

DISTRICTS.	NAME OF MINES.	Number of mines.	ORE.
Camargo.....	Peña Gorda.....	1	Silver lead.
	Agua Zoquete.....	1	" "
	Encinillas.....	1	Copper.
Andrés del Río.....	Batopilas.....	8	Native silver and gold.
	Cerro Colorado.....		
Arteaga.....	Urique.....	2	Silver, gold.
	Guazapares.....	3	Silver.
	Realito del Carmen.....	1	"
	Uruapan.....	4	Silver and gold.
	Topago.....	2	" "
	Palmarejo.....	1	" "
	Chinipas.....	3	" "
	Barranca del Cobre.....	1	Copper and gold.
Bravos.....	Corralitos.....	1	Silver.
	Sabinal.....	6	Silver and gold.

There are 46 mineral districts and 160 mines opened. The methods employed for the reduction of ores are: smelting, lixiviation, "patio" and pans.

The mineral districts which at present attract most attention are those of Batopilas and Cerro Colorado.

The ancient and celebrated mining district of Batopilas in the municipality of Andrés del Río, is situated on the right bank of the river of the same, which is an affluent of the Río Verde that later on forms the Río del Fuerte. This district is situated about 500 kilometres to the S. W. of the City of Chihuahua and at an elevation of 702 metres above the sea.

According to the reports given by Mr. Alexander A. Shepherd the principal veins are in a formation of diorite surrounded by porphyry, which extends for a distance of 5 miles. More than a hundred veins are found cropping up on the surface of the ground, containing silver under various forms and conditions, and assaying from a few ounces up on 25,000 ounces per ton.

The silver which is found in a native state is very capricious in its forms, and is sometimes discovered in spikes or thick wires which hold together the matrix of the vein, at other times in tangles of very fine wire, in thick or thin slabs or in solid pieces of pure silver which require to be cut with a chisel so as to be able to smelt them in a crucible without any necessity

of previous treatment. These mines also produce rich sulphurets of silver, such as rosicler and black silver.

The mining zone of Batopilas is divided into 44 sections, each of which measures 2,000 metres square, and the workings were commenced in a thoroughly scientific manner during the year 1889. The explorations carried out since that period have resulted in the discovery of 224 veins.

The system of reduction which is employed in the magnificent works at San Miguel, which are the principal in the State, is that of lixiviation.

Cerro Colorado.—This interesting gold formation is situated at a distance of 12 kilometres N. of Batopilas and 250 from the City of Chihuahua. Its elevation above the sea is 700 metres, whilst the Sierra that surrounds it reaches an elevation of over 1,500 metres.

According to the reports presented by the Engineer M. Fleury, the hill of Cerro Colorado measures 1,500 metres in length, 1,000 in width and 500 in altitude. The porphyritic rock of which it is formed is generally soft and is accompanied by white, green or blue magnecite. Sometimes it is found hard and contains oxide of iron, hematite or iron crystals very full of pyrites. The gold is found in a native condition, it is excessively fine, has an opaque color and forms veins or masses, which often reach a large size.

The rich ores, which often assay over \$2,900 per ton, are found in a matrix composed of the above mentioned green or blue magnecite. The pyrites are generally of a low grade which will not pay to work, and it appears that the native gold proceeds from the alteration or concentration of these under the chemical influence of the atmosphere.

The formation of the vein is very regular, and the ore presents itself in excessively rich pockets or bunches, in free gold or in long stretches of clay which are either poor or barely pay expenses.

The average returns from the ores of Cerro Colorado, ac-

according to the experience acquired, are found to give them a value of one ounce of fine gold per ton of 2,000 pounds.

The ores extracted from these mines are treated by the amalgamation system in the New Australia reduction works, which the Company has established at a distance of three kilometres to the S. E. of the Mine of San Gabriel, that being the principal mine held by it.

The new mining agents appointed by the Department of Fomento for this State, reside in Chihuahua, Ciudad Guerrero, Santa Rosalia, Cusihiuriachic, Parral, Mineral de Ocampo (District of Rayon), Guadalupe y Calvo, Batopilas, Chinipas and Ciudad Juárez or Paso del Norte, the jurisdiction of each extending over the districts of which these towns are centres.

