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The English courts have refused to extend the three-wire patent in that country. The General Electric Company controls the patent in the United States, where it has still two years or so to run.

In October a remarkable collection of giant fossil remains of prehistoric animals, found in the Rockies during the past few years, will be exhibited for the first time to the public at the American Museum of Natural History, in New York. Professor Henry Fairfield Osborn, curator of the museum, has written a popular account of these strange beasts, and the article will appear in the September *Century*. The illustrations accompanying the article are striking reproductions of the animals as they probably appeared in life in their natural surroundings.

An opportunity is offered to our iron and steel makers by the Government of New South Wales, Australia, which is desirous of building up these industries at home in place of importing all such material. Tenders will be received by the Secretary for Public Works in Sydney, and the Agent-General for New South Wales in London, up to December 30th of this year, from persons willing to contract for the supply of 150,000 tons of steel rails and the necessary quantity of fish-plates, bolts and spikes, manufactured in the colony of New South Wales, out of iron ore and other necessary minerals, with coal, coke or other fuel, all to be the product of that colony. Anyone tendering must state price per ton for manufacture and delivery, and each tender must be accompanied by a deposit of £5,000. The delivery of the rails is to be at the rate of 15,000 tons per annum, commencing eighteen months from the date of signing contract.

The developments of the chemical industry, excellent and beneficial as they are for the most part, have nevertheless the effect occasionally of interfering with established methods and products. At the recent meeting of the Lauter's Nitrate Company in London it was pointed out that the continued fall in the prices of nitrates was due in considerable degree to the competition in the market of sulphate of ammonia, the recovery of which as a by-product is rapidly increasing, while the low price at which it can be furnished is a strong inducement for its use in the manufacture of artificial fertilizers. The returns of the chief inspector of alkali works show that the production of ammonia sulphate in the United Kingdom rose from 152,762 tons in 1893 to 160,048 tons in 1894 and 179,651 tons in 1895, with prospects of a still greater increase during the current year. Apparently the manufacture, at the lower prices which prevail, yields a sufficient profit, since new concerns are going into the business; but the nitrate companies are suffering severely from the competition. Such inconveniences are inevitable to all industrial changes and improvements, but the public benefit in the end usually overbalances largely the individual losses.

Quicksilver Production in California.

Quicksilver production in California has shown this year a considerable increase, the total receipts at San Francisco for the six months ending with June having been 18,439 flasks, a gain of 4,743 flasks, or 34.6 per cent. over the first half of 1895, and of 6,033 flasks, or 48.7 per cent. over 1894. While these receipts gauge the rate of production very fairly, they do not give the whole amount, as the reports do not include the quicksilver sold directly from the mines, nor that shipped from them to the East by rail, which does not come to San Francisco at all.

The larger output seems to have been absorbed without difficulty. In addition to the greater demand from the California mines, there has been a growth in exports very nearly corresponding to that in the production. The trade with China, which had been suspended for several years, has been renewed, and has aided materially in disposing of the increased production. There has been, however, a reduction in prices, and the present quotation in New York is \$2 per flask below that of \$37.50, which ruled at the opening of the year, following—as it always does—a similar fall in the London market. There has been some talk of a possible further reduction, but in the present condition of demand and supply it does not seem probable, especially as this market is one in which lower prices will not induce increased sales except to a very limited extent.

The figures of the production of the Spanish and Austrian mines for the current year have not been made public, but it is understood that there has been but little change as compared with last year. There is said to have been some increase from the Mexican mines, especially the Huitzaco, but this has no influence on the general market, since the Mexican production is still considerably below the home requirements.

The increase in California production has not resulted from the opening of any new mines, but from the more active operation of the old mines, all of which have been steadily working since the opening of the year.

We have been accustomed to congratulate ourselves on the superiority of our methods of mining and metallurgy, and in some respects this has

been justified by our success. In quicksilver, however, we find that ores are worked of lower grade abroad than can be successfully worked here. The Idria mines, for instance, have been successful on ores averaging as low as 0.70 per cent. metal, and at the Spanish mines ores of quite as low tenor are treated. A very complete description of the furnaces and condensing plants in use both at the Austrian and the Spanish mines is given in this issue, reprinted from THE MINERAL INDUSTRY, Vol. IV., which is now ready for publication, and it will be found of much interest to our producers.

Relative Cost of Iron and Copper for Conducting Electricity.

The question is frequently asked, since the use of an iron conductor has been found advisable in the B & O. tunnel, and on surface or elevated roads using the "third rail" system, as to the relative economy of the use of copper conductors or iron.

The accompanying table, given by Mr. J. R. Allen in *The Technic*, shows the relative cost of copper in cents per pound as compared with wrought iron, Bessemer steel and cast iron in dollars per ton. The comparison is made for conductors having equivalent carrying capacity. In using Bessemer steel rails for conductors it is possible to use those that are winding and imperfect. Such rails may be purchased at a greatly reduced price. Let us consider the saving that can be made by the use of Bessemer rails, assuming the rails to cost \$25 per ton, as compared with copper at 11 cents per pound. Let the current to be transmitted be 1,000 amperes at 500 volts and the distance it is to be transmitted be three miles with five per cent. drop in voltage.

Cost of copper conductors.....	\$39,000
Cost of Bessemer steel conductors.....	23,711
Difference.....	\$15,289
Deducting \$400 per mile for bonding.....	1,200
Total saving.....	\$14,089
Saving per mile.....	1,363

The first use of steel rails as conductors was on the intramural road at the World's Fair.

Cost of copper, in cents per lb.	Cost of equivalent wrought iron conductor, in dollars per ton.	Cost of equivalent Bessemer steel conductor, in dollars per ton.	Cost of equivalent cast iron conductor, in dollars per ton.
7.	19.25	18.10	14.50
7.5	20.75	19.50	15.50
8.	21.50	20.30	16.75
8.5	23.75	22.25	17.75
9.	25.00	23.50	19.00
9.5	26.50	25.00	20.00
10.	28.00	26.25	21.00
10.5	29.25	27.50	22.00
11.	30.75	29.00	23.00
11.5	32.25	30.25	24.25
12.	33.50	31.75	25.25
12.5	35.00	33.00	26.25
13.	36.50	34.50	27.25
13.5	38.00	35.75	28.50

Ore-Crushing.

The works of the Metallic Extraction Company, at Florence, Colo., have made a great record in fine-crushing, notwithstanding the difficult character of the ore that is handled. For perhaps six months, and the works have been in operation only a little more than eighteen, the average crushing has been over 125 tons per day, the record at times rising as high as 160 tons. The ore is crushed to pass a 40-mesh steel wire screen. We are not acquainted with the details of the screens, but a proper idea of the fineness of crushing may be gained by assuming them to be made of No. 33 wire, Washburn & Moen gauge, in which case the aperture would be a square of 0.014 of an inch, or 0.3556 mm., sides. Needless to say, this large amount of ore can be crushed to so great a degree of fineness only by gradual comminution in a system of machinery of ample capacity. At the Florence works this consists of Gates crushers, Blake multiple-jaw crushers and Krom rolls arranged in the order named. The final crushing is done by the Krom rolls, which have rolled-steel tires and are driven at a speed of 100 revolutions per minute. A curious fact was observed in the shells of these rolls at one time when they had been for several weeks over-taxed. The shells of the rolls then flattened, producing a flange one-half inch deep at each edge, or, in other words, spreading the face from 14 inches width to 15 inches, the faces at the same time keeping themselves true. The ore upon which the Florence works, which were designed by and are still in charge of Mr. Philip Argall, are run, is wholly derived from Cripple Creek, and is an exceedingly hard igneous rock, chiefly andesitic breccia and phonolite. Its average specific gravity is probably not over 2.5, in view of which the crushing record is all the more extraordinary, since the volume of material passing through the machinery is twice as much as with an ore consisting of half galena and half quartz, and three times as much as with pure galena, assuming these materials to be equal in hardness.

In this connection it is worth while to mention the mistake that is often made by engineers in estimating the capacity of crushing machinery by having in mind only the comparative hardness of substances and ignoring their specific gravity, or, in other words, their volume. Probably there is no other part in construction undertaken by metallurgists

in which errors are so frequently made—more often by overestimating than by underestimating. On the other hand, however, it may be truthfully said that there is no other branch of their work in which there is so little data to go on. The engineering hand-books have none, and the information in text-books and treatises is too scattered and unsystematic to be of value, while the figures given by manufacturers of machinery are invariably incomplete with respect to qualifying conditions. What is needed is a series of experimental tests on a variety of materials to arrive at their comparative hardness and toughness, or, we may say better, their strength or resistance to compression, their specific gravity and their friability. Such data collated with results in practice on typical ores would be of as much value to the metallurgist as the data concerning the flow of water in pipes is to the hydraulic engineer.

Lubricants, Oil Cups and Dopes.

Requirements at the mines and at the mills, smelters and other metallurgical works are rather more exacting, as well as more versified, than for most kinds of machinery. In the first place, there is the necessity, almost absolute, that every part of a large plant should be as nearly automatic as possible, and in this direction improvements have been carried so far that from the moment the ore is received at the bins from the track or wagon road above until it goes out in tailings and amalgam or bullion, gravity takes the place of hand labor at every stage. Also, in place of "armstrong" work, the automatic devices supplant human judgment, and often more effectively, as is shown by the self-feeders which distribute the ore over the dies at the determined thickness rather better than the average hand feeder does, and by a whole range of devices like mercury feeders in amalgamating mills, adjustment of screens and dies to wear, and so on. One of the wonders of this age of mechanical progress is that it is now possible to run a 120-stamp mill having a 24-hours capacity of 360 tons of ore, with an 8-hour shift of only six men, and steam power used at that.

From this it will be seen that there is a large market for lubricants of the best quality, the ones which need the least renewal. As to kind, there is a demand for the heavy, thick oils and other lubricants used in such cog-bearings as geared Cornish pumps, rock breakers, mine cars and surface wagons. From this extreme the demand runs to the thin, high-grade oils suitable for fast running machinery, such as is required in many branches of electric power machines. Everything that is useful in heavy work, like railroad car axle bearings and from these up to the finest sewing machine sperm, have a market in one or another department of mining. Animal oils and fats, including neatsfoot and whale, sperm and other fish oils; and vegetable oils like cottonseed oil, rapeseed, castor and others, are sure of a market in the mining trade. Besides these there are a number of dry lubricants, such as graphite (plumbago), mica, soapstone, etc., for cylinder and heavy bearings, and various combinations of oils, fats, minerals, etc., tending to give a soft lubrication with a heavy body.

One of the most important uses of lubricants is in the way of heavy work for car-journal bearings. There are many branch roads on which the conditions are very similar—high gradients, much dust, great dryness, etc. These conditions are very much like those of the mines and metallurgical works. Any test of railroad work, therefore, ought to throw light on the selection and use of lubricants for mine work of the same class.

We have lately received from Berlin a letter giving some particulars as to a lubricant which is being experimented with on the German state railways. From this it appears that on a 90,000 kilometre test only 1½ grains of lubricant were used per 100 miles of each car box run. It would be of great assistance to the trunk and branch railroads if we could have similar tests and records, with the composition, cost per unit of weight, and "wear" of lubricant on any of our great roads. The new German lubricant is said to cost only 1.45 marks per kilogramme, say 15 cents a pound. But the initial price is not so important as the net cost for doing a certain work.

Automatic oil feeders, regulators, oil pumps that feed back to the bearings, and all labor-saving devices are in demand at the mine and metallurgical works. The power lost in friction is very great, not only in money cost, but measured by tons of fuel and the time wasted in supplying the lubricant is also important. This latter point means that there is an advantage in using automatic and self-sight oil cups, drips and recovery oil pumps.

When a foundry or machine shop sends iron, steel or brass machinery to some hot, moist country like Venezuela, Ecuador, Honduras, etc., it is good policy to protect the metal with some dope of tallow, tar, beeswax or a combination that will keep it from rusting. So, also when a big mine in our northern climate and altitude is shut down, it is best to protect the hoisting and pumping plant and all the small machinery by giving them a liberal dope to protect them from rust.

We would be glad to hear from any of our readers who have had experience in lubricants for machinery.

NEW PUBLICATIONS.

THE MANUFACTURE AND PROPERTIES OF STRUCTURAL STEEL. By Harry Huse Campbell, S. B. New York and London, 1896. The Scientific Publishing Company. 8vo., 397 pp. Price \$4.

