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GOLD PRODUCTION OF THE UNITED STATES AND OF THE WORLD.

The official figures of the United States Mint, now issued, show the gold production of the country in 1896 to be five hundred million dollars more than the highest previous year. The total production of the country for 1876 was valued at sixty-four and one-half million dollars, of which the Central State alone furnished more than one-third. California produced nearly one-quarter, while South Dakota and Montana are laggard thirds with nearly equal productions.

Africa is still far and away the most important gold producing country, having to its credit a decrease of its production to the amount of eighty million dollars, or twenty-eight per cent of the whole. Australia stands next in the list, with a production of sixty-five million dollars, having increased the output of the United States, and overtook California in the second position since 1897. The world output of gold in 1896 was valued at over twenty-two million dollars, and includes the production of South Africa, which was estimated at forty million dollars, and Brazil, which was reported at forty million dollars.

Although the output of gold in the United States has expanded enormously in the last ten years, other countries have shown similar progress and the percentage that our production bears to the total product of the world is distinctly less than it used to be. In the years 1875-77, for example, we produced 34 per cent of the entire output of the planet, and in the five years following, 36 per cent. In the five years 1896-97, we produced 22.5 per cent of the total output of the world. Last year, with an absolute production double that of twenty years ago, we provided nearly 22.5 per cent of the aggregate production of the world.

SILVER PRODUCTION OF THE UNITED STATES AND OF THE WORLD.

The official figures of the United States Mint, recently issued, make the aggregate silver production of the country in 1896 about 214 million dollars, more than double the value of the silver mined in the United States in the previous year, and is more than one billion dollars' worth of ore every month. Comparatively little zinc comes from other parts of the country, but it is probably safe to say that the Joplin zinc deposits are not far from a quarter of the aggregate silver production of the world.

ZINC MINING IN THE UNITED STATES.

For many years the lead miners of Southwestern Missouri were annoyed by frequent outcroppings of a peculiar substance which they deemed of no value, and which they promptly consigned to the dump pile. About twenty years ago this "peculiar" material was discovered to be zinc ore, and since then the dump pile has known it no more. The mining of zinc has gone on in greater or lesser volume from that time, but in the last five years a number of causes have worked together to make the individual ore of the most importance in the Southwest. In the first place, the Kansas-Missouri zinc fields—what is commonly called the "Joplin District"—have shown amazing richness, and mines without number have come into being in places never suspected of harboring such treasure. Moreover, the cost of production has steadily gone down in this section, and the result has been that zinc has advanced the price of the metal far beyond anything known before, and vastly beyond the cost of producing it, even under adverse conditions. This combination of factors has naturally stimulated production. It is difficult to com-
dykes, which hold no gold and have to be left in the workings as posts and pillars or rejected as waste. This large class of deposits constitutes the bonanzas of the Southwest and comprises part of the worldwide fame and the near Yuma, deposits at Mesquite near Glamis, deposits on North Battle Mountain, Los Angeles County, Holcomb Valley Deposits, Minden, Nevada, and many others. It is interesting to note that prospectors have discarded them as worthless and left them to be located by others, and the Colorado mineral belt is far from being prospected as thoroughly as the great Mother Lode miners of supposed infallible judgment have condemned them, as they had no experience in this class of deposits, and did not comprehend the fact that quantity of ore is the condition that makes the mine, when the machinery and facilities for working it economically are furnished. The possibility of mining and milling from one to several hundred tons of ore per day at low cost, and with a profit of one or several dollars a ton, renders this the most desirable class of property for the safe investment of large capital.

BONDING A MINE OR PROSPECT.

A great deal has been written as to the advisability of a prospector or mine owner granting the right to the intending purchaser to prospect or thoroughly test a claim before a sale is made. If conditions are imposed on the purchaser as to the manner in which the work is to be done and the amount of it that is required, then the claim owner is protected against dishonest work or trickery on the part of the intending purchaser, who, if holding fraudulent intentions to depreciate the value of the claim, when the exchange price has not been agreed on beforehand. If the property has not been exploited sufficiently to meet the requirements which the purchaser demands, then he should be bound to sink 50 feet, or still better, 75 or 100 run levels and crosscut at that depth, and if more work is demanded, to sink 150 feet and drive levels and crosscut. By stating at what point the exchange work is to be done, the owner will protect himself in doing so. Under an option of this kind the intending purchaser has to perform the development work, or prove the value of the property by covering up the ore which is found. To grant an intending purchaser an option or bond without such necessary precautions, is to place too much confidence in a stranger, especially if the owner is not always present at the property to see that the work is conducted for the betterment of his property. It is the custom with mining papers to state that owners of mining property claim and demand too much for their claims or mines, but there are exceptions to this rule, in those who have faith in their ore and the value of the property and are willing to grant a working option. A case of gross ignorance or wilful fraud on the part of an Eastern firm of chemists or their agents, who were interested with development work under an option to purchase a mining property in San Diego County, Cal., is a case in point. Positive intent to depreciate the value of the property by filling up with refuse rock openings where ore was found, is neither honest nor the act of a gentleman, when the owners were absent from the property. It is expected that an action at law for damages will be taken by the owners.

INTERNATIONAL MINING CONGRESS.

The Third Annual Session of the International Mining Congress will assemble in June, 1900, at Waukesha, Wis., and will continue thereafter at the pleasure of the Congress during 20th, 21st, 22nd and 23rd of June. The greatest factor in promoting the power and growth of this country is the mining industry. It is the mining industry that is the power that will most easily, naturally and permanently build up our foreign trade, restore prosperity among the people and lay a firm financial foundation for the present and future generations. It is therefore desired that all earnest scientists, metallurgists and practical mining and mill men, manufacturers of mining machinery and all others interested in mining attend and participate in the deliberations of this coming session of the International Mining Congress, and by their presence, instruction and advice make the proceedings of this assembly of so interesting and educational as to command favorable consideration throughout the civilized world.

The Congress will not confine its consideration alone to iron and steel, copper, silver and their by-products, but that of iron, coal, marble, stone, the various fire clays, asphaltum and all kindred interests of the mineral and metallic classes will receive attention.

It desires better recognition of the mining industry in the National Government: needed changes in the Federal Mining Laws; to cultivate acquaintance and to exchange practical ideas.

The basis of representation will be the same as on previous occasions, or as follows:
- The Governor of each State and Territory to name thirty delegates at large.
- The County Commissions of each county to name five delegates at large.
- The Mayor of each city and town to name five delegates at large.

And one additional for each 10,000 population or fraction thereof.
- Each Mining Bureau to name five delegates.
- Each Mining Exchange to name five delegates.
- Each Real Estate Exchange to name five delegates.
- Each Chamber of Commerce to name five delegates.
- Each Board of Trade to name five delegates.
- Each Miners' Union to name five delegates.
- Each Trade and Labor Assembly to name five delegates.
- And all other commercial bodies to name five delegates.

IRON ON THE PACIFIC COAST.

The advances made in the price of iron and steel by Eastern manufacturers, due to excessive consumption at home and the stimulating effect of an outlet opened up in the export trade to foreign countries, has caused an advance in prices in all lines, and a marked scarcity of raw material, such as pig and scrap iron on the Pacific Coast. Some railway lines who made heavy purchases of new steel rails before the advance in prices took place, have been able to sell the old rails and buy new ones at a good price for new rails, and some claim for the cost of relaying them. Old mining machinery, both cast and malleable iron, is in demand for foundry and rolling mill uses. With the large export trade with China, Japan and the Pacific Coast, the construction of railway lines to the coal fields of Utah is an absolute necessity, which is required to bring the rich iron ore deposits of California and the coal from Utah and our California crude oil together, so as to make our large iron resources industrially beneficial at the present time. There is an excellent opportunity for the manufacture of foundry pig iron and car wheel iron and to supply billets for the local rolling mills in San Francisco, Los Angeles, Cal., to begin the industry. On these heavy classes of iron the high freight rates from the East and by ocean warrant the construction of blast furnaces on this coast, when we have obtained the coal for fuel from Utah. It is reported that the Randsburg Railway, which is a branch line from the San Juan to the gold mining districts of Randsburg, Cal., is paying ten per cent profit, and when it is remembered that there is no heavy freight business on that line like hauling coal, the contention is warranted that lines of railway to the coal fields of Utah and the paying investment for local traffic alone, but with a large coal trade and through connections will pay much better.

THE IRRIGATION QUESTION.

As time proceeds, this question more and more elicits public thought and discussion. It is amongst the most important of materialistic subjects presented for the consideration of the American people. It has taken no small amount of work to create a public sentiment favorable to the adoption of effective steps towards the solution of the problem. Vast interests are involved economic and social.

There is very little public land not taken up in regions where dependence is upon rainfall to produce crops, and hence congested populations, whereas the fewest find homes and means of livelihood in what are termed arid regions, where comparatively little for human support can be produced without irrigation. In the arid domain, there are something like 700,000,000 acres belonging to the States and to railroads, under grants made to them by Congress, and about 500,000,000 acres are still owned by the general government.

Without some comprehensive and intelligent plan for impounding and conserving the waters, and for an equitable and economical delivery of them, the bulk of these lands will never be of very great value to the people of the United States. It is conceded that building and managing irrigation works will not be as effective under private enterprise as under the authority of government.

There is something of a division of sentiment on the question whether this work would be better done by the States or by the national government. It is proposed by those who favor the former that the public domain shall be ceded to the States as a means of aiding them in the construction of dams, reservoirs, and the delivery of the water to the lands. It is based on the history that the principal if not all the land frauds that have been committed in this country have been in the disposition of State lands. There have never been many complaints of federal officers in this respect. State legis-
latures have shown themselves not to have been above manipulation.

The general Government has a well organized and able corps of engineers. It has existed near a century, and has been under constant training during all that period. It is learned and experienced in the art of engineering, and enjoys a high reputation for honesty and industry. The States are not thus equipped, and it would take a long time for them to provide themselves with such equipment. It is improbable that any two States would adopt the same plan, while that of the general Government would be systematic and similar throughout the entire area.

The Government engineers have been accustomed to do their work well. The lands supplied with water should be disposed of with a water right annexed, and on condition that the two should remain inseparable, and that charges should only be enough to defray the expense of operating the plants and keeping them in repair, and that all classes should be impartially treated.

This would avoid the monopoly which arises when irrigation is by private enterprise. Water, like the air and sunlight should never be made the subject of monopoly.

The need for homes and larger production, incident to the growth of population, press this subject upon the country. Even in the far east farms become intensified in it, and now look upon it with favor, when a few years ago the proposition that the Government should undertake the work was regarded as utopian. The need for enlarging the area of production is made apparent in the falling off in the number of meat animals. Since 1892, the reduction of the number of cattle in the two head, of 130,000, and of swine, 13,000,000. Production and consumption in this country are rapidly approaching an equilibrium.

MODERN PRACTICE IN GOLD MINING.

By John Hays Hammond.

Problems in mining may be classified as those relating to—(1) mining geology; (2) mining engineering; (3) metallurgy; (4) mechanical engineering.

1. Geology. Geology deals with the determination of the geological character, with especial reference to their genesis and magnitude, of ore deposits and co-relatively their commercial values. This is the most important province of the mining engineer, but, unfortunately, one in which but few are proficient.

2. Mining Engineering.—In this class are the problems relating to the methods of the exploitation of the mine.

3. Metallurgy.—Under this category are included the methods of reduction of ores. This branch of mining engineering is rapidly becoming specialized. The importance of the problems presented to the metallurgists is obvious, as they relate to the adoption of appropriate methods of reducing highest percentage of extraction of the metals from their ores with the least possible reduction charges.