The mineral district of Guazapares is one the most important is the State of Chihuahua. Its mines are situated at a distance of 2 kilometres to the eastward of the town which bears the same and which is the capital of the district of Arteaga. It stands on the slopes of the great Sierra Madre at an elevation of 7,000 feet above sea level.

The geological formation of alternating series consist of trachite and porphyritic rocks, which frequently take the form of conglomerates on account of the quartz which they contain mixed with pheldspathic rocks.

The group which is called Carmen Mines, is situated on a low chain of hills, and contains the following veins: Carmen and Santa Julia with their veins branching off in different directions. Their ores whose matrix consists of quartz associated with aluminium, magnesia and calcareous spar, are of native silver and sulphurets accompanied by iron and copper pyrites and occasions ally by lead ores. They are treated under the pan system in the reduction works close to the mines.

The Mine of San Antonio is one of the most interesting for the abundance and high grade of its ores.

The Mine of San Luis generally produces lead ores in the upper workings and amalgamating ores in the lower.

San José is a very important mine, on account of the great width of its vein, the high grade of its ores and the abundance with which they are produced.

Santa Clara was in former times very largely worked, and still produces sulphurets of silver with iron pyrites. The second group is formed of the veins of Batosegachic, San Miguel, San Francisco, La Libertad, San Juan and Rosario, all containing argentiferous ores; such as, rosicler, chlorides and sulphurets accompanied by pyrites and galenas.

In Hidalgo del Parral we have the important mineral zone of San Juan Nepomuceno, situated in the Sierra Madre at a distance of 15 leagues to the N. W. of the chief town of the district. It contains rich veins of gold, silver, copper and galena, worked in twenty five mines.

COAHUILA.

The Sierra of Ramírez has at times produced large quantities of silver, and its principal mines are Esmeralda, Calavera San Acacio San Juan and Valenciana, which have given large returns to their owners.

Large deposits of virgin iron have been found in the Sierra of Santa Rosa and in other parts of the State, besides which we have lead and copper in Guadalupe, asbestos in the vicinity of Viesca and Monclova, nitrate in San Blas District of San Buenaventura, copper and iron in the Sierra de Patos, silver ores in the Sierra de Candela, sulphur and caparrosa on the slopes of Gigedo.

The important points where mining is carried on at the present day in the State of Coahuila, are Sierra Mojada, Sierra del Carmen and Sierra de Santa Rosa. To give an idea of what these districts are, we cannot do better than copy the report of the Governor of this State, published in December, 1891.

REPORT OF THE GOVERNOR OF COAHUILA, ON THE MINING INDUSTRY
IN THAT STATE.

Government of the free and sovereign State of Coahuila de Zaragoza.—To the Secretary of State and the Department of Fomento.—México.

Under to-day's date I write as follows to the Secretary of the Treasury and Public Credit:

"In answer to your communication N° 1368, dated 3rd. inst., I have the honor to inform your Department with respect to the situation of this State in the important branch of mining industries.

In the flourishing mining district of Sierra Mojada, there are the following mines at present in work; "San José" producing ores with an average assay of $12\frac{1}{2}$ ounces of silver per carga of 300 pounds, and occupying 300 men in the offices and mines. The amounts paid for salaries and wages reach the sum of \$20,000 per month, and the annual product of the mine is 257,631 cargass.

"San Salvador," which is the property of the "Constancia and Parreña Companies," yields an ore averaging 3 ounces of silver per carga, it occupies about 450 people in the offices and mines, with salaries that amount to \$25,000 per month, the annual product being 251,627 cargass.

"La Esmeralda," "Providencia," "Dionea and Santa María de los Angeles," belong in the Constancia Co. and the ores produced by them have an average assay of 130 ounces of silver per ton of 2,000 pounds. the greater part of them being exported to England. These mines occupy 13 men in the office who earn \$5,740 in the year, and 500 laborers who earn \$15,000 per month, the product being 35,000 cargass.