There is probably no one in this country better fitted than Mr. Campbell to write on the subject of this book, if indeed, there is in the whole world. For the past 17 years he has been engaged in the manufacture of steel, largely for structural purposes, accepting a position with the Pennsylvania Steel Company in 1879, shortly after his graduation that year from the Massachusetts Institute of Technology at Boston. He is still superintendent of that company. Possibly he has lost something in the way of experience in not having followed his profession in various localities where different conditions of manufacture prevail and consequently varied experience is to be gained. On the other hand, however, his knowledge of many types of steel-making apparatus and processes at his works may fully atone, in educational value, for lack of change of locality.

Although the subject of the book is structural steel, the author no doubt felt constrained to give brief accounts of the other branches of iron metallurgy, for it is a fact that in order to understand one branch thoroughly, a fair knowledge of the theory and practice of the other branches is essential. Of course some of the material of the book, especially in relation to these allied branches, has been given before, but it is well that occasionally the facts and theories of an art be sifted through the brain of one who knows, if only for the purpose of eliminating errors and thus killing those misstatements which get into print from time to time, and which compilers would make immortal.

One is hardly prepared to point out parts of especial interest in this work, as such a course might be construed to mean that the rest is of inferior value. It should rather be said that the whole book teems with useful information, no part of which should be omitted by the student of the metallurgy of steel, be he young or old. It is no unworthy companion to Howe's "Metallurgy of Steel," Peters's "Modern Copper Smelting," Hofman's "Metallurgy of Lead," and the many other standard works brought out by the Scientific Publishing Company, whose imprint is in itself a guarantee of judicious selection of subject-matter and of critical editing.

The author criticizes Webster's attempt to write the formula which shall represent the strength of steel of a given composition. It might be said by some steel men that his own results hardly yield a practicable working formula either, and for some time to come probably each steel works must get any desired set of physical properties by the old way, viz.: If more or less tensile strength is wanted, run the carbon up or down. If more elongation or reduction of area is required, decrease the phosphorus. These variations, together with proper furnace practice and instruction to the rolling mill as to finishing temperature, must be chiefly relied on, it is feared, until the chemists tell us more of the composition and structure of steel.

The various strengths of pure iron which Mr. Campbell found by the different ways in which he studied his observations, and especially the differences shown by steels made by the basic and acid processes, lead one to ask if the correct figures have yet been found. The final conclusion that pure iron would have a tensile strength of 38,000 to 39,000 lbs. seems hard to accept, in view of the tensile strength of best Swedish iron, which probably approximates pure iron in composition more closely than even the purest of the steels cited by Mr. Campbell. Why would it not do to assume the strength of pure iron, basing the assumption on the strength of good Swedish bar, and then deal with the increase of strength due to the metalloids? Or perhaps, better yet, why not take, say 60,000-lb. steel for zero, assume the various compositions which will give such a strength (which can be closely done), and then treat the increases of strength and metalloids above that point and the decreases of the same below it? Such a plan would avoid the hidden sources of error which hover around pure iron—a part of the field which has no practical value anyway, but whose errors tend to vitiate the whole result when given full sway.

Campbell's and Webster's conclusions, while arrived at by such diverse methods as not to be comparable, still may serve to illustrate how the different processes yield different results. Webster's steels were all made by the basic Bessemer process, in which are presented the strongest oxidizing conditions of any of the structural steel processes. Campbell's steels were all made on the open hearth, part of them by the basic process, in which, when properly conducted, is met the blessed and all-important fact that metallic manganese is continually entering the metal from the slag, which, with the ample time afforded, removes oxygen and silicon from the metal to a degree not met with elsewhere.

The author's struggles with the relation between chemical and physical results are very interesting and instructive, and he has done perhaps all that the present state of the art permits. The problem, however, is too complex and the variables too many to admit of exact mathematical treatment. Further, many of the variables cannot be determined from the steel after it is cast, being connected with the furnace practice.

The soundness of averaging results in the formation of groups, as the author has done, is open to question. An average analysis or physical result represents no actual piece of steel, and pertaining to the group there may have been variables working in opposite directions. For instance, what is usually reported by the chemist as Si may exist in the steel as Si or SiO or SiO₂.3FeO. Si probably strengthens steel, while SiO₂ and its combinations are rank poisons and may fairly be held to represent the devil, to whom Mr. Campbell says the poor quality of steel is not infrequently ascribed. Thus the average effect of Si may appear to be insignificant, or practically zero, while it is actually strengthening some steels and weakening others, both in important degrees.

Possibly results of more value to the steel makers, at least, would be gotten from fewer samples, with a full history of each, recorded by the most competent person at hand; but, as already stated, the results would not be capable of reduction to a mathematical formula because of the great number of things to be taken into account. Further, in practice, a formula, if used, must be applied to individual pieces of steel. If this had been done in the case of the steels examined and considered in this book, possibly some glaring discrepancies would be brought to light which are now concealed beneath averages.

It will be universally admitted that there is a vast amount of information condensed between the covers of this book, valuable alike to the manufacturer and the engineer, and steel structures hereafter built will be better, safer and possibly cheaper because Mr. Campbell has written it.

BOOKS RECEIVED.

In sending books for notice, will publishers, for their own sake and for that of book buyers, give the retail price? These notices do not supersede review on another page of the Journal.

Alabama Geological Survey—Iron Making in Alabama, by William Battle Phillips, Montgomery, Ala., 1896. Alabama Geological Survey. Pamphlet, pages 164.

CORRESPONDENCE.

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested. Letters should be addressed to the MANAGING EDITOR. We do not hold ourselves responsible for the opinions expressed by correspondents.

Ammon-Stivers Mining Company, Montana.

Sir: I see in your issue of July 25th, from an interview with R. A. Ammon, of the Ammon-Stivers Mining Company, of Gilt Edge Mont., that he states that he bought the mines of the old Gilt Edge Mining Company for \$48,000, and afterward built a cyanide plant at a cost of \$80,000.

There is not a word of truth in that statement, and I believe it but just to let his dupes in New York know how things stand in this camp. The Gilt Edge mine was located some eight years ago by W. E. Wilson and was bonded in February, 1893, to Sherrard & Chandler, of Great Falls. They interested Collins & Armington with them, and formed a stock company, and in April started to build, and by fall they had the present mill built and running, and on January 9th, 1894, the Lewistown creditors attached, which shut the plant down, leaving most of the employees unpaid, and their only resource was to file liens, which some did; those who did not lost all. Nothing further was done till September, 1894, when the sheriff sold the entire interest of the Gilt Edge Mining Company, subject to all valid liens. The same was bought by Colonel Ammon for about \$14,000, which was something more than it was attached for. Ammon brought Professor Potter here with him, and with a flourish of trumpets they started the mill about September 15th, 1894, and things ran along until the early part of December, when they quit, having made an utter failure, and having extracted less than \$500.

Mr. Ammon now made an appeal to the men to help him out, which was favorably received, and the works started up with Clark & Losinger in charge of the cyanide mill, who made a success of it and things ran along smoothly till September, 1895, when trouble occurred in the company. Meanwhile the lien claimants against the old Gilt Edge Mining Company had obtained judgment in the courts and an order of sale was issued, the sheriff of Fergus County selling the same on December 20th, 1895.

The mill is located on coal ground, more than a mile below the mine, which belongs to the lien holders, they having offered proof on the same at the United States Land Office.

The lien holders on the day of sale bought the property in for the amount of their claims, and took immediate possession of the office and mill on receipt of a bill of sale from the sheriff. They then bonded some claims in the vicinity and went to work to get the money out of the property, and have so far been successful.

R. A. Ammon was in Lewistown, some 15 miles distant from here, and it was supposed that he had come to redeem the mines, but he did not do so, and the time for redemption expired on the 29th day of June, 1896. He never came to Gilt Edge, and he probably never will, as many a working man would like to settle with him. Some have obtained judgment against the Ammon-Stivers Mining Company, but as it has no property in this State there is no show for them to get it. Colonel Ammon had Mr. F. G. Phelps appointed receiver of the Ammon-Stivers Mining Company before he left Great Falls.

Mr. Phelps came out here about July 10th, after having looked over the records in Lewistown. He was in Gilt Edge not more than two hours, and as he found nothing to receive he returned to Great Falls, and has not been heard of since.

BURR CLARK.

GILT EDGE, Fergus County, Mont., August 1st, 1896.

Santa Fe Copper Company.

Sir: Noticing an inquiry in the issue of the *Journal*, August 8th, in regard to the affairs of the Santa Fe Copper Company, I am pleased to be able to give you some information on the subject.

It is deeply to be deplored that no reorganization of the said company took place during the Boston boom in copper stocks last fall. Probably the parties in interest considered they had more lucrative transactions to look after, and that there was no need for hurry in attending to the affairs of the Santa Fe stock and bondholders.

After the company lost the Canyon del Agua grant embracing its copper properties, by decision of the Supreme Court at Washington, they reverted to the United States, subject to location by the public.

All of these properties were located and are owned at present by Leonard Lewisohn as trustee for the individual stock and bond holders. His firm advanced the necessary expenditures for assessment work, for development, etc., also for the legal talent retained.

In addition to these expenditures, the company is indebted to the firm of Lewisohn Brothers to the amount of about \$75,000, for which they hold as security the San Pedro grant, comprising about 35,000 acres of mineral and grazing land.

A few judgments and claims stand against the company, amounting to about \$35,000. They could have been bought some time ago at a liberal discount, but there was nobody to advance the money. One of the creditors has applied for a receiver, but it is doubtful whether the court will grant the application. Several of the most prominent mining experts of this country have recently examined the copper properties and made very

favorable reports. The minimum estimate of copper ore in sight ready to be taken out is 200,000 tons.

The estimated annual net profit with a 200-ton plant is given as \$144,000 minimum. A new plant with all modern improvements has to be erected at a cost of about \$125,000. Added to the debts of the company and the necessary working capital, etc., the amount of \$250,000, equal to a voluntary assessment of 50c. per share, would be required to reorganize this company.

The bondholders should be satisfied to get stock in the new company for the actual amount they paid for their bonds.

The report of one of the best mining experts closes as follows:

"The exploration of the great San Pedro grant and the probabilities of opening profitable mines there would alone justify the investment of a large amount of capital, and the results there may overshadow easily in importance the groups of copper mines which even now have so considerable a value. It is rare, indeed, that a mining property—counting this now as a new enterprise—can show a net value, substantially proved, that will fully cover all the expenditures necessary for putting it in a position to do a large business, and for thoroughly exploring so vast and promising an estate as is the San Pedro grant."

However, the present time is not suitable for any reorganization.

Two suits are pending, involving a small part of the company's properties, but they can safely be designated "as blackmail," and the courts will undoubtedly not sustain the plaintiffs. While annoying slightly, they could and would nevertheless not interfere with the company's operations.

R. C.

New York, August 12th, 1896.

The Work of a Horse.

Sir: The introduction of electric power supplanting horses, and more particularly mules, in mining work, has directed attention to the inaccuracy of the so-called mechanical horse power as a measure of the power of a horse. In street railway practice, for instance, in the early days, 4 and 6 H. P. of motors for an ordinary car was considered an ample allowance, but it was soon found to be too small, and now 50 and even 100 H. P. in motors is now applied to a single car; but here, of course, the increase in the size of cars in use and the enormous increase in speed require a large proportion of the extra power.

In mining work, again, it is found that a motor, or more properly locomotive, of perhaps 40 H. P., will pull no more than perhaps three or four times the number of cars per trip that a string team of three sturdy mules would haul, particularly if a short up-grade is the determining factor in the length of trip which can be handled. The explanation lies

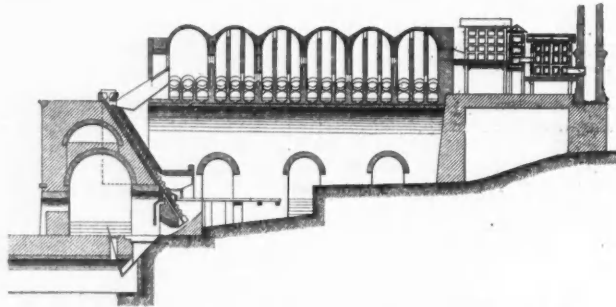


FIG. 1.—THE MODIFIED LIVERMORE FURNACE.

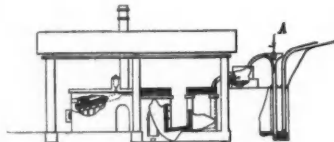


FIG. 2.—THE RODRIGUEZ FURNACE.

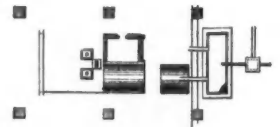


FIG. 3.

partly in the faulty definition or standard of value of a so-called horse power and partly from the fact that a horse or mule has an enormous reserve power which he can exert for a short period of time.