4. Mechanical Engineering.—In this class are the problems pertaining to the installation of mining machinery.

The problem of deep mining likewise belongs to this class and the author would point out the salient factors of this problem. The great importance of deep mining, i.e., of obtaining maximum depths—may be gauged by taking the special ease of deep-level mining on the Witwatersrand. As is well known, this formation is unique as regards the continuity of the ore-bearing formation and of the payable grade of the ore. There are many miles of reef along the Witwatersrand banked, which is confined to the central, which has been more thoroughly explored than the other sections of the Rand. The author has estimated the value of the central mile, along the direction of the outcrop of the reef, worked down to a vertical depth of 1,000 feet, to be $5,000,000 sterling. The central section embayments of the reefs, to which the above estimates apply. These are obviously sufficient to stimulate the ingenuity of the engineer to increase the limits of deep-mining.

The main factors determining the limit to which deep mining may be carried are—

1. Depths per 1,000 ft., i.e., costs of deep shafts and of haulage; (2) ventilation; (3) drainage.

1. Depths per 1,000 ft.—From the engineering point of view mining could be carried on at depths which considerations of an economic nature would preclude. With the existing type of machinery, however, there is no difficulty in hauling through vertical shafts from depths of 6,000 feet. An improvement in types of engines and apparatus generally varied within the power of the engineer, would enable this depth to be considerably increased. From the bottom of the vertical shaft an incline or a second vertical shaft could be sunk to a vertical depth of, say, 5,000 feet, thus giving a total depth of 10,000 feet. Such depths increase greatly the first cost of operation, and the corresponding increase in the size of the plant required for short sinking, for hauling, mining, material, miners, and ore, in addition to the cost of the shaft itself. The actual extra cost per ton of ore, etc., handled would not be excessive, and would not greatly militate against profitable mining, unless the margin between profit and loss had already been a narrow one in the shallow lever.

2. Ventilation.—One of the great obstacles to deep mining is the difficulty of securing the requisite efficiency of ventilation. This is due to the fact that the workings are not a uniform depth as is attained. The heat encountered in mine workings may be due to one or a combination of two or more of the following causes:

(a) The increasing secular heat as the interior of the earth is approached; (b) proximity of the mine workings to regions of heated volcanic rocks, saltaseras hot springs, etc.; (c) chemical decomposition of certain constituents of the ores, or of the enclosing wall rocks, confined to deposits of comparatively rare occurrence; (d) animal heat and heat due to lighting. All of these factors are of subordinate importance. Geologists estimate the rate of increase in deep boresoles and other tests, that the average increment of temperature in a mile of earth is 1 degree Fahr. for about 60 feet vertical depth. The rate of increase in different localities is by no means uniform, sometimes being as low as 1 degree Fahr. in 450 feet vertical depth. Indeed, in the same mine, the increment of heat is not invariable, though generally it is fairly constant in some mines, indeed, within the limits of 1 degree Fahr. The temperature of regions of saltaseras action or other volcanic phenomena, and by the conductivity of the rocks in which they lie. If 1 degree in 60 feet be accepted as the average increment of temperature, there will be an increase of 16 degrees in each 1,000 feet vertical, or to 80 degrees at a depth of a mile. Assuming the normal surface temperature to be 60 degrees Fahr., this would give a temperature of 146 degrees Fahr., one that is intolerable, but at the same time not economical.

To counteract the effect of this undue temperature, artificial ventilation is requisite. Under the most favorable conditions, that of the necessary artificial ventilation in metallic veins, especially where inflammable and noxious gases are of rare occurrence, would not go mine to depths of 10,000 feet. Nevertheless, high temperatures even when not intolerable, entail extra expense, due to the fact that the miners are more or less incapacitated.

Under these abnormal conditions short shifts are adopted, and not only artificial ventilation, but also the frequent use of iced drinks, cold baths, etc., are necessary.

3. Drainage.—This is one of the least determinable factors. The water pumped from mines is sometimes almost absolutely limited, even in workings of considerable depths, to the water level. On the contrary, however, there is sometimes a progressive increase in the water as depth is attained. The increase is by no means constant generally varying from level to level, depending upon the character of the ground drained by underground developments. Where there is an abnormal influx in depth, the expense of pumping becomes a menace to profitable mining operations, though under normal conditions this in, creased cost may not prove an insurmountable factor.

The extra cost of deep mining, as has been indicated, is chiefly due to longer haulage, etc., to increased cost of drainage and of ventilation. In the working costs of shallow mines, or those of moderate depths these items are small compared with the total cost, in which are included general expenses, cost of development, stopping, metallurgical treatment, etc. Therefore the cost of deep mining in deep entails by these factors could be considerably increased before reaching a sum which would make deeper mining uneconomical. The factors should determine the limit of deep mining, and, by deep mining, depths of 4,000 feet and upwards are referred to, are—(1) The discontinuance, or, what is tantamount, the impoverishment of the ore deposit. This, irrespective of other considerations, is the cause of cessation of deep mining operations in the majority of cases; (2) the excessive costs of first plant, of ventilation and drainage under favorable conditions. This applies especially to the exploitations of ore deposits, where the margin between profit and loss is close; (3) difficulties of supply and transportation to market.

From the foregoing considerations it will be seen that the difficulties included in this category will not be insurmountable until long after the exhaustion of a deposit has become one of academic interest alone.

Engineers, who make a trial of genuine All-Weather Grease, gratefully acknowledge its superiority for all lubricating purposes. L. T. Snell, of Natick, Mass., writes under date of October 23rd, to Adam Cook's Sons, New London: "Your Grease is all right. I have some of another make on hand. When used up will give you a call."
BELT CONVEYORS.

A 48-page pamphlet and catalogue bearing this title has just been issued by the Robins Conveying Belt Company, 147 Cedar street, New York, and as it is the first illustrated and complete description of this system which has appeared, a few extracts from it will be of interest to those engaged in the mechanical handling of material.

The construction of the belt and idlers is shown in cuts Nos. 1 and 2. The dark portions of the belt are rubber and the light of cotton duck. The heavy reinforcement of rubber in the center where the load is carried enables the belt to withstand abrasion which would destroy an ordinary belt very quickly and also make the belt pliable enough to conform readily to the trough idlers. These are lubricated by grease cups through hollow shafting, being thus rendered dust proof. These as well as the take-ups, pillow blocks, and all the other component parts of the Robins system have been standardized, and belt conveyors have been raised from the category of make-shifts to the rank of finished machines adapted to all the varying propositions in which conveying machinery is required.

Thirty or more pages of half tones show these conveyors in operation in all parts of the world and under a great number of different conditions. The three cuts here given show three of the most typical uses of belt conveyors.

No. 3 shows a conveyor at work carrying dredgings of rock, gravel and mud from a dredge to the river bank. The dredge is engaged in widening the Danube below Vienna, and the work required a conveyor with a capacity of 1,200 tons per hour. The Belt Conveyor was the only machine which could handle such an amount of material. The belt is still in good condition after two years of most arduous service.

No. 4 shows the belt conveyor used in place of a sorting table by the Sterling Iron and Zinc Company, Franklin, N. J. This is a service for which it is especially adapted. There are no teeth or links to wear or get out of pitch, nor bearings exposed to dust or grit, nor any crevices where a piece of ore can stick or jam. The belt, on account of its elasticity will stand for several years an amount of pounding, hammering and abuse that would in a few weeks destroy a machine more rigidly constructed. For this work a wide, heavy belt is used, with idlers, so shaped as to give the belt a broad, flat surface at the center and narrow, very slightly raised sides.

No. 5 illustrates the Robins Patent Tripper in operation. By means of this device, the belt is enabled to empty its load at fixed or moveable points along its length, its position being changed either by hand or automatically. In the latter case, the tripper may be made to move back and forth along the line of the belt, reversing itself at either end and distributing its load as it goes. The tripper is principally used in storing material in piles or in bins.

Transvaal, which is built in architecture after the Holland style, President Kruger intended to display all geographical documents, also exhibits of the Military Administration, Public Instruction and the very interesting Ministry of Mines.

In the two other Transvaal Pavilions will be shown how gold is taken from the earth; how it is amalgamated by mercury, and how the ingot worked, chiselled or struck, is transformed into jewels or coins.

The mill building for the treatment of gold ore will be composed of two parts between which will be installed the "cyanuration" in the open air as practiced. In one of these parts will be the apparatus for crushing the ore. A battery of five pestles will be placed in operation before the eyes of the public. In the other building will be established a foundry for gold and a laboratory where the public can see for themselves the gold industry applies in a remarkable way to indications which science has brought and the progress which has followed its movement step by step.

The driving force, in the form of electric energy, will be furnished by the large central mills established by the Superior Exposition of the Champs de Mars.

Transvaal Mining Exhibit at Paris in 1900.

Captain A. H. Mattox of the Bureau of Publicity of the U. S. Commission to the Paris Exposition says: Of all the Foreign Exhibits at the Paris Exposition of 1900, the most advanced is that of the Boers of the South African Republic. Just what effect the war between England and the Transvaal will have upon this exhibit of the Boers depends upon the result of the war. The Transvaal Exhibit, if carried out, will be one of the most interesting of the Exposition. The French authorities have allotted the Boers about 10,000 square feet, and this limited space President Kruger proposed to fill with novel displays from the Transvaal.

In the National Pavilion of the
PORTO RICO AND HER MINERAL RESOURCES.*

BY MANUEL VICTOR DOMINGUEZ, C. E.

The mineral resources of the island of Porto Rico have not only never been developed, but have not even yet been explored. Although the island was discovered in 1493 and settled shortly afterwards by the Spaniards, no attempt, worthy of the name, has ever been made to even investigate any of its natural resources which, if utilized, could have developed almost entirely by foreign capital and skill. In all the course of over four centuries not a single practical step has been taken to encourage the growth of any mining industry on the island. With the exception of a crude development of materials of construction, the island stands today without a single mine of any kind in operation, and with the further exception of the late development of the phosphate on the islet of Mona, now abandoned, there has never been any real mining machinery used on the island. All this, however, is in face of the fact that the existence of valuable mineral deposits has been known ever since the discovery of the island. Generation after generation has seen gold taken out each succeeding year from the river beds and the parent lodes have not been hunted for; each successive generation has kept a partial registry of rich mineral specimens, and there has never been any scientific inquiry made either on the part of the government or of individuals. Except in a few rare instances, there has not been even so much as an analysis of the specimens. This condition of affairs is difficult to explain, but is very likely due to a combination of causes; to Spanish corruption, a corrupt administration of the law, absence of transportation, lack of capital and of technical skill.

The island of Porto Rico is rectangular in shape, extending in length about ninety miles in a course due east and west, and having a width of some thirty-seven miles. Around the coast extends a narrow strip of level land varying from two to five miles in its width, but the rest of the surface is very mountainous and there are no plateau lands except a small area around the town of Caguas. Two roughly defined and nearly parallel mountain ranges cross the island from east to west, then the mountains in the northeast rising to an elevation of 3,300 feet above sea level and those elsewhere to about 2,000 feet. The sides of the mountains are precipitous and the valleys narrow and traversed by innumerable small streams which become violent rivers in the rainy sea-son. There are but few good passes through the mountain chains and the roads leading through ascend to an elevation of 1,000 to 1,500 feet in the course of a few miles. The heavy rainfall of the months of August, September, and part of October necessitates many bridges and makes road building costly. The island is divided geographically into seven divisions called jurisdictions, and these in turn are subdivided into barrios; for the sake of definiteness, these terms will be used in this article.

Almost all the buildings of Porto Rico are constructed either of wood alone or of wood and brick. Quarries of hard stone are found in all parts of the island, but are not utilized at the present time, although many exist in close proximity to the towns. Various granites and syenites are found in profusion near the towns of Naguabo, Pajarijo, Juancy, Piedras, Yabucoa, Caguas, and others; marbles abound at the towns of Naguabo, Rio Piedras, Cayey, Coamo, Juana-Diaz, and many others. Compact limestone of a good quality is found all over the island. The marbles and jaspers, although existing abundantly and possessing great merits and beauty, have never been developed and are not likely to be until better means of transportation shall be provided.