"Veta Rica," "El Porvenir," and "San Patricio" were only opened on the 18th of September of the present year; up to date the result has been 200 cargass of ore with an average assay of 16 ounces of silver per carga. The mines occupy two

men in the office and 84 laborers at an expense of \$2,469 per month.

"La Fortuna," belongs to a Company of the same name and has an annual production of 8,150 cargass, with an average assay of 3 ounces of silver per carga; it employs 44 laborers who earn a total of \$720 per month.

There are five reduction works for the treatment of ores.

The works of the "Compañía Constancia" in which \$500,000 have been invested in machinery, buildings and offices.

"El Fénix," which is the property of Don Dámaso Rodríguez who has spent \$3,000 in the construction of the building.

"Dolores," belonging to Mr. Ismael Galan, represents a value of \$2,000.

"San Nicolás," belongs to Mr. Nicolás Villareal and is valued at \$500.

The rich mining District of Sierra del Carmen and Sierra de Santa Rosa in the Municipality of Múzquiz is not of less importance or of less promise to the State of Coahuila.

In the first district the mine called "La Fronteriza" is of very great promise, its ores carrying an assay of 50 to 500 ounces of silver per ton, which are treated under the patio process.

It occupies 50 laborers who earn a dollar per day, and its annual product is 1200 tons of ore. The machinery employed in the treatment of these ores can be considered as the best in the State, its mechanism being so thoroughly well organized that the ore can be introduced into the proper parts of the machinery, and be received within 24 hours converted into the finest and purest silver which up to date has been seen in the different mining districts of Coahuila. The Company has invested in this machinery the sum of \$50,000.

The following mines are also being worked with the most magnificent prospects: "La Reina de las Lomas," "Abundancia," "Guevrendolen," "Bonanza," "Providencia," "Oso Grande," "Caballo azul," "Monte-Cristo," "Concordia," "El Rubí," "Porfirio Diaz" and "Las Mercedes."

In the second locality that I have above named, we have the "Cedral" mine belonging to Murdock and Co., which produces 1,500 tons of ore per annum, assaying from 2 up to 96 ounces of silver per carga; it employs 60 laborers who earn a dollar per day and the capital invested in the business amounts to \$50,000.

"Santa Gertrudis," is being worked by Messrs. Becker and Co., occupies 25 laborers with the same wages as the last and has a plant that cost \$25,000.

"La Luz" is the property of a Company which bears that same name, its ores assay 56 ounces of silver per ton, and 56 per cent of lead; the annual production is 500 tons, and the number of laborers and wages the same as the last.

"San Juan and San Miguel" are two mines belonging to Messrs. Murchall and Co., their ores assay 96 ounces of silver per ton, they employ 100 laborers and have a capital invested of \$25,000.

The Consolidated Mining and Smelting Company of Santa Rosa, is operating 30 mines which have been conceded to it, and amongst these we find "La Bonita," "La Zona," "El Cuarteron" and "Rosario."

The construction of the smelter was commenced in the month of August last and occupies 200 men.

In the Municipality of Romero Rubio and in the Sierra de Pánuco a mine is being worked by the "Candela Mining and Smelting Company" with an extraction of 7,176,100 pounds of copper ore which contained 25 per cent of copper, and giving continuous employment to 90 to 100 men.

The mining industry is looking especially prosperous in the jurisdiction of Cuatro Ciénegas; amongst others the "Reforma" mine produces 150 tons of ore per month with an assay of 5 marks of silver and 125 pounds of lead per carga, giving occupation to 107 laborers.

Other mines in active work are, "El Barril," "La Paz," "San Márcos" and "Estrella."

In Jimulco which is situated in the Municipality of Viesca, the mines most favorably situated are: "La India," "La Sultana," "La Noche Triste," "La Casita," "El Alferez," "La Candelaria" and "La Providencia," all of which give valuable assays. The ores extracted from these mines include silver, copper and gold, lead, antimony and iron.

In the Municipality of Saltillo, two mines are being worked, called "Los Placeres" and "La Ventura." At present, they are not doing any more than dead work in the mines, but their ores are known to assay from 4 to 5 ounces of silver per carga.

