

In 1787, Tarve, having acquired a sufficient capital, and an intimate knowledge of the mining capabilities of the district, resolved to commence operations upon his own account, and to attack the vein of the Pavellon. With this view he set out for Mexico, in order to close his accounts with the Company, and to give up the management of the Veta Negra, which he had conducted with so much success. He was taken ill upon the road, and died at Zacatecas, but not before he had bequeathed his confidential mining "dependiente," Don Juan Martin de İzmēndī, as a precious legacy to his old patrons, and with him a knowledge of his projects with regard to the Pavellon.

In these Izmendi was supported by Don José Mariano Fägöägä; but the family being reduced by various misfortunes, and the mines of Veta Negra failing almost entirely at the same time, it was with the utmost difficulty that he obtained the means of carrying his plans into execution; and he only effected it at last, by disregarding the positive and repeated orders which he received to give up the work.

Tarve's favourite scheme was to drive a level from the Veta Negra in such a direction as to strike the vein of the Pavellon (which runs through much higher ground), a little below the spot where the bonanza of the preceding century had ceased, conceiving it probable that, in a vein which had produced such extraordinary riches above, the dete-

rioration that had taken place afterwards, would only be temporary, and that the ores would resume their original quality below.

This work Izmendi executed, by driving the Crucero (cross cut) of San Rafael, which led to the second great bonanza of the Pavellon, and rendered the Marquis of Apartado and his brothers the wealthiest individuals of their day in Mexico, or perhaps in the world. It is a curious fact, and one that serves to illustrate the vicissitudes inseparable from mining adventures, that had this crucero been executed with the same precision as the rest of Izmendi's works; that is, had it preserved its original level, and struck the vein of the Pavellon one single yard lower than it did, it would have cut the vein in "*borrasca*," that is, in a part where it presented no indications of rich ores; in which case, the enterprise would have been instantly abandoned, Izmendi, and his patron Don José Mariano Fagoaga, denounced as rash and imprudent adventurers, and the district itself forsaken, as one from which nothing more was to be hoped. As it happened, the level of San Rafael, by rising one vara higher than it ought to have done, according to the measurements, struck almost the lowest stone of a "*clavo*," or natural deposit of rich ores, which, although it did not extend above sixty varas in depth, or thirty-five in length upon the course of the vein, produced a bonanza of eleven millions and a half of dollars, adding one-eighth as partido to the value of the

8771 bars of silver registered at the Royal Provincial treasury. The ores were raised in about eight months, (at different intervals,) but their reduction lasted from the year 1792 until 1811, during the whole of which period the Fagoagas enjoyed an exemption from duties, granted them before the extent of their good fortune in the mine of the Pavellon was suspected, in consideration of their former losses.

Much time elapsed in the first instance before any advantage could be derived from Izmendi's successful labours; for, from the moment that the communication between the two veins was opened by the crucero of San Răfăel, the water which had accumulated during a whole century in the old workings of the Păvėllōn, rushed down into the Vetă Nėgră, where it became necessary to draw it off in order to render the new discoveries accessible. The shaft of Lă Crūz was afterwards sunk directly upon the cross cut, between the two veins, and through this a great part of the bonanza was raised. Another shaft, called San José, was subsequently added, and a Hacienda built in the centre of the town, with a magnificence well worthy of the ores for the reduction of which it was intended. The Patio, or court of amalgamation, is surrounded by eighty-four arches, under each of which an arrăstre, or crushing mill, is placed; and in addition to these, there are fourteen large furnaces for smelting, with store-rooms for ores, stampers, and apartments without number for workmen, guards, and superintendents, all enclosed

by a lofty wall. The whole is now going to decay, but it is still a splendid monument of the former opulence of the mines, and as such cannot be visited without interest.

The vein of the Pavellon has always been more remarkable for the richness, than the abundance of its ores: during the great bonanza, thirty-five marcs of silver were often yielded by one quintal of ore, and twelve or fifteen marcs per carga was the ordinary produce of metals classed as "Comunes." Mr. Anitua himself has, more recently, reduced ores from a little branch of the vein, in the shaft of El Carmen, which contained forty-five marcs to the carga. One hundred cargas yielded twenty-one bars of silver, or 21,000 dollars; but the vein was small, and soon lost itself in the mountain.