Small quantities of flooring and roofing tiles are made but are not used except in a very limited quantity; the price at which they are sold does not permit competition with the imported galvanized iron so extensively used at present.

The quicklimes made in the vicinity of Juana-Diaz and Ponce are much prized by the sugar planters, who use them to neutralize the acids of the juice of the cane.

The fatty limestones furnish the base for the manufacture of lime and are abundant in all the littoral lands, failing only in the eastern syenitic zone and being scarce in places in the interior. The method of manufacturing the lime is very crude, only intermittent kilns being used, there being no continuous kilns in use on the island.

Gypsum is scarce and lime is generally used in its stead in building, but it is found in many places in the town of Juana-Diaz and in large quantities in the barrio de la Florida, jurisdiction of Manati.

In the jurisdiction of San German are found large deposits of kaolin of a quality apparently very superior, it being used there for painting instead of white lead. It might be utilized in the making of white porcelain; to be until better means of transportation shall be provided.

Luquillo range, in which rise the rivers Mameyes, Grande Esperanza, and Sabana. The river Loiza, like all the above named, carries in its sand, particles of gold in greater and less proportion. The grains found in the alluvial soils of the lower regions of the valleys are very small and accompanied by minute particles of platinum invisible to the naked eye.

On the southern slope of the same range of Luquillo are found the best known copper deposits on the island.

Copper sulphide has been found in the Corozal and a sample of blue carbonate manganese has been exhibited coming from the barrio Quebrada Limon, jurisdiction of Ponce. All the other samples, so far exhibited, came from the extensive mineral deposits which extend along the south slope of the range of Luquillo as far as the mountain of Pandura near the town of Yabucoa, with a course following the river Garabo until near the town of Caguas. The geological formation of this district is very uniform; in almost all of it are seen sedimentary strata of the Paleozoic age; granite with some amphibole, syenite with mica, in conjunction with feldspars in a very advanced stage of decomposition, producing great plains of clay lands.

In the vicinity of Pena-Parada and in the

*Abstracts from an article in Mines and Minerals.
rivers Isacos and Cubuy, whose beds are formed by granite masses, are seen enormous banks of white marble and porphyry, replacing the granite. Near Rio Blanco, some ten miles from the town of Naguabo, there have been worked two mineral concessions, called "Perseverancia" and "Santa Teresa." From the veins and lodes which cross the metamorphic limestone of the former and from the outcroppings in the latter, were taken out the greater part of the materials mined, the average yield being not less than 12 per cent. of copper. From the last named mine were taken several tons of copper sulphides whose richness approached that of the carbonates, and of which, one sample showed 38 per cent. From the mine Constancia, an ancient concession long since abandoned, situated in the barrio of Los Bocas, jurisdiction of Corozal, samples were taken showing 33 per cent. of metal. Other indications of copper are found as follows: in the neighborhood of the village of Piedras, with a course north and south and at a distance of five-eights of a mile from Humacao; also at a place called Pita, in the barrio of Marmeno, jurisdiction of Ponce; near the town of Jayuya, jurisdiction of Utuado; in Maricao, in Serpentine rocks; in the barrio of Pinales, jurisdiction of Guanica, where have been observed signs of copper, and finally, at a place near the main road from Caguas to San Juan. The following shows the results of the official analyses of samples from all the known copper deposits:

- Carbonate of copper from the mine "Perseverancia." 33.50 per cent.
- Carbonate of copper from the mine "Santa Teresa." 20.50 per cent.
- Copper bearing pyrites 25.50 per cent.
- Variegated copper from the mine "Santa Teresa." 38.00 per cent.
- Mixture of carbonate, pyrites, and native copper 52.10 per cent.
- Carbonate impregnating the rocks of the Santa Teresa. 25.00 per cent.
- Variegated copper from the Corozal mountains 33.00 per cent.
- Sphalerite and crystals of sulphide of copper 65.50 per cent.
- Carbonate from Maricao 3.00 per cent.
- Carbonate from Las Piedras 3.50 per cent.
- Carbonate from Humacao 4.70 per cent.
- Carbonate from Pinales 3.00 per cent.

From the above figures it is to be noticed that high grade copper ore is found in various places on the island of Porto Rico, and time will no doubt develop many of them.

Iron ore has been found at the town of Jayuya, jurisdiction of Utuado, and auriferous iron pyrites in the river Conchos, in the Corozal mountains, but no analysis has been made of either; it is certain that the oxides from Jayuya could not be profitably worked at the present time because of the great difficulty of transportation from the interior to the coast. On the left bank of the river Curabo, barrio of Cebita del Norte, jurisdiction of junco, exists a mound 300 feet high, 1 1/2 miles long and 1,600 feet wide at the base formed by feldspars and amphibolite whose scale is huge mass of magnetic iron oxide which shows by analysis 59 per cent. of iron. This deposit is distant only eleven miles from the nearest port.

Silver and lead have not been matters of development in the island although there are signs of their existence. Samples of galena from the barrio of Guanica, jurisdiction of Marcano show a yield of 53 per cent. of lead, and 856 grains of silver for each 220 pounds. There have been samples of foliated galena from near the town of Mayaguez. From the banks of the river Rio Blanco have come pieces of native sulphur and some samples of mercury. Native sulphur is also found near the village of Aguadilla.

Traces of other minerals such as manganese, bismuth, and antimony have been also found on the island.

Of combustible minerals but very little is known: peat and lignite abound in various places but the matter has received almost no attention. On the north coast lignite is found generally beneath the Tertiary limestones but it contains a large quantity of iron pyrite and has never been developed. Many years ago a Company was formed to develop a mineral concession near the village of Moca, registered under the name of "Minas de Moca," but it did nothing beyond sending one small steamer load from the port of Aguadilla to San Juan. In the jurisdiction of Utuado occur lignites which appear to be free from pyrites, but the absence of means of transportation has prevented any possible development. Near Caba-Rojo are deposits of lignite strongly bituminous which might be tried for the extraction of illuminating oil. Evidences of the possible existence of petroleum are found at various places. The turfs and peats which occupy many thousands of acres along the north coast and elsewhere might be made the basis of a very profitable industry.

Mineral springs occur at several places on the island, the principal ones being at Coamo, Juana Diaz, San Sebastian, San Lorenzo, and Ponce. The most important of these are the baths of Coamo, near the village of the same name, and situated on a small elevation on the left of the road leading from the village of Coamo to the village of Santa Isabel. The springs give an abundance of water. The analysis of the hot sulphur water gave as result per 1,000 parts of water the following:

<table>
<thead>
<tr>
<th>Mineral</th>
<th>Per 1,000 Parts of Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbonate acid</td>
<td>24.57</td>
</tr>
<tr>
<td>Hyd. sulphuric acid</td>
<td>23.47</td>
</tr>
<tr>
<td>Hyd. chloric acid</td>
<td>0.54</td>
</tr>
<tr>
<td>Carbonate of lime</td>
<td>0.25</td>
</tr>
<tr>
<td>Carbonate of magnesia</td>
<td>13.72</td>
</tr>
<tr>
<td>Sulphate of lime</td>
<td>0.26</td>
</tr>
<tr>
<td>Sulphate of magnesia</td>
<td>0.54</td>
</tr>
<tr>
<td>Sulphate of iron</td>
<td>3.07</td>
</tr>
</tbody>
</table>

The temperature is 45° 3' Centigrade, and is the same in all the springs, odor slightly sulfurous; specific gravity, 1.233.

At Punta del Agua, jurisdiction of Cabo Rojo, exist works for the extraction of marine salt, and at the same place are also the natural salt deposits belonging to the State, which have produced several thousand bushels of salt annually. The tax imposed has prevented any proper development of the latter. Natural salt is found also at the towns of Salinas, and Guanica in enormous quantities. Spanish efforts, both by individuals and by the government, have been made to develop this industry, but were ill directed and failed of success.

The fertilizing minerals consist of sulphates and phosphates of lime, and while deposits of these substances exist all over the island, the only ones so far developed are those located on the islets of Mona and Monita, both of which lie in the San Domingo channel, a short distance west from the town of Mayaguez.

The fertilizer is found in cave-like subterranean galleries, partly filled with old, organic products mixed with carbonate of lime. A German Company undertook the development of the mines on the island of Mona and exported 9,000 tons to Europe in 1894 but at present has ceased operations.

Finally, as to mining laws, it must be remembered that the Spanish Crown never granted any patents except for the surface of the land and so much of the subsoil as was necessary in using the surface. The Crown reserved the title to the subsoil as well as such easements in the surface as were necessary to the development of the subsoil. With regard to minerals located on or under private property, there are three persons interested, the Crown, the owner of the surface, and the person who posses the mineral. The State has divided all mineral substances in the following three classes: 1st. Such as quarries of building stones, sands,
granites, marbles, etc. These belong exclusively to the owner of the surface. All such placer deposits, mineral-hearing sands, and washings, ochres, etc. In these, the State reserves the right to grant them to whomever offers a concession, the owner of the surface, having the right to develop them as his exclusive property, but upon his refusal to do so, the State may grant a concession and provide for a proper indemnified hoist, which is intended to work down to a depth of about 2000 feet. It was built for the Yellow Aster M. & M. Co., of Randsburg, Cal., by the Union Gas Engine Co., of New York. The hoist is placed underground about 300 feet from the mouth of the tunnel at the head of an inclined double compartment shaft.

It is arranged to start the big engine with a small auxiliary one, the latter being used also for running the blower for ventilating the mine. Both engines run on distillate, which is about half the cost of gasoline when burning as fuel in the mine; but they can also be run on naphtha, benzine and any grade of gasoline. The levers are all brought to one platform, enabling the enginer to have a clear view of both hoist and engine, as in modern steam practice.

The double cylinder and four cylinder engines are particularly well adapted to hoisting purposes as they have more frequent impulse than the single cylinder engines, and as each impulse has a smaller volume and force, the result is that the load is lifted more steadily.

The Yellow Aster M. & M. Co. has been using one of the "Union" hoists for the past two years with such good results that they ordered from the same Company the hoist of 130 H.P. The Union Gas Engine Co. make a specialty of gasoline mining hoists and engines, which they have been building for the past fifteen years.

MINE IN SOUTHERN CALIFORNIA.*

BY O. S. WEBER.

As a western writer once said: "Eastern newspaper statisticians are professionally masters of the art of inaccuracy, and their so-called statistics are usually to be taken like dreams, or women's whim, by connoisseurs. But they are probably not far wrong in their every-season estimate that a hundred thou-
fornia Star Oil Company, which was situated near Newhall in Los Angeles county, and managed by T. H. Scott. Subsequently, refineries were erected at Alamenda, by the Pacific Coast Oil Company, and at Santa Paula, by the Union Oil Company. To-day there are refineries at Los Angeles, Chino, Ventura and Alamenda, also at Oleum, in Contra Costa County, to which place the refinery at Los Angeles is connected by a daily rail service.

"During the last decade there has been a steady increase in the amount of petroleum produced in California, and in the amount of oil produced during the year. The total value of petroleum for the State was $35,555,000, which is an increase of more than sevenfold. Oil yielding formations have been traced thorough the Coast Range, almost from San Diego to Del Norte County. North of San Francisco, no oil fields have as yet been developed, but prospect wells are being drilled at various points.

"In the Los Angeles oil field fully 100 wells have been drilled, within an area of about two and a quarter miles in length and less than one mile in width. Most of the oil field has been developed by a western extension of that oil field is rapidly being developed about a mile to the westward of what has heretofore been known as the Los Angeles oil field.