The State of Coahuila also contains a powerful source of riches in its immense coal fields, which extend over a considerable zone within its territory and are being operated with very handsome profits.

In the Municipality of Juárez the "Alamo" mine is being worked at a place called San Felipe, and its coal supplies most of the fuel used in the Mexican International Railroad. The output is 35,564 tons per annum, and it occupies, between officers and laborers, 300 men who earn from 75 cts. up to \$4 per day.

Another coal field is being worked in the Sierra de Santa Rosa, in the Municipality of Múzquiz, and its coal is employed in the Cedral mine.

Of no less importance are the rich coal beds of Sabinas and Guerrero, the first of these districts containing the "Hondo" mine which is being worked by a foreign Company and has a monthly output of 4,800 tons of coal.

NUEVO LEON.

The Sierras of this State contain an abundance of metalliferous veins, of which some of the most famous are the "Iguala," and those found in "El Potrero," and the mountains to the South of the town of Bustamante. The mineral productions of this State may be stated in general terms as: silver, lead, copper, cinnabar, iron; and in the town of Bustamante: sulphur,

nitrate of potash, different varieties of sulphate of lime (chalk, selenite and crystals), carbonates of lime (alabaster and marble), and extensive beds of muriate of soda.

The mines at present being worked in the State, are the following: In the Monterey district,

- 5 of lead ores in the Sierra Madre.
- 6 " " " in the Cerro de la Mitra.
- 1 " " " in the Loma Larga.
- 1 " " " in the Cerro del Topo.
- 1 " " " in the Hills of the Urdiales.
- 1 " " " in the District of San Pedro.

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In the Municipality of Cerralvo.

- 43 of lead ores in Potrero del Naranjo.
- 1 " copper ores in the same.
- 17 " lead ores in Potrero de Urias.
- 1 " " " in Potrero de Magueyes.
- 1 " " " in Potrero de Reyes.
- 1 " " " in "La Loma del Vinatero."

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In the Municipality of Mina.

- 2 of lead ores in the Cerro de Enmedio.
- 1 " " " in Potrero del Aura.
- 1 " " " in Potrerillos.

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In the Municipality of Villaldama.

- 10 of lead ores in Minas Viejas.
- 3 " " " in Montañas.

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In the Municipality of Aramberri.

- 2 of copper ore in the Cerro del Cuervo.
- 1 " " " in the Cerro de la Peña.
- 1 " " " in the Cerro de San Juan.
- 1 " lead ore in the Cerro Colorado.

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In the Municipality of Sabinas Hidalgo.

- 3 of silver and argentiferous lead in the Mesa Mediquena.
- 1 " " " " in La Loma de la Iguana.

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In the Municipality of Agualeguas.

- 3 in Potrero de la Parra.
- 1 in Cerro de la Escondida.

4

In the Municipality of Garza García.

- 3 of lead ore in the Cerro de las Mitras.

In the Municipality of Vallecillo.

- 1 of lead ore.

In the Municipality of Aramberri.

- 6 of lead ore in the Cerro del Dulce Nombre.

In the Municipality of Santa Catarina.

- 2 of argentiferous lead in the Sierra de Ventanas.
- 1 " " " in the Cañon de Ballesteros.
- 1 " " " in the Cerro de las Mitras.
- 1 " " " in the Cañon de Santa Julia.
- 1 " " " in the Cerro de Enmedio.
- 1 " " " in the Cañon de San Pablo.

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In the Municipality of Santiago.

- 6 of lead ores in the Sierra Madre.
- 1 „ „ „ in the Cerro de la Silla.
- 5 „ feruginous ores in the Sierra Madre.
- 1 „ saltpeter in the cave of the Cañon de la Boca.

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Besides the above there are many other mines in the Municipalities of General Escobedo, Allende, Salinas Victoria, and El Carmen, the class and quality of whose ores are not given in the official lists.

Of all these mines the following are in actual work:

- 13 of copper ore in Cerralvo.
- 1 of lead ore in Escobedo.
- 5 of silver ore in Santa Catarina.
- 1 of lead ore in Vallecillo.
- 1 of silver ore in El Carmen.
- 4 of lead and copper ores in Linares.
- 2 of silver-lead ores in Villaldama.
- 16 of lead ores in Lampazos.
- 7 coal beds in Lampazos.

