

republic, it is extracted in a few places, as in Vallecillo, in the state of Nuevo León, where silver-lead-mines are worked containing a great deal of zinc ore, which is separated and exported to Germany.

Platinum is found in the state of Hidalgo. A European company with the necessary capital would probably succeed. There are also found nickel and osmium at several points in the country.

Lead, as necessary as mercury for treating silver ores, is found everywhere,—above all, in the form of galena and in small quantities as carbonate.

Metallic lead, which may be mined, and from which silver is extracted, is found in enormous masses at Lomo de Toro (state of Hidalgo) and in several other quarters. Large deposits of



THE BEND, ON THE CUERNAVACA AND PACIFIC RAILROAD.

silver-lead ores are found at Sierra Mojada, state of Coahuila, and are being worked advantageously. Most of these ores go to the Monterey smelters.

Mexican mining can be suspended, developed, or retarded according to the wish of the proprietor, subject only to police regulations and those touching the safety of the miners. The government of Mexico, desiring to develop the mining industries of the republic, has taken a very important step by passing a mining law that will induce American capitalists to enter the promising field of its yet but partially explored mineral regions.

The principal deposits of sulphur are at San Antonio, Guacamán (San Luis Potosí), Mapimi (Durango), and the volcanic region of Michoacán (Taximaso), Popocatepetl, and several districts in the centre and north of Lower California.

The marble of Galeana (Chihuahua) is comparable to that of Carrara; that of Tecali,

which, although a marble, is known to every one in the United States under the name of Mexican onyx, is of admirable transparency and variety of color.

The state of Nuevo León produces a great variety of colored and white marbles, and the same might be said of almost all the other states. The gray, black, and other colored marbles, more or less beautiful, of Orizaba (Vera Cruz) constitute to-day one of the vastest and most important interests in Mexico. The quarries are very numerous, and their exploitation is developed day by day.

There is no marble or other stone which has ever compared in beauty with the Tecali Mexican marble or Mexican onyx. For centuries before the conquest the Aztec artists and architects found in this marble their favorite material, which was so highly prized that they considered it too sacred for common use, and so devoted it almost entirely to religious structure and decorations. Its Indian name tecali is merely a corruption of the Aztec word teocalli,—a large mansion,—a name which the Indians gave to their temples. In the days of Cortez altars and baptismal fonts were always made of it when it could be obtained. While the ordinary grades probably surpass in elegance any similar material, it is only in the light and dark grained, the ivory-colored, the brilliantly banded, and the dark-red varieties that there is had a full realization of this stone at its best. Under the touch of a skilled hand it becomes almost a gem. It owes its combination of colors to iron and manganese. It is as hard as marble, but susceptible of a higher polish. In the quarries it comes in detached masses of from a few inches up to ten or twelve feet. The inferior qualities that lack color are sawed into very thin slabs, so thin as to be almost transparent, which are then colored and pencilled to make a fair counterfeit of the real article, after which the side that is painted is covered with a coating of very fine cement, giving it the appearance of having been merely sawed and then polished. All the quarries are small. The most famous, La Pedrera, in the district of Tecali, twenty-one miles from Puebla, is less than three acres in extent, and the average quarry not over seven feet, but the value of the material taken from this small area is hard to realize. The material obtained is a very fine quality of green, from very light to very dark, sometimes showing a slight tinge of red or pink.

The most abundant precious stone is the opal. One of the heroes of the war of independence, General Guerrero, has several diamonds which were given to him by one of his soldiers, who found them during an expedition in that part of the Sierra Madre which crosses the state of Guerrero. The deposits which yielded these precious stones, and concerning which the general has given but very vague information, have been vainly sought by explorers. There have also been found in Mexico the topaz, the ruby, the emerald, and the garnet.

The most celebrated salt-mines in Mexico are those of Peñon Blanco (San Luis Potosí), their products containing from seventy to eighty per cent. of pure chloride of sodium. In the same state are found the equally important salt-mines of Tapado and Zamorelia. On the coast of both oceans there are a great number of salt-mines, those most worked being the mines of Yucatán.

Until 1881 Mexican geologists asserted that there was no mineral coal in Mexico, but since that time investigators have found deposits in various parts of the country, particularly one in the state of Sonora, in which the percentage of carbon is so high as to cause General Rosencranz to give it the name of "black gold." Government commissions have found coal in Sonora, Michoacán, Vera Cruz, Guerrero, Oaxaca, Puebla, and other states. There are also deposits in the north, in the states of Chihuahua and Coahuila. Coal is also found in the states of Tlaxcala and Hidalgo, where it is not worked. The most important of these deposits are those of Sonora, Puebla, and Coahuila.



Despite the fact that the coal discovered is of unusual richness, the Mexicans have never worked the deposits. The first important purchase was made in Coahuila by Mr. C. P. Huntington. This coal contains seventy-three per cent. of fixed carbon, and has a heating power of eighty-two and four-tenths per cent. The very first year that Mr. Huntington's mines were worked they yielded one hundred and fifty thousand tons, and they are now producing two hundred and fifty thousand tons a year.

Mexico uses about five million gallons of petroleum per annum. Crude petroleum springs running freely are to be seen on the banks of several rivers, some of them having a natural flow three inches in diameter. This industry has not been developed.

Attention may be called to abundant and easily worked sources upon the Gulf of Mexico, and above all those of Macuspana (state of Tabasco). They have not been worked, except to a trifling extent in the state of Vera Cruz, where there are rich deposits.