"Although only a small portion of the California petroleum is available for manufacturing illuminating oil, it can be solved. Furnace Creek, which has been developed, yields naphtha, gas, distillate, lubricating oil and asphaltum. The greatest value of California petroleum is that it furnishes an excellent lubricating oil, which is to be found in the Los Angeles district. In the course of time the petroleum in that district will be developed to such an extent as to make the Los Angeles district one of the most important oil fields in the world. The oil field is situated in the western part of the state, where the oil is of a higher grade than that found in any other part of the state.

"During the last four or five years, the mining industry of Kern county has experienced a great revival. In the older camps, such as White River, Kern River, Havilah and Caliente, the old mines are being reopened and operated by men of capital, and many of them will no doubt make steady producers. All of these mines have been opened in Goler, Red Rock and Summit, and several others have been opened in the vicinity of Kernville, and the Randsburg district is the result. This camp is so well known to the world, on account of its wonderful richness and the immensity of its lodes that it is unnecessary to dwell upon it. The Yellow Aster Mining and Milling Company have a most complete 50-stamp mill in operation, crushing ore, turning out gold bullion, and have paid in dividends some $255,750 to September, 1900.

"While Inyo County is north of the sixth standard line south, Southern Inyo is tributary to metropolis of Southern California, and therefore of some importance in mining operations of that section. In the southeastern portion of the county along the Amargosa Creek and in the Kingston range, mining has been carried on for years, gold and borax being found in paying quantities in the northern end of Death Valley, and along Furnace Creek, borax and quartz veins of borax of a good quality have been found, but on account of the long wagon haul, none of it has ever been sent to market.

"The Panamint range of mountains abound with large low-grade veins of gold ore and a few high-grade propositions. Ballarat in the last few years has rapidly come to the front, and is now a thriving little gold camp. Some gold mining has been carried out west of the Post Office Springs, also in the Argus Range, while around Darwin and Opfini Mountain, silver and lead have been discovered.

"The total area in Southern California where mining is now being carried on, is in round numbers about 35,000 square miles. More than three-fourths of this territory is a plain, with patches of fertile land scattered here and there, like scattered islands. Considering the few years in which development work has been prosecuted, Southern California has shown a wonderful increase in oil, mineral production, and with more capital invested in our mines, we bid fair to rival any other section of the United States.

CORRESPONDENCE

ARIZONA.

From our Special Correspondent.

CHLORIDE, ARIZ.

"Most of the lumber and timbering for the new Merriman Concentrator is now on the ground at Chloride. The manufacturer is engaging quite a force of men in putting it in readiness for the machinery. There is an accumulation of ore on the dump awaiting the erection of the machinery. In the northwest and southwest drifts of the mine from the 300-foot level, the ores are fine and of a high grade shooting character. Six feet of ore is reported in the Tennessee Mine at this level, with silver in the ton. Timbers are arriving for stopping in all the underground workings, which will necessitate the employment of a larger force of men than ever before, and more than double the output.

"Late the management of the Elkhart Mine has changed the greater portion of its development work into contracting, but not lessening the number of men formerly employed. Much of this, however, is new work, the company having decided to do several hundred feet of prospecting in the underground workings. Work continues, however, as formerly in the mine proper, and the output is as great as usual.

"The Midnight Mine, which has been pushing ahead with great rapidity, has commenced development work for some time past, is passing through and cutting some fine streaks of high grade gold and silver ore in the northeast drift of the 250-foot level. The new work consists of a 200-foot shaft and northeast and southwest drifts of 100 feet each. During this time a great deal of ore has been hoisted that will average $15 to the ton in gold, and, if water can be developed, suitable machinery and processes will be erected for its reduction.

"Salt Lake capitalists are here looking at the new vein of minerals - the new mine at Chloride, and it is quite probable that two or three sales have been made, but no definite information can be obtained. If this is the case, the Redemption Mine is probably one of them, besides the Bryan and Distefano.

"Isabelle, Kern Co., Cal., Nov. 3, 1900.

EDITEOR-JOURNAL: While some of the miners in the higher mountains in this vicinity are closing down for winter, others at a lower altitude manifest renewed activity. The Gilliam & Welch, just to the southwest, has recently passed into the hands of San Francisco parties, since which time brisk development work has been going on, with a large body of good rock in sight.

"The same parties purchased the Bryan Mine on the main contact. This mine is what has generally been called the Blow Out. It is a body of quartz, iron stained towards the top, and being cupola, and crossed by tables of 50 feet high, and nothing but vein matter. It has never been worked, but a mile from the most available water. It has generally been considered of low grade, and offering no chance to men of moderate means. Perhaps, however, no body of gold-bearing vein matter of the same size is met with on this coast outside of Alaska. It is supposed that this vein caused the depth of 300 or 400 feet by the ancients of South Africa.

The negotiations beginning the Sierra Forest Reserve are beginning to revive the miners of Havilah to the necessity of employing some other power than steam, and there has been some inquiry after sites for electric plants on Kern River. A company of Los Angeles men located the power on Kern River for a distance of thirteen miles, from Kernville down, some five years ago, and for some time has been working on it a good portion of the time. But as the canal is to have a capacity of 700 cubic feet per second, it is surmised that it will not get it done until the beginning of the next century. In fact, it seems to be turning grey now, probably from the perplexity of answering questions. Most of the franchise privileges of this company were obtained on condition that they ran electricity into Los Angeles.

Since the above enterprise was inaugurated, a private company has constructed a small power house on the North Fork, above Kernville, and crossing the main Kern River at this place, eighty-five feet above low water. But few figures would be necessary to show that an additional investment of say $10,000 would suffice to enable this ditch to furnish all the power Havilah needs. This must come sooner or later, for Havilah is destined to furnish deep mining centers.

The immense deposits of hematite iron ore in Kern County, will in time make a demand for the manganese of this section. In fact, if there had been a supply of silver, antimony, zinc, lime, marble, slate, and many other mineral products, as well as the great surplus of the products of the farm, to say nothing of what is now done, and what can be done in the production of gold.

Stephen Barton.

Virginia Dale District.

From our special correspondent.

SAN BERNARDINO CO., CAL.

EDITEOR-JOURNAL:--The cool weather has brought the people of this District back and the work is going on as it always does in the winter season.

"The revenue of the O. K. Mine is back in camp and is having some timbers and a new ladder way put in the mine. The mine will be closed down a few days until this work is completed, but the mill will keep on running. Elkan & St. Cynne of the Ivanhoe Mine are having a lot of ore milled at Dale. Their mill is not able to keep the ore out of the way. They have two eight-mile teams hauling ore to Dale. The ore from this mine
is of good grade and there is enough in sight to keep every mill in the camp busy for some time.

The Star King Mine is keeping its mill busy and could furnish ore for a much greater capacity.

Mr. Reynolds of Los Angeles and a Mexican have just located a new placer mine which seems to be very rich.  **DALE MINER.**

**MEXICO.**

(From Our Special Correspondent.)

Turic, Oct. 27, 1889.

The Valenciana Mine in the Tepic District, has struck a very rich feeder in the crosscut on the first level, which assayed 1240 ounces of silver per ton. The company will put up a ten stamp mill, which will be run by water power from a fall which is 375 feet high, only 500 metres west of the mine.

The Catarina Co. will also sell their ore, which is of a very high grade, to the Valenciana Co. and later on will put up a mill of their own, when the mine is developed enough to supply a 10 stamp mill.

The La Lagre Mill, located in the Río Grande de San Antonio, District, has a large force of men working the property. This is a gold property, and has 27 feet width of ore running from one to one and three-fourths ounces of gold per ton.

Active operations have begun on the mines at Tatuynoco on the lands of the widow of the late General Lepidus Ramonato. These mines are very rich in silver and gold, and there will be a large mill erected to handle the ores from the four mines. The ores were worked and held by the revolutionists in 1879 and turned over to the owner of the mines, a considerable amount of silver and gold, which was the main support of the revolutionists. They have been lying idle ever since the squashing of the rising.

M. F. King, a mining and milling engineer will soon depart for San Francisco to arrange for the purchase of mining machinery, also for an electir light plant for the city of Tepic. **Turic.**

Miscellaneous Mining News.

**ALASKA.**

Platinum in Alaska.

A miner, an experienced miner from California, who with eight men has been prospecting along the shores of Disenchantment Bay, reports finding what he thinks will prove to be the greatest platinum field in the world. The place is about forty-five miles northwest from Sitka, and the platinum is not only very plentiful in the sand but it is on the rock as well, though the rock is not in place. M. F. King felt assured that he would find the ledge very soon and the whole party was enthusiastic, when the big earthquake and tidal wave of September 10th broke in upon them, destroying their camp, washing away all their tools and specimens and left them in a wrecked condition. They managed to get back to Sitka after great hardships, and will return to their work in the Spring, with tools and machinery. They have five tons of provisions and supplies in cache. Gold in the ledge, in quantities to make hydraulic mining feasible, has been found in the neighborhood of the platinum, but the platinum is a richer find. Thus far, only traces of this metal have been discovered in Alaska, though it is generally believed from indications that large deposits of it exist.

**ARIZONA.**

Waddell & McNulty have let a contract to James O'Brien to sink 100 feet on their mine on Copper Creek, Yavapai County.

The Drycoo Mining Company, operating the Drycoo Mine, at Dragoon Summit, has become one of the largest shippers of high grade ore to the El Paso Smelting Works.

From Cherry Creek comes the news that the Eclipse Mining Company has opened up a large and rich body of gold ore in the shaft of the Dewey Claim. This company continues to send bullion to the Mint monthly.

The Greenwood Mill and Cyanide Plant is in constant operation and is reported as paying. Prof. Treadwell has closed the deal for the Cliff group of mines at Jerome, paying therefor $16,000. This deal is much more important than it appears on its face, as the company that has made this important purchase has sold its other contracts at Jerome in that immediate neighborhood and will commence extensive development work at once.

The option held by Messrs. Wood & Files on the Mohawk group of mines in Pine Creek District has been purchased by Thomas Roach, owner of the mine, who paid the papers. The mine is said to be looking well, one of the value of $22 per ton being exposed in the bottom of the mine. Messrs. Wood & Files have three or four other properties in the County which they are developing.

**CALIFORNIA.**

**AMADOR COUNTY.**

The Jackson-Butte Mining Company has had work resumed on its mine south of Butte Mountain, near Jackson, after a shut-down of several months. The work is all being prosecuted under the superintendence of R. L. Marsh, the original promoter of the development of the property.

The Crown Point Mine at Butte City has been relented to an Eastern company by the owner, Tony Mello. One-half of the purchase price has been paid and the balance is due in one year. Active development operations will be commenced in about ten days.

The milling of ore from the Central Eu- reka at Sutter Creek still goes on at the Zelius Mill, and it seems that its product will be greater than from the last crushing. According to B. F. Taylor, the millman, the ore then crushed was the best he ever milled.

**EL DORADO COUNTY.**

Work on the Stillwaggon Mine at Omo will soon be resumed.

Several men are engaged in driving a tunnel on the Coloma mine, at Omo, to prospect for gravel.

The force at the Mt. Pleasant Mine, Grizzly Flat, is being increased as rapidly as room can be made for additional men.

The Spreckels & Mulkey Mine at Cedar Grove has finally closed down. They have decided that it will not pay to work it any more.

At the copper mine near Pilot Hill, a number of men are now setting up buildings and opening up the mine. It is claimed that the ore goes 40 cents per copper and $15 per ton gold.

**CALIFORNIA.**

It is reported that active operations are to be resumed in the Blazing Star Mine, near West Point. Extensive development work has been done down to the 400-foot level. This report proves a rich vein, which will take place in that district, as the mine is thoroughly equipped with mill, chlorination works and a cyanide plant, and would require a large force of operating men.

On the Demarest Mine, near San Andreas, work is being pressed in the winze and some rich ore is being taken out. The negotiations with Mr. Stickle are still pending.

The Blair Gold Mining Company has sold its Maggie Bell quartz mining claim, located in Angels Mining District, to the Libra Mining Company.

