The Mining and Metallurgical Journal

Vol. XX. No. 7

Los Angeles, Cal., January 1, 1899.

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THE ENGINEERING AND MINING JOURNAL, under date of 6th November, publishes the following, which needs no further remarks:

"Our Californian contemporary, the Los Angeles Mining Journal, sends us this paragraph, and we are obliged to confess that it has some grounds for complaint, because we gave credit to the Mining & Metallurgical Journal, also published at Los Angeles, as the source of our information concerning the Stephens process. We are exceedingly sorry for this mistake, of which we were inadvertently guilty, and we make haste to tender a thousand apologies to the Los Angeles Mining Journal and to the readers of the Mining & Metallurgical Journal for our error, which was not the less offensive to us, and we are very sorry to give it the credit it has long cherished for the Stephens process, to which we shall revert in an early issue. We desire also to express our high regard and appreciation of the Los Angeles Mining Journal for imputing to it, even inferentially, any serious attention to the Stephens process."

ENCOURAGE DEEP MINING.

In the Transvaal, of South Africa, where the deposits of gold bearing, brecciated conglomerate dip at an angle from the horizontal, it has been demonstrated that the vertical side boundary is a condition imposed on the mine owner, which is not in the interest of labor and capital invested in deep mining. This condition, combined with the fact that in that country there are many American mining engineers of long experience operating the mines, who have been accustomed to a more just system of following the dip of the deposit as practiced in the Western States, has caused a change in opinion in regard to the limits put on deep mining, by adopting a farmer's surface boundary for underground mining conditions. These circumstances have made the British South Africa (Chartered) Company adopt a better system for regulating mining operations within their concession of mineral territory. As in the Western States, the miner is to be encouraged by allowing him to follow the dip of his deposit, and thereby protect capital invested in the early stages of development of the mines of the country. This is a sad blow to the desires of a few well meaning but inexperienced parties who have spoken in favor of a change in the law encouraging deep mining in the Western States. If these regulations also provide for a Commissioner of Mining and the power to invest and settle and ground all mining disputes between adjoining owners, and thereby keep mining lawsuits out of courts, and the manipulation and legal fees of lawyers, then there will be short and speedy Jacoby administered in such cases.

The laws of any country must be framed to encourage the operators of the mining, and not impose surface conditions, which restrict industry of the miner and are not a just condition to regulate underground work, or in the interest of capital already invested in mining enterprises.

DUMP OR STOCK PILE.

In parts of the Western States, the term dump is too often applied to a stock pile of ore which has been placed there for want of concentrating plant or other good reason. Whereas, the use of the word dump ought only to be used where the material is refuse or refuse rock is thrown. It is a fortunate condition of affairs at any mine where there is no dump or waste mined, and that term has to be applied to a pile of ore. The miner who sends a carload of ore to the dump, instead of to the stock pile, or concentrate, in an eastern mine would not be liable to do it a second time; but then, our western mines are so rich that they have only a pile of ore which they call the dump. The economical practice of dumping waste into the abandoned workings of the mine is not a common practice of the Western States, but is the best way of disposing of refuse, and having the double benefit of making such part of the mine secure against falls of wall rock.

STATUS OF THE MONEY QUESTION.

The President, in his Message to Congress, had little to say with reference to monetary legislation. The only specific recommendation he made was that the law be so changed that when the greenbacks are received by the treasury they shall not be reissued except for gold. If this were done, it would amount to their retirement as fast as taken in, for there can be no appreciable advantage in buying greenbacks with gold, which can perform no greater function. There is convenience in the use of paper money it is true, but bank notes and silver certificates can be obtained more easily than greenbacks could be made by the proposed change.

Mr. Secretary Gage, in his report, reaffirms the views he promulgated a year ago, which embrace the permanent retirement of the greenbacks through interest-bearing bonds. It will be observed that the President's recommendation is in line with the Secretary's scheme. Their retention, when taken in payment of taxes will deplete the resources of the exchequer, and are thus employees, which would cause a deficit, to be made up by the sale of bonds. Practically, the President's recommendation would come to the same result finally, that which Secretary Gage would accomplish directly.

Should Congress adopt the President's recommendation, it may be regarded that the disappearance of the greenbacks from circulation would be a matter of brief time only. With greenbacks no longer in circulation, the specie would be open for the substitution of bank currency, which Mr. Gage would have done, and then his proposition to get rid of the silver dollar would be practically carried out. That being achieved, our money would be gold coin, bank notes, and subsidiary silver coin, making gold the only legal tender.

If Congress carries his last thought upon the adoption of this view with the same firmness as in his first, circumstances have not wrought any change, nor lessened the energy with which he has shown the necessity. The attitude vigorously stands behind the Secretary, and is ready to exert its influence upon Congress. The President is timid, or proposes to adopt altered management in aid of Mr. Gage's radical plans.

It is improbable that an attempt will be made in the present session of Congress to enter upon a radical revision of the money system, both for want of time, and the reason that a revision on the lines laid down by Mr. Gage will not pass the Senate. Possibly, there may be an effort to enact some changes in the existing system, in what will be urged by the Secretary and the Bankers' Alliance in the next Congress.

The contest over the money question is certain to take place during the next Congress, of which the Republican party will be in control in both branches, whether the full measure of Mr. Gage's views will be agreed upon cannot be foretold, but the administration of public business will form the basis on which its policy will be formed. Must it do that or it cannot go before the country in 1900 with any prospect of success, if it is aimed less upon a question in which the country is so deeply interested, defeat is its certain doom.

It is improbable, however, that the President would call an extraordinary session of Congress to merely dispose of the money question, but conditions growing out of the war with Spain indicate that such a session is probable, and it almost seems inevitable. If such a session does not call itself to what the final policy will be hang over the country for the next fifteen to eighteen months.

THE HIGHEST POSSIBLE.

The largest percentage of metal which an ore can contain varies with the nature of the mineral, or metals, containing that metal, of which the ore is composed; but for a given metal, in its state of absolute purity, the percentage of the metal is, theoretically, always the same. This fact is frequently unknown to the public, and as such knowledge is important, we will here try to make the question of "the highest possible percentage" of metal in an ore more clear to the uninitiated.

Some contain the different metals, either in their native state, as gold, silver, platinum, lead, copper, antimony, mercury, etc., in which case they are said to be free; or the metals may be combined with one another. Gold may be combined with oxygen, as copper, cuprite and melanite, iron in red hematite and magnetite, etc., and the oxide of copper, cuprite and melanite, iron in red hematite and magnetite, etc.; they are then called in chemistry oxides. Or else again the metals may be combined with sulphur, such as chalcocite (copper sulphide), pyrites (iron sulphide), galena (lead...
The text is illustrated by twelve figures and also by thirty-one plates.

VOLUME II.

Reports on the stratigraphy and geology of Western Kansas, including the Upper Cretaceous and the Tri-REX. Illustrations include three figures in the text and forty-eight plates.

VOLUME III.

Contains the first part of Professor Samuel W. Williston’s report on the Paleontology of Kansas. The volume provides a detailed account of the first geologist of Kansas, of whom the author presents a photo, and pays a high tribute to his memory, as an excellent teacher, a faithful friend, and an honest man. This volume contains a Frontispiece, Reptiles of the Kansas Cretaceous, and a painting by J. Carter Beard, which has been collected from the restorations of this volume and others by the author, and contains one hundred and twenty plates.

VOLUME IV.

The whole of the series of volumes is uniform in size and printed in a large clear type, with ample margins. A scientific and a reference work of this kind is useful for the reader's or student's private notes or remarks. Another desirable feature is the binding with each volume of the section I and II figures and plates, which illustrate each volume and form an appendix to each. A complete index is given at the end of each volume, a rare feature in American works. From the large number of specimens collected, the stratigraphy of the rocks described seems to be have been worked out with care, as their collection is proof of the intimate acquaintance of the author with his subject, and that the work was not done in a superficial, "walk over the country," but was conducted in a systematic and thorough manner, which can only be accomplished by much hard work and is only undertaken by such as have a thorough love of the work involved, both in the collecting and classification of the results.

Although ample justice has been done to the scientific part of the geological examination of the rocks of Kansas and other states, the commercial development of the mineral resources of the State are illustrated and described by the methods of operating the mines and the classification of the minerals, together with statistics of coal and coke, and mine directory by W. R. Crane; table of mines, showing the depth of shafts, grades of coal, strata, etc.; table of machinery, and the mining laws, rendering Volume III of special interest to coal miners and engineers outside the limits of the district described. In future volumes it is to be hoped that the other industries, such as oil, iron, kyanite, lime, etc., will receive the same careful attention.

Geology as a science pure, study, has interest for a few, and for that reason the commercial application of geological knowledge has an important bearing on the development of the mineral resources, to make them known to capital and labor. Volume IV, contains a page of the past life history of the earth which Moses and his prophets neglected to mention, but although Moses was the first miner on record, the author has gone to the trouble to write the history of paleontological research in Kansas as far back as records go, which is a task-realized as well as contributing original matter to the legend. From a scientific and educational standpoint, this handsome volume has special interest, and reflects credit to the State of Kansas, the University, and to the authors of it. The mining interests of Kansas, although not of great diversity, are a topic to notice by the guidance of the work already commenced in these volumes, by future publications which will cover the whole field.