In this connection the following communication sent to the *London Electrical Review*, by Mr. A. L. Stevenson, is of interest:

"I notice in your article upon motor carriages you ask from any one who has tried it, 'any dynamometer tests which will show at given speeds the tractive pull of a horse on an ordinary carriage?'"

I cannot give them on a carriage, but I can tell you what I got 13 years ago when testing the work of some of the finest draft horses, 16½ to 17 hands, in the Cleveland mines, and showing probably the best work to be got from any horse.

A discussion had arisen at the Northern Mining Institute, and a gentleman, speaking in favor of feeding with maize, had compared the work of horses carting night soil in Newcastle with the work of these mine horses fed upon oats and beans, to the advantage of the former.

I therefore fitted up a dynamometer and tried it. This machine consisted of one of the spring weigh machines of Messrs. Pooley, to the pointer of which was attached a pencil which registered the pull in pounds, upon a sheet of paper fastened round a drum; this latter was slowly lowered by an air cataract during the time that the horse traveled a given distance.

I got many diagrams under varying conditions, but found it impossible to make any comparison with the cart horses whose work in Newcastle was mostly down hill to the railway siding, and the journeys of considerable length, while the mine horses seldom traveled more than 200 yds., but pulled heavy loads in wagons at their full strength. For instance, in a special test experiment: One diagram showed that the horse with a draft of 648 53 lbs. at 4.62 ft. per second = 2,996 foot lbs. per second had traveled 138.6 ft., doing the work of 5.44 conventional horse power. The accuracy of the dynamometer was tested by weights, and the diagrams measured by planimeter.

Tramway horses are not so powerful as these horses, but I have no doubt that for their size each time a tram starts they exert a relatively large amount of strength—probably not less than 3½ H. P. At the period of which I am speaking, I looked up all the information available on the subject, and carefully read *Experiences sur le Tirage des Voitures*, by Arthur Morin,

The only record I have found of work done by a horse comparable with that given above, is in Morin's *Mechanics* in some mail-boat experiments, when the horses were called upon during one or two minutes to make an effort of 205.66 lbs. at a speed of 13.84 ft. per second, equal to 2,846 foot lbs. per second, whence, says Morin, results in straining of the hams and other accidents."

ELECTRICIAN.

Boston, August 10.

Mineral Resources of British Columbia.

Sir: Although much is being said and written concerning the mines of British Columbia, and especially the Trail Creek District, near the town of Rossland, the extent and character of the ore bodies in that region are little known. Excepting the placer mines of the Cariboo country, this extensive and much-talked-of region was absolutely unknown until about the year 1890, and nothing was done on any of the mines until two or three years ago.

The region extending along both sides of the International Boundary Line, but especially north therefrom, contains one vast system of veins, reaching from some distance east of the Columbia River westerly to the Pacific Coast and on to Vancouver Island, a distance of about 400 miles. The character of the ores through this entire region, aside from the galena ores of the Slocan country, is the same, being a sulphide of iron and copper, massive in structure. The veins are universally found in unstratified igneous rocks, and are characterized through this entire region by their great strength and extensive mineralization. A large proportion of the filling of these veins carries excessive iron, and it is rare that ores running very high in silica are found. Little oxidation has taken place; there is therefore a limited amount of free milling ore. The sulphide ore being covered by only a few feet of oxidized material, or in many cases cropping out of the ground with only a thin shell of oxide to prevent decomposition.

The Rossland district, which is at present attracting the greatest attention, consists of territory extending about five miles easterly and westerly by four miles northerly and southerly, with many outlying and dependent camps. In this territory is a vast network of veins. Owing to many modifications in the laws of British Columbia during the last six years, there have been several methods of location. By the laws of 1890, mining claims consisted of territory 1,500×600 ft., with extra lateral rights; the present law allows locations 1,500 ft. square to be made, and the miner is confined to vertical lines. Inasmuch as many of the claims have been located during the last two years most of the locations consist of 50 acres of land. This absurd extent of territory has a tendency to retard pros-

pecting; there have, however, been about 4,000 locations made in the territory surrounding the Rossland recorder's office. The great activity, stimulated by developments in some of the principal mines, has caused in this district, as elsewhere, the organization of many mining companies; and there, as elsewhere, wild-cat schemes have been placed upon the market.

The most striking characteristic of this district, however, is that it amounts to a reasonable certainty that any tract of land of 20 to 50 acres, within a certain prescribed territory, contains one or more veins and that its possibilities may be as great as those of any mine in the district. If their title to property is assured, and if the money of the company is economically and intelligently spent, there is at least a chance for the investor in all cases.

Three years ago the only means of ingress was by way of the Dewdney Trail, an old trail built many years ago at government expense by the present governor of the province. In 1894 a wagon road was built from the Columbia River, seven miles distant, to the mines. At the present time a narrow-gauge railroad is in operation from the town of Trail, on the Columbia River, at which point extensive smelting works are in operation, to the various mines; and the Columbia & Red Mountain Railway will be completed from Northport, on the Columbia River, to Rossland, on October 1st. This is a standard gauge and is part of the Spokane & Northern Railway system. Twelve months ago one air-compressor plant was in operation in the Le Roi mine; now there are, either running or to be erected within the next 60 days, 15 separate plants, and the indications are that 12 months from now there will be twice this number.

The district is essentially one of extensive expenditure. Although many prospectors have become rich by selling their properties, it is impossible for anyone to be successful without resources. The nature of the rock and the ores is such that much expenditure must be made before the point of profit is reached.

West of the Rossland District are the Kettle River, Boundary Creek, Rock Creek, Similkameen, and on Vancouver Island the Alberni and Barclay Sound districts. The veins and ore in these districts are similar to those of Rossland, and upon the construction of local smelting works and railways this entire territory bids fair to be one vast field of mining activity.

FRANK C. LORING.

POKANE, Wash., July 30, 1896.

TREATMENT OF QUIKSILVER ORES IN THE ASTURIAS, SPAIN.*

A recent paper by M. A. Dory gives a very full account of the quicksilver mines of the Asturias, in Spain, from which the following particulars are taken: The quicksilver mines of the Asturias produced in 1893 about 2,000 flasks of quicksilver of 3 arrobas (34.5 kgms.) each, representing a total value of 720,000 reals. In 1895 this production was 2,331 flasks. The principal mines are those of El Porvenir and of the Mieres Company. The ore in both mines is cinnabar, which is usually found in masses of considerable size, varying somewhat in color, but frequently of a distinct red. Occasionally the cinnabar is accompanied by a small quantity of realgar and orpiment, but not in sufficient quantity to permit those minerals to be considered as a reliable source of arsenic. At Funon a variety of black cinnabar very rich in quicksilver has been found which is known as metacinnabarite and closely resembles a black cinnabar found in Lake County, Cal. The deposits of the Asturias are generally found in the sedimentary rocks in contact with the schists and upper calcareous strata. At the Pena mines of the Mieres Company the ore is found in a conglomerate of schist, quartzite and limestone.

None of the wet or other processes for the treatment of cinnabar has been adopted in this district, the process of roasting and condensation of vapors having been used. The tendency for several years past has been to replace the furnaces formerly employed by new and improved types. The transformation has proceeded rather slowly and is not yet completed. Three systems were formerly in use, the oldest being the aludel furnace, which is also locally called the Bustamente furnace, because it was first introduced in Spain by Don Juan Bustamente from Peru in 1646. The construction of this furnace is so well known that it need hardly be described here, and while it was a great improvement at the time of its introduction, its defects have long been recognized. The principal objections to it are the loss of quicksilver and the tendency of the furnace to crack and permit the escape of mercurial vapors, with consequent injury to the health of the workmen. It is, moreover, not economical in the consumption of fuel. The other types formerly in use were the old Idria furnace and the Livermore furnace, which is also called locally the American furnace. The new types which have been in use are the improved Livermore furnace, designed by Eusebio Oyarzabal, director of the Almaden Company, the Rodriguez furnace and the Gascue-Rodriguez furnace, which is also called sometimes the continuous furnace. These three types have each their advantage and are being introduced in different works.

The New Livermore Furnace.—This furnace is shown in section in Fig.

minerals pass are frequently obstructed owing to the lumps sticking together and choking up the passage. The peculiar form of the distilling apparatus makes it impossible to protect it by iron plates, which can always be done easily with a cylindrical furnace. The absence of this protection results in frequent cracks in the refractory brick subjected to the action of the fire, permitting the escape of vapor and consequent loss of metal.

The Rodriguez Furnace.—This furnace, which is of the muffle type, is shown in Figs. 2 and 3, which are respectively an elevation and a plan. The retort which receives the charge of mineral and in which the vaporization is carried on is furnished with three openings. The opening in front of the furnace can be partly or wholly closed by means of a sliding door, which serves to regulate the admission of air while the sulphur is being driven off. Above the retort and at the back end is found a cast-iron hopper furnished with two slides, one above the other; these permit a charge of mineral to be introduced without allowing the escape of gases or injurious vapors. The back end of the retort is a cylindrical chamber of cast iron which serves as a connection with the condensation chamber to which the vapors are conducted by a wrought-iron pipe. An inclined pipe of iron is also connected to the furnace near its front end to facilitate the extraction of the calcined mineral from the retort. The furnace is heated from below by a firebox in which coke is burned. It is not placed horizontally, but is inclined in such a way that the charge of fuel distributes itself naturally over the whole width of the apparatus. The quicksilver vapors are condensed by passing them first through two chambers of masonry, then through two other chambers of somewhat smaller capacity, and finally into a wooden reservoir the bottom of which is cooled by a current of water. From this last condenser the gases and vapors are conducted by a tube into a sort of well divided into two compartments, where they are washed and cooled by a jet of water and then passed into the chimney. The scarcity of water during the summer season requires the use of a blower instead of the water current. In several cases the want of sufficient space in the narrow valleys where the works are situated has made it necessary to place the reduction works on the hillside. This has suggested the use of inclined passageways in carrying the gases to chimneys, which can be made high enough to provide sufficient natural draft. Each furnace is composed of two or three retorts, but those built in future will probably have a larger number of retorts in order to reduce somewhat the consumption of coke and the labor employed. A furnace containing two retorts consumes in 24 hours about 330 kgms. of coke.

The ore is treated by charges, a charge of 50 kgms. being made at inter-

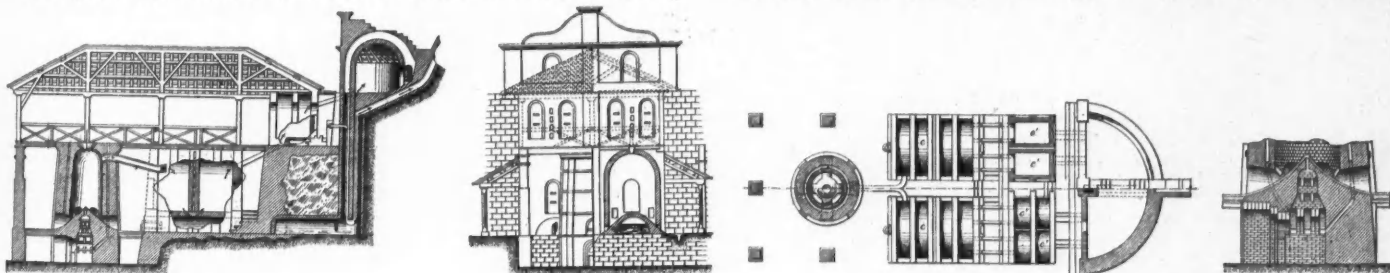


FIG. 4.

FIG. 5.

FIG. 6.

FIG. 7.

1. No full description has heretofore been published. In some respects it is analogous to the Hasenclever-Helbig furnace used for roasting blends. In this furnace the mineral to be roasted is dumped upon an inclined plane 2.50 m. in width, divided by walls into 12 compartments or channels; the plane is inclined at an angle of 56° and is built of refractory brick. The mineral passes down the plane in a thin layer, offering a large surface to the action of the fire. In the various furnaces there are two different sizes of passages or channels, in one of which are treated the more finely broken ores, and in the other the larger lumps. It is necessary to pass the broken ore over a sieve in order to free it from fine grains and dust, which have a tendency to pack and obstruct the channels. This dust from the screens is afterward molded into bricks, or bolas, as they are locally called, which are treated in one of the old aludel furnaces. At the foot of the first series of channels there is a second series placed perpendicular to the first, the distance separating the two inclined planes being exactly equal to the depth of the charge of mineral in the distilling apparatus proper. The workman who operates the furnace stands near the intersection of the two planes; he draws out with a tool made for the purpose a quantity of the calcined mineral, which is replaced at once by an equal quantity of fresh mineral from a hopper at the top. The calcined mineral is pushed into the second series of channels. The firebox is below the second inclined plane and facing the first series; it has two grades placed at different levels. The air supplied to the furnace is heated before entering by its passage through the mass of masonry below the firebox. The treatment of a charge weighing 434 kgms. takes about four hours.