The well-known Cramer Mine at Mokelumne Hill has been sold to Denver capitalists. Active operations are to be commenced in about ten days under the superintendency of J. Carpenter.

**FRESNO COUNTY.**

Reports from Fresno state that the Copper King Mine, which is situated about 14 miles from Sanger, has 20,000 tons of ore on the dam ready for the mill. This is the property which was sold by H. B. Veree in January for $40,000, and reports since received from London go to show that the purchasers are quite satisfied with their bargain. The mine is a horse power hoisting plant, and it is thought that reduction works will soon be erected.

**INYO COUNTY.**

Indications are that the Western Borax Company, which has succeeded to the Conn & Trudor interests in Saline, will work those fields on an extensive scale. The company has purchased the old manganese mill boilers from J. S. Cain, and will soon have them taken over. It is anticipated that several additional teams will come into service hauling borax out to Alvord.

Messrs. Geraux, Philer and Stewart, representing Pennsylvania capital, have made an arrangement with Messrs. Barnes & Anderson for the purchase of their gold mine near Citrus. The terms of the agreement are as follows: Each owner is to receive $100 a month for a year and $500 for the mine with improvement, at the expiration of the year. The Los Angeles parties who are interested do not buy the Hirsch Mine, it is probable that the above mentioned gentlemen will purchase it also.

**KERN COUNTY.**

W. H. Caplinger, who was in Garlock two years ago, is now there representing Eastern capital, and is negotiating for two or three copper properties.

Asa Rhodamacher reports that the litigation which has kept his Garlock mine in the background for three years is about to be settled out of court.

W. H. Brigman is at work with three men on his property near El Paso Peak, and is taking out fine smelting ore.

The last store in Garlock has moved to Raudsburg and the Henry Mill was moved to Kingman, Arizona, last week by Messrs. Pickering & Tittle of Los Angeles.

H. H. Knight, owner of the Oxford mine, and H. C. Lee group of miners at Garlock, and is taking out a carload of ore to ship to Selby's.

Messrs Sitye & Sailor have sold their claim on the Copper Basin to a rich company who intend putting in a matte furnace. They have purchased the old Boden Hotel property at Garlock, and with it are building houses and shops at the mines.

The sale of the Exposed Treasure Mine
near Mojave, Cal., to Telfair Creighton of Los Angeles is reported. The Exposed Treasure has long been known as one of the most valuable properties in Mojave District and the bulk of ore shipped from it to San Francisco for treatment have invariably given good results. The sale carries with it the Yellow Rover, Golden Carrier, Justification and the Exposed Treasure Extension, forming a group. The price is stated to be $40,000.

MARIPOSA COUNTY.

The machinery for the mines of the Mariposa Commercial and Mining Co. has begun to arrive and is being placed in position. An 80-horse power boiler is already up.

Development work on the mines is being pushed vigorously, and as soon as everything is in condition bullion will be turned out in large quantities.

SAN BERNARDINO COUNTY.

The Iron Chief Mine, in the Eagle Mountains, is rapidly developing into one of the largest producers in the desert country. Not many mine owners fall up against the good fortune of a entire plant of such magnitude as are Marshall Ehrler, who have had development work at this mine. The first trial of the new and, although not as rapid as expected, has been far more successful than was anticipated.

When these lucky owners bonded the mine and received their proceeds, the deal was supposed to be closed, but the $153,000 in addition as the purchase price was not made good. In the meantime the new owners put up a 66-ton cement plant, four grinding mills, 12 miles of pipe line, the whole forming as complete a plant as could be desired. While these improvements cost $50,000, the bonders took out $100,000. The mine is down over 150 feet, with several levels. The ore averages $16 or $17 to the ton, and the ore body four or five feet in width. Some of it runs as high as $50 and $50, but this is exceptional.

SAN DIEGO COUNTY.

Mr. Shellhamer, manager of the Mt. Beauty Mines, says that he has ordered a 4-stamp mill of the latest pattern, and will erect it at the Mt. Beauty Mine in the Oak Grove District. Mr. Shellhamer believes that the Oak Grove Mines are on the same lode that runs through Calusa, Kenworthy, and Tanguit, and that the same mineral vein can be traced out on the desert to Dale, Grapevine, and on to Kramar, Randsburg and the South Mountain. The title to the Balaklala mining property in the Flat Creek District is clear. Now the four months' option held on the claims in the sum of $400 by Nova Scotia parties, represented by W. A. Temple, can be made operative.

The numerous owners in the Balaklala a long time ago gave power of attorney to Big Wells and A. C. Ely, and the story is told, that these two transferred the stock to Miners, and other transfers were made ostensibly in good faith for the interests of the property. Their action caused trouble and the suit of Barney Conroy and many others against A. C. Ely and others to have the transfers set aside resulted.

SONOMA COUNTY.

Within a stone's throw of the country road, passed and repassed daily by hundreds of travelers during the past twenty years, on the Oak Creek, which flows in a north-westerly direction, a short time since was discovered a vast deposit of slatee or silicate of magnesia. E. F. Heath, a Santa Rosa metallurgist and researcher in the spring, was out in that vicinity, found specimens of float that attracted his attention, and as a result of a second visit he discovered a clearly-defined ledge, 50 feet wide, and where cut through, by a ravine, it was over twenty feet in height. Traced along the surface, the vein cropped out here and there for nearly a mile, showing that there is practically an inexhaustible supply of the product. The deposit is foliated, opaque and principally of a creamy color, varying in some instances to a delicate turquoise. It was exposed on the surface, as well as grades of hardness were found in the succeeding strata. Some clear white, a pure tale and entirely free from grit was pronounced a most superior and the article for exportation.

In the center of the vein, however, was found a strata which has been pronounced to be a most excellent quality of "lava," the deposit is the Commercial Mantle, a deposit of the same nature as that in the Masonic, which is mined from the gas burners are made. In this field alone there is an immense demand for the substance, as the only known deposit of a suitable grade of this character is near Chattanooga, Tenn., and comparatively limited in extent.

Samples of this "lava" submitted to a number of the best supply houses and manufacturing centers, both on this coast and in the east, brought forth numerous inquiries as to the location of the discovery and the amount thereof, and the highest price that can be paid for the quality. Worked up to a state ready for use, and able to meet the demand. With ease and without a fear of their chipping out. A large and considerable tonnage is available, and greater quantities can be produced at a lower cost than at the present time.

Realizing the coming value of this deposit, already capitalized, it has been in town trying to get a bond on the property upon which the vein is located, but the owner, knowing the value of his property, has refused all offers, both for bond, sale or lease, and will probably, after opening it up well, fix a stated price per cubic yard, and allow any one to quarry it. His idea is that he can realize more in this way than by selling it, for a lump sum, and thus giving some from a monopoly.

TUOLUMNE COUNTY.

The cross-cut tunnel on the Esperanza Mine in Sonora has been driven 150 feet, just one-half the distance to the vein. A contract has been let for sinking a winoe on the old Smith Mine, located one-fourth of a mile south of the Dead Horse, near Sonora. The Bonito, located between the Consuelo and Grizzly at Sonora, and owned by trustees of the Fairbank, is also being worked. In the famous Balch Mountain Pocket Mine on the Mother Lode the 100-foot upraise is nearing the surface, there being but ten feet further to go, and the entire mine will be splendidly ventilated. The work of cross-cutting the foot-wall will be commenced.

COLORADO.

The machinery in the Economic Extractor in Elk Creek Pass County, is in position and fires have been laid under the great boilers. During the next five or six weeks the process and the plant will be thoroughly tried, and the success or failure of the project demonstrated.

At the very first the mill will be subjected to a severe test—namely, the treatment of low-grade rock from the dumpe Creek mine. If this rock can be successfully and profitably handled the success of the enterprise will be assured and the popularity of the process immediate.

Cripple Creek Items.

The Mollie Dwyer has a showing at only 38 feet from the surface of four feet of ore that samples $200 per ton.

Morning Star at the 150-foot level has cut a four-foot vein of high-grade ore.

From the Magner lease on the Minnie Bell, adjoining the Hull City Place, there was recently sent out 50 tons of ore, half of which had a value of 20 ounces, and the remainder was $40 rock.

A company has been organized on the Big Mule, May and Staye Place claims on Carbon Hill, the Magna and the Magna on Gold and the Fulton on Raven Hill, and is known as the Fulton Marguerite Co.

The output of the Portland for October has exceeded all previous records. It totalled over 5,000 tons of a gross value of $750,000. Stopping has just begun at the 900-foot level where the ore carries improved values. Everything is in readiness at the mine to resume shipments. The volume of water in the mine is decreasing and the pumps are now raising from 700 to 800 gallons a minute only.

Thirty-three ounce gold ore has been shipped from the Last Dollar.

Forty-dollar ore is being run through the new machinery at the Lost Lily.

Horan & Horan are taking out about 15 tons a day at present from their lease on the Deadwood.

IDAHO.

A concentrating mill is being erected on the Miners Hill, near Pocatello, Idaho, and is expected to be ready for business in the month of October. It will be equipped with four double deck Wilfleys, so it is said, and a Huntington mill for the grinding of tailings.

The Bannock Dredge Company is still at work prospecting the bed of Payette River above the Wetzell bridge. The gravel varies in depth from 12 to 24 feet. Six holes have been sunk. Two more will be put down near the bridge. No one outside of the Company and those engaged in the work knows anything about the value of the gravel beyond the fact that the prospects are satisfactory. A dredge will be put up next year.

A fine strike in the Middleman Mine, at Willow Creek, Idaho, is reported. The strike is said to have been made in extending an old drift which runs from the bottom of a 25-foot shaft. The lead is two feet wide, of which from two to six inches is reported as carrying from one cent lead, 55 ounces gold, and 105 ounces of silver to the ton; about 12 inches carries 5 ounces gold, 7 percent lead and 19 ounces silver.
**MICHIGAN.**

Wonderfully rich ore has been encountered in the "C" shaft of the Michigan Mine at Rockland, Ontonagon County, and all the openings are presenting a splendid appearance.

Iron ore shipments from the Gogebic Range passed the record of the season of 1898, during the past week, and the unequalled shipment of 1892 is liable to be reached before navigation closes. The shipments via Chequamegon Bay docks to Oct. 23rd, amounted to 2,852,782 tons, in which must be added the tonnage sent to local furnaces and to the docks at Escanaba. The following mines have contributed to the increase noted at the compering period in 1898: Ada, Cary, Mikado, Montreal, Newport, East Torrie, Pabst, Sunday Lake, New Davis and Tilden. The season’s total shipments to date are close to 2,600,000 tons.

The Chapin Mining Company is engaged in enlarging the stock docks at the Hamilton and Ludington shafts at Iron Mountain very materially, which indicates a purpose on the part of the company to make the mine considerable more ore this winter than last. The last of the stockpile ore was shipped to Escanaba recently.

**MINNESOTA.**

The Lake Region Iron Mines.

Mahoning Mine, at Hibbing, Mesaba Range, has closed down for the season with a total shipment of 750,000 tons. This makes over 2,000,000 tons for this mine since the spring of 1895, when it was first opened. A one-fourth interest has been sold to the American Steel Hoop Company of Pittsburgh for a large sum, and this company will take about 250,000 tons of the ore next year. The mine will probably ship about 1,000,000 tons in 1900. It is a steam-shovel mine and one of the largest in the world.

Fayal Mine, Mesaba Range, will close the season with a shipment of over 1,000,000 tons, and will probably lead all mines of the Lake Superior copper belt. It is a property of the Federal Steel Company.

The Oliver (Carnegie) Company has closed some of its mines for the season on account of high freights, and will send out little more ore.

The Aragon Mine, Menominee Range, has put in a complete system of compressed air for handling its ore cars underground, doing away with man or mule tranning.

It is reported that an output of 20,000,000 tons of ore is to be attempted next year. Such an increase over the present year is an impossibility unless many more men can be secured on all ranges. The 1900 output is not likely to be over 18,000,000 tons and this will be double what was ever mined in one year previously.