CORRESPONDENCE

NEW MEXICO.

Electric Smelting.

In your issue of December 1st, you refer to an article concerning the use of electricity as an agent in heating for an assay furnace, and incidentally refer to Ahearn’s methods of electrical heating.

As one having had extensive experience in the use of electric current for heating and metallurgical purposes, I am permitted to make some remarks upon the subject. If they answer your correspondent’s purpose, or otherwise enlighten your general reader, I shall be pleased.

Ahearn’s, and all the other electrical heating devices, so extensively used in the heating of street cars and railroad engines, convert electrical energy into heat, by sending the current through a resistance, consisting of iron, german silver, or other wire or strips of high resistance. Their patents are based on this principle of insulation and protection of the coils from oxidation effects of the atmosphere. One of the earliest was Burton’s, consisting of a simple iron wire, zigzagging across a frame, which is then covered with a refractory. It made a very good and effective heater.

But none of these devices could possibly produce a temperature suitable for smelting purposes, as the wires being themselves metal would also melt.

The neatest way to smelt electrically consists in using black lead or plumago crucibles, which being conductive to the electric current, and of high resistance, may be made the means of producing the heat within themselves. It is simply necessary to stand the pot on a heavy copper plate connected to one pole of a dynamo, another copper plate acting as a return, and the clay should fit neatly, and to which the other pole of the dynamo is attached.

Of course, anyone conversant with electrical matters understands that the heating effect is produced in proportion to the quantity of current sent through more than of the pressure or voltage. It therefore becomes necessary to have a current of high amperage and low voltage. If an alternating current be available, this is readily obtained by means of a special transformer. The welding outfit of the General Electric Co. are available for this work, the plumago pot taking the place of the piece to be heated.

I have smelted in such a pot with direct current by placing the pot in series with the lighting system of lamps (incandescent) and vary the current by turning lights on and off. Magnetic, otherwise inductible, may be melted in this way. In such smelting as I have described the heating of the charge is by radiation, the same as in a muffle furnace.

Moisson, the French experimenter, used more largely, and I believe, the pot as one pole and a thick carbon rod immersed in the charge as the other pole. In this case the charge if not conductive, must be made so by the addition of carbon or coke.
One of the recent incorporations in Los Angeles, Cal., in a mining way, was the incorporation, November 18th, under the laws of California, of the Mountain Beauty Mining Co., with properties at Oak Grove, San Diego county, Cal. The capital stock has been placed at the exceedingly reasonable figure of $25,000, and has a par value of $1.00. The stock is fully paid and non-assessable.

The general office of the company is at present in the Homer Laughlin building, and the directors and officers are as follows: E. H. Little, president and manager, a thoroughly practical miner and business man; J. A. Shelhammer, vice-president; F. J. Eddy, secretary and treasurer; E. H. Caner, and H. A. Perkins.

The properties of the company, as above mentioned, are located near Oak Grove, San Diego county, Cal., at an altitude of 5,500 feet, with an excellent climate summer and winter, and plenty of wood and pure water; it is estimated that from fifteen to twenty-five inches of water can be made available for power purposes, with a fall of about 300 feet. They consist of the Mountain Beauty, Beauty's Annex and Jesse L. gold mines.

The country rock is granite and syenite, with mica schist running with vein; large dykes of granite and porphyry are running parallel with all of the veins, forming contacts in which the ores are found. The Mountain Beauty mine is well defined, and the coppers, which average six feet in width, prospect the entire length of the claim, 1,500 feet. A drift has been run in thirty feet with the lead, following the foot wall, and a cross cut run twenty feet all in pay ore. At the junction a chamber has been made and a five by six foot shaft, following foot wall, has been sunk between twelve and fifteen feet, with a five foot vein of ore. Another tunnel is in nearly one hundred feet, and is about 135 feet lower than the first. It is proposed to run this tunnel 1500, and the system of development work mapped out by the directors will place the mine in a condition to properly extract the ore at a minimum cost.

The ore is free milling quartz, of a rosy hue, and from 100 to 125 tons arec the dump at present.

The Beauty's Annex and Jesse L. mines run parallel with and adjoin the Mountain Beauty mine on the east. These veins will average 3½ feet in width on the surface, are well defined, in some formation as the Mountain Beauty and prospects from wall to wall.

One of the officers stated the other day that the first block of 5,000 shares, had been sold at 40 cents per share, and the second block was now on sale at the same price. The second block will place sufficient money in the treasury to prosecute the necessary development work, which will be pushed vigorously.


The following officers were elected for the first term: Fred. K. Rule, President; A. C. Jones, vice-president; O. Pooley, secretary; H. J. Fleishman, treasurer; F. F. Flint, attorney; Chas. Kowdy, manager of agencies.

The corporation has capital stock of $50,000,000, and was incorporated under the laws of Arizona.

The objects of the Pioneer Mutual Mining and Exploration Co. are to give an opportunity to invest in a general mining business, conducted on the safest basis, by contributing small monthly installments, to add the profits to the amount paid in, until each share is worth $50, and to participate after maturity in such dividends as may be appropriated annually by the Board of Directors.

Further, to develop properties against a certain interest, or to bond such properties. To buy or sell mining properties, and to invest in such manner as deemed advisable by the Board of Directors and mining experts. This will give any one with a monthly investment of 50 cents per share an opportunity to participate in some mining properties, and not only in one but in a number of them, so that the chances of losses are reduced by the average of a minimum, while one good mine can easily yield returns that will mature the stock in a very short time. This plan will make the investor, sooner or later, a partner in very desirable mining properties, which by individual effort one may never be able to accomplish. Nothing yields larger returns than a good paying mine. Under this plan, all stand on an equal basis, and if you become a shareholder, you become a partner to your investment. This insures an equal chance to the smallest investor, and absolute fairness.

In its "Preamble," the Company says: "It has been proven by those who have made the most money out of mines that the best way is to take hold of a claim in a good locality which looks as if it had some future to it, prove its worth by labor, and then expend the necessary money. The few thousands spent in this way often return many hundred fold. There are great numbers of this class of mines in the mining regions of the country, and they may be readily and cheaply acquired.

"By creating a fund which yields a certain income every month, we can work mining properties in such an increasing number that we must obtain an average result. In this sense, we have made the law of average the fundamental principal of our undertaking. To illustrate, there are 100 properties offered to the company. Our mining experts find that only 10 are first class and 90 as inferior. Out of the 10 recommended prospects, there may be one or two a success, and pay eventually $1,000 a month. This certainly would pay amply for the expense of the other eight and make a sure gain, as by the careful selection, and accepting a number of the best, we have obtained the advantage of a favorable average, while, on the other hand, if no different owners individually would develop each one his prospect, and they were equally successful, 98 would be losers against only two winners, thus explaining the so often discouraging loss in mining, as the availability of average assured in our company was unobtainable by these individual workers.

The Battle Creek Steam Pump Co., of Battle Creek, Michigan, has issued their catalogue, No. 9, illustrating the Marsh Steam Pump, a standard for all duties. These pumps have absolute actuation and regulation, are fitted with patent self-governing steam valves, patent, easy-seat ing water valves, and have no outside valve gear. They are simplex not duplex. As Emerson says, "to be simple is to be great." They have a maximum of strength and service, are economical, efficient and durable, and are adapted for every service.

This catalogue is well gotten up, having been printed on fine glazed book paper, with an elegant lithographed cover. The lists and detail tables have been arranged with care, and in convenient form.

The first section of the catalogue is devoted to standard boiler feed pumps. Section two embraces tank and vacuum pumps, while section three describes air compressors. Section number four calls attention to deep well pumping engines. The fifth section of the Utah catalogue shows pumps for handling the hot water of condensation. A description of pumps for sugar-house work comprises section six, and the Marsh sinking pump is described in the seventh section, while the eighth section contains illustrations of Marsh creamery pumps. Section nine speaks of Marsh hydraulic pumps and engines, and the last section, which is number ten, is a general resume of miscellaneous Marsh pumps.
AMERICAN DEVELOPING AND MINING COMPANY.

The town of Gibbonsville is situated in Lemhi county, Idaho, about four miles west of the summit of the Rocky Mountain Range and thirty-five miles in a northerly direction from Solomon City, the county seat, at an altitude of 4,500 feet above sea level.

Placer gold was first discovered near the site where Gibbonsville now stands in the early '80s by Montana prospectors enroute to the Loon Creek placer excitement, forty-five miles farther west. Soon after, profitable mining was carried on by the Nicholson Brothers.

 Afterwards, in August, 1877, quartz veins carrying gold were discovered on what is now known as Gibbonsville Hill, and later on, in the fall of the same year, the miners organized the Dahlonega mining district, to cover all the area west of the summit of the Rocky Mountain Range drained by the north fork of the Salmon river and its tributaries.