The condensation of the vapors takes place in a series of masonry chambers, each divided by walls into three compartments, openings left in these walls forcing the vapor to pursue a zigzag course through the chamber. The bottom of the chamber is corrugated in form, the corrugations being so arranged as to carry the condensed quicksilver into a single discharging channel. At the end of these condensing chambers there is another series of chambers constructed entirely of wood and glass; each of these is divided into four compartments, and they are generally placed at a level somewhat above the floor so that they can be easily examined. After passing through these chambers the gases are conveyed into the chimney.

The temperature obtained in these furnaces is not very high, and this is a favorable point. On the other hand, owing to the arrangement of the channels through which the ore passes, a great deal of heat is wasted and the consumption of fuel is high. The channels through which the

vals of about an hour and a half. When the ore carries over 15% lime is added. In this way a double furnace will treat 1,000 kgms. in 24 hours. Experience shows that the loss of quicksilver does not exceed 1%. Work in the furnace is very simple: the furnaceman having drawn out the calcined ore introduces a new charge through the hopper, and then has simply to watch and see that the distribution of the mineral is uniform and regular. The oxidation by the air is so complete that the cinnabar is not only separated into metallic mercury and gaseous sulphureted products, but the quicksilver itself is oxidized and takes the form of a black powder. It is not a stable compound, however, and in its turn quickly decomposes, setting the metal at liberty. The larger part of the quicksilver is condensed in the first chamber, but a considerable part is collected on the inclined bottom of the second and third condensing chambers. From these condensers the quicksilver is drawn out through a spout into a stone basin. A part of the metal, in a very finely divided state, is carried over and settles in minute drops upon the walls of the condenser. One advantage which the Rodriguez furnace presents is that it permits the use of powdered as well as lump ore, and thus avoids the labor and cost of making the powder into briquettes.

The Gascue-Rodriguez Furnace.—This furnace is shown in Figs. 4, 5, 6 and 7, Fig. 4 being a longitudinal section, Fig. 5 a cross-section, Fig. 6 a plan, and Fig. 7 an enlarged view of the bottom of the furnace. This furnace, which is used for treating the mineral in a lump form, is in section a conical tower 2 m. in diameter just above the grate and 1.85 m. in diameter at the top where the gases are drawn off. The top of the furnace is conical in form with an opening, or hopper, through which the charge of ore can be introduced. This opening is provided with a bell which closes it when the furnace is charged. The total height is 6.55 m., divided as follows: 2.85 m. from the ash pit to the masonry upon which the charge rests; 2.85 m. from the grate level to the opening through which the gases are drawn off; and 0.85 m. for the dome at the top. Openings are made in the wall of the furnace at different heights in order to permit the operation to be watched. The firebox has a section smaller than that of the reducing furnace proper. The grate is placed 0.85 m. from the bottom of the ash pit, and the interior diameter is 1.10 m. Above the grate the walls are vertical for 0.80 m., and above that point again they are conical in form, the diameter being reduced to 0.60 m. in height of 0.50 m. Above this cone is a cylinder 0.60 m. in height, closed at the top by a dome pierced with small openings which permit the products of combustion to pass through and into the charge of ore. Above this dome, as shown in Fig. 7, is a cone-shaped floor forming the bottom of the reducing furnace itself. The whole arrangement is made in such a form as to permit the gases from the furnace to pass freely, while at the same time the openings are so arranged as to prevent

* From "The Mineral Industry," Vol. 1V.

them from being clogged up by pieces of the ore. A cast-iron shoot permits the calcined mineral to be drawn off upon a stage, from which it is loaded in a wagon to be carried away.

The inner wall of the furnace is of refractory bricks and is 0.30 m. thick. Between this lining and the exterior wall, which is of ordinary masonry, four open spaces, 0.80 m. long and 0.10 m. wide, extend the whole height of the furnace. In these chambers any vapors of quicksilver or arsenic which may possibly filter through the lining of the furnace are condensed.

The products of the distillation are carried away from the furnace by an iron pipe which divides and leads these products into two series of chambers which serve as condensers. This arrangement allows operations to be carried on continuously, as one group of condensers can be shut off at any time to permit cleaning without interfering with the other group. The condensation of the quicksilver and arsenic acid is carried on in two ranges of chambers with inclined floors. On these floors the quicksilver collects and is drawn off by openings in the walls. Gases and vapors pass out of the upper part of the first chamber and into a second one by an opening near the bottom. Other openings made in the side walls permit the extraction of dust and arsenical products which collect upon the floors, under which a current of water is kept constantly in circulation to cool them. Entrance into the chambers in order to clean them can be had by doors which are carefully closed while work is going on.

These first condensing chambers, which have a total capacity of 40 cu. m., are connected with four others which are of similar construction, but of smaller size and placed on a higher level. From these four small chambers four iron pipes conduct the gases and vapors into a large flue, from which they pass to a chimney, which is situated about 100 m. from the furnace. Except the last condenser, the whole apparatus is under roof.

This furnace treats 8,500 kgms. of ore in 24 hours. The ore is charged in lumps of various size, the largest usually being about 600 cu. cm. Fresh charges are introduced at intervals of 75 minutes, the usual quantity for each charge being 443 kgms. of ore and 2.22 kgms. of coke mixed. The quantity of coke used with the charges is usually 42.5 kgms. in 24 hours. It is only in special cases and when the furnace is started that it is necessary to keep up the fire on the grate of the firebox. In the last case a few hours are sufficient to heat the furnace thoroughly and to start the coke mixed with the ore; after that the combustion of the coke in the charges and of the sulphur contained in the ore is quite sufficient to keep the furnace at the necessary temperature. Before a new charge is introduced a corresponding quantity of calcined ore is drawn out from the bottom of the furnace. This waste does not carry over 0.01% of quicksilver. About 2 l. of water per second, or 173 cu. m. per day, are used to keep the condensers cool. When necessary, the circulation of water is replaced by air forced through the passages by a ventilator. A test-plate placed near the escape chimney in the current of gases, shows that the quantity of quicksilver carried over by this current is hardly appreciable.

The principal advantages of this system may be summed up as follows: The forced draft permits the development in the furnace of a temperature high enough to reduce the ore completely and liberate all the quicksilver. The excellent disposition of the condensers and the cooling of the gases and vapors carried over by the current of air reduces the temperature and prevents the excessive heat, which is the chief cause of the loss of metal through the chimney. In the flue leading to the chimney the current of gases is obliged to follow a sinuous line, and the last particles of the quicksilver are collected. The ore is treated with a smaller consumption of fuel than had previously been attained in this district. The mixture of coke with the ore prevents in a great degree the formation of flue dust, which is a serious cause of loss of mercury, and the formation of different mercurial products by the complex reactions between the essential oil and the carbonized product. Moreover, the continuous operation of the furnace is a great advantage, preventing almost entirely the cracks in the walls caused by alternate heating and cooling, which were a source of heavy loss of metal in the old furnaces, besides reducing their life. There is also much less danger to the workmen from the escape of mercurial vapors. But little labor is required and the losses are light.

Comparison of the Results with Different Furnaces.—Careful trials made over a considerable period of time with the Gascue-Rodriguez furnace showed that the average quantity of quicksilver obtained was 96.88% of that contained in the ore, the loss being equal to 3.12%. In the Rodriguez furnace the loss was not over 1%. In the old aludel furnaces the loss varied, and it is said to have been at times as high as 50%. There was some exaggeration about this, but it certainly approached 5%, and must have been frequently higher when the furnace was not in good condition. At most of the mines in the Asturias the average tenor of the ore is not over 0.7% of quicksilver; that is, it is necessary to treat nearly 5 tons of ore to obtain a flask of quicksilver. This shows the necessity of careful treatment of the ore in these mines. The results obtained with the Gascue-Rodriguez furnace have been so good that the question of erecting several of these furnaces at Almaden is now under consideration.

Arsenical Products.—These products, which are condensed with all quicksilver in the condensers, have an average composition about as follows: Quicksilver, 14%; sulphate of quicksilver, 0.87%; arsenious acid, 82.78%; arsenious sulphides, 0.45% volatile oils, 2%; water, 1.50%; carbon, 1.50%; silica, alumina lime, etc., 16.90%. This composition is that of the flue dust, or h liness, as it is called. In treating it, it is first mixed with lime after being spread out on a floor, then washed in a tank through which a current of water flows. The resultant product is mixed with 0.3% of coke and 0.3% of clay, which serve as binding material and permit it to be formed into briquettes. These are placed in the upper part of the old Bustamente furnaces and a new product is obtained in the condensers which has the following composition: Arsenious acid, 90.73%; sulphuric acid, 0.27%; quicksilver, 8.61%; lime, 0.17%; carbon, 0.22%. This new product is again formed into briquettes with a somewhat higher percentage of coke and again treated in the furnace, the resulting product containing only a trace of quicksilver, but a very high proportion of arsenic. This product, which was formerly thrown away, is now sent to the color works at Munon, where it is made into pigment.

Assays of the Quicksilver Ores.—For this purpose two methods were

formerly used at the mines of the Asturias, the Eschka and the electrolytic. The first has been abandoned because the low grade of the ore made it difficult to get exact results, although it is fairly successful with ore of a higher grade. It was a process of amalgamation and required very great care and precision in this case. The electrolytic method gave satisfactory results, but was very slow, each assay requiring at least 18 hours. At present the sample to be assayed is introduced into an iron cylinder, serving as a retort; in the compartment there is placed a small quantity of slaked lime, which, when the retort is heated, sets free water and facilitates the passage of the drops of quicksilver from the ore. The ore is mixed with lime, soda and charcoal, the object being to reduce here the cinnabar which it contains. The current of gas passes from this chamber through a tube, into a condenser, of glass made in two pieces. From the lower end of this condenser a tube passes into a basin which is kept full of water. The quicksilver collects in the bottom of the condenser. The grate is placed under the retort, and the heat rising from the fire is directed to the point where it is most needed by the screen.

Reducing Works in the Asturias.—The number of furnaces at the different quicksilver reducing works in the Asturias in 1895 was as follows: El Porvenir Company at Mieres, 4 Idria furnaces, 1 Livermore furnace, 3 Rodriguez furnaces and 1 Gascue-Rodriguez furnace; La Union Asturiana at Mieres, 4 Idria furnaces, 2 Bustamente and 2 Rodriguez furnaces; Concordia Company at Branalamosa, 1 Bustamente furnace; Soterrana Company at Munon Cisnuro, 2 aludel furnaces and 2 Rodriguez furnaces; Exploradora Company at Vallina de Longren, 1 Rodriguez furnace with two retorts; Felugao Company at Vallina de Aler, 1 Rodriguez furnaces with five retorts; Minera Company, 1 Rodriguez furnace with two retorts.

MINING ACTIVITY IN CALIFORNIA.

The State Mining Bureau for a number of years past has been accustomed, through its agents, to prepare a table of mines in operation in the State, together with the number of men employed in each mine. The report for the current year has just been completed and affords the most convincing evidence of the revival of the mining industry on a large scale.

The remarkable activity noted is confined to no particular mining section of the State, but everywhere, whenever a chance exists that money is to be made by the extraction of the precious metals, men are found who are willing to stake their time, money and labor against the chances of a rich discovery; mines that have been abandoned or were, under the old system of mining, unprofitable, are being drained, retimbered and put in order for a renewed activity; placers that were thought to be exhausted are to be worked again, and hydraulic mining, under the new laws, has returned to life again.

In quartz mining, however, the largest development is anticipated. Ore can be reduced so cheaply under present processes that mines producing low-grade ore are in active demand owing to the fact that so much development has usually been accomplished on these mines that only small capital is required in order to place them in working order again. The following shows the number of miners employed and registered mines in the ore-producing counties of the State in the year 1895:

Number of men, 9,404. Number of mines, 1,661.

For the year 1896 a most remarkable change appears. The total number of men employed is increased by 9,006, or almost double, while the number of recorded mines increased in 1.96 over that of the year 1895 by 750. The greatest increase of the men employed is apparently in those districts where the great producing mines are located, though the increase in the new mines is distributed through the State.