The various mining and transportation companies have already secured ships capable of moving 18,000,000 tons. In no preceding year has the loading of tonnage taken place before February or April, and the chartering of 10,000,000 tons last February was unprecedented. The question of ore prices is not usually discussed before the beginning of the new year, but this season it is likely that at least 15,000,000 tons will be sold and placed before the last of this year’s ore has gone forward.

Timber is being received at Duluth for the new ore dock of the Eastern Minnesota road.

It will be the highest and widest in the world, with the largest capacity per pocket. It will be seventy-three feet above water and sixty feet below, and sixty-five feet wide, and will have 70,000 tons storage. It will rest on 14,000 long piles, and 15,000,000 feet of timber will be used in its construction. Purchase of the material for its construction has swamped the mills of the North Pacific, and exhausted the immediate pile capacity of the pine woods of Minnesota and Wisconsin.

**MISSOURI.**

A combination known as National Lead and Smelter Company, with a capitalization of $10,000,000 and a surplus of $50,000, to control and work large interests in the Joplin, Galena, District, has been formed. As a result of the organization, lead and zinc stocks will be on the stock exchanges of New York, Boston and Chicago.

The Continental Zinc and Lead Mining and Smelting Company has purchased, it is reported, the Smokey Mine adjoining the Silver Dick Mine in Oronogo, and has ordered a 125-ton mill, a large pumping plant and air compressor. The mine is opened by twelve shafts each 110 feet deep connected by a drift.

**ONTARIO.**

The returns from Lapher & Wilkey’s top of the pot of June 15th at the Silver Moon Mine, adjoining the Silver Dick Mine in Oronogo, and has ordered a 125-ton mill, a large pumping plant and air compressor. The mine is opened by twelve shafts each 110 feet deep connected by a drift.

The returns from Lapher & Wilkey’s car of ore, 18 tons, taken from a lease on the Clipper Mine, in Madison County, amounted to a little more than $2,000 net. This has been taken out since the 1st of July. In the latter part of June they made a shipment of 126 tons that netted them a little better than $2,500. In addition to this they had milled at the Clipper Mill recently 200 tons of ore which, including the concentrates, cleared them $2,200. Their shipment last month amounted to more than $4,000. This only amounts to $10,700 taken out of one lease in less than a year by two men.

The semi-annual report of the Drummond Company, of which Mr. H. H. Washburn is president, says: "The new mine at Maryville, Mo., has just been made for the first half of the year 1899. This Company has two stamp mills, one of 50 and the other of 60 stamps, both located in the tunnel through which the ore is extracted. The report shows that the 50-stamp mill was in operation during the entire half year, producing and stamping 22,211 families of ore, while the 60-stamp mill was run until May 31, and reduced 15,830 tons of ore, making a total of 37,652 tons. If both mills were run at about the same ratio to their full capacity, this indicates much greater effectiveness in the 50-stamp mill than in the one with 60.

The 37,652 tons of ore crushed represents the total output of the mine, the value of which, as stated by the returns, is given at $329,985.35, an average of $6.57 per ton. The total expense of reduction is shown to have been $421,956.91, equivalent to $5.39 per ton, and leaving a net profit of $15,030.44.

At the cyanide plant, some four or five miles down the canyon, from the 18th to the 30th of May, all the tailings were treated, the average realization being $3.41 a ton, and the total footing up $57,144.17. The expense of treatment was $49,173.95, an average of $1.75 per ton, giving a net profit of $8,570.22, on a run of two months and twelve days.

**NEVADA.**

The Picket group of mining claims in the Deer Lodge District, Nevada, has been bonded to R. C. Land and associates, the former being the owner of the property. The consideration has been just made. The consideration could not be learned, but the owners of the property, Col. H. L. Picket, Adam Clark and W. T. Troutman, have rejected all offers of the 12 months and have been driven well into the thousands of dollars. The property consists of ten claims, which were among the first located in the camp, and they are considered to be very valuable.

Among the claims bonded to Mr. Land and his co-partners are two which deserve special mention—the Log Cabin and the Injun. The former is a large steam hoist, capable of carrying the present working shaft to great depth. No one doubts but the Log Cabin will make a great mine, and there is every reason to believe that the Log Cabin and the other claims which go to make up the Picket group will make another bonanza.

Colonel Pickett still retains his Deer Trail property in Pike’s Diggings, and it is expected that he will make important enterprises.

**NEW MEXICO.**

The Cooney Mine, at Cooney, Grant County, New Mexico, has been sold to Colorado Springs capitalists, for $50,000. The new owners will install first class machinery upon the mine and make extensive additions to the milling capacity of the property. A new shaft is expected to be completed within a few months.

Jos. Schlosser continues to develop rich copper ore upon the Humboldt Mine, at Hanover. The last shipments of a carload each demonstrated that the ore is high grade.

Burns and Brinkman shipped a car of good copper ore from their Colorado claim, near Hanover.

Ed. Baker has made a big strike on the Emma Mine, at Hanover, owned by the H. W. Hutchinson estate, and which is worked under bond and lease. The ore was encountered at a depth of 40 feet and is developing very favorably.

On the Confidence Mine, Mogollon District, the work of sinking upon No. 2 shaft still progresses, with large bodies of a very good grade.

Operations at the Last Chance Mine and Mill, at Mogollon, have been temporarily suspended. Mr. Ernest Craig, the manager in charge of the work, is operating a big mine.

The New Mexican Iron & Steel Company, of the Long range, has decided to go into the iron and steel business, and the company is expected to be in operation within a few months.
OREGON.

Preparations for heavy placer mining operations in the Southern portion of Douglas Co. are in progress. At Tennessee Gulch, Starved-out and other points about the head of Cow Creek, mining deepening of the sluices and renewing and headgates strengthened for the purpose of taking advantage of all the rain that falls. The same activity prevails at the Victor, the Crackack and the Cain placer mines, on the lower creek. Miners look for unusual activity among the Douglas County placer mines during the ensuing Winter and Spring.

Indications for renewal of operations at the nickel mines near Riddle are good, as several hundred tons of the ore are now being prepared for shipment to Chicago as a test of its value. These mines have been closed down nearly five years, though at one time 150 men were employed, and an expensive plant had been erected. Resumption of work will be hailed with delight by the citizens of the growing town of Riddle.

SOUTH DAKOTA.

The Detroit & Deadwood Mining Company of Detroit has crossed the ledge of ore in the City Creek copper property, in the city limits of Deadwood, and it is found that there are 3,000 tons of ore which will average $4.00 per ton, 3 per cent copper and about $2.60 in nickel. The nickel properties in the mine will form an important item in the working of the mine. It is the first time that nickel has been reported in the Black Hills for the paying quantities. The tunnel in this property now is in about 425 feet, and the company feels satisfied that the ore veins have only commenced to appear and that the wide copper ledge will be encountered when the tunnel reaches a depth of about 700 feet.

A rich vein of ore has been encountered in the Big Four Mine, in Deadwood Gulch, which is being worked by parties residing at Hamburg, Iowa. J. W. Dalby is general manager. The ore averages well and the vein is going to be followed in.

UTAH.

The Haggin-Hearst Syndicate holdings in the Daly-West Mine at Park City have been bonded by C. R. Bambarger, presumably the Guggenheim Exploration Co. This will give the clients of Mr. Bambarger control of the property. The price agreed upon was on a basis of $2,000,000 for the property, or $3.33 1/3 per share.

John T. Hodson of the Tesoro, and extensively interested in other properties in Eureka and the Diamond end, is visiting Mark Hopkins, resident Manager of the Tesoro Company’s affairs at Silver City. Mr. Hodson will inspect the Tesoro and also size up the mining in Eureka in which he is personally interested. Speaking of the May Day, Mr. Hodson said that their new plant will cost between $5,000 and $25,000, including ore crushing device and a full complement of power drills.

It is reported that the Gold Dust, at Mercury, will soon pass Capt. De Lamar’s hands and become part of the Great Golden Gate, which it adjoins. The Gold Dust is being developed and is showing up very well. Overtures from the De Lamar Company have previously been made with a view to getting the property, but the terms could not be agreed upon.

Now, it is understood, the company is offering the old Dust to the gel. In giving an option on a basis of 25 cents on the share, and it is thought likely a deal soon will be made.

Speaking of the present showing and the general grade and character that the ore has maintained in the Ajax Mine at Mammoth, Thomas Weir said that the last lot sent to the smelter turned out 300 tons, and the previous returns, sampled very satisfactorily, especially in copper values. For some time he had been considering the advisability of sinking below the present level and considered prospecting is being done now to that level to determine the policy of such a step. Two winzes are now being sunk and in one of them a small ore chute has been encountered which gives them a marketable article, carrying copper, gold and silver values, making it better than $10.

The $4,000,000 contract between the American Smelting and Refining Company and the Centennial-Eureka Mining Company of Eureka for the reduction of the latter’s ore having been ratified upon the arrival of the Hon. William H. Coolidge of Boston in Salt Lake City, the management will now direct its efforts to arranging for energetic extraction.

WASHINGTON.

The site for the Bunker Hill Mill, on the Pend d’Oreille River has been graded. Its ground dimensions will be 300x70 feet. Four cabins and other buildings have been constructed, and the place begins to look like a small town. The right of way for the tramway and flume have been surveyed and cleared. A ten-stamp mill has been purchased from Fraser & Chalmers, and is of the wet crushing type. It will be provided with a Blake Rock crusher, 10 stamps and three fine-vanners. The latter will be used to concentrate the tailings after they come from the plates.

The plant is on its way from the east now, and it is anticipated that it will be ready for operation by the first of January. Operations on the mine have temporarily ceased, but the prospect is soon to start a tunnel which will tap the vein at a point 10 feet below the present workings.

FOREIGN MINING NEWS.

BRITISH COLUMBIA.

Shipments of Rossland Ore.

The ore shipments for last week are over the average. 5,175 tons approximately having been sent down to the smelters during the preceding 70 days. The Le Roi easily leads the list with 2,300 tons, a daily average of more than 342 tons, a very fair showing under all the circumstances. The War Eagle, which sent down 2,320 tons the week previous, fell below the 2,000 mark this week, to 1,950 tons. The combined output of the War Eagle and Centre Star for the week was 2,510 tons. The Cokey appears in the list for the first time, and has 25 tons, and the ore is very coarse.

The X. L. shipped another carload of 25 tons during the week. Supposing the ore to run in values about the same as the initial shipment, namely $13, the shipment made will represent about $105. The Iron Mask sent out four carloads, or 120 tons, somewhat less than the previous week.

It will be noticed that the total reached for the week of 5,175 tons means a daily average output of $5,175 less than the week, 70 days. The estimated shipments for the year to date now reach the respectable sum of 138,682, with a little more than two full months yet to complete the year. Up to the same date last year the output was about 95,000 tons, while the total output for the year was placed at 125,000 to 130,000 tons. With reasonably good luck the output this year should exceed 175,000 tons.

Of the week’s output the Northport smelter obtained 2,445 tons and 2,730 tons were sent to the Canadian Pacific smelter works at Trail.

LOWER CALIFORNIA.

The 10-stamp mill of La Republica Gold Mine, 45 miles east of Ensenada is at work on ore assaying 5% in free gold and $10 sulphides from the 600-foot level. L. A. Wright, a lawyer of San Diego, is the owner.

MEXICO.

Ground is rapidly being prepared for the site of the new mill projected by the Esperanza Company at El Oro. This is to be of 80 stamps, which, with the 40 now in use, will give the Esperanza Co. the largest stamp mill in the Republic. August Sahlberg, General Manager, recently returned from the United States, where he has placed the order for the required machinery.