In the spring following, (1878), on petition of the residents of the district, a post office was established, and named Gibbonsville, in honor of Gen. Gibbons, who commanded the United States troops against the Nez Perces Indians under chief Joseph in the celebrated battle of Big Hole, fought the previous year. From this time on a large number of men were occupied in mining the surface ores of the district. These were successfully treated in arrastra and small mills, but when the sulphide ores were encountered the primitive plants failed to treat the ore profitably.

In this condition the American Developing and Mining Company, a syndicate of Whitehall, Montana, men, found the camp in 1882, and purchased the principal group of mines there. Since that time the systematic development of these mines and their equipment with mining and milling plants have been conducted on an extensive scale with favorable results by this company. On Gibbonsville Hill the company owns thirty lode claims, from the surface ores of which $400,000 had been extracted by the original owners, with the primitive methods above outlined. In the neighboring gitches and adjacent hillsides it also owned about 650 acres of placer claims and millsites.

For the development of its lode claims the company has adopted a system of adit cross-cut tunnels, three in number, 150 feet apart, vertically. These tunnels, with the drifts, aries and winzes run on the veins from them, aggregate a total development of about 20,000 linear feet.

Owing to the fact that the mines are developed and operated through adit tunnels and the compressed air used by the drills generated by water power, the mining plant while effective is comparatively small and cheaply maintained. As may be seen in the illustration it consists of a building 30x34 feet, containing an air compressor, machine shop, store room and also a building 26x40 feet for blacksmith shop, with lean-to for charcoal bins, situated at the mouth of No. 3 or deep tunnel. A special ore bin of 400 tons capacity receives the ore as delivered from the mines.

The buildings comprising the reduction plant are shown in the illustration, and the mill has ample capacity for the treatment of 100 tons of crude ore and twenty tons of concentrates daily, using a combination of processes which may be described in three sections as follows:

First: Stamp crushing and amalgamation of the free gold and copper plates, followed by concentration of sulphur from the pulp on Frane Vanners.

Second: A Pearce turret furnace with retorts from the pulp on Frane Vanners.

Third: Chlorination of the roasted sulphur in the revolving barrels and precipitation of the metallic gold from the chlorine solution.

The ore of the plant is the ordinary gold 30-stamp mill especially arranged for the crushing amalgamation and concentration of auriferous pyritic ores, fitted with the most approved automatic and economical devices.

The whole plant as above described is driven by water power and lighted by electricity. The water power is supplied under a steam plant of sixty-horse power to be used for auxiliary power and steam heating purposes when occasion demands.

An assay office is conveniently situated for the process of dead-roasting of the concentrates.

The stamp mill and equipment was first erected and operated in September of 1895, and for four months after starting it was in successful operation, during which time it had produced over $40,000 in free gold and over 900 tons of concentrates valued at $60 per ton. The value is mostly gold, only one per cent being silver.

The property has had a varied existence from the first, and while it is an excellent property today it has had the misfortune of passing into the hands of a receiver.

The following report was turned into the United States court at Butte, Montana, by the receiver, F. W. Becorem for the month of November:

"There was produced of what is known as plate bullion, $8,624.65, and 78,000 tons of concentrates, which, after deducting loss in cost of treatment, is estimated, with a net value of $2,447.60, making a total product for the month of $11,072.25. The expenses were as follows: Pay roll, $1,840.30; supplies consumed, $320.52; ore purchased, $7,403.05; total expenses, $11,242.55. The total was recorded at $842.50.

"At the Gibbonsville store the sales amounted to $3,337.02. In addition to this the goods to the amount of $535.66 were used by me in the operation of the mine and mill, and are included in the item supplies consumed, $545.50 above."

The document also includes a balance sheet showing that the receiver had $1,814.27 in cash on deposit and otherwise that $6,302.79 has been paid to former employees of the company in accordance with the order of the court; that $2,337.45 has been paid for legal expenses, office expenses and allowance paid receiver under order of the court; that $2,337.45 has been paid for maintenance of the property in the receiver's hands, under orders of the court; that $2,400 has been paid in settlement of certain damage cases against the American Development & Mining company under orders of the court; that $10,000 has been borrowed from the Union Bank & Trust Co. of Helena upon receiver's certificate No. 1.

The Sioux Curries engine, at the Omaha Exposition, was awarded the gold medal over its competitors. This engine was built by the Murray Iron Works Co. of Burlington, Iowa, and it was in continuous operation, twenty-four hours per day, during the greater part of the Exposition, furnishing all of the power used on the grounds.
A FIFTY HORSE POWER GASOLINE HOIST.

One of the largest gasoline double drum hoists ever built, is the one built for the Minas de Santa Maria de La Paz, Metealula, Mexico.

The gross measurements are: 17 ft. 6 in. long by 9 ft. 6 in. wide and the drums are so arranged that they may be operated independently of each other, and are controlled by a set of four levers, the two for operating the brake bands as well as a lever for actuating the governor, are all mounted on a suitable platform, so as to enable the operator to maintain full control of the entire hoist without moving from his position. It is also fitted for both tube and electric igniter and weighs 25,000 lbs.

The hoist has operating cages in a double compartment shaft and the duty on each drum consists of lifting 15 metric tons 400 meters per hour, making 22.2 H.P. of 75 kilogramme meters each.

One of the important features of this hoist is, that the operator may reduce the speed of the engine between loads if necessary.

While in the testing room before shipment, this engine running at 100 revolutions per minute used the exceedingly small amount of 6 gallons, 74 degree gasoline in 1000 continuous running in another test, it developed 48 brake H.P. continuously for 10 hours on a consumption of 48 gallons of gasoline, and a third test developing 24.3 H.P. it consumed 29 gallons of gasoline, on a 10 hour continuous run.

It will be seen from the above tests that the consumption of fuel in a gasoline steam engine is in exact proportion to the number of foot pounds lifted in a given time, basing the calculation on 1 to 10 of a gallon of gasoline to each H.P. exerted per hour.

Using the tank system for water circulation around the water jacket and valve chambers is also an important factor in the present location of this engine where water is a very scarce and expensive article as the evaporation during a day and night on a continuous 40 H.P. load was only 22 gallons. This hoist was built by the Weber Gas & Gasoline Engine Co., 434 S. Boulevard, Kansas City, Mo.

Graphite.

One of the most important materials of the modern arts is graphite. Its origin, its nature, its formations, its sources of supply and its many uses, would make a most interesting publication while its possible importance and its uses in the future are only beginning to be grasped by enthusiasts of today.

Graphite is one of the many forms of carbon, it is a triplet brother of diamond and charcoal; it is closely related to the coal family and in combination it is related to all organic matter indeed, the chemical study of organic and coal matters is now termed "the chemistry of carbon compounds."

Diamond and graphite are crystallized forms of carbon, while all, or almost all other forms are amorphous. Therefore, while graphite, plumago and blacklead are practically one and the same thing in a technical sense, in industry they are classed as distinct and indispensable to the requirements of the world as iron itself.

Graphite is, as it comes from the mine, contains from 50 to 60 per cent silice, sulphur and other impurities, and the process of completely freeing the graphite from impurities requires very expensive machinery and the most skilful manipulation. Only manufacturers having such facilities can hope to produce an absolutely pure article. The impurities in much of the graphite now in the market take on the appearance of graphite by contact, and such impurities are sometimes undetected even by the expert, unless chemical tests are employed. This is especially true of amorphous graphite, commonly called black-lead, which is graphite without any particular form and usually mixed with clay.

The Connersville Blower Co. of Connersville, Ind., have issued their 3rd catalogue of Pressure blowers, Rotary pumps; Gas exhausters and Hydraulic Motors for 1898. The catalogue is handsomely gotten up covered with a heavy dark green paper cover embossed in gold. The body of the phamplet is printed on heavy glazed paper and shows numerous beautiful half-tone and line illustrations, its 72 pages has four pages, and is full of interesting reading about the all usefull graphite.

Mining Location Notices.

Mining Location Notices are required by law to contain certain distinct statements. A notice which fails to contain them may cause serious trouble and may invalidate your title to valuable property. By using notices prepared, so that the locator cannot fail to state everything required by law, trouble from that source is avoided. Bell's California Mining Location Notices will be found correct in this particular.
MISCELLANEOUS MINING NEWS.

ALASKA.

Bernels Bay is keeping up its reputation. The Ophir, Northern Belle, Eald Eagle and Seward all having their mills in operation. Judge Mellen, who represents an Indiana company, writing as those six claims operatively up the Juulin, is now developing the Ivanbou, over the ridge between the Juulin and the Comet, and has about completed a 20-stamp mill. The Juulin has turned out 6,000,000 or $12,000, a normal nine months started. MIlo Kelly has some very good claims in the Bernels bay district, showing free milling ore, and is working them. Montana creek, which runs into Horn canal between Bernels bay and Juneau, is coming to the front. The placer works were in the early days, and now the Early is working in very rich ore and running a five stamp mill. The Boston and Alaska Company is sinking a shaft on the Hunters bay mine.