Compressed Air Motors for Street Cars.—Two street cars equipped with the Hardie compressed air motors have been placed in regular service on the 125th street line of the Third Avenue Railroad. The first car which made the trip from the East River to the North River was under control of Robert Hardie, the inventor of the motor. On the car were the officers of both the General Compressed Air Company and the American Air Power Company. No trouble has been experienced since they began to operate, the cars starting and stopping without a jerk and free from any hissing noise. The perfect control the motorman has over the car at all times, being able to stop it within a car's length when running at ordinary speed, is one of its commendable features. The tanks which contain the compressed air will supply the car with sufficient power to enable it to run from 12 to 14 miles.

Mining Activity in Mexico.—In the second half of the fiscal year 1895-96 there were issued 1,044 titles to mines covering a superficial area of 7,966 hectares. The number is just equal to that of the deeds issued during the whole of the fiscal year 1894-95 and the area covered is greater than in that year. This is very satisfactory, as it shows that the interest in mining here is on the increase. It is also a proof of greater activity on the part of the Mining Bureau in the despatch of business.

The titles issued during the whole of the fiscal year numbered 1,924 covering an area of 15,451 hectares.

Origin of Standard Voltage.—The question of why 110 volts became the standard for lighting circuits has recently been given in the *Electrical Review*, on the authority of Mr. Edison. The inventor, in his early work on the lamp, always allowed 10 per cent. for errors, leakage, etc., and when one of his assistants suggested 100 volts Edison said, "We'll add 10 per cent., as usual, and make it 110 volts." That settled it, and the standard has remained the same ever since. Two hundred and twenty volts became the standard for early motor work from the wide use of the three-wire system which gave this voltage between the positive and negative wires.

THE CONCENTRATION OF IRON ORE.—III.

Written for the Engineering and Mining Journal by Wm. B. Phillips.

(Concluded from page 125.)

If the fineness of the ore referred to in the last part of this paper should be found to militate against its use in the blast furnace, although a great deal of Mesabi ore is quite as fine, it could be still more finely ground and used for paint.

At any rate, it seems to me that it should be removed from the coarser stuff before this is sent to the machines. Almost every concentration process proceeds more uniformly and regularly if each machine has to treat material of about the same size. What this size should be depends, of course, upon the nature of the ore, the purpose in view and the machine itself. It rarely happens in concentration processes that as good results are reached by attempting, on the same machine and at the same time, to treat a variety of sizes as when each machine is fed with a uniform size. Many disastrous failures have occurred, especially in coal washing, by the neglect of this principle. It is likely to maintain, in a marked degree in the concentration of iron ores, no matter what the process may be. It is most important to decide what sizing gives the best results, and to send to each machine its proper size.

To determine the efficiency of the inclined Wetherill machine the material through an 8-mesh and over a 15-mesh screen was also concentrated with the following results:

	Iron.	Insol.
Raw ore through 8-mesh, 24%.....	35.40	46.34
Heads, 6 amp., 45.5%.....	50.20	24.34
Middlings, 19.0%.....	43.00	34.95
Tails, 55.5%.....	15.40	75.35

By repressing the middlings there could be made to yield 50% by weight of a 50% ore, so that the final heads would be 55% and would carry 50% of iron.

On ore of this character, however, the best results were obtained from material through a 15 and over a 40-mesh screen. The mechanical separation of the ore into ferruginous material, plus matrix, is more perfect with the finer stuff than with the coarser. This does not apply to all kinds of ore.

The principle underlying the efficiency of the Wetherill machines, both the flat and the inclined magnets, is, of course, the same as in the magnetic separators of the ordinary type, viz., the mechanical separation, by crushing and sizing of the iron-bearing portion of the ore from the impurities. Unless this be done the magnetic force cannot act to the best advantage, the heads will be poorer in iron and the tails richer than should be the case.

To sum up the results obtained per ton of ore treated:

We would have, as saleable ore and concentrates; 739.2 lbs. through 40 mesh at 45c. per ton, 14.8c.; 537.9 lbs. concentrates, through 15 mesh at \$1 per ton, 23.9c.; 295.7 lbs. concentrates, through 8 mesh at 55c. per ton, 7.2c., making the material from a ton of this ore worth 45.9c. These are merely provisional figures. It is likely that the value of the material obtained from a ton of this ore could be brought to 50c. in the Birmingham District. Even at 46c. there would be a fair profit in concentration, as the raw ore can be delivered at the works for 20c. a ton, and a prominent contractor has said it could be done for 15c. Putting it, however, at 20c. this would leave 26c. for drying, crushing, sizing, separating and profit. The material passing a 40-mesh screen, and which does not need concentration, should pay even as ore, for the mining and delivery of the raw ore. If we assume that it would do this, we would have the material passing a 15 and an 8-mesh screen for concentration. The value of the process would then depend on the value of the concentrates, and this would depend, *ceteris paribus*, on the amount of iron they carried. They would be sold on analysis at so much per unit of iron with a probable starting point of 50% of iron and 2c. per unit. The concentrates are worth as much as this to the furnace, and at 2c. per unit the operator could make a fair profit.

The concentrates are not worth as much as brown ore of the same content of iron, as this class of ore seldom has more than 10% of insoluble matter with 50% of iron. Brown ore, stockhouse delivery, can be bought for \$1 per ton, starting at 50% iron and 10% insoluble matter with 5c. per unit of iron and 2c. per unit of insoluble matter "up and down."

In the discussion of concentration as applied to the Clinton ores of the Birmingham District, it must not be forgotten that the concentrates will have to compete with ore of very low price. Soft red ore of 46% of iron has been delivered in the stockhouse during the last 12 months for 50c. per ton. This is the ore with which the concentrates made from soft ore will come into active competition, and their introduction will not be as easy as might appear. If they were of the same physical character, viz., in lumps, the problem would be simplified, but there has been little or no experience here among furnacemen with ore passing a 10-mesh screen. Other factors will come into play besides that of mere iron-content, and these may affect the question very seriously.

While I am convinced that a ton of 53-56% ore can be made from 1.75 to 2 tons of raw ore, and that the tailings will not carry more than 15% of iron, it must be said that the successful prosecution of the business will demand the most unremitting and skillful attention. There will not be much profit in making anything but the best that can be obtained. It seems to me that below 53% of iron the process does not promise much. The whole question hinges just here, to what degree of richness can the concentrates be brought? This will depend not only upon the nature of the ore, but also and particularly upon the treatment it receives. All the Clinton ore is not of the same character. It varies not only in the amount of iron it contains, but also (and here is where the efficiency of the Wetherill machines is put to the test) in the separability of the oxide of iron itself from the silicious matter with which it is so closely associated. It by no means follows that two low-grade ores of the same content of iron will concentrate equally well.

There seems to be a marked difference in respect of the magnetic attractability of the oxide of iron in the ore, but what it is and what causes it is at present unknown. It is a point deserving of the most careful investigation, for while it may not influence the commercial use of the process injuriously, still upon its solution will depend the explanation of the process as a whole. The process is new; it is as yet barely out of the shell, and that so much is known about it now is due to the efforts of

the Wetherill Company to satisfy the public that it is worthy of attention. So far we have considered the soft ore exclusively for the reason that it was originally contemplated to restrict the use of the process to the two million tons of low-grade soft ore now uncovered, as well as to the immense deposits that have not been touched.

But it can be applied with great advantage to the low-grade hard (limey) ore that is now being left in the underground workings. Under cover the soft ore becomes hard, or limey, and the same relative differences are to be observed between the good and the bad soft ore and the good and the bad hard ore. As the mining operations on the soft ore are confined to the upper 10 ft., leaving from 8 to 10 ft. as being too silicious for use, so the underground workings on the hard ore are confined to the upper 8 to 10 ft., and there is left about the same amount.

In order to test the efficiency of the Wetherill machines on the hard ore we made the following experiments on the better grade. First, raw, hard ore through 15 over 40 mesh: Iron, 37.60; insoluble, 16.20; lime, 15.00.

From this we obtained at five amperes:

	Iron.	Insol.	Lime.
Heads, 55%.....	48.70	10.26	9.76
Middlings, 15%.....	29.00	18.20	21.40
Tails, 30%.....	18.20	27.00	25.12

The gain of heads in iron was 29.5%; the loss in insoluble was 36.6%, and in lime 34.9%.

The same ore through 8 over 15 mesh:

	Iron.	Insol.	Lime.
.....	34.50	18.04	17.10

From which were obtained at 6 amperes:

	Iron.	Insol.	Lime.
Heads, 64%.....	45.40	12.25	11.45
Middlings, 7%.....	25.80	17.95	24.02
Tails, 29%.....	13.55	30.34	27.10

The gain of heads in iron was 34.5%; the loss in insoluble was 32.1% and in lime 33.0%.

Encouraged by these results, which are assuredly remarkable in that they showed that the lime did not go into the tailings and that the self-fluxing nature of the ore was preserved, we then tried the low-grade hard ore.

Low grade hard ore, raw, through 15 over 40 mesh:

	Iron.	Insol.	Lime.
47%.....	32.80	33.70	9.90

From this were obtained at 5 1/2 amperes:

	Iron.	Insol.	Lime.
Heads, 43%.....	47.70	14.50	8.40
Middlings, 10%.....	35.90	23.28	13.20
Tails, 47%.....	21.60	42.70	8.80

Gain of heads in iron, 45.4%; loss in insoluble, 56.9%; loss in lime, 15.1%. The same ore through 8 over 15 mesh:

	Iron.	Insol.	Lime.
25%.....	31.80	33.10	10.79

From this were obtained at 8 amp.:

	Iron.	Insol.	Lime.
Heads, 44%.....	43.15	19.66	8.80
Middlings, 6%.....	29.45	32.90	12.40
Tails, 50%.....	22.80	43.82	12.32

Gain of heads in iron, 35.7%; loss in insoluble, 40.6%, and in lime, 18.4%.

The material passing a 40-mesh screen, 28%, contained: Iron, 42.00; insoluble, 18.40; lime, 10.90.

We observe in the hard ore, as in the soft, that the fines are much richer in iron than the original ore. No attempt was made to concentrate this material, as the experiments had to be concluded within a certain period and there was no time left. Considering the nature of the ore these results are most encouraging. In its raw condition it cannot be profitably used in the blast furnace, but by concentration over the Wetherill machines it becomes a better ore than a great deal of the hard ore now used. It is true that the concentrates are not self-fluxing, but the same objection holds to a great deal of the hard ore now mined in the district.

There can be no question of the improvement in this class of ore, an improvement so great as to bring it well within the limits of commercial use on a large scale. As it is it is practically worthless as an ore; concentrated it can be used to advantage.

We might extend these remarks and quote other illustrations of the value of this process as applied to low-grade non-magnetic ores, but space forbids.

We will, however, mention that the phosphorus is not materially affected. At one time there were indications, from analysis, that this element could be reduced by 0.10%, so that the concentrates would carry 0.25% instead of 0.35% as in the original ore, but further work in this direction has not led to the expectation that the phosphorus was materially changed. So far as at present known there is no hope of removing the phosphorus from the Clinton ores except by some chemical means, and it is not likely that this would be profitable.

In summing up the whole matter I may say that we have in the Wetherill Process a valuable means for utilizing immense deposits of low grade non-magnetic ore, one that is at once cheap, simple, easily regulated and more efficient than any that has come under my observation.

Note—At the close of the preparation of these articles I have seen the proof of the paper presented at the Pittsburg meeting of the American Institute of Mining Engineers, by Messrs. Wilkens and Nitze on "The Magnetic Separation of Non-Magnetic Material."

It is most interesting and valuable, but as I shall have the honor of commenting on it in the *Transactions* of the Institute I trust that I may be excused at present.

Submarine Freshwater.—Proceeding on the theory that the variations in temperature ought to cause shearing strains between the upper and lower layers of the granite rocks, and in that way produce horizontal crevices into which water from the surface would percolate, Nordenskjöld had a well sunk in the islet of Arko, off the Swedish coast, in 1894, and at the depth of 110 ft. fresh water was found, supplying 4,400 gallons a day. Since then six other wells have been bored, and water found at about the same descent, the object of the research being to provide lighthouses and pilot stations with a permanent and plentiful water source. *The Engineer.*

MODERN METHODS OF HANDLING MATERIAL.

In no branch of industrial economy has greater progress been made of late years than in that of cheaply handling material of all kinds. This progress is the most natural result of the conviction that has frequently been forced upon the owners of our great industries, their managers and superintendents, in an unpleasant manner, that unless a revolution were effected in the method of handling their raw material and manufactured products and a great saving be thereby effected, business would be at an end for them.

In remodelling existing works or the erection of new ones these points have been fully impressed on the designer, and every construction engineer of experience has spent days and nights in thinking over and working out some scheme by which saving in this direction could be brought about.