The new 100-stamp mill of the American Mining Co. at El Oro is rapidly approaching completion, and it is stated on good authority that the entire set will very soon be dropping. The plant, which, up to date has cost over $500,000, silver, was most ably planned and its building supervised by D. M. Hayner.

latest Mining Decisions.


The rights of a foreign corporation to engage in business in another State depends upon the comity of that State, and this comity is again limited by the public policy of the State which may be interfered with or determined by general attitude with regard to such corporations, or may be positively declared by statute. Williams vs. Gold Hill Mining Co. et al., 96 Fed. Rep. (U. S.) 454.

The decisions of the Supreme Court of California holding that judgment creditors of a mining corporation may question the validity of a mortgage given by the corporation on the ground that it was not ratified by the stockholders, as required by the State statute, do not relate to any question of commercial or general law, but are local in their effect and are binding on a Federal Court. Williams vs. Gold Hill Mining Co. et al., 96 Fed. Rep. (U. S.) 454.

The State of California having declared its public policy by its Constitution (Article 12, Section 12) that a foreign corporation organized outside the limits of this State shall be allowed to transact business in this State under more favorable conditions than are prescribed by law to similar corporations organized under the laws of this State," and having provided by Statute (St. 1880, p. 131), applicable by its terms to all mining corporations, that "It shall not be lawful for the di-
GENERAL NEWS

The Joseph Dixon Crucible Co., of Jersey City, N. J., have issued a pamphlet concerning the use of Dixon's Ticonderoga Flake Graphite for cylinders and valves. Oils are not entirely satisfactory, especially where high pressure and superheated steam are used. It seems to be generally conceded that for lubricating purposes a mineral oil is every way preferable, excepting that it lacks body, and in some cases the desirable body animal oils are added; the consequence is that the high heat and steam now used are apt to char the animal oils and form a gummy or sticky mass on cylinders and pistons, even though the surfaces look clean and dry. Careful experiments seem to fully demonstrate that a finely ground graphite furnishes a better body for mineral oils than any of the animal oils, and at the same time is not affected by any degree of heat, and moreover it fills up the microscopic inequalities of the bearing surface, making an ideally smooth surface.

Regarding Cling-Surface belt dressing Prof. Carpenter, of Cornell University, writes the manufacturers that the Cling-Surface Mfg. Co., 167 1/2 Virginia Street, Buffalo, N. Y., under date of October 5th, 1889, as follows: 1 Later tests of the use of Cling Surface on belts for dressing the same perfectly every particular in the statements made in my report of April 17th. They also indicate higher efficiency of transmission and less loss of power in the case of belts treated with Cling-Surface than in the case of belts not so treated, when working under the conditions prevailing at the time of the earlier test. This is due to the fact that the slipping of a belt causes considered loss of power, the power so lost passing off in heat. The use of Cling-Surface reduces the slipping and consequently the loss of power occasioned by the use of belts that slip.

"During the past six months I have had occasion to observe the practical use of Cling-Surface in a number of instances. In all such cases Cling-Surface has improved the belts by softening them, and as far as I can determine in the limited time (seven months) it tends to preserve the leather of which they are constructed."

Catalogue No. 10, published by the Jackson Drill and Manufacturing Company of Denver, Colo., is a 16 page pamphlet with numerous illustrations showing the points of excellence of the Jackson drill. The manual is said to be so light and simple that it can be easily handled by one man. The number of blows, their force and length of stroke can be quickly varied, and the machine is stated to work without any jar to the miner. Holes can be spouted and long drills changed without dismounting the machine. The company states that this drill is not on the market yet two years. A long list of references and testimonials given, substantiating all claims made.

A significant fact in the Pennsylvania iron trade is that the Thomas Iron Company, Catasaqua, has just received an immense consignment of ore, said to have been over 200,000 tons, from Nova Scotia. The company has of late been taking native ores from the Lehigh Valley. The foreign ore is to be used at Catasaqua and Alburtis.

PERSONAL NEWS ITEMS

W. J. Schieffelin of New York has agreed to hold the majority of the stock in the company for for a period of ten years. The company has been in existence for nearly two years and has been doing a steady business.

PROF. A. L. BARTLETT, of the University of New York has been in town for a lecture on the Metallurgy of Gold, illustrating stereoscopic views of mines and a description of the physical, chemical and commercial properties of gold, before the Southern California Academy of Sciences in Los Angeles, November 14th, 1889.

Otto E. Aubrey, E. M. of Los Angeles, Cal., will leave for Colorado, Arizona, in a few days.

PROF. W. L. Watts has returned to San Francisco, Cal., from a visit of several weeks in the Los Angeles, Cal., oil fields.

PRES. W. H. Edgar of the Dearborn Drug & Chemical Works, Chicago, has returned from a business visit to Hotbliss.

F. H. Benjamin, Secretary California Miners' Association, left San Francisco, Cal., on a two months' trip to Fort Dick, Alaska.

F. L. Butterfield, Treasurer of the Spokane Stock Exchange and Treasurer of the Mudgett-Routte Company, of Spokane, is at present in New York for the purpose of placing some mining properties.

THOMAS J. HILBY, Treasurer of the Exploration Syndicate, of New York, has been elected Vice President of the Briquette Coal Company, whose 200-ton plant has recently begun manufacturing compressed coal at Chicago.

W. S. Edwards, formerly General Manager Silver King, M. & Co., Ltd., of London, is in New York City.

D. C. Jackling, of Salt Lake City, Utah, is cyanide experimenting on ores of Republic, Wash.

Col. George W. E. Dorey, has returned to Utah, from a recent trip to Boston and New York on mining business.

ROSS E. BROWN is devoting much time to a study of economic conditions in Tintic, Utah. He is one of the experts on behalf of the Grand Central in its action against the Monarch Press.

L. C. TRENT has returned to Salt Lake City, Utah, from a business visit to California.

FREDERICK G. CORNING, President of the Exploration Syndicate, of New York, left last week for Mexico, to examine the mines at Zacatecas and Guanajuato operated by the Syndicate.

W. C. DODD, of the Union Iron Works of San Francisco, has returned to that city from a four months' trip to China, Japan and Korea.

Roy H. BURTON, Colorado Agent Sullivan Machinery Co., has returned to Denver from Salt Lake City, Utah.

A. S. WRIGHT of Denver has been in Idaho and Montana, looking up mining properties.

M. I. NEWHOUSE, of London, is investigating Utah mining and smelting conditions.

W. A. CARLYLE, late of the British America Corporation, will leave for Europe early in December.

NEW INCORPORATIONS IN THE MINING AND METAL INDUSTRIES.

COLORADO.


Sioux Falls & Cripple Creek Gold Mining & Development Co. of South Dakota, Cripple Creek. General mining business.


Little Mary Mining Co., Telluride. Capital $1,250,000. Incorporators: J. H. Miller, E. W. Waybright, T. B. Beach, all of Telluride.

THE MARKETS.

New York, Oct. 14th, 1900.

The following are the Silver, Copper and Lead quotations for the last two weeks:

<table>
<thead>
<tr>
<th>Metal</th>
<th>Nov. 1</th>
<th>Dec. 15</th>
<th>Dec. 31</th>
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<tr>
<td>Silver</td>
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<td>Copper</td>
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SILVER.

The silver market has been steady and dull showing only small fractional changes during the week and closing at 20.48 in London.

The quotation for tin is quoted at 91.67 in London and 91.68 in New York.

Copper.

Prices remain unchanged from those quoted last week. Copper 90.85c. Electrotype in cans, wire and bars at 17 1/2 to 18c. Cathode 18c to 18 1/2c, casting copper 1c nominal. The foreign market is still dominated by the countries of Argentina and Transvaal. London is quoted, English 78c, 12s @ 19c. Best selected 80 1/2s @ 20 1/2c. India at 97 1/2c.

Lead.

Lead continues in good demand and with no change in prices. New York being quoted at 45 1/2c to 50c. The foreign market has been irregular but the tendency is upwards. Scrap quoted at 17 1/2c to 18c per lb. Spanish and 16c 6d to 17c 6d for English, while futures are at a discount of 5c to 10c.

Platinum.

The disquieting news from the fields raised prices and a good bull market has resulted in strengthening prices. New York is quoted at 54 1/2c.

The foreign market is also firmer and again higher good orders being quoted at £12 2s 6d. Specials £22 17s 6d.

Antimony.

Antimony is in good demand. We quote Cookson's at 101 1/2c. Hallett's at 94 5/8c. U.S. and Hungarian at 74c 1/2c.

Nickel.

Nickel continues steady and no alteration of prices can be reported. We quote for ton lots 33c 3/4c per lb. for smaller orders 30c 1/4c. London prices are 140 1/2d per lb., according to size of order.

Tin.

It is quite natural that this article, which always volatile should suffer in consequence of the unsettled state of affairs abroad and the higher money market. Fluctuations have been rather wide but the close is again firm at £1 45 1/2s for spot and £1 46 2s 6d for three months.

In New York the buying was restricted to quantities needed to cover immediate requirements although consumption continues at a fair rate. We quote Straits intercolored lots at 32c 5/6d. New York is quoted at 25c.

Platinum.

The demand for Platinum is good and prices are firm. New York is quoted at 40c 1/2 per ounce for large lots and 35c for smaller orders.

Potassium Cyanide.

Purified, $8 99 per cent. in cases of 120 lbs., at 100c per lb. in 5, 10, 25, 50 and 100 lb. lots at 50c.

Quicksilver.

The wholesale price in New York has advanced $1 and is now $18 50 per lb. The London price has risen to £1 17s 6d per lb., with the same rate from second hands.

Chemicals.

Most of the business done in heavy chemicals is for future delivery, the little doing on spot being at advanced prices.

Imports this week included 200 drums, 250 cans and 250 boxes of matching powder. Importers expect a curtailment of shipments from England. When the war is over, the merchant vessels will be used for transporting troops to South Africa. Receipts of domestic goods at New York last week included 1055 sacks and 2755 drums cast iron.

Caustic soda high test is quoted per 100 lbs. $1.32. Low test works at 1.25. Sodium carbonates of soda is quoted at 85c 1/2c. Carbonate of potash is quoted at 32c 1/3c. All others are quoted at 85c 1/2c.

Chloride of Lime.

English prime brands are quoted at 1.08 1/2c and 1.08 1/3c for other brands.

BROWN, DURRELL & CO.

CLING-SURFACE MANF. CO.

BUFFALO, N.Y.


CLING-SURFACE MFG. CO.

BUFFALO, N.Y.

TO THE MANUFACTURERS OF CLING-SURFACE MACHINES:

Having tried Cling-Surface on my 12-in. three belt (six feet between centers), I have been able to carry full load with 27-in. rag on belt with no perceptible slip. It surpasses my expectations and I can recommend it to all that is claimed for it, if it can be manufactured to quality.

Yours respectfully,

E. W. BROWN.

BOSTON.


To the Manufacturer of Cling-Surface Machines:

I have been using your Cling-Surface for the past two months and find it is a most valuable addition to my plant. It has given me satisfaction in every way and I can recommend it to all who are using Cling-Surface.

Yours truly,

F. W. BRAUN & CO.

Assayers, Gold and Silver, Los Angeles, Cal.

The Automatic. This machine will make five-stone cups of ideal perfection. Capacity 500 an hour. Three designs and sizes.

RIVETED SHEET STEEL WATER PIPE

For Platea, Water Powers, Irrigation, Etc.

THE WEIGLE PIPE WORKS

D. B. WEIGLE, Proprietor

1849 37th St., DENVER, COLO.

F. W. BRAUN & CO., Assayers, Goods and Bullion, Los Angeles, Cal.

LARGEST GASOLINE PUMPING PLANT IN THE WORLD

This plant is producing gasoline for the Hercules Gasoline Engine Works, at the Pacific Coolers, California, 906 N. California, producing 9000 gallons a minute, 57 feet high, and with a delivery of 32 1/2 gallons at a draught of 17. The largest engine is 24 by 36 by 36, 500 horse-power. See Catalogue. HERCULES GAS ENGINE WORKS, 136 Bay St., San Francisco.