According to the report of Mr. Martínez Baca, 30 setts belong to the Mining Zone of Minas Viejas, which is now being operated under a concession by Messrs. Blas Diaz Gutiérrez and Gaspar S. Butcher. These veins are irregular and contain carbonates and oxides of lead with a small proportion of silver, whilst in some parts they produce sulphurets and galenas accompanied by iron and silica which greatly help in the smelting of the ores.

In the mineral district of Montañas to the N. E. of Villaldama, the formations and general characteristics of the lodes are found to be the same as those of Minas Viejas although rather inferior with respect to richness. The zone is divided into 30 setts, which are also being worked under a concession by Mr. Gaspar S. Butcher and his partner.

The same concessionaires are working the mineral zone of "La Iguana," which is also divided into 30 setts. The formation is distinct from that of the preceeding zones, as it is found to contain at a very slight depth, thick ledges of slate, which is very smooth, black, compact and resistant, and between the stratification of which are found pockets of sulphureous lead ore with a matrix of calcareous spar mixed with a little quartz. The veins of "La Iguana" are generally found to be stratified."

MEXICAN GULF COAST.

Tamaulipas.

The mineral riches of the State of Tamaulipas, can not be said to have been as yet worked, although they are by no means scarce in the mineral districts.

In the ancient "Real del Pantano" which was afterwards known under the name of "Infantes" and at present by that of "Bustamante," situated to the S. W. of Ciudad Victoria, there are other abandoned mines of silver, copper and lead.

In the "Real del Borbon" in Villagran, to the N. W. of Ciudad Victoria, there are other abandoned mines of gold, silver and lead.

The Sierra de San Carlos, which was formerly known under the name of "Riñon de Oro," on account of its extraordinary production of ores, contains veins of iron, copper, lead, silver and gold. Iron is especially abundant in all its classes, magnetic, sulphuret, carbonate and common oxide. In the Sierra Madre, at a distance of 65 kilometres to the N. W. of Ciudad Victoria, we have the mineral district of Chigüe, Rampaguala and Revillagigedo. All the mines in that district produce an argentiferous galena which forms in the matrix of calcareous spar. But all the work in this important branch of mining industry is at present limited to simple exploration.

The mineral district of San Nicolás, which is perhaps the most important in the State of Tamaulipas, is situated in a

mountain range between Cruillas and Burgos in the northern district.

Extensive strata of limestone are here found to be crossed by enormous masses of eruptive rocks which have dislocated the former from their original position, and which contain besides, a good deal of basaltic conglomerates with siliceous cement. The veins are very irregular and traverse the stratifications of lime. The crystalized matrixes of these veins are composed of calcareous spar, brown spar, baritina, dolomite and quartz, and their ores are almost exclusively argentiferous galena.

According to the important data collected by the Engineer Aldasoro, and repeated in the report of General Francisco Olivares, these ores have an average assay of 0.0023 of silver and 0.43 of gold without including the baser metal.

VERACRUZ.

The most important mineral district in the Eastern Cordillera of México is that of Zomelahuacan.

This mineral zone is about 20 kilometres long and 15 wide including within this extension the municipalities of Perote, Altotonga, Atzalan and Tatatila. The entire ground within this zone contains mineral, and particularly in Bordes and lower down where it is crossed by metalliferous veins, some of which are excessively wide. In different points these veins are found forming shapeless masses of ore with a good assay, which can be considered as fragments of dislocated beds. The existence of gold in the ravines of this Sierra, induces the belief that the larger valleys must contain placer formations of this metal.

The greater part of the veins are of copper ore with pockets and small veins of oxide of iron, and these contain the richest gold ore. Other veins contain lead, silver, iron and antimony with more or less gold, all these metals being mixed in different proportions, and all the veins carrying a good deal of sulphur. To the W. and N. W. of the town, distinct veins of argentiferous galena are found with a good assay, and according

to the reports presented by Mr. Vergara López from which I have obtained these details, the veins in this zone are separated from those of the surrounding country by a formation of sedimentary rocks, which on their side are limited by veins of copper ore.