The perfection of link-belt appliances has contributed most materially to success, and the modern methods of handling coal and other material in bulk could hardly be surpassed for cheapness and efficiency. We are indebted for the accompanying illustrations to the Link Belt Machinery Company, of Chicago, who have made such great improvement in this special class of mechanical handling.

The conveyors are now made able to perform what would formerly be considered impossibilities by means of the "Monobar" chain, which con-

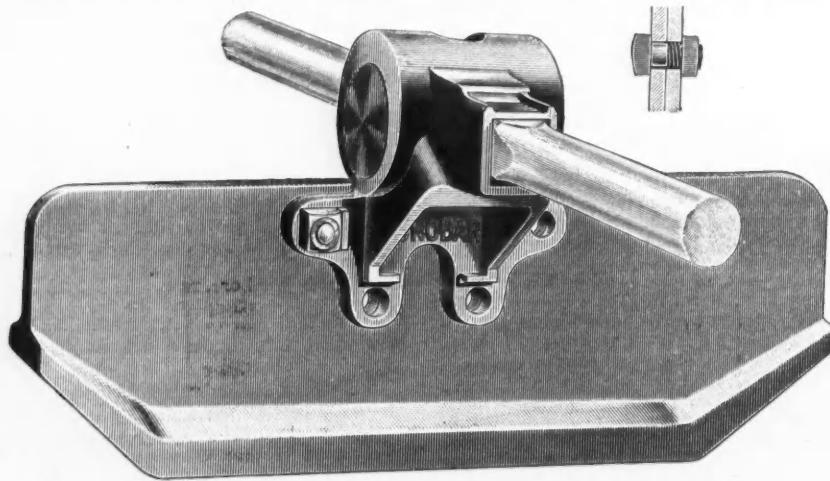
DIAMONDS, WHERE THEY OCCUR AND HOW TO SEARCH FOR THEM.

By Melville Attwood.

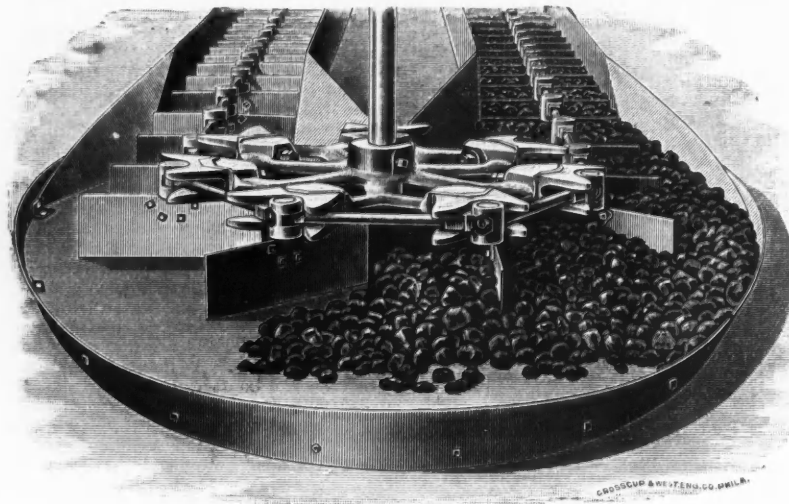
Frequent inquiries are being made by placer miners and diamond prospectors for some simple way by which, without the possibility of mistake, they can tell when they find diamonds in the working of their placers. I have looked over most of the books on the subject of precious stones, but cannot find in any one of them plain directions for that purpose. I often hear of stones, supposed to be diamonds, being sent to London, Paris and other places for determination, denoting that there is much attention being paid to this matter. Many years ago I worked some of the diamond places in Brazil, and think the following directions may be useful.

The gold and diamond placers of Brazil, like those of California, may properly be divided into three classes:

First. The surface washings and the ravine diggings, which have derived their gold principally from the degradation or breaking up by atmospheric and aqueous agencies of the croppings of auriferous lodes. The gold found in these placers is mostly water-worn and in scales, sometimes with pieces of quartz adhering to it. This class, to a certain extent, has been the most important of the three, as nearly all our richest



FRONT VIEW OF THICKENED EDGE NOISELESS FLIGHT BOLTED TO MONOBAR.



HORIZONTAL MONOBAR CONVEYOR 180° TURN.

sists of a series of bolts flexibly connected (see Fig. 1). This illustration shows a front view of thickened edge noiseless flight bolted to Monobar, and it is by a device of this nature that such work as shown in Fig. 2 is made possible. This illustration is of a horizontal Monobar conveyor 180° turn. The enlarged space at the turn is made necessary by the feathering action of the flights in passing round the wheel.

As an illustration of the system in use by the Pennsylvania Railroad Company for storing coal we refer to Fig. 3. This plant (Dodge system) is at South Amboy, N. J., and has a capacity of 90,000 tons.

Diamonds in Steel.—It was shown by M. H. Moissan, about three years ago, that when iron was saturated at 3,000° C. with carbon, and then cooled under a high pressure, a portion of the carbon separated out in the form of diamonds. It occurred to M. Rossel, *Comptes Rendus*, July 13th, that the conditions under which very hard steels are now made, should also result in the formation of diamonds; and an examination of a large number of samples of such steel has shown that this is really the case. The diamonds are obtained by dissolving the metal in acid, and then subjecting the residue to the action of concentrated nitric acid fused potassium chlorate, hydrofluoric and sulphuric acid, successively. The crystals are very minute—about 15 μ —the largest attaining only 0.5 mm. in diameter, but *Nature* says they present all the chemical and physical properties of true diamonds.

quartz lodes were discovered by working them. For instance, in the Grass Valley District, at Rhode Island Ravine diggings, the first gold lode was uncovered, the Gold Hill. Then the Boston Ravine Diggings, the Massachusetts Hill mines, the Allison Ranch mines, the Lamarque diggings, near the North Branch of Wolf Creek, which uncovered the Eureka, Idaho and Maryland mines.

Second. This class consists of the recent river beds from which the water has been diverted and the present river beds. In this class most of the Brazilian diamonds are met with.

Third class, the ancient river beds, in which diamonds are also found. The diamond prospector's outfit should consist of a light pick, a shovel and two riddles, one having $\frac{1}{4}$ -in. apertures and 18 in. in diameter, the other having eight holes to the linear inch: a miner's wallet, which is a bag 4 ft. 8 in. long by 18 in. wide, with an opening in the middle. It can be carried over the shoulder or used as a saddle bag. With it a miner can pack 40 ft. of gravel or more for a long distance. A tub for washing the gravel in. This may be got by cutting a wine or beer barrel in two; a rubber bath-tub will also answer the purpose. A piece of rubber cloth to be used for sorting the gravel on. A watchmaker's lens of two powers, fitted into a spectacle frame. A placer miner's scale of hardness consisting of fragments of diamonds, sapphires and quartz, mounted at the end of a pencil. The scale of hardness can easily be made by taking the rubber out of the end of the pencil, and filling the space with "lapidary's

cement" (which melts at a very low temperature) over a small spirit lamp; warm the diamond or sapphires, and while hot insert them into the cement. By wetting the fingers and rubbing it the cement can be molded into any shape desirable, and when cold it will be as firm as if soldered. A piece of glass tubing about two inches long, with an aperture of something less than $\frac{1}{4}$ in. in diameter will answer as well as the pencil. The diamond can then be mounted at one end and the sapphire at the other.

The sample of gravel to be examined must be first put into the coarse riddle and that fastened above the finer one. Then immerse both riddles into a tub of water and with a half rotary motion wash all the fine gravel into the lower one, the dirt and sand passing through into the tub. Then throw away what was collected in the coarse riddle, unfasten it from the finer one, immerse the latter in the tub of water, and use a jiggling motion until all the heavier portions of the gravel have settled at the bottom; continue the jiggling, and by raising the riddle a little at one side, you can get all the gravel to the opposite one. Then with a very quick motion turn the contents on to the sorting cloth or board, which should be placed near the tub. The heaviest gravel will then be at the top, and can easily be examined and tested by taking the pencil with the fragment of diamond mounted at the end of it, and pressing lightly, try to scratch the prospected stone, at the same time looking at it through the lens. If no mark or scratch is found upon it it must be a diamond, no matter what the shape or color.

In Brazil, as yet, no mines have been discovered like those in South Africa, such as the Kimberley, etc., where the diamond may be said to be found in place.

Mr. E. I. Dunn, in a paper read before the London Geological Society on the African diamond mines, says, "That the old mines are 'volcanic pipes,' and that they have burst through the carbonaceous shales is

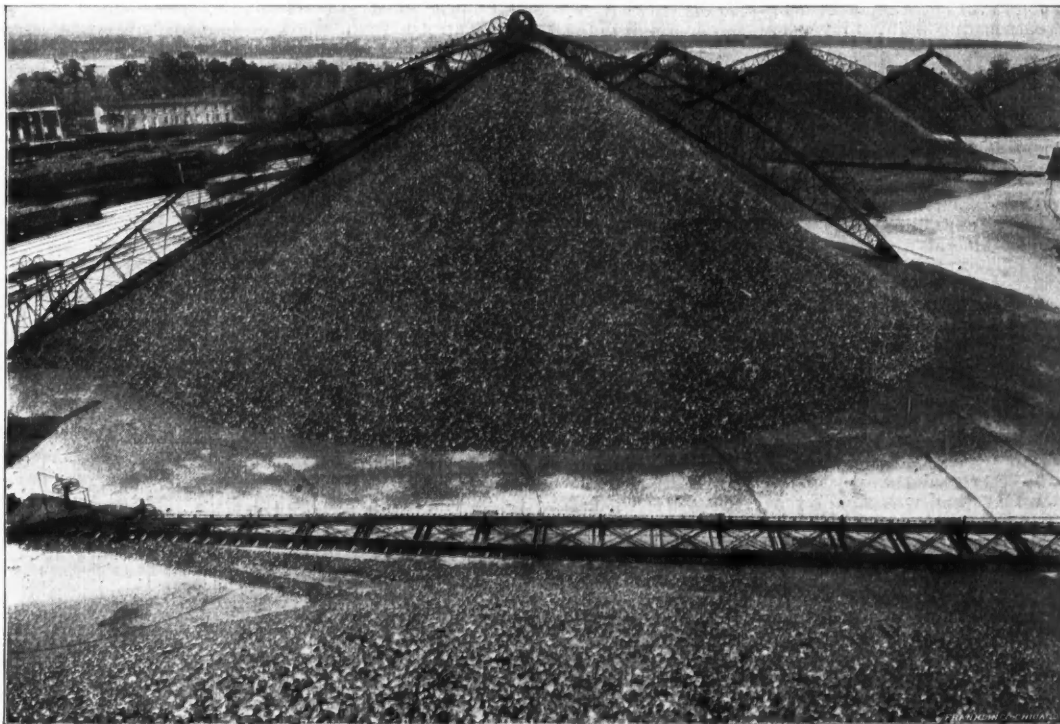
WOLFRAM ORE.

Written for the Engineering and Mining Journal by R. Helmhacker.

The mineral wolfram occurs, associated with tin ores, in the Erzgebirge, between Bohemia and Saxony. In the southern part of these mountains among the several ore deposits of this region the tin mining industry was for centuries very active, but now most of the mines are idle, because their product—the tin—cannot be produced at the low prices now prevailing. When the tin mines were yet operated the wolfram ore that is occasionally met with was without any use, like the nickel, kobalturan-ores of other silver-bearing mines in that section of country—and it was either thrown on the dump, or escaped recognition and no systematic search is known to have been made.

Part of the ore remained in the filling of the stopes from which the tin ore had been extracted. Though all the Bohemian tin mines of Schlaggenwald, Graupen, Maria-Schonfeld and others, occasionally carry wolfram ore, so far as observed the association of wolfram with tin ore occurs in considerable quantity only at the Zinnwald mine a short distance from the Saxon boundary. Since that time as the wolfram mineral, formerly unfit for use, has become a valuable substance for making the very hard tungsten steel, all the ore deposited in the piles of barren rocks or in places easily accessible in the abandoned stopes was picked up, and when they were exhausted, the mine, almost idle, was reopened.

The veins commonly carrying a preponderance of wolfram were worked, and there is reason to expect that the new use of this mineral may give rise to a more careful system of mining in the old Zinnwald mines. The old reopened tin mines are owned and operated by the Prince



SOUTH AMBOY, NEW JERSEY, COAL STORAGE PLANT (DODGE SYSTEM.)

evident. Is it not reasonable to infer that the carbon indispensable in one or another to the formation of the diamond, was supplied by these shales."