Learned by a public report that the Hercules Gas Engine Works, at the Pacific Gasoline Engine Works, 906 N. California, have purchased a large quantity of the Hercules Gas Engine Works, 2 by 36 by 36, 500 horse-power. See Catalogue. HERCULES GAS ENGINE WORKS, 136 Bay St., San Francisco.
The Cleveland Mining and Stock Exchange Co.
New England Building, Cleveland, Ohio.
A Reliable Information Bureau for Miners and Investors to obtain FACTS Regarding Capital and Mines. Stocks and Mines listed. Send for prospectus.

Morgan-Watson Mining and Construction Co.
Sagamore Building, Cleveland, Ohio.
MINES AND STOCKS
We Buy, Sell, Lease and Bond Mines of all kinds.
We Buy, Sell, and Negotiate sales of mining and other stocks.
We Furnish Tacklery in work for good mines under special arrangement.
We Furnish Capital to develop mines.

JAMES IRVING & CO.
ASSAYERS
Largest and most complete establishment in Southern California with the most modern equipment.
128 N. Main Street (Old Location), Los Angeles, Cal.

$35,000,000 in Dividends paid out by Utah Mines up to date.

UTAH MINING STOCKS

P. J. CONWAY & CO.,
SALT LAKE CITY, UTAH

WANTS
Advertisements of this class containing not more than five lines will be inserted, for not exceeding three months in any year, free of charge, at the discretion of the Manager. Or, at rates not exceeding $1.00 per line per month, at the discretion of the Manager. No advertisement accepted for less than one month.

COPPER MINE. State full particulars in regard to development work location, distance from water, price of fuel, character of ore and returns from shipments. Must have at least 1500 feet of development work done. Send all information possible. Address, JAMES HOWARD, Care The Mining and Metallurgical Journal, 106 Nassau St., New York, N. Y.

GOLD mine anywhere in United States, must have at least 1000 feet of development; where coal is not over $4.00 per ton or wood $4.00 per cord delivered; plenty of water; no objection to low grade ore if profit can be made by having large plant to amalgamate and concentrate; want 6 months working band; no property considered unless owners are prepared to deposit certified check for expenses of engineer if property is not as represented. Address J. E. M., Mining and Metallurgical Journal, 150 Nassau Street, New York, N. Y.

ANTIMONY
Incomparable having location of this nature and willing to sell at once, will do well to address M. G. Wor, Rushville, Ill., or P. O. Box 500, San Francisco, Calif.

FOR SALE AT A BARGAIN.
A 6-ton copper stamp mill built in 1893, costing $25,000. This complete, all is in good condition, and would suit very well, and could be used for any other mining purposes. Address M. G. Wor, Rushville, Ill.

STEEL CASTINGS
Chester Steel Castings Co., Works Chester, Pa., Office, Library St., P. O. Box 724, Phila., Pa.

FOR SALE, $72.00 PER YEAR.

Sulphuric Acid
Also Strictly Chemically Pure
AMMONIA and
C. P. Acids
For Laboratory Use and Fine Chemical Work.

THE JACKSON DRILL & MFG. CO.
1756 Larimer Street, Denver, Colo.
## INTEGRATED MINES PAYING DIVIDENDS.

### NAMES OF MINES

<table>
<thead>
<tr>
<th>Location</th>
<th>Capital Stock</th>
<th>Par Value</th>
<th>Amount of last dividend</th>
<th>Date of last dividend</th>
<th>Total Amount Paid in Dividends</th>
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* S. Silver; G. Gold; I. Lead; C. Copper; Q. Quicksilver; I. Iron; Z. Zinc.

N. B.—Companies not listed paid nothing in the last twelve months.
THE CAMMETT CONCENTRATOR

The perfect wanner motion given to the pulp by our hand motion together with the freedom from "jumping" resulting from the special rigid guides used, explains why the Cammett riffles never "pack," and why the table has such a great capacity when handling shives.

The continuous grooves and riffles extending from end to end of the table maintains the greatest possible margin of safety between the concentrates discharge and the tailings.

Thoroughly protected by strong patents.

Write for Circular.

Denver Engineering Works,

Shepard & Searing.

Sole Manufacturers.

30th and Blake Sts.

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ROASTING FURNACES

OF THE WETHEY MULTIPLE DECK AND HOLTHOFF-WETHEY STRAIGHT-LINE TYPES

WE CLAIM—That These Furnaces are built from Original Designs fully covered by Strong Patents which we control and will Protect. The design embodies NUMEROUS NEW FEATURES in the construction of Ore Roasting Furnaces and Does Not Imitate or rely on any of the old and very faulty models.

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THE EDWARD P. ALLIS CO.

MILWAUKEE, WISCONSIN

SULLIVAN ROCK DRILLS

Rapid, Strong, Convenient, For Mining, Shaft Sinking, and Tunneling

SULLIVAN Diamond Prospecting Drills

Operated by Hand, Horse Power, Steam, Compressed Air and Electricity.

Contractors for Prospecting with the Diamond Drill.

SULLIVAN MACHINERY CO.,

Cable Address, Diamond, Chicago,


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CHICAGO, ILL., U. S. A.

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CHICAGO, ILL., U. S. A.

54 TO 60 NORTH CLINTON STREET
CHICAGO, ILL., U. S. A.
The Detroit Lubricators in good company.

The Detroit Lubricators are in good company. The Detroit Lubricator, a name synonymous with excellence in the field of lubrication, is known for its superior quality and reliability. They have a long-standing reputation for providing reliable lubrication solutions to various industries, and their products are trusted by many companies worldwide. The Detroit Lubricator is committed to continuous improvement and innovation, ensuring that their lubricants meet the highest standards in terms of performance and durability. Whether you need lubrication for machinery, equipment, or any other industrial application, the Detroit Lubricator is a reliable choice for your lubrication needs. Contact them today to learn more about their products and services, and discover how they can help you achieve optimal performance and efficiency in your operations.

J. A. FAY & EGAN CO.
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Wood Working Machinery
- For -
Box Factories, Planing Mills, Sash, Door & Blind Factories Carriage, Wagon and Agricultural Shops.

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Gold, Silver and Lead Ores and Concentrates
Purchased at Reduced Rates for Treatment.

Selby Smelting and Lead Co.
416 MONTGOMERY ST., San Francisco
Consign Shipment to Vallejo Junction, Cal.

WEIS & GIBSON,
Assayers and Analytical Chemists
32 Clark St., Chicago, Ill.
Assays and analyses of all kinds. Mail orders promptly attended to. Mining properties examined and reported upon. Terms to applicants.

AINSWORTH NO. 045
Sensitivity: 1-50 Milligrammes
Light touch beam, single rider attachment, and designed for a silver button balance to carry a heavy load.
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1251 Lawrence St., Denver, Colo.

WESTERN BRANCH,
412 17th St., Denver, Colo.
TURBINE AND CASCADE WATER WHEEL

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3 Feet to 2000 Feet

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NEW YORK OFFICE, 123 Liberty Street.

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Steel Plate, Copper and Bronze

For all uses. Send for Catalogue.

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Works, Darwood, N. J.

L. Manasse Company
Mfg. Opticians

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Manufacturers and Importers of
Architects' Instruments
Engineers and Surveyors' Supplies.
Optical Instruments of every description. Barometers, Thermometers, Field Glasses, etc.
Catalogue on application.

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Importers of CARBONS
and DIAMOND DRILLS and all Mechanics' Purposes.

Henry DeMert

The National Feed Water Heater

Highest Premium at World's Fair

800,000 HORSE POWER IN USE

SIMPACITY
CHEAPNESS
RELIABILITY
EFFECTIVENESS

Henshaw, Bulkley & Co.,
Agents.
SAN FRANCISCO, CAL.

OLIVER'S POWDER
METEOR DYNAMITE

Extra Strength for Heavy Rock Work and Ore Mining

GELATINE

The OLIVER POWDER CO.,
OLIVER MILLS,
LUZ. COUNTY, PENN.

For Tunnel Work—free from
Obnoxious Odors

SUPERIOR STRENGTH
FREEDOM FROM SMOKE

The OLIVER POWDER CO.,
OLIVER MILLS,
LUZ. COUNTY, PENN.

S. H. Indian Street
Chicago
Manufacturers and Importers of
Architects' Instruments
Engineers and Surveyors' Supplies.
Optical Instruments of every description. Barometers, Thermometers, Field Glasses, etc.
Catalogue on application.

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and DIAMOND DRILLS and all Mechanics' Purposes.

Henry DeMert

OLIVER'S FLAMELESS DYNAMITE
Will not Ignite Gas or Coal Dust. Does not shatter coal
ALL GRADES OF MINING POWDERS A SPECIALTY

ESTABLISHED 1860

MANUFACTURED BY

THE COLORADO IRON WORKS COMPANY
DENVER, COLORADO.

Challenger Eclipse Ore Feeder
Will feed both wet and dry ores

CATALOGUE ON APPLICATION
FOR SALE

$157 A YEAR

ORE TESTING

Complete mill for testing ores on practical scale by all processes to determine the best process adapted to treating ore submitted. Processes in use investigated to overcome unnecessary losses, etc.

RICKETTS & BANKS,
Metallurgists & Chemists,
NEW YORK CITY.

P. & B. PAINT

FOR MINES, SMelters, CHLORINATION WORKS,
THE CYANIDE PROCESS.

P. & B. Roofing put up in rolls to lay 200 square feet, with Paint and Nails. Absolutely Acid and Alkali Proof.

PARAFFINE PAINT CO., Manufacturers, 312-314 W. 5th St., Los Angeles

The M. and E. Co.

Machinery & Supplies

MINING HOISTS—GEARED & FRICTION

Engines

"OIL CITY" STATIONERY.

"BATES" CORLISS.

"IDEAL" AUTOMATIC.

"OIL CITY" Gas and Gasoline.

"Oil City" Boilers

"GEARY" WATER TUBE

Pumps

Shifting, Belting, Pulleys, Hangers, Boxes, Etc. Write for Prices

The Machinery and Electrical Company,
351 & 353 N. Main Street.
Los Angeles, Cal.

C. DUCOMMUN,
300-302 N. MAIN STREET,
LOS ANGELES

Assayers Material

Mine and Mill Supplies

Dixon's Black Lead Crucibles, Denver Fire Clay Crucibles, Muffle, Siphon, etc., Quicksilver, Dull Steel, Retorts, Mortars, Glass Funnels, Drilling Hammers, Drifting Picks, Horn Spoons and Shovels.

G. C. FOWLER, 656-68 Howard Street
SAN FRANCISCO, CAL.

NORWALK IRON WORKS Co.
SOUTH NORWALK, CONNECTICUT.

THE NORWALK AIR and GAS COMPRESSOR

In use in every State in the Union, Central America, and South America, Great Britain, etc. Also used by the U. S. Army and Navy.

Especially Designed for Driving

ROCK DRILLS,
PNEUMATIC LOCOMOTIVES, ENGINES, PUMPS, COAL CUTTERS.

and Other Mining Machinery. The Best Machine for Compressing Air for all Dynamic Purposes. Send for Illustrated Descriptive Catalogue.

HENSHAW, BULKLEY & CO., Agents
San Francisco

THE BEST
LOW PRICED GOOD
STEAM ENGINE
MADE

Governor and Bell, Fly Wheel, Driving Pulleys, Guide Oils, Crank Shafts and Sprocket Teeth Lubricated with Grease. From Four to Twenty Horse Power.

GLOBE MACHINE WORKS,
133-135 W. 20 ST.
CINCINNATI, OHIO.

PERFORATED METALS
GRIZZLEYS FOR PLACER MINING.
BATTERY SCREENS
STEEL SHEETS FOR TROMMELS.

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