The Făgōăgăs having entirely abandoned their mines, they remained unworked from 1812 to 1819, when an association of native miners was formed to denounce them anew, at the head of which was Don Narcisco Ānītūă, the present proprietor. The necessary funds were raised, and the drainage nearly effected, when the declaration of Independence in 1821 threw the country into an unsettled state. The labourers all quitted the mines to join Ītūrbīdē's armies; and Anitua, whose whole fortune was embarked in the enterprise, saw himself compelled to abandon it at the very moment when his labours seemed drawing towards their close. For three years all his operations were suspended; but at the expira-

tion of that time, having concluded a contract with the United Company, and ceded to them, as "Aviadores," or Habilitators, one-half of the negotiation, he obtained the necessary funds for carrying on the undertaking, and on the 3d of December, 1825, the drainage recommenced. A difference of opinion prevailed, for some time, between the proprietor and the Company, with regard to the best mode of effecting this; Mr. Alaman being desirous to confine his operations to the vein of the Pavellon, while Mr. Anitua maintained the impossibility of ever entirely clearing that vein of water without attacking the Veta Negra at the same time.

From the difference in point of elevation between the two veins, the waters of the Pävällön flow, at first, into the Veta Negra, but, as the extreme depth of the levels of the Pävällön is much greater than that of the lowest workings upon the Veta Negra, the waters, upon rising in the last to the level of the Crücērö of San Răfăël, flow back again into the Pävällön; and although they might be restrained for a time by building a wall across the Crucero, (as was formerly attempted,) still the danger with which such an accumulation of water would be accompanied, in the event of the present attempt to explore the vein of the Pavellon to a still greater depth proving successful, induced the Company to resolve upon comprehending the Veta Negra in their enterprise, as the only means of ensuring the safety of those engaged in it.

In the time of the Fägöögäs, thirty malacates (horse-whims) were employed upon the two veins, but under Mr. Anitua's superintendence a much smaller number had proved sufficient; twelve malacates having been erected at the shafts of La Cruz and José, upon the vein of the Pavellon (six at each shaft), and twelve more at the shafts of Güadälüpē and San Antōñö upon the Větă Nēgră; by which, as already stated, the mines in one year have been entirely cleared of water.

The object of the Company is to examine the Cerro (or hill) which the vein of the Pavellon traverses, at a point immediately below those from which the two great bonanzas of 1675 and 1792 were raised, in the hope of finding a third "clavo rico," or "bunch" of rich ores, which it seems to be the character of the vein to produce after an interval of barrenness. For this purpose the shaft of La Cruz is to be carried down a hundred varas below its present depth, and cross cuts driven from it, at intervals, in such a direction as to explore the whole course of the vein in the parts where it has hitherto been unworked. The expence incurred is fully warranted by the importance of the object, and by the certainty that if any portion of the vein be found productive, such is the richness of the ores, that a very small quantity will be sufficient to repay the whole outlay; while should a third great mineral deposit be discovered, instances of which have not unfrequently occurred in other mines, (as Răyăs, La Qüe-

brädillä, and Bärancö, mentioned in the preceding sections,) the profits of the Adventurers would be enormous.

In order to complete their trial of the capabilities of Sömbrerētē as a mining district, the Company has commenced a new shaft, called La Concordia, "denounced" by the brother of Don Narcisco Anitua, upon a part of the vein never before explored. This shaft is situated to the North-west of all the old workings, a little beyond an arroyo, or ravine, in which the crest of the vein is distinctly visible, and from its size appears to announce a lode of no common dimensions.

In December 1826, the workings were 112 varas in depth. At 120 varas, a first level was to be driven in the direction of the vein, which it will cut at the distance of thirty-seven varas, if the inclination be the same below, as in the shaft of La Cruz. The necessary buildings at Concordia were all complete, and excellent of their kind; and should fortune favour the enterprise, not a moment would be lost in turning the produce to account. It is regarded by professional men as one of the most interesting experiments that has yet been tried in Mexico, and, whatever be the result, it deserves to be repaid with success.

A similar attempt to explore an untried portion of the Veta Negra has been made, by sinking the new shaft of San Lucas, in which the vein had been cut a short time before my visit to Sömbrerētē; the

first six cargass of ore raised, which I saw smelted, produced fifty-nine and a half marcs; and, in the opinion of Mr. Keating, a very able mineralogist from the United States, who had examined the mine a few weeks before, appearances were such as to warrant the most sanguine expectations with regard to the result.