ARIZONA.

F. B. Logan has the following to say of the Globe mines in the Tucson Citizen. The Globe mines were first located and worked for silver only, but long since have developed into very rich copper producers. There were but five people in Globe when Dr. T. C. Stallo came in 1876, bringing with ox teams the first merchandise ever sold in Globe. The Stonewall Jackson silver mine, near the site of Globe, owned by one Harris in those early times, became famous as the producer of a 15,000 pound silver nugget.

Globe will now, more than ever, be a desirable place of residence, since it has ready communication by rail with the outside world. A brief glance at the Old Dominion Copper Company's plant and operations may be of interest. The superintendent, Mr. Parnell, being absent, I was unable to secure the more data of the workings at the mine, from personal observation. I learned that the company was making numerous and important improvements and additions to their already extensive machinery. The whole hillsides were strewed with lumber and casting material for various uses about the new machinery to be added. In the new machine and carpenter shop, a 22 inch drill press, a 6 foot planer, a new pipe cutting machine, with power to cut pipe from 2 1/2 to 8 inches, and other improvements were noticed.

E. H. Cook is the superintendent of the United German Mines, formerly known as the Buffalo Copper Co. Mr. Cook was absent at the time of my visit, but through the courtesy of A. L. Waters, the metallurgist and smelter, I learned something of the present and prospective movements of this company.

The smelting ore now comes from the Black Warrior mine, but the company is developing the Hoosier group and the mines lying on the Globe ledge formerly worked by the Old Dominion Co., and developing four others on a parallel ledge. The improvements under headway and in contemplation are quite extensive, as those of the O. D. Co. above are described. An electric motor will remove the slag from the three large furnaces, while the 6000 foot tramway, some time in use, delivers the ore from the mine to the smelters. A new dynamo will soon be ready to furnish electric light all around the workings high in the Juulin, and will be a most important improvement.

The Lost Gulch Gold Mining Co. and mines of the Webster gulch are spoken of with high confidence, as is also the Pinto mining district 15 miles west of Globe. The latter is comparatively unexplored, but nevertheless considerable development work in it has been accomplished by Messrs. McNelly, Williamson, Siebert and Crowley, who own herein a group of six claims now working as copper. A tunnel of 190 feet develops good copper ore and another tunnel of 180 feet cuts through a 38 foot ledge, and at the end of the tunnel a 36 foot gold ledge has been struck running from $3 to $5 in gold. A 28 foot ledge of copper on the Hal and Al claim running from 10 to 12 per cent. A 130 foot tunnel on the Dan and Mac mine has been run. A 60 foot extension, it is estimated, will reach the main copper lead. The mineral belt extends miles beyond and prospects well.

W. House and others have gold claims a few miles from Globe, with considerable development work exposing an 8 foot ledge of good ore, principally gold.

CALIFORNIA.

AMADOR COUNTY.

The Mechanics mine people, of Sutter Creek, are having a chucking of ore hauled to the Bullion mill. This ore is rich and yields plenteously in free gold as well as sulphures.

Nothing is being done at the Centennial mine, at Drytown, except keeping the water out of the shaft. A good supply of material is already on hand, and we hope to see this property working in full blast again within the next few weeks.

An attachment on the Amelia mine, near Jackson, which was placed on it about the 1st of the month, has been released by bonds. The work on the property will now be pushed forward with the least possible delay and greatest economy.

Everything about the Pocahontas mill, Drytown, is getting into shape, and will be ready to run as soon as the water comes. A force of men, under the supervision of Charles Mitchell, of Sutter Creek, is laying the pipe and cleaning out the ditch from the Amador Canal Company's ditch, past the Bunker Hill and Cover mines. Everything about the mill is in good running order, and looks promising for the Pocahontas to become one of the paying properties in the near future.

Amador Ledger.

CALVERAS COUNTY.

The McSorley mine, of Chili Gulch, is producing crystals which are shipped to New York and have proven valuable. Mr. Burton, under whose management operations were conducted, intends to resume his hunt for more, and operations to that effect will be commenced in the near future.

EL DORADO COUNTY.

G. Thomas & Co., are preparing to erect a five stamp mill on their quartz proposition, three miles below the Ebbetts pass. The mill site has been selected, and the necessary surveys run out by Henry Lahiff. Mr. Roberts, the superintendent, is now busy driving the tunnel to tap the ledge, which, when completed, will give him 100 feet of back.

After having been closed down for several years, the entire plant at the Gopher-Bowl-

der, including the finely equipped electric plant which was started up again. The resumption of operations at this mine means much for Kelsey and El Dorado county.

KERN COUNTY.

The new dry-crushing and cyanide plant at Mojave is amongst the most complete west of the Rocky Mountains. The company has added many new features in the way of labor-saving improvements, which is brought up to the highest efficiency. Every advance, to the smallest detail, is utilized, and works in perfect harmony on economical principles, even in utilizing the water to the second and third times. The ore, which is mined and hauled four miles away, keeps up to its minimum average, 277 gold and $2 silver per ton. A. J. Morse, the secretary and superintendent, is a practical man and works on that basis.

A new free-milling Huntington plant, just completed and put into operation in close proximity to the cyanide plant, is having it all can do. It is owned by a Mojave company of local capitalists and business men.

The whole country around Mojave is attracting attention, and a new mining era is dawning with more than average stability.

Work on the new mill, of the Yellow Aster plant, was temporarily delayed on account of the non-arrival of the mortar blocks. These are twelve pieces of Oregon pine, 30x30 inches square and twelve feet long. There are six batteries and two of these blocks are to be used for each battery. The frame of the mill, engine room, ore bins and all, are in place and only awaited the corrugated iron with which the roof and the outsides are to be covered. The machinery is about all on the ground, and the boilers are now being set up. The three iron water tanks are completed and the water connections made. The new force pump, to force the water through the pumping place at the 50,000 gallon oil tank above the mill is completed, and if the blocks arrive in time, the mill will be running by the fifteenth of January as at first announced. The mines are looking better, and development work is being carried on and the last clean-up at Barstow for the month of November amounted to about $47,000.

THE HARD CASH.

The new mill at the Hard Cash is about completed and was started last week. Everything worked very nicely and the company feel confident. Much money has been expended by the owners of the Hard Cash in the erection of buildings which are of an excellent character, the residence, engine house and concentrator house, being all separate and yet under one roof. They are all put up substantially and covered with shingles. A fine chute is built to connect mine above and covered with corrugated iron, and everything is very complete and convenient.

The ore when hoisted from the mine is dumped on the chute and lands at the hopper at the mill. The ore is a tremendous body of ore easily worked, requiring no waste hoisting, as the vein is larger than the double compartment shaft which is down about 100 feet, where a drift is run to the south 100 feet more, showing no indications of running out.

It will require some days to have the mill running in complete shape, but it is expected
that by the first of next week everything will be in shipshape and the company beginning to reap some reward for their expenditure.—Rumford Miner.

MARION COUNTY.

There was filed in the United States Circuit Court, December 5th, an important mining suit, involving property worth over $9,000,000. The disputed lands are located in Tuolumne and Mariposa Counties. The Merced Gold Mining Company, a Montana corporation, is the complainant. The accredited respondents are David Dorward, C. M. Dabney and Daniel Corcoran of Coniferville, Mariposa County. We understand the parties are the representatives of the Rosenfields and other San Francisco capitalists.

TUOLUMNE COUNTY.

The famous Black Oak mill is soon to have its crushing capacity increased one-third, by ten additional stamps. It is generally understood that grading and other preliminary work will be in action in a few days, and that it will be done in such a way that, later on, they desire again to add ten stamps more, so that it can be carried out. We hope and expect that we may, ere many months, record in our columns that the Black Oak is adding the ten stamps that will make it a forty-stamper.

COLORADO.

Cripple Creek Production.

The managers of the various treatment plants handling Cripple Creek ores report as follows:

Gilliet Reduction Works treated 2,600 tons, averaging $26. A gross value of $67,600.


Brodie Mill, Mound City, 1,850 tons, average $18. Total value $35,300.


Colorado-Philadelphia, Colorado City, 7,000 tons, average $30. Total $210,000.

The small treatment plants, tonnage unknown.

Smelting ores, 10,700 tons, with an average value of $73.90. Gross bullion value, $756,410.

Summarized the totals stand:


District mills (3) 6,850 $175,500

Florence (3) 12,600 267,500

Colorado City (1) 7,000 210,000

Small plants 17,500

Smelters 10,700 786,450

Grand totals 37,150 $1,456,950

The New York Tunnel and Mining Company is a corporation that has not heard very much about, but for all that, it is a substantial one and one which believes in doing lots of work.

The company owns a tunnel site at the head of San Diego gulch, and during the past few years it has pushed the ore into the hill a distance of 1,200 feet and over. Numerous veins have been cut in the process, but very little prospecting on them has been done, the management being anxious to push ahead. A vein is now, however, being drifted upon, and the outlook is encouraging.