The Work Expended in Bicycle Propulsion.—As frequent attempts have been made to drive bicycles by electric power from storage batteries carried on the wheel, some recent experiments of the power consumed, made by Mr. Bouny, will be of interest to workers in this field. Mr. Bouny shows that there is no absolute dead point such as occurs with an ordinary connecting rod and crank motion, and, secondly, that there is always some pressure on the pedal during the rise, the negative work due to which has to be subtracted from that done during the down stroke to obtain the net amount used in propulsion. The experiments were made at speeds ranging from $10\frac{1}{2}$ to $21\frac{1}{2}$ miles per hour, the machine being run on a wooden racing track. The results were as follows:

Speed Miles per Hour.	Work Done per Semi Revolution. Ft. lb.	Speed. Miles per Hour.	Work Done per Semi Revolution. Ft. lb.
10	18'58	17'5	53'75
11'56	20'96	20'0	63'62
12'5	33'98	21'4	66'08
15'0	47'50		

It will be seen from the above figures that the average pressure of the foot required on the pedal increases rapidly with the speed, being at 20 miles an hour nearly $3\frac{1}{2}$ times as much as at 10 miles per hour. Unfortunately the gear used is not noted by M. Bouny, and so it is impossible to deduce from the above figures the average tractive resistance of the machine at the different speeds. Probably at the higher speeds named a large proportion of the total work done was expended in overcoming atmospheric resistance, and the run of the figures might be changed considerably if the trials were conducted on a rough road instead of on a smooth track.—*Electrical Engineer.*

Ferdinand Lobkovic; and there are raised yearly 17 to 72 tons of ore with 15 to 40 laborers to cover the demand. The yearly production for the years 1889 to 1894 was 17, 38, 56 $\frac{1}{2}$, 72, 43, 40 tons with 15, 32, 35, 40, 35, 31 laborers. The price was 34, 32 $\frac{1}{2}$, 37 $\frac{1}{4}$, 27 $\frac{1}{4}$, 23.6, 27.4 ft. per cwt. delivered.

The average yearly shipment to the tungsten steel works is about 43 tons. The principal consumer of wolfram ore is the cast-steel works Kapfenberg, in the Murz valley, Upper Styria, Austria, but since the year 1892 a considerable quantity is shipped to Germany (about 20 tons in the year 1894, while 6 tons were consumed in Styria). The average price for 1 cwt. (quintal metrique = 100 kg.) delivered to the steel works is slowly decreasing from 35 florins in the year 1887 to 32 $\frac{1}{2}$ in 1890, and 27 $\frac{1}{2}$ in 1892 and 29 $\frac{1}{2}$ in 1894. The larger portion of wolfram ore consumed by the tungsten steel works is received from Zinnwald, Bohemia; but as the association of wolfram with tin ores exists also in Cornwall, whence a smaller quantity comes into the market, the result of this competition is the gradual reduction of price. At Maria-Schonfeld, easterly from Teplic, Bohemia, where wolfram occurs also to the detriment of the tin ore, the mines were worked for a short time some five or six years ago, producing a small quantity of tungstic ore; but the result was unsatisfactory, and it is doubtful if there will be any shipment in future from that mine. The French wolfram ore is often associated with sulphurous and arsenical pyrites, and therefore unfit for metallurgical treatment in steel works.

The tin and wolfram ore deposits of Zinnwald are in many cases rather exceptional in character, and have given rise to considerable speculation as to their origin, which undoubtedly are theoretically very interesting. The mines of Zinnwald are situated in the Leitmeritz district north from Teplitz, in Bohemia, and form a part of the adjoining mining region, namely the Altenberg mining portion in Saxony. The tin-bearing old-granite (greisen) massive formation of Altenberg on the northern side of the Ore mountains (Erzgebirge) is exposed also at Zinn-

wald. The old granite, mainly in conditions of alteration to greisen far advanced, is presumably of lower Silurian (?) age. The mines opened by two tunnels and shafts to a depth of about 145 m., being almost idle, there remains an uncertainty which exists as regards the true character of these deposits, but little can be definitely said. Though the original condition of that tin-bearing granite (greisen) can rarely be definitely determined it is highly probable that this early eruptive rock had intruded through gneiss and crystalline schists and forms an underground cupola. Immense masses of eruptive rock of Permian age were forced up through the already altered old granite (greisen) and congealed before they reached the surface to granite while the rock moved to the surface formed sheets of quartz porphyry and also in some places of syenite granite porphyry that are overlaying the greisen cupola. The porphyric mass may be essentially considered to be the same as the (young) granite one; there is probably a gradation of the granite formed under pressure and the porphyric rocks.

The greisen cupola or vault is divided in sheet-like masses, presenting a jointed structure. The tin ores are distributed in three manners of occurrence:

1. Parallel to the cupola shape with its banking tendency occasioned by joints, of the greisen, there are spread layer-like deposits with evidently vein structure—that means that they were once cavities filled later with minerals—having a dip varying between 0° and 40°. The layer-like veins from 1 cm. to about 1 m. thickness have a banded structure, on both walls are deposited well-defined bands of very coarse-scaled Zinnwaldit-mica (lithionite), on the footwall commonly showing a chink between the granite (greisen) and the vein. The inner mineral is quartz often in crystals pointing in the free space in the midst of the vein and proving the vein type of these deposits. Sometimes the quartz forms the earlier formed mineral and the Zinnwaldit-mica the newer one. In the quartz there are disseminated ores in granules or bands mainly cassiterite, also in large twin crystals, wolfram, arsenopyrite, galenite and other ores. The gangue with much quartz bears also fluorite, baryte. There are known eleven separate parallel layer-like veins, the distance between them varying from 4 to 15 m.

2. The rock between the ore-bearing flat veins is impregnated with tin ore. This intermixture of ore in the rock follows sometimes to slight fissures formed by shrinkage, from which the surrounding rock may have been permeated by metal-bearing agencies, and it appears as if it were finely and irregularly percolated with cassiterite.

3. Both the old granite (greisen) and the younger granite, as well as the porphyric development of the granitic masses to quartz-porphyry, are crossed by true lodes; that means rents, or, rather, fault planes, faulting the flat veins at about 15 m., and filled with fragments of decomposed granitic rock, clay, gangue minerals and ores, dipping at northeast at the angle of from 70° to 90°. The gangue, or vein material, is simply pulverized wall rock, clay frequently, with quartz zinnwaldite, hard kaolin (nakrit) and also fluorite topaz (pycnite), baryte. The most common ores are wolfram and pyrite; but there are also found, but rarely, cassiterite, sphalerite, galenite and others. Even these lodes, having an average thickness of about ½ m. to more than 1 m., contain the wolfram in valuable quantities, and in former times, because they contained tin ore often in scarcely paying masses, they had attracted attention to the other kinds of tin-bearing deposits already referred to.

The metallurgical character of iron is determined by the influence of the several admixtures of C, Si, S, P, As, Mn, Cr or W. The element W—tungsten appears the best adapted of all other known to the manufacture of very hard steel, a fact that was first discovered by experiments made in the government's cast-steel works at Reichramming, Upper Austria, in the year 1858. The influence of this wolfram ore, that might be called also a true steel ore, on the special process of manufacture of tungsten-steel is the great value claimed for this mineral. And thus the undoubtedly valueless ore in former times becomes now useful and represents a supplement of the tin mines of Zinnwald. The value of the wolfram is rated by its tenor of tungstic acid— WO_3 , by which the price is determined when it is shipped to the consumer. The mineral wolfram is a mixture of iron with manganese tungstate, $FeWO_4 + MnWO_4$, or a manganese tungstate with the substitution of iron for manganese. The mineral occurring at Zinnwald is composed nearly $3 MnWO_4 + 2 FeWO_4$. It is found in large crystals, with lamellar structure; also in coarse divergent columnar lamellar masses of sub-metallic luster and dark black brown color.

Before the mined ore reaches the consumer it is separated in three varieties, which then are delivered for transportation. The first is represented by lumps, or rather crystals of ore picked out by manual labor. The second and third varieties are dressed ores, concentrated after having been wet crushed. The second variety is a granular concentrated ore; the third are sands of ore. Lots of those three separated ores show the following average analysis:

	Lumps (crystals).	Granular ore or coarse grains.	Separated and concentrated sands.
WO_3	76.5	73.6	69.1
FeO.....	10.3	9.8	8.1
MnO.....	12.2	12.6	9.6
CaO.....	1.1	.4	.9
MgO.....	trace	trace	trace
SnO_2	trace	3.6	8.4
Residue (rock, gangue).....	13.1

The tin peroxide in the second and third variety is intimately and minutely associated cassiterite difficult to separate by the ore dressing process. The tenor of WO_3 and MnO, which latter is of advantage to the steel works, varies sometimes even to 80% WO_3 , and to 20% MnO.

To make a definite conclusion as to the value of wolfram ore it is necessary to have a method for assaying the tungstic acid. The new and somewhat improved method, according to B. Shetlik (*Bohemian Chemical Journal*) is as follows: A sample of 3 to 5 grams of the ground ore is exposed to a heat of 110° C. The dried powdered material is fused with the 4 to 5 times the weight of Na_2CO_3 in a platinum-crucible. The chilled molten mass is extracted with water, filtered, and the filter washed till the last drops of filtered water render no cloudiness with added HCl hydrochloric acid. The filtered precipitate is heated to boiling, with HCl in excess for half an hour, by which leaves insoluble WO_3 tungstic acid (containing adhering impurities as SnO_2 , SiO_2 and sometimes MoO_3). The yellow precipitate is filtered off, dried, weighed and treated with HF

fluoric acid in an air bath, to drive off the SiO_2 as fumes of SiF_2 . The residue consists of pure WO_3 , if there was no additional impurity of SnO_2 to influence the result. In that case the matter consists of $WO_3 + SnO_2$. For the estimation of SnO_2 the mixture of $WO_3 + SnO_2$ is ignited for half an hour with KCy, by which Sn is reduced. The fused mass is dissolved in water, the remaining reduced Sn is dissolved in HCl and determined.

For the estimation of Fe and Mn, the residue from the first fusion is dissolved, the ferric oxide Fe_2O_3 reduced with Zn into FeO ferrous oxide, which is determined by titration by the potassic permanganate solution $KMnO_4$ with the usual precautions; while another part is precipitated with $CaClO_2$ and the Mn determined by titration as known.

The peculiar properties, and not readily imitated, i. e. hardness of the tungstic steel, its utility, its present use, secures the continuance of the demand for wolfram. The Bohemian ore occurring in large quantity is scarcely replaceable by any other known tungstic mineral.

Finally it may be added that the tungstic products derived from wolfram gain great importance, not only by utilizing them for dyeing and fire-proof making purposes, but that recently Edison discovered covered tungstates as a medium for photographing with the invisible ray of Roentgen.

Hot Water Motors.—The New York Central Railroad has been experimenting with a new motor, the power being neither electricity nor compressed air, but hot water stored in supply boilers under high pressure, and then charged, under the same pressure, into the battery cylinders of the motor. The experiments have been conducted secretly on the New York Central road for some time past, and it is stated that the results have been very satisfactory. Final experiments are to be made soon, which, if successful, will probably result in the adoption of the motor for suburban service. The idea of a hot water motor originated in Germany, but was first practically applied by an American engineer named Lamm, who ran a locomotive charged with hot water through the streets of New Orleans about 15 years ago. The special merit of the motor is said to be its cheapness as compared with the cost of the systems at present in use. Expensive plants are not required and the cars can be run on any track. All that is required is a number of boiler houses along the line.

PATENTS RELATING TO MINING AND METALLURGY.

United States.

The following is a list of the patents relating to mining, metallurgy and kindred subjects issued by the United States Patent Office. A copy of the specifications of any of these will be mailed by the Scientific Publishing Company upon receipt of 25 cents.

WEEK ENDING AUGUST 4TH, 1896.