I have not heard whether these expectations have been since realized, but I can bear evidence to the zeal, and ability, with which their attainment was sought. It is difficult to possess a more perfect acquaintance than Mr. Anitua with all the local peculiarities of his ground, or to imagine a better system than that which he has introduced into every part of his establishment. The drainage, which has been effected entirely by Mexican machinery, was conducted with unprecedented activity, and concluded in half the time allotted for it in the opinion of the other miners of the district. The malacates used are smaller and lighter than those of Guänajuātō; the drum of the largest being only six varas in diameter, and the "palanca," or cross beam, to which the horses are attached, eighteen varas in length. But the difference in point of size is compensated by the rapidity with which they are worked, the horses being kept constantly at a very rapid trot, and changed every two hours. Should the vein of El Pävällōn assume a favourable appearance in the new workings, now that the mines are cleared, a general system of drainage will be established for

the whole negotiation, by concentrating the water from both veins at the shaft of San Pedro, which will be sunk for the purpose to the depth of 500 varas. This will be sufficient to carry the deepest part of the shaft below the lowest levels of the Pavellon, while, from the vicinity of the two lodes, and the manner in which the water already passes from one to the other in the deeper workings, a cross-cut, (or sangria,) will be all that is necessary in order to ensure a regular communication. The whole drainage will, in this case, not require more than eight mälacätēs, for which, should the present experiment lead to more permanent works, a steam-winding, or pumping-engine, may be substituted.

The outlay of the Company at Sömbrrētē, in 1826, amounted to nearly 500,000 dollars. With this, the whole of the mines mentioned in the preceding pages had been cleared of water, and retimbered where necessary; three new shafts sunk, (La Concordia, San Luis, and El Carmen, which last was intended merely for the extraction of rubbish from the old workings of the Pavellon;) two Haciendas de Beneficio put into complete repair; and so large a stock laid in of maize, wood, horses, and every other necessary, that it was thought that during the whole ensuing year but few additions would be required. In every department, Mr. Anitua's exertions appeared to have been indefatigable; and as, from his long experience in mines, he looked into every thing himself, and understood every thing

into which he looked, there was no inattention or negligence amongst the subordinate agents, but all the parts were made to work well together. Upon the whole, I did not see in Mexico a better-regulated enterprise; and there are very few the management of which is so entirely free from defects.

In the two Haciendas of the Company, La Purissima and La Soledad, amalgamation is but little employed. The ores are usually smelted, and in this process great use is made of the tēquēsquītē, (carbonate of soda,) from La Sälādä, which is employed as a dissolvent. The lead ore (or Grētä) used, is brought from Mäpimi, or Cuēncämē, (on the frontiers of Dürängö and Chihuähüa;) the charcoal from the Mēzquītäl, or the Mēzquītē woods belonging to the Hacienda of Mülērös, on the road to Durango. The charcoal costs one dollar for the carga of ten arrobas, or 250 lbs.; the lead varies from eight to twelve dollars per carga, about one arroba, or 25lbs. of which is lost in the reduction of a carga of ore.

Mr. Anitua, who manages the whole smelting department himself, and is thought to understand the process better than any man in the district, informed me that the average expences may be estimated at fifty-six dollars to the monton of twenty quintals; they consequently exceed considerably the charge for reducing a similar quantity of ore by amalgamation; but it is a favourite theory in all the smelting districts, that the ores yield a greater proportion of

silver in the "horno," (furnace,) than in the patio, (amalgamation court,) and the difference, in Mr. Anitua's opinion, is more than sufficient to cover the additional expence. The question has never yet been fairly brought to an issue, as, in the different districts, the choice of the process was usually determined, in the first instance, by the greater or less facility with which the ingredients required in each could be procured. Very rich ores are, however, always smelted; and as those of the Pävällön are remarkable for the quantity of silver which they contain, this circumstance is perhaps sufficient to account for the general preference now given in Sömbrerete to reduction by fire, although in the neighbouring districts of Zäcätēcäs and Guänäjüatö, it is very little in use.

## SECTION IV.

JOURNEY FROM SOMBRERETE TO DURANGO.—  
ACCOUNT OF THAT STATE.—MINES OF GUARISAMEY, AND THE SIERRA MADRE IN GENERAL.—EASTERN FRONTIER, TEXAS.—STATES OF SONORA AND CINALOA.—GULF OF CALAFORNIA.—MAZATLAN AND GUAYMAS.—MINES OF ARISPE, ALAMOS, MULATOS, AND COSALA.—GENERAL OBSERVATIONS UPON THE NORTH OF MEXICO.

IT was our intention, on leaving Mexico, to have extended our journey North as far as Durango, but so much time had been consumed by the first part of our tour, and so much was still requisite for the return by Zacatecas, Guadalajära, and Välladolid, that both Mr. Martin and I thought it inexpedient to prolong our absence from the Capital by adhering to our original plan. With the coach, a visit to Dürängö from Sombrerete, and the return, would have occupied nine days; the road being bad, and the dis-