The New York Tunnel Company stockholders have just held their annual meeting. There was a very good representation of stock, and at this, the subsequent directors' meeting following officials and directors were elected: J. J. McCarty, president; John Bridge, vice-president; J. W. Campbell, secretary and treasurer; J. C. McKenna, superintendent; and R. T. Fahey.

The treasurer's report showed that over $4,000 had been expended in pushing the tunnel a short distance, and that considerable developing work had been done. The company has money in the treasury and is in a prosperous condition. It has secured leases on some of the most desirable properties under which its tunnel passes and where the showing is said to be very good. The work of the past month is said to be the most encouraging in the history of the company, and from the present showing it would not be unreasonable to expect a new producer to be opened up any day.—Colorado Springs Mining Inspector.

GEORGIA.

Our correspondent at Dahlonega writes: The mining excitement here continues unabated; many new people are coming in to examine the mines and many of them invest. If this section was 100 miles north of Knoxville, in an inaccessible place, it would require a standing army to keep the people away from here. Our reports that could honestly and fairly be made.

IDAHO.

The Florence Miner reports rich strikes in the Good Enough, Iola and Little Giant mines, near Warren. The Good Enough has a solid body of 840 ore six feet wide, in the stope about 35 feet above the lowest workings. The Good Enough mine has been running about five weeks and a very satisfactory clean-up was made in the first month's run. The Iola lode is increasing in size and richness with the working of five feet of ore in the lower workings that will average $60 per ton. Picked specimens have assayed as high as $22,000. Thirty-five men are employed at present on this mine and the mill is running night and day. The Little Giant mine is developed to a depth of 300 feet and has a pay shoot that runs from $800 to $2,000 per ton, the free gold being taken down through the ore. This mine does not employ a very large force of miners and the output is not large, all owing to a fanciful idea of the owner, which is not in the interest of a greater amount of production.

Hyde Has Resumed.

The Hyde mine, near Florence, has resumed operations and is at present working a force of about fifteen men. A. D. Wheeler, an expert mill man from Greenwood, B. C., has the management of the property, and is at present making repairs. The mill will start up in a few days and run through what ore is in the bins.

The work of sinking the shaft 200 feet deeper will commence in a few days. A new pump and piping has been purchased and is now on the ground.

MINNESOTA.

The amount of ore shipped over the Duluth, Missabe & Northern road and the Duluth & Iron Range, will be found in the following table published by the Duluth News Tribune:

Following is a comparative statement of the shipments from the mines on the Missabe road for 1897 and 1898:

<table>
<thead>
<tr>
<th>Year</th>
<th>Franklin</th>
<th>Adams</th>
<th>Coonrodre</th>
<th>Lone Jack &amp; M. M.</th>
<th>Mountain Iron</th>
<th>Rust</th>
<th>But</th>
<th>Hull</th>
<th>Pillsburg</th>
<th>Ohio</th>
<th>Sellers</th>
<th>Biswalik</th>
<th>Duluth</th>
<th>Lake Superior group</th>
<th>Day</th>
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<tr>
<td>1897</td>
<td>285,723</td>
<td>357,700</td>
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<td>38,175</td>
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The mines in the Lake Superior group are given separately for 1898.

Following is a statement of the shipments from individual mines on the Iron Range road:

<table>
<thead>
<tr>
<th>Year</th>
<th>Franklin</th>
<th>Adams</th>
<th>Coonrodre</th>
<th>Lone Jack &amp; M. M.</th>
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<th>Rust</th>
<th>But</th>
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The Calumet & Hecla Copper Mining Company has declared a dividend, $10, making $50 for the present year, and $5,850,000 in all. A very pretty showing.

SHIPMENTS STOPPED.

Ships of ore from Ishpeming mines have ceased, the Lake Superior being the last to stop. A cargo was needed for the Illinois Steel Company which required attention. Stock piles are well cleaned up, and prospects for the coming year are excellent.

Franklin Stamp Mill Burns.

The stamp mill at the old Franklin copper mine was destroyed by fire last week. It had been in constant operation for 38 years. There were three heads of stamps under which 14-ton anvil blocks had been placed during the past few years, which added to their former efficiency. The capacity was about 450 tons of rock in 24 hours.

This removal of stamp mill from Portage Lake in the vicinity of Hancock and Houghton. The old mill was an expensive
one to operate, in that it had been impossible to arrange things in modern fashion. Many additions had been made to the original stock, in- 
ing, the ground under roof being considerable at the time of the fire.—From Ore.

MISSOURI.

Joplin Notes.
The Topsy mine at Lebigh has put in a 9-inch pump and is working and making good 
turns. The Sergeant shaft on the Snapp-Warren at Tuckalee has struck a deep run of jack at 200 feet; they are now at 50 feet. J. L. Nautly has purchased eleven acres of the A. Mitchell land, adjoining the East Alba mines, and will prospect for minerals.

Houk & Co., on the Chitwood Hollow Mining Land Co.'s tract have let the contract for
a complete concentrating mill, to cost $4,600.

In sinking the shaft, the Morning Star mine at Oronogo has encountered what is considered the richest run of jack in that town.

The Old Hickory in Chitwood Hollow is running a prospect drift at 130 feet, and is opening up a good run of lead at 20 feet from the shaft.

In addition to the cruiser and roller put in at the Mascot on the Bailey leases, the owners Geo. Reddell and Chris Steinbach are figuring on putting in Star jigs.—From Herald.

T W O.

H. L. Frank, who recently acquired a large interest in the new Hope mine of Basin, Jefferson County, has returned, after making a personal investigation of conditions at that property. He declares that he was more than surprised at the showing on the bottom level, and predicted that the Hope would yet be known as one of the great gold mines of Montana. Mr. Frank has been interested in mining for many years, and his judgment is generally accepted by mining men in mining matters. It yielded about three-quarters of a million dollars from the surface to the 300-foot level, and it is generally believed that nearly 50 per cent. of the output was lost in the tailings and went into the creek, owing to the crude and imperfect method of concentrating.

"Up near the 200-foot level the ledge was only about six feet wide. Down at the 500-foot level, where the shaft is now being cut, the ledge is 24 feet wide, and the prettiest quartz ever seen in any state. In fact, it looks like a mountain of pure and that carries, it carries good values too. If it only carried a value of $5 per ton in gold, it would be one of the biggest mines in the state, but an average value would give better results than that. Six feet of this ledge is solid ore. It looks exactly like the narrow streak of high-grade taken out above the 200, which netted the fortunate owners over $600,000. There is about 100 feet of development work at the 300-foot level and about 800 feet at the 200, where they took out the rich ore a few years ago. There is yet fully 10 feet of ore in the hanging wall, as indicated by crosscuts made at different points.

"We are now cutting a shaft and putting in a pump at the 500. We will drill on the ore body to the Katy line, which will probably be about 200 feet long, and then begin sinking to the 600. If the ore body at that depth is half as good looking as it is at

the 500, the company will begin work on a 500-ton concentrator, which we believe we will have in operation by July." 

One of the most important events in mining in the Cracker Creek district that has occurred for some time was the strike made a few days ago in the E. & K. mines.

From a reliable source it is learned that on the 300-foot level of the Excelsior in the north shift, a vein of one and one-half feet of ore gives return by assay of $31.25 to the ton. The full width of the ledge in the drift is seven feet.

In the Excelsior No. 2 tunnel, also, a five foot ledge has been uncovered in a drift that assays $30 to the ton.

SOUTH DAKOTA.

Rapid City Chlorination Works.
The Rapid City, South Dakota, Chlorination Works started up last week for a trial run on 120 tons of ore from the property of H. H. Day. The plant has been improved into the hands of Mr. Day many alterations and improvements have been made in it, and it is now one of the best appointed institutions of the country.

Black Hills Notes.
Quartzite is said to have been struck in the Chicago & Two Bit shaft, in Two Bit, at a depth of 500 feet.

The steel hoist over the Deadwood-Terra shaft is nearly completed. It will be completed about the first of the year.

John L. Scofield has put a force of men to work on the Aurora group of claims, in Ice Box Canyon. The property is owned by Deadwood parties.

The Paust & May shaft, at Garden City, has been emptied of water, and everything is in readiness to commence sinking. A new pump was put in this week.

General John Walker has purchased the quartzinterest in the Red Nose lease on the Dakota Maid property, which was owned by Messrs. Secoy & Shaw. The purchase price was $2,000.

OREGON.
The huge dredger of the Griffith & McDee, Constuction Co., of Chicago, has begun work on the gravel beds of John Day River, in Grant County. The machinery handles 2,000 yards of dirt every 24 hours. Two shifts of five men each are employed and the dredge is operated day and night. A 5055 light capacity damno has been placed on the boat and presents a pleasing spectacle at night. The company has several dredgers under construction, one at Mount Mccena, another in Utah. —Oregon Mining Journal.

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UTAH.

W. S. McCormick, the Salt Lake City banker, has secured a third interest in the well-known Ajax mines of Mammoth, having bought Samuel McIntyre's interest.