- 555,039. PROCESS OF REFINING HYDRO-CARBON OILS. George M. Saybolt, Jersey City, N. J., Assignor to the Standard Oil Company, of New York, N. Y. Filed December 13th, 1895. The method of purifying petroleum distillate, which consists in treating it, after final distillation, with non-fuming sulphuric acid, and then removing the impurities remaining after the acid treatment by bringing the distillate into intimate contact with a finely divided, substantially non-alkaline substance without intermediate treatment of the distillate with water or alkali.
- 555,132. EXCAVATORS FOR HYDRAULIC DREDGERS. Alphonso B. Bowers, San Francisco, Cal. Filed Feb. 6, 1895. A dredge boat having a self-contained pivot or center of oscillation and an excavating or disintegrating device (other than a continuously rotating implement) provided with cutting edges, blades, teeth, or other disintegrating devices, in combination with and secured to the outer end of a suction pipe, the whole being constructed and arranged to have the dredge boat, suction pipe and excavating implement swing in a horizontal arc on the self-contained pivot (or center of oscillation carried by the dredge boat), and continuously sever spoil from its bed during the swing with means for making the swing.
- 555,151. WASHER FOR AURIFEROUS GRAVEL, ETC. Thomas G. Barlow-Massicks, Prescott, Ariz. Filed January 23d, 1895. The combination of a hopper into which auriferous gravel and such materials are dumped, pipes running around the hopper having lateral discharge nozzles for directing the jets of water toward each other, a series of alternating inclined hoppers beneath each other and the receiving hopper and having a rounded portion and receiving the material discharged from the hopper above, longitudinal bars conforming to the hoppers and upon the surfaces thereof, with spaces or grooves between, the bars receiving and supporting the larger stones or boulders and the finer materials passing down the grooves, and a screen at the lower end for separating the boulders and larger pieces of material from the water and fine materials, a hopper for receiving the water and fine materials and delivering the same for subsequent treatment.
- 555,152. AMALGAMATOR. Thomas G. Barlow-Massicks, Prescott, Ariz. Filed February 1, 1896. The combination in an amalgamator of similar riffle-plates and similar troughs, each riffle-plate having riffles on its upper surface, and edge flanges and flanges at its outer edges for bolts, and each trough having a flat bottom, a vertical side and an inwardly-inclined side to come below the upper end of a riffle-plate, ends to the trough and outwardly-projecting flanges for the attaching bolts, the parts being constructed so that the upper end of the lower riffle-plate is connected directly to the edge of the trough and the lower end of the riffle-plate is supported directly above with an intermediate space for the flow of the water.
- 555,289. MINE CAR DOOR FASTENING. Anderson Maxwell, Barnesville, O., Assignor to the Watt Mining Car Wheel Company, same place. Filed November 29th, 1895. A vertically-movable latch-fastening consisting of a pivoted latch-bar, provided with a swinging locking-bail moveable with, and also at right angles to, the latch-bar; and a fixed catch adapted to be engaged by the bail.
- 555,334. CONVEYOR. James M. Dodge, Philadelphia, Pa., Assignor to the Link-Belt Engineering Company, same place. Filed June 23d, 1896. An elevator bucket consisting of upper and lower carrying sections connected at sides and rear, and having a loading and discharge opening in front and adapted to carry the load until turned beyond the point of complete inversion.
- 555,342. MINING GOLD OR LIKE METAL. Herman Frasch, Cleveland, O. Filed August 17th, 1895. The process of mining gold, or analogous metal such as silver or platinum, by introducing into the auriferous or argentiferous or platiniferous earth in its natural bed in the ground a reagent which converts such metal into a compound soluble in water, and removing the aqueous solution of gold or like metal formed by the aid of such reagent.
- 555,355. VANNING MACHINE AND CONCENTRATOR. William H. Hooper, Empire, Mont. Filed July 10th, 1893; renewed March 6th, 1896. The combination with the belt and its carrying-rollers, a tank for receiving the concentrates, and a cleaning roller arranged in contact with the belt so that the concentrates removed from the belt by the cleaning roller will drop into the tank.

PERSONAL.

COLONEL LIVERMORE, of the Calumet and Hecla Mining Company, sailed for Europe last week for an extended recreation trip.

MR. C. A. DOLLARHIDE has been appointed superintendent of the Summit mine, Colorado, and now has entire charge of the property.

MR. T. REYNOLDS has gone to De Lamar, Nev., to assume the position formerly occupied by Mr. J. M. HEALY, as foreman of the De Lamar mines.

MR. T. A. RICKARD, mining engineer, of Denver, Colo., has gone to Southern Idaho to examine the Alturas Mine. He will be in Salt Lake City on the 16th and 17th, and hopes to return to Denver by the 20th.

MR. ARTHUR WEINSCHANK, who has had charge of the Lackawanna Iron and Coal Company's foundry, at Scranton, Pa., has resigned his position. He has been in the employ of this company for 44 years.

MR. HORACE V. WINCHELL, geologist and mining expert, of the firm of Sharpless & Winchell, Minneapolis, Minn., will during the next three weeks be occupied in the examination of some Washington gold mines.

MR. GEORGE R. MAIR, who has for several years been connected with the Mining Department of the General Electric Company, recently sailed for England en route to South Africa, where he will assume a position of responsibility with the United Gold Fields, Ltd.

MR. EBENEZER MCKAY, B. A., Ph. D., has been elected to the McLeod Chair of Chemistry and Mineralogy in Dalhousie University, Halifax, N. S. Recently he has been lecturer assistant to Dr. IRA REMSEN in his course in organic chemistry to graduate students at Johns Hopkins, and is now pursuing special studies at Harvard University.

MESSRS. W. H. STORMS and **E. G. PRESTON**, the field assistants of the California Mining Bureau, have gone on official tours of inspection. MR. STORMS went to Amador County to make a thorough examination of the rock formation of the great mother lode. He will be gone about a month. MR. PRESTON has gone to Nevada County. He will probably be away six weeks.

OBITUARY.

J. D. REED, superintendent of the Woodward Iron Company's coal mines at Dolomite, Ala., died July 31st.

EDWARD MAY died at his office in New York City on August 10th, from heat prostration. He was president of the Mount Morris Electric Light Company, and vice-president of the Eagle Gold Mining Company of North Carolina.

HON. SAMUEL B. PRICE died suddenly on August 7th at his home in Mauch Chunk, Pa. He was for many years secretary and treasurer of the Upper Lehigh Coal Company. He also filled a term as judge of Carbon County.

MATTHEW ADDY died at Falmouth Heights, Mass., on August 2d, aged 61 years. He was born in Montreal, Canada, but went to Cincinnati early in the fifties and finally went into the iron business. As president of the Addyston Pipe and Steel Company, he was at the head of one of the largest and most successful manufacturing industries in the West. The works at Newport are still operated to their full capacity, in addition to the plant at Addyston.

SOCIETIES AND TECHNICAL SCHOOLS.

LAKE SUPERIOR MINING INSTITUTE.—The fourth annual meeting of this institute will be held at Ishpeming, Mich., beginning at noon on Tuesday, August 18th, and ending Thursday, August 20th. The local committee has arranged the following programme: All members to assemble by Tuesday noon and start soon after dinner to visit the Ishpeming mines; in the evening a business meeting will be held. Wednesday: Start by early train for Champion and Republic and return to Negaunee. After lunch at the Breitung Hotel, visit the Teal Lake and Buffalo ranges. At the Buffalo mines the party to take a train for Marquette over the L. S. & I. Ry.; inspect the Dead River bridge en route to the docks; thence by steamer or street cars to the city. Dinner at 6 p. m. at Hotel Superior, and second and final meeting in the evening. After the meeting members who desire to return to Negaunee and Ishpeming can take the 11.40 train and those desiring to remain at Marquette can go to Ishpeming by special train on the L. S. & I. Ry. the next morning, when members will all meet and prepare for a trip to the Gladstone furnaces. Meeting to close Thursday afternoon. A description of the important mines of Marquette County has been prepared for the meeting by Mr. Geo. A. Newett.

SOCIETY FOR THE PROMOTION OF ENGINEERING EDUCATION.—The fourth annual meeting will be held at Buffalo, New York, August 20th, 21st, 22d, 1900, in connection with the American Association for the Advancement of Science. The society, as

guests of the Engineers' Society of Western New York, will hold its meetings in the Library Building, the headquarters of the Engineers' Society, on Lafayette square.

There will be five sessions for the reading of papers and the transaction of business. These sessions will be held Thursday morning at 9:30; Thursday evening at 7:30; Friday morning at 9:30; Friday evening at 7:30; and Saturday evening at 7:30.

There will be an excursion on Saturday under the auspices of the Engineers' Society of Western New York, as follows: Leave Buffalo at 9 a. m. via electric railway to Niagara Falls, stopping and examining the Power House of the Niagara Falls Power Company, the Pittsburgh Reduction Works, and possibly other plants in that vicinity (Niagara Falls Paper Company, Carborundum Works, etc.). The route will be continued, via electric railway, down the river to Lewiston, through the Gorge, returning by the same route to Niagara Falls, where lunch will be served at 1:30 p. m. The following plants will be visited here: Niagara Falls Hydraulic Company (1,000 horse-power), Scenikopf Mills, Cliff Paper Company, and others.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.—The 45th meeting of this association will be held in Buffalo, N. Y., August 24th to 29th, 1896. The committee appointed by the council to prepare a programme of proceedings for the meetings of Section C, chemistry, announce the following programme, subject to modification at the time of the meeting: Monday morning, August 24th, general session of the association, followed by meeting of the members of Section C. Room 5, High School, for organization and election of sectional officers. Afternoon session, at 4.30, address of Vice-President Noyes, subject: "The Achievements of Physical Chemistry." August 25th, morning, "Physical Chemistry," with Dr. A. A. Noyes as leader. Afternoon, "Inorganic Chemistry," Prof. F. W. Clarke, of Washington, leader; "Organic Chemistry," Prof. P. C. Freer, University of Michigan, leader. August 26th, morning, "Diatom Chemistry," Prof. J. L. Howe, of Washington and Lee University, leader. Afternoon, "Analytical Chemistry," Prof. E. D. Campbell, University of Michigan, leader; "Technical Chemistry," Dr. William McMurtrie, New York, leader. August 27th, morning, "Technical Chemistry," (continued). Afternoon, "Sanitary Chemistry," W. P. Mason, Hensselaer Poly. Inst., leader. August 28th, morning, "Agricultural Chemistry," Dr. L. L. Van Slyke, of Geneva, N. Y., leader. Afternoon, "Biological Chemistry," Dr. E. A. de Schweinitz, Washington, leader.

INDUSTRIAL NOTES.

The Union Rolling Mill, at Newburg, Cleveland, started up August 3d after a five weeks' shut down.

The New Jersey Zinc & Iron Company, of Newark, N. J. is building a new furnace on the site of its old No. 2 stack.

The Phosphor Bronze Smelting Company, Philadelphia, has recently secured the right to manufacture Delta metal in the United States. It is now placing it on the market in rods, plates and heavy castings.

The Johnson Steel Works at Lorain, O., closed down August 5th at midnight, and 800 men are thrown out of employment. The suspension, which, it is believed, will be only for a short time, is owing to a lack of orders.

The Wellston, O., Iron and Steel Company has purchased the Milton Furnace at Wellston, which has been idle for several years. The furnace will be thoroughly overhauled and remodeled, and will be ready for the blast about September 15th.

The New York, New Haven & Hartford has placed a contract for 23,000 tons of steel rails with the Lackawanna Iron and Steel Company; 20,000 tons have been placed with the Cambria Iron Company by the Pittsburg Traction Company.

The Clifton Iron Company, of Ironton, Ala., is pushing work on the furnace, which it is changing from charcoal to coke. Its other stack will not be altered for the present, as the company has not yet decided to give up entirely the manufacture of charcoal iron.

The Midvale (Pa.) Steel Works has had plans prepared and is ready for estimates for the construction of a storehouse, 135x44 ft. and 24 ft. high, to be built of hard and stretcher brick, and a carpenter and pattern shop and rigging loft, 130x87 ft. and 18 ft. high, to be built of iron.

The Davis Sulphur Ore Company, of Springfield, Mass., is considering the feasibility of the transformation of the ore from its iron pyrites mines into sulphuric acid. The average output of the mines has been about 50,000 tons a year, and at present the production is greater than the demand.

After several weeks of idleness the Midland Steel Works and the Indiana Iron Works, at Muncie, Ind., resumed operations August 10th with nearly 500 hands in each mill. The puddling mill at the Indiana Iron Works will work two turns a day. The nut and bolt works will not be started for some time.

The sheriff has levied on the Reading, Pa., rolling mill on an execution against the bridge-building company of Cofrode & Saylor, Philadelphia and Pottstown, and the Reading Rolling Mill Company for \$146,561. The works are now idle. The execution creditor is the Security Company of Pottstown.

The Brilliant Pipe & Tube Works Company, of Brilliant, O., made an assignment last week to John S. McMasters. This firm was looked on as being one of the most solid in the valley. The deed of assignment includes the personal and real property and machinery and all privileges of the company.

The Brown Hoisting and Conveying Machine Company, Cleveland, O., has received, in addition to the Krupp order, mentioned in our last issue, an order for three of their largest overhead bridge tramways for the handling of coal and ore, from the Krainische Industrie Gesellschaft, a large manufacturing concern of Austria. Both this and the Krupp order are large orders, and have been awarded entirely through correspondence.

At the Mahoning Valley Iron Works, Youngstown, O., both puddling mills and plate