nov. 15. We devoted the whole of this day to the Valenciana mine, it being impossible to form an idea, in less time, of the extent and importance of this vast undertaking. The history of the Valenciana, like that of the Biscaina Vein, was first made known to us by Humboldt, and is now almost forgotten; it may be advisable therefore to state that the mine is situated to the North of the town of Guānājuātō, upon a part of the Větā Mādrě, which, after being slightly worked towards the end of the sixteenth century, had been neglected as unpromising until the year 1760, when Mr. Ōbrėgōn, a young Spaniard of very small fortune, resolved to explore the vein upon one of those points where it was believed to be "*emborrascada*," or destitute of mineral riches. For six whole years he continued to work upon this spot, with a perseverance which nothing but a presentiment that he was to make his fortune there can account for; and in 1767, having exhausted his own means, as well as the patience of those from whom he had occasionally obtained supplies, (Avios,) he entered into partnership with a shopkeeper of Rāyās, called Ōtěrō, wielding with his own hands, it is said, the tools of the miner, until the year 1768, when the works having attained the depth of eighty metres, the vein suddenly began to produce enormous masses of rich ore; which continued to increase in value and extent to such a degree, that the profits



of the proprietors amounted, in several successive years, to one million and a half of dollars. From 1788 to 1810, the produce averaged 1,383,195 dollars, and the profits 527,701 dollars, as may be seen by a reference to the Tables annexed to the Third Section of the Fourth Book. A town of 7,000 inhabitants was formed in the vicinity of the mine, in which 3,100 individuals found daily employment, under the immediate inspection of an Administrador, to whom the proprietors paid a salary of 12,000 dollars, (2,500*l.*) conceiving, very properly, that the value of the situation was the best security for the good conduct of him by whom it was held.

A number of different "Pertinencias" are united at Vălenciănă, the works in the interior occupying nearly half an English mile in extent. In order to give access to the different levels, various shafts have been sunk, the first of which, called the Tiro Viejo de San Antonio, is said to have cost 396,000 dollars. Through this the first "Bonanza" was raised. The Tiro de Burgos, and the Boca de San Ramon, were next purchased and incorporated with the great mine, (they cost 82,000 dollars;) and the Hexagon shaft of Nuestra Señora de Guadalupe was afterwards sunk at an expence of 700,000 dollars. All these being deemed insufficient, the great Octagon shaft, called El Tiro General, was begun in 1801, and carried on until the commencement of the Revolution, when it had cost nearly one million of dollars, and attained the depth of six hundred and

thirty-five Mexican varas. When the Company took possession of the mine, the whole of the interior was filled with water to within one hundred and eighty-five varas of the mouth of the great shaft: there were consequently four hundred and fifty varas to drain, and this not merely in perpendicular depth, but disseminated throughout the whole of the workings, most of which had been so long under water that the communications were destroyed, the timbering falling to pieces, and many of the lower levels filled up with masses of rock, or Těpětătě, detached by the action of the water from those above. Had this volume of water proceeded from internal springs, the attempt to carry it off by any power of machinery would have been hopeless; but up to a very late period, the mine of Valenciana was distinguished by its extreme dryness, which was such that the workmen were at times much incommoded by the dust. The water was first admitted by an injudicious communication with the neighbouring mine of Těpěyăc, and it was allowed to accumulate during the whole of the Revolution, the machinery having been much injured by Hidalgo's troops in 1810, and subsequently destroyed by Mina's followers, after his unsuccessful attempt upon Guanajuato in 1818. The effect of such an accumulation in a country where a river is often formed in an hour by the Tropical rains, can hardly be conceived by those who are not acquainted with their violence. It was such that no individual could have undertaken the



task of repairing the ruin, which this long season of abandonment had occasioned. Even for a Company it may be regarded as one of the boldest mining speculations ever yet attempted.

The drainage commenced on the 1st of February 1825. Steam-engines were not employed upon it, on account of the scarcity of fuel; but eight Malacates (horse-whims) of the largest kind were erected round the Tiro General, and kept at work day and night without intermission for twenty-one months, in which time they lowered the water 185 varas. As it descended, the levels which became accessible were repaired, and ores raised wherever veins of any promise appeared; and such was the vigour and activity with which these operations were carried on, that, (as I have already stated) a "Barra," or share in the Valenciana, which, in 1824, would not have sold for 20,000 dollars, was thought by the natives to be worth 100,000 dollars at the time of my visit. It is indeed true, that the difficulties of the drainage increase in proportion to the depth from which the water must be raised; but then they diminish in other respects, because the mine contracts below the level of La Soledad, towards which the water was gradually descending, and the volume of water to be raised consequently decreases. Upon the whole, I saw no reason to question the probability of a favourable result, and the natives were very sanguine in their anticipations of it, fixing for the completion of the drainage the term of eighteen

months. Long before this period arrives many valuable levels will be opened, which will prevent the prosecution of the enterprise from being, as it has hitherto proved, a drain upon the Association; for it is not so much in the deepest levels, (which are supposed to have exceeded the limits within which the Veta Madre of Guanajuato has proved hitherto most productive,) as in the extension of the lateral workings, that the value of the Valenciana as a mine is thought to consist. The outlay in September 1826 was 672,264 dollars, including the alimentos to the proprietors, which amount to 24,000 dollars annually.