It is reported that Bullion Beck Company's mine at Eureka are again in good ore on the 1400 foot level. The regular dividend of 25c per share, of $10,000, was paid on the 15th of December.

The gold, silver, copper and lead property of Eureka also paid a dividend on the 15th of December, amounting to $15,000. The last dividend was paid in March, 1897. The mine is said to be in excellent condition—an old new ore chute having been open up, and the mine proves to be the equal of any found in the palmy days of this bonanza.

The Buckeye Company of Tintic announces the resumption of ore shipments from their well known properties.

Work is being pushed steadily at the Alliance mine near Park City, but there is no
change in the character of the ore. Good reports reach Salt Lake City from the Anchor property, also at Park City, in the form of an increase in ore values.

Matters look much brighter at the Chloride Point mine, near Mercur, in the Camp Floyd district. The mill tonnage is being increased and the savings are high.

Developments at the Galena mine, in the Fith Springs country, are being rapidly pushed ahead, and the mine is in a better condition at the present time than for a year past.

Reports continue to come in of a strike of rich ore at the Mammoth property, located near Mammoth, Utah.

WASHINGTON.

Patrick Clark, of Rosslard, says: "Republic is a new camp. It differs from the Rosslard camp in a good many ways. This is true as to the character of its ores and the formation. There the ore is of the cyaniding variety and carries no copper or other base metal. The values are principally silver and gold, mostly the latter. The cost of reduction in both camps is about the same, but though we have several mills it will be Rosslard. The ore in Republic is not of much higher grade than is found in Rosslard mines. There is this difference, however, that at Republic the ore can be treated on the ground, which is some advantage. The nearest drawback that we have in the way of more economical extraction of the ore of Republic's transportation facilities are better. Rosslard is supplied now with transportation facilities, which was not the case when I first came here. We expect that we will have railway transportation at Republic next year. I think we will have a city at Republic about the same size as Rosslard. For its age, Republic has done well to have one good dividend payer in 18 months. There will be others in my opinion that will be dividend paid in a year. None so far, however, have as high grade as the Republic — Spokane Miner and Electrician.

FOREIGN MINING NEWS

BRITISH COLUMBIA.

GOLDEN.

At the annual meeting of the Northeast Kootenay Miners' Association, held at Golden last week, the following officers were elected: President, Hon. F. W. Aylmer; vice-presidents, Golden mining division, W. G. Mitchell-T бесплатно; Windermere mining division, J. L. Mackay; Donald mining division, W. G. Neilson; secretary-treasurer, E. A. Haggen; treasurer, Messrs, M. Dainard, H. O. Low, W. McNish, C. Cartwright and H. G. Parsons — British Columbia Mining Critic.

PORT STREELE.

New machinery has been placed on the mines of the Sullivan Group Mining Company. There has been opened up a vein 100 feet wide between walls showing 65 feet of clean galena. In a crosscut on this ore body an average assay of silver and lead was obtained. In a test pit sunk on the Coyet at a point about 100 feet north of the shaft, galena of much higher grade has been found.

ROSSLAND.

Superintendent Jack Hanley says that before spring he will develop the Bonanza mine into a valuable property as the Le Roi. Besides the immense ore bodies already opened up, great bodies are just penetrating in the 500 foot level a larger and richer ore chute than ever, and from now will ship three cars a day. It is Mr. Hanley's intention to continue sinking until the two foot level is reached, and hopes to have this depth by next spring.

MEXICO.

The famous old Santa Baula mine, near Chihuahua, which had its shaft burned out some months ago, has been thoroughly repaired and refitted, and the mine is now turning out large quantities of high-grade ore, as it did 300 years ago.

Enrique C. Creel and his Chihuahua associates have sunk a shaft 120 feet deep, at their La Alianza property, five miles from Chihuahua. This is regarded at Chihuahua as one of the most valuable mines in the state. It is located on ground that has been gone over for hundreds of years, and no one dreamed of denouncing it until recently.

F. M. Aizpurua, a large manufacturer of iron at Jalisco, Mexico, says Modern Mexico, also owner of very valuable iron mines, known as the Providencia, reports that some $500,000 will be expended on new equipment for his plant. The work of remodeling will be in charge of Capt. A. Evans, Jr., of Pittsburgh, at present, the mills turn out all kinds of iron, except rails and beams, but the mines in connection produce Bessemer ore, and steel manufacture is to be introduced.

The water has been pumped up from the Alogrado mine, near Hermosillo, Sonora, and the owners have started to sink the shaft to a greater depth and open up new workings below. This promising property is owned by a company of which James McNab of San Francisco is president, George J. Wanless of Hermosillo is manager, and J. D. McGilvray superintendent.

Prof. E. T. Dumble, the geologist, who has returned to Sonora to explore and test the Barranca coal field, western part of the Southern Pacific Company, has gone to the scene of his labors, reaching La Barranca early in the present week. The exploration force numbers two engineers and more than fifty workmen of various kinds, with a splendid outfit of tools and implements for the work in hand. It is anticipated that about fifty laborers will be employed several months in sinking shafts, running tunnels, etc. — Nacote Osage.

GENERAL NEWS.

Horace F. Brown, M. E., patentee of Brown's Complete Automatic Mill Process, Brown's Horseshoe Roasting Furnace, Brown's Chloridizing Furnace, Brown's Cooling and Conveying Hearth, and Brown's Pulp Distributor for Leschning, is now located at Victor, Colorado. He is putting in a very large plant there, nearly 500 tons daily capacity, for the Economic Gold Extraction Co, and Mr. Brown believes it will bear out the name of the company, and says he will have an automatic milling plant that will be more economical than any other in the country.

STEAM BOILER HEATING SURFACE. (BY CHARLES WHITING, RADER.)

It is very easy to understand why water should have so much greater heat-absorbing power than air. The specific heats of water and air are both equal to 0.179; but since air at ordinary temperatures weighs but 1:812 as much as an equal volume of water, we consider a thin film of air in contact with a hot surface and a film of water of equal thickness and area in contact with a similar hot surface, the water would absorb 3:530 times as much heat as the air if the temperature difference were the same.

Again, the relative heat conductivities of water and air, according to Lord Kelvin, are as 40 to 1. On the other hand, in the transmission of heat from a surface to a fluid, the mobility among the particles of the fluid, whereby fresh portions of it are constantly brought in contact with the surface, is a matter of great importance, and, in this respect, as compared to steam, has a decided advantage.

The writer has been unable to find any trustworthy figures for the relative heat-absorbing power of air and water; and the importance of the determinations to be trifling, for we know in a general way and from the examples already cited that water absorbs heat very many times more rapidly than air, so many times that in the case of a thin plate, such as a boiler tube, transmitting heat from furnace gases on one side to water on the other, we can be quite certain that the temperature of the water plate is at most only a few degrees warmer than the water in contact with it.

In other words, in any steam boiler with clean heating surfaces we can assume the temperature of the fire side of the heating surface to be practically the same as that of the water in the boiler. Perhaps it may be 1 degree more; perhaps it may in some cases be 20 degrees, or possibly 30 degrees more. The difference is of small importance, since in the few cases where so large a difference as 20 degrees or 30 degrees may possibly exist, the temperature of the fire to which the surface is exposed is practically 2000 degrees or more than the temperature of the plate.

If, now, it is clear that the fire side of the boiler tube or flue is practically the same as the water side, the real heat surface of the boiler, which measures its capacity of making steam.

The great resistance to the flow of heat in any steam boiler is in getting the heat from the hot gases into the surface exposed to them. Compared with this resistance to the passage through the plate and the resistance to the passage from the plate into the water, the resistance to the passage from the plate into the water, or the mere trifles. If we increase the surface exposed to the hot gases, we will increase the capacity of the boiler to absorb heat; but if we leave the surface the same and increase the surface exposed to the water, the amount of heat transmitted in a given time will be practically the same.

The case can be made more clear perhaps by an analogy to the flow of water through the pipes. If we have a length of 1-inch pipe containing two turns of 1-inch pipe, and allow water to flow through them under a head, it is clear that the flow will be determined by the resistance of the 1-inch pipe.
If we enlarge that, we shall enlarge the flow; but if we leave that alone and enlarge either or both the 12-inch pipes, the flow will be proportionately increased. The area of the fire side of the tube is what determines the heat-absorbing power and the steam-making capacity of the boiler. If we can convey any large number of tubes through the boiler in any way, we shall increase the power of the boiler. The serve, tube, with its ribs extending into the hot gases, increases the inner surface of the tube, and thus its capacity for absorbing heat. If, however, instead of putting ribs on the fire side of the tube, we put them on the water side, we increase the surface exposed to the water and make it easier for the water to be heated to a greater extent than if exposed to the fire (in fire-tube boilers), effects no increase in the amount of heat transmitted. The real heating surface, which determines the amount of heat transmitted, is the water side.