All along the Gulf coast there are traces of asphalt, and in the northern part are deposits thereof. This asphalt may be broken into blocks and floated down the river to the sea-coast, there to be collected and loaded on vessels.

Lower California contains, besides silver and copper and gold, mica, alum, saltpetre, borax, salt, and sulphur. The little islands of Rasa, St. Teresa, and Palos contain phosphates, of which there are exported about fifty thousand dollars' worth per year.

The legal taxes in taking title to a mine are one dollar for admission and declaration and five dollars for adjudication. The costs of advertisement are charged to the claimant, as well as the tax of two dollars per league to the member of the delegation who makes the adjudication.

Mines and deposits of every inorganic substance may be exploited without authorization from the owners of the land on which they are found; these, however, reserving their rights in coal, building-stone, mineral springs, and placers of all metals except gold and platinum, and of precious stones.

The Mexican government, desirous of favoring the development of the mining industry, and understanding that the small legal claim of two hundred metres square allowed to one person would not attract foreign capital, gives large companies special concessions, embracing a considerable extent of territory, and permitting the working of many veins, thus diminishing the fleeting character of enterprises of this kind. A mining company may have a maximum of twenty claims in ordinary cases and thirty where the company works newly discovered mines or takes up work in an abandoned mining district. The maximum quantity of land that may be taken up is one million eight hundred thousand square metres. All special concessions made to companies last ten years, after which the companies come under the general law. They must invest in working their mines at least two hundred thousand dollars. This sum is exempt from all federal taxation except that of timber.

The name Atotonilco is very common in Mexico, and always indicates the proximity of warm mineral springs.

Sponges, mother-of-pearl, and shell—which can hardly be deemed mining products, yet which cannot be classed among agricultural productions—are found in abundance of the best quality on both coasts, and are already worked regularly in Vera Cruz, Yucatán, and Lower California. The government, in order to develop this branch of industry, has already made very liberal concessions to companies desiring to follow this profitable line. It is an infant industry, but well worthy of recommendation,—above all, because the capital necessary to establish it is very small, while the profits are high.

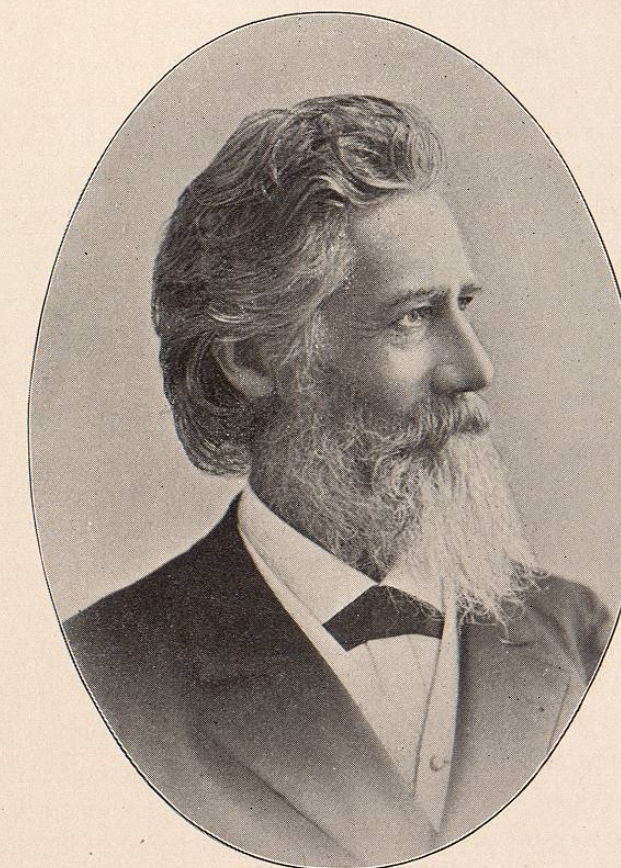
At Yucatán tortoise-shell is manufactured with considerable skill into articles of ornament.

## CHAPTER XLVII

## RAILROADS AND TELEGRAPHS

THE time has gone by when Mexico was isolated from her fellow-republics and the world at large by lack of means of communication. At present she has large and rapidly developing facilities of transportation of matter and communication of thought.

The first concession granted for the construction of a railway in the Valley of Mexico was issued on October 12, 1852, the concessionnaire being Count Cortina, who is often and favorably mentioned in Madame Calderon de la Barca's "Life in Mexico." The charter was for a line from the city of Mexico to Tlalpam, passing *en route* through the towns of Tacubaya, Mixcoac, Coyacán, and San Angel. The count was a very brilliant and versatile man, being at once a littérateur, a journalist, a man of business, and a conspicuous figure in society. But he did not succeed as a railroad-builder, and the concession lapsed. The next charter was granted on August 13, 1856, to Mr. George Luis Hammecken for the construction of a railway from Mexico to Tacubaya. This line, which was no other than the present one, was bought by the Mexican (Vera Cruz) Railroad in 1865.



MAJOR ROBERT B. GORSUCH.

The railway era of Mexico may be dated from the year 1880, when the charters were granted under which the two great systems of the country, the Mexican Central and the Mexican National, were commenced. These charters were dated respectively the 8th and the 13th of September, 1880; and then followed the flood of concessions for railways which, if all had been carried out, were more than sufficient to create a complete net-work of rails, covering the whole country from north to south, from east to west.

The development of railway construction in Mexico since 1880 has been really remarkable, and the benefits which have resulted to the republic are incalculable. From a turbulent nation,