We entered the Valenciana by the Boca de San Cäyētānō, at which the old Count Valenciana began his operations; a flight of steps, which even ladies can descend without difficulty, leads to the Capilla, about sixty varas from the surface, where passages branch off to different workings in the interior of the mine. Here a prayer is usually recited by the chief miner before a large picture of the Virgin, and after this the more fatiguing part of the excursion commences. We passed nearly five hours in exploring the different workings, the extent of which exceeds all that a person acquainted only with ordinary mines can imagine. I found the ventilation in general good, except in some "labores" where no communication with the shafts had been yet established. In these the thermometer rose to 90° and 94° of Farenheit; and the heat was very oppres-



sive; but even close to the water's edge there was nothing like foul air. The operation of retimbering, and, in many parts, of digging out the communications anew, was proceeding rapidly, and from some levels ores were raised which produced at times silver enough very nearly to cover the weekly expences of the mine. These amounted to six thousand dollars, including both the mining operations and the malacate horses employed for the drainage, which were upwards of three hundred in number; each malacate requiring thirty horses in the twenty-four hours.

On re-ascending from the lower levels, we visited the Tiro General, which is both a wonderful and an imposing sight. Its dimensions are unnecessarily large, but it is sunk with a magnificence unparalleled in the annals of European mining, the diameter being eleven Varas. The whole of the Tiro is sunk in solid masonry, and the sixteen cueros, or leather buckets, by which the water is raised, though composed each of two bullock's hides, are lost in the immense dimensions of the shaft.

The greatest praise is due to Mr. Williamson, the principal commissioner of the Anglo-Mexican Association, for the constancy that he has displayed in carrying on the drainage of the Valenciana with the means within his reach. Public opinion was unfavourable to the undertaking, until he demonstrated its practicability; and although in the deeper levels the application of steam may be necessary,

yet in a contract limited with regard to time, there can be no doubt that he has rendered the most essential service to the adventurers, by turning to all possible account the powers of the native machinery, which have been much underrated in Europe. What he has been enabled to effect by a proper application of them both at Valenciana, and in the mines of Sirena and Villalpando, may serve as an encouragement to those who are engaged in speculations in districts, where, either from the scarcity of fuel, or the difficulty of access, European machinery never can be introduced. The absurdity of the indiscriminate use of it, contemplated in 1824, has been already demonstrated. Many mines may be made to produce a reasonable profit for a given time by the use of the Malacate, that would never repay the costs of a steam-engine, doubled, as they always must be, by the expence of conveying it from the coast. There is a point indeed beyond which the Malacates cease to act; yet even then, with so many obstacles to be overcome, it is only on mines the richness of which is well ascertained, (as at Real del Monte, or Bolaños,) that it would be prudent or advisable to hazard the substitution of European machinery, with all its attendant train of workmen and artificers.

Besides the mines already enumerated, the Anglo-Mexican Company possesses that of Mëllädö, belonging to the family of Rühl. The contract and Alimentos are the same as those of Villalpando. The



mine was almost paying its own expences in 1826, the weekly sales being about seven hundred dollars; but the drainage was proceeding very slowly in consequence of the difficulty of coming to an arrangement with the proprietors of the neighbouring mines. The works in Tēpēyāc were likewise suspended, the contract with the proprietor, Colonel Chico, being considered disadvantageous; it was thought, however, that more favourable terms would be obtained. In 1826 the Alimentos were 16,000 dollars; making a yearly disbursement of 88,000 dollars in all on the part of the Company, the periodical recurrence of which, in conjunction with the very large investment required by some of the mines, has proved a burthen heavier than many of the shareholders were inclined to bear.

That they might have commenced their operations on more favourable terms, had they possessed the knowledge of the country which they have since acquired, there can be little doubt; but even now, deducting from their future profits all their unnecessary expenditure in salaries, and machinery, and confining their works entirely to their principal mines, it is the opinion of their agents, that their whole outlay may be repaid in three years, and that their profits will amount subsequently to twenty-six and a half per cent. upon their nominal Capital.

I do not vouch for the correctness of this calculation, but I give it as the opinion of a gentleman extremely temperate in all his views, much

looked up to and respected by the natives, and indefatigable in his efforts to promote the interests of those, by whom he has been entrusted with the conduct of an enterprise of greater magnitude than any in which British Capital has been employed hitherto beyond the limits of the British dominions.

Both Mr. Williamson and Mr. Jones do justice to the liberality and good faith displayed by the Mexican proprietors in all their transactions with the Company. The accounts of each mine are balanced and finally wound up at the end of every year; and nothing has yet occurred to interrupt this good understanding, by which the interests of both parties are so effectually promoted.

17th and 18th of November. I passed both these days in visiting the mines worked by the United Mexican Company at Guanajuato, the most important of which are Rāyās, Sēchō, and Cātā.

The first of these "San Juan de Rāyās," (so called from its original proprietor,) is one of the most valuable mines upon the Veta Madre; and the most ancient document in the archives of Guanajuato is the certificate of its denunciation. It is situated in one of those Cañadas, or ravines, in which the great riches of the vein have been usually found concentrated, immediately below the mines of Santa Anita, and San Vicente, both of which are prevented from pushing their works downward by levels extending from the mine of Rayas below the whole of their "Pertinencias," as marked out upon the surface.