This district also contains some marble quarries of a very good class.

In the country around Tenexpanoya, Tatatila and Las Minas, a great many mines have been opened on the above mentioned veins of argentiferous galena, gold, auriferous and chalcoppyrites, which give a very fair assay of gold.

TABASCO.

In the mountains between the districts of Macuspana and Tacotalpa, and particularly in the place that is known as Punta de Piedra, a coal bed has been found which as yet has only been very superficially prospected. Another bed exists in the Rivera de Chiquiguo at a distance of 7 leagues from the capital of the State. Samples of these have been submitted to the distinguished mineralogist D. Santiago Ramírez, and by him pronounced to be common lignite. The following is the analysis:

Fixed carbon.....	45
Humidity	12
Volatile and combustible matters.....	35
Ash.....	8
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	100

In the river of Istacomitan near a place known by the name of Calzada, as well as in Tierra Colorada between San Juan Bautista and Macuspana, extensive peat beds are found.

Petroleum is found on the surface in the neighborhood of San Fernando, and it presents itself in open wells which have been sunk for the purpose, in the form of a greenish fluid similar to that of Pensylvania. An analysis which has been made of this oil gives it 50 per cent of illuminating oil.

In several places such as El Tortuguero to the S. of the town of Macuspana, almost pure naphtha is found accompanied by a gas of a highly inflammable nature, and the district shows every sign of a large extent of oil formation, which, when taken in conjunction with the similar formation found at the foot of the Sierra forms a large zone producing this important combustible.

CAMPECHE AND YUCATAN.

The peninsula of Yucatan is of very slight importance with respect to mining, and particularly with respect to metalliferous formations, although some are said to exist in the mountains of Bacalar and other points. Very possibly the want of explorations and of detailed knowledge of the country, keep us in ignorance of unknown riches. The only productions of this class of which we have any clear knowledge, are the clays, the ochre and flint of Tekax, the marble of Seibaplaya, the chalk of Tihosuco, Bacalar and Hopelchen, and especially the salt, so essential an ingredient for the amalgamation of ores, which is found to exist in abundance on the river Lagartos, Chuburna, Celestun, Punta Desconocida, Isla de Mujeres and many other points of the Coast.

MINING LAW OF THE UNITED STATES OF MEXICO.

Department of Fomento, Colonization and Industry of the Mexican Republic.—Section third.

The President of the Republic has been pleased to send me the following decree:

"PORFIRIO DIAZ, Constitutional President of the United States of Mexico to their inhabitants, know ye:

That the Congress of the Union has thought fit to decree as follows:

"The Congress of the United States of Mexico decrees:

MINING LAW OF THE UNITED STATES OF MEXICO.

SECTION I.

About mines and mining property.

Art. 1. Mining property in the United States of Mexico shall be governed by the following laws, and the regulations which the Executive Government will issue in accordance with its constitutional powers.

Art. 2. The present law applies to those mineral substances which cannot be worked unless a previous concession be obtained, and those for whose extraction work is required which may put in danger the lives of the workmen, the safety of the workings or the stability of the surface.

Art. 3. The mineral substances, for working which a previous concession is required under any circumstances, are those which are hereafter enumerated, whatever be the nature, shape or situation of their respective ore bodies.

A. Gold, platinum, silver, quicksilver, iron, except marsh ores, loose surface ores and ochres which are worked as colouring matter, lead, copper, tin, except stream tin, zinc, antimony, nickel, cobalt, manganese, bismuth and arsenic, whether found in native state or mineralized.

B. Precious stones, rock salt and sulphur.

Art. 4. The owner of the ground can work freely, without necessity for a special concession in any case whatever, the following mineral substances:

The mineral combustibles, oils and mineral waters, the rocks of the ground in general, whether they serve directly or form part of materials for construction or ornamentation, the matter which forms the ground, as earths, sands and clays of all kinds; the mineral substances excepted from concession in Article 3 of this law, and generally, all those that are not mentioned in the same.