In the preceding discussion it has been supposed that the heating surfaces were clean on both sides. As a matter of fact, heating sur- face is almost always dirty, whether caked with soot or ash on the fire side and with scale on the water side. If the preceding discussion has been carefully followed, it will be clear that the transfer of heat will be much more interfered with by the deposits on the fire side than by deposits on the water side. To use again the analogy of the water pipes, a half-closed valve in the 1-inch pipe would have far more effect than a half-closed valve in the 12-inch pipe. It is no part of the purpose of this paper to excuse lack of care in keeping boilers free from scale; but it is nevertheless quite certain that a thin scale on boiler tubes does not interfere in any noticeable degree with the capacity or economy of a boiler, while the coating of the fire side of the tubes with a scumulent deposit of soot does certainly interfere in a marked degree with a boiler's steam-making capacity. Of course, a thick scale on the water side of the tubes or other heating surface, or any other material which acts as a non-conductor of heat will considerably reduce the flow of heat. If it does this, the temperature of the heating surface itself will at once be raised, and may reach a point, as happens sometimes, of exterminating the boilers and with the furnaces of marine boilerers, where the metal may be so heated as to bulge or buckle.

Another deduction of practical importance from the fact just set down, is that so far as the transmission of heat after the boiler is making steam is concerned, the circulation of the water in boilers is of a good deal less consequence than has been sometimes claimed. I do not mean by this that it is not worth while to make proper provision for circulation. There are possibly some parts of boilers worked with forced draft, such as the tube plates of marine boilers, where it is so difficult for the steam bubbles to get away fast enough, that we have a mass of foam instead of water in contact with the plate. Under such conditions, of course, the plate would be less heated; but I know of no evidence that this is any other than a rare occurrence, even in boilers which are pushed most severely. If anyone has evidence to the contrary, I advise him to consider the conditions in the narrow water space (about ¾ inch deep) behind the locomotive fire box, where the steam rushing up is directly op- posed by the water going down. Let it be understood that I am referring to circulation only as affecting the making of heat and the consequent economy and capacity of the boiler. Good circulation is desirable to prevent unequal heating of the boiler, and consequent straining, and it may be of service in preventing fires in place and mud in places where they are least desirable; but that it has any appreciable effect on economy and capacity is not proved, and probably cannot be.

It has been demonstrated above that the surface exposed to the fire is the real heating surface of a steam boiler. Is there any good reason for supposing that it is not generally adopted by engineers as the correct, and the only correct, method of computing heating surfaces?

The following are some reasons, good or bad, which are likely to be urged against it.

1. The makers of fire-tube boilers will claim that this gives the water-tube boiler makers a greater number of tubes in a boiler of the same length, the water-tube boilers can show 7 to 11 per cent. greater heating surface. This is of course true; but is it not an advantage to which the water-tube boiler is entitled?

It must be remembered that nowhere in this discussion has it been claimed that there was any fixed heat transmitting value for heating surfaces. It is evident that it is entirely certain that a square foot of heating surface in one type of boiler may have double the heat transmitting power of an equal area in another.

Again, the relative facility with which heating surface can be cleaned of soot and ash counts for a vast deal, more than most steam users are accustomed to think. It certainly seems to the Officers of fire-tube boilers that they have enough valid arguments to offer for their product without demanding the privilege of overrating their heating surface by 7 to 11 per cent.

2. Another argument offered for the use of the exterior surface as the heating surface is that this makes a given boiler show a larger heating surface than if the interior were taken. However, surveys have shown lots of boiler manufacturers—and I hardly think they will take it very seriously—it deserves no weight with engineers. A foot rule is no longer than a foot rule.

3. It is urged that practice is and has in the past been fairly uniform in accepting exterior area as the heating surface, and it is best to stick to a uniform practice, even if it be in error, than to change. If the practice were actually uniform, there might be reason in this argument; but while the majority of engineers probably use the exterior surface of tubes in computing heating surface, there is a very respectable minority which insists on the correct method of computation, and this minority shows no signs of decreasing.

4. As the outside diameter of the tube is even larger and the thickness of tubes varies, it is easier to compute the exterior heating surface than the interior. Probably this is one of the principal reasons why the outside surface is so frequently made and abused. The use of these days of tables and pocketbooks and aids to computation, so trifling a matter as computing the interior area of a tube ought not to be considered even an error. As a matter of fact, it will generally be less labor to do this than it is to figure the cost of the tubes with the numerous series of discounts which are frequently found on hardware bills in these days.

KANSAS LEAD AND ZINC.*

The only locality in the State which has ever produced lead or zinc ores in paying quantities is the extreme southeast part of Cherokee county. Here the ores of these metals exist in phenomenal richness.

HISTORICAL.

It was in April, 1876, that the first discovery of lead ore was made in the county. For three years similar mineral discoveries had been made at Joplin and Granby and adjacent points in Missouri. In general character the surface rocks in this part of Kansas were known to be much the same as those in the ore in the Ozarks. Different parties had prospecting there and up and down the little creek called Short creek, but nothing of value had been found. In April, 1876, while digging a hole, ostensibly for a well, on the farm belonging then to Mr. Harper, a well digger was fortunate enough to come upon a mass of the purest lead sulphide (galena). No sooner had word of the discovery gone abroad how the farmer who made the discovery procured the land and immediately began prospecting for ore. Mining lots and town lots were surveyed, mining leases let, and temporary buildings erected, forming the town which was later incorporated into a town of existence, and which was known as Bonanza, a name still borne by that particular locality.

Mining operations, however, were prosecuted slowly, largely on account of the fact that few rich deposits of ore were found. The rapid growth of the village during the first few months gradually became checked, and twelve months from the time of the discovery there were but few people living there than at the end of the first six days after the discovery was made.

In the spring of 1877 the same prospector, while digging in Short creek valley about a mile above Bonanza, came upon a large body of pure lead ore which produced hundreds of dollars' worth of ore. Again the excitement was renewed. Land was purchased; prospectors swarmed in; mining lots were bought and sold; and the narrow valley of Short creek soon changed from the quiet corn field of a farmer into the busy scene of activity known in mining towns of the world. Almost every shaft that was sunk found large quantities of lead ore near the surface. Two rival town companies came upon the scene, one of which got control of a considerable part of the land on the south side of the creek, and named the town Galena; the other of which controlled the greater part of the exceedingly productive valley and the upland to the north. This company named its town Empire City. The story of the remarkable development of this area has been told in many newspapers from that time. It has grown and grown, and different companies have become prosperous beyond the limits of reasonable hope in those early days. It is estimated that within three months from the discovery of ore in that locality not less than fifteen or twenty thousand people had camped upon the grounds.

The first mining operations were crude in detail as has been likewise the history of Mining Resources of Kansas for 1877, by Francis Hawthorn, Professor of Physical Geography and Mineralogy, University of Kansas, Lawrence.
method and detail. The lead ore was found near the surface, so that but little hindrance was met with by water in the shafts. Chaos reigned supreme in local government. No one attempted to keep accurate account of the output of the mines, so that it will always be a matter of conjecture regarding the first few months or even few years' operations. This chaotic tendency was increased by the mutual jealousy of the two town companies and the discord which resulted.

It was only a short time, however, until matters assumed a much more quiet and substantial form. Regular mining companies were organized; each controlled the properties belonging to it and conducted its operations in a systematic manner. The income from the ores brought vast sums of money into this country from the outside. Thousands of people were entirely dependent upon the success of the mines or upon the wages for a day's labor. The citizens of the adjacent farming communities soon learned that they also were to be greatly benefited by the development of the mines, for a strong and steady demand was supplied for all of their products, and was brought almost to their very doors. Of the millions of dollars received for the lead ores and the zinc ores sold from Galena, a large portion has been immediately distributed throughout the farming communities near by. In this way, beneficial results have reached the whole community. (To be continued.)

PERSONAL NEWS ITEMS

EDWARD DITTMAN, a Mexican mine owner, is in San Francisco, Cal.

W. O. LEWIS, the mining man of St. Charles, Bear Lake county, Idaho, is now in Republic City, Washington and writes that Republic camp is 'a dandy.'

Geo. H. ROBBISON, the well known mining engineer of Salt Lake City, Utah, was in Bismarck, Mont., examining some promising mining properties. He is returning to St. Louis from Santa Fe.

The old Hope mine among others coming under his observation.

H. SHALEMBOOM, of Spokane, who is extensive in the Boundary county, B. C. district, is gathering together a representative collection of the ores of the district which will be taken to Scotland by another party who will go across the water soon to interest Scotch capital in the Boundary country.

J. SICKLE and J. H. FREEDMANN, representing the J. O. Leach Machinery Co., of Denver, Colo., is now in the state of Michigan, Mexico, putting up a plant on the Ingerman Copper properties in that State.

H. F. MILLER, of Elk Point, S. D., well known in both the eastern and western parts of the state, arrived in Deadwood, S. D., Mr. Miller will remain some time in the hills, and will pay considerable attention to his mining ground in Grizzly gulch.

Richard M. Jerss of New York has a position with the Gold Mine Companies Company and Gregory Consolidated Mines Company, Gilpin County, Colorado.

Joseph L. GIRoux, manager of the big mine at Jerome, Arizona, the United Verde Co.'s properties, is at present in Hermosillo, Sonora, Mexico, on important mining business.

After a sojourn of several days in Denver, Col., M. B. DAY has returned to the Black Hills, S. D. He went to Denver for the purpose of supervising the services of one or more men to take charge of the new chiorina, mining, works, at Rapid City.

It is a well known fact that when the J. S. Dixon Carborundum Co., does anything they try to do it in first-class style. They have been making Christmas presents and the same rule applies here too. We can testify to the fact. A package containing an assortment of Dixon's "American Graphite" pencils was received at this office as one of their presents, having been selected especially for editorial purposes, and for which we hereby extend our most sincere thanks.

J. S. Dixon's pencils are well known for their superior excellence.

GEORGE KLEINBERG has returned from Utah on business.

W. K. KRUEGER, of Detroit, Mich., is in Central City, Colo., to look after his interests in the Alaska Gold Mining Company.

HARVEY A. COHEN, who has recently resigned the general management of Captain J. R. De La Mar's mining enterprises in New York where he has opened an office as mining engineer.

Dr. GEORGE W. MAYNARD, a New York mining engineer, is in California in the interest of a foreign mining syndicate.

S. T. JONES, a brother of Senator John F. Jones of Nevada has been recently visiting various points in Sonora, Mex. Last week he was out to see Col. W. S. Morrow's properties at Mazatepec, about thirty miles southeast of Minas Prietas.

FRANK NICHOLSON, having completed his engagement as general manager of the Consolidated Gold Fields of Mexico, Limited, at Santa Elena, Mexico, has returned to New York, where he will establish an office as consulting mining engineer and metallurgist.

ALBERT A. HENDE is in New York on what purports to be most important business. It is said that on his return to Butte, Mont., he will, in all likelihood, assume the management of the Butter & Boston Co.

Marshall P. Wright of Kansas City is south of Matapa in the Ures district of Sonora, Mexico, where he has recently announced some very promising properties in which he is preparing to work on an extensive scale.

If You Have Only ONE BELT THAT SLIPS USE CLING-SURFACE ON IT

and we will guarantee that the increase in power will pay for all the CLING-SURFACE required for the whole plant.

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The Pulsometer Steam Pump

"The Miner's Friend"

Often imitated—Never Equaled

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The Handleless, Simplest and Most Efficient Steam Pump for General Mining, Quarrying, Retreading, Irrigation, Irrigation, Coal Washing, Tank-Sizing and all Pumping Work. Liquid and Solid mud without injury to the Pump.

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538 EAST 86th STREET, NEW YORK

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Pump, Bell, Brass and Machine Works,
138-142 Fremont St., San Francisco, Cal.
THE MARKETS.

All quotations, financial reports and other statistical figures given under this head are New York quotations, unless otherwise stated in each case. These figures are carefully revised each hour, and constitute a very accurate accumulation of statistical matters.

NEW YORK, Dec. 28th, 1898.

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

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SILVER.

The silver market has been quiet, with business done at slightly declining rates. It is to be noted, however, that the rates for spot and future have been converging so that March silver has commanded a price only a little under metal for prompt shipment.

COPPER.

The demand, as is usually the case at this season of the year, is slow, but many as producers have all they can do to fill contracts previously entered into, while little business was transacted during the previous week, business at Lake, 12% per 100 lbs. For electrolytic in cakes, wirebars and ingots, at 12.90 per 12.55%, for cathodes at 12.30 per 12.55%, and casting copper at 12.47 per 12.55%.

POTASSIUM CYANIDE.

Purified, 94.99 per cent., in cases of 124 lbs. at 5.20 per lb., and 25 and 50 lbs. tins at an advance.

QUICKSILVER.

The New York quotations are unchanged at $96.60. The London price is also unchanged at 7 lb. 5s. per half bushel, with 7 lb. 4s. named for second ends.

POWDER.

F. O. B., San Francisco: No. 1, 190 cent. nitroglycerine per lb., in carded lots, 15.5 per cent., less than one ton, 15.5 per cent. No. 1* 60 per cent., carded lots, 15.5 per cent., less than one ton, 15.5 per cent. No. 2* 25 per cent., carded lots, 11.5 per cent., less than one ton, 11.5 per cent. No. 2 40 per cent., carded lots, 16.5 per cent., less than one ton, 15.5 per cent. No. 2 35 per cent., carded lots, 15.5 per cent., less than one ton, 11.5 per cent. No. 2 30 per cent., carded lots, 15.5 per cent., less than one ton, 11.5 per cent. Black blasting powder in carded lots, minimum cost, 72.84 per cent., less 15.5 per cent., less 11.5 per cent., less 10.5 per cent., less 10 per cent., 14. Black blasting powder in carded lots, minimum cost, 72.84 per cent., less 15.5 per cent., less 11.5 per cent., less 10.5 per cent., less 10 per cent., 14.

CHEMICALS.

Deliveries on contract are good. New contracts have been taken, particularly for alkalai. Much interest has been shown in domestic caustic soda, and as low as $1.30 f. o. b. works is reported as the contract price.

CAUSTIC SODA.

Quotations for Caustic soda domestic high test are $1.40 @ 1.45 per hundred lbs.

ALKALI.

Domestic, 58 per cent., 60c. @ 75c., foreign 55c. @ 60c. from dock as to style of package.

CARBONATED SODA AMI.

58 per cent., 90c. and 55c. per 100 lbs. hair 48 per cent.

BICARBONATE OF SODA.

English, $2.125 @ $2.25 per 100 lbs. per 100 lbs., American, bulk, $1.25 and $1.50 per 100 lbs. according to brand.

SAL SODA.

For domestic, 55c. per 100 lbs., less usual discounts; English, 65c. @ 66c. Concentrated sal-soda, $1.60 @ $1.65 per 100 lbs.

CHLORATE OF POTASH.

Chlorate of potash is quoted at $9.65 and $9.75 per 100 lbs.

BELTING Leather, * * * Cotton, Rawhide, etc.

L. P. DEGEN, Manuf' 

Agent for Rubber Belting, Hose and Packing. 105 and 107 Mission Street, San Francisco, Cal.

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Largest and most complete establishment in Southern California and Mill Test.

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W. M. HOSKINS,

105 South Clark St., Room 57 CHICAGO, ILL.
Chloride of Lime.

English prime brands $1.60/$1.70, American $1.70/$1.80, Continental F., $1.50/$1.60 per 100 lbs.

**Acids.**

Spot business is fairly steady, while for next year's delivery a few more contracts have been booked. Sulfuric acid has been reduced by the syndicate to 45c.; thus the jobbers who have bought heavily at 60c. are in a position to take advantage of this.

Quotations are per 100 lb New York and the following: Nitric acid, 80%, $3.00-$3.05 per lb; 70%, $2.50-$2.55; 60%, $2.10-$2.15; 50%, $1.60-$1.65, according to quality and brand. Nitric and Hydrobromic acids, 50%, $1.00 per lb for drums and $1.15 for barrels; 70%, $1.35 for drums and $1.45 for barrels; 50%, $1.60 for drums and $1.75 for barrels.

**Bromine.**

The market has eased off on the arrival of 2,000 tons and spot best unmixed follows 20c. per ton. The Goodwin No. 5 bromine is now quoted at 25c. per lb for 500 lb cases.

**Nitrate of Soda.**

Buyers and sellers of nitrate of soda are still far apart when compared to any large sales, although about 5,000 bales were sold recently at $1.50 per lb. Sellers are quoting up to $1.50 for spot, and for future extending through December, $1.60 to $1.70 per lb.

---

**THE NATIONAL IRON WORKS**

**Iron & Steel**

**WATER PIPE**

**WELL CASING**

Riveted J. Boilers, Tanks, and Sheet Steel or Iron work of every description.

Manufacturers of National Steel Ore Car

Repairing of all kinds Promptly Attended.

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**Dividend Paying and Investment Mining Stock**

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Estimates Furnished on All Classes of Mining Work

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**Monarch Rock Drills**

Any style of mining. Simple, compact, economical. Operated by air or steam.

Hoisting and Haulage Machinery to fill all requirements.

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Chas. P. Grimwood,
Mining Engineer and Metallurgist

Laboratory, 214 Pace Street,
SAN FRANCISCO, CAL.

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**FINANCIAL NOTES.**

**New York period from January 1.**

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**WANTS.**

Advertisements of this class containing not more than two lines will be inserted for 50 cents per insertion, whether prepaid or not.

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This was set in place in our small house in the Cripple Creek district and 10,000 feet above the level of the sea, and has been running continuously ever since, and at times over 150 0 cuse.

The speed of this compressor is controlled automatically and independently set Condenser, for which we are using the mine and the maximum of consumption is very noticeable.

The operation of this Compressor is near perfect as that of any machine we have ever seen and its type is well

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Yours very truly,
The Portland Golding Co., Jan. 4, 1899, President.
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**Reliable Assays**

Table:<br>
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<th>Sample Material</th>
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## Incorporating Mines Paying Dividends

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<th>Names of Mines</th>
<th>Location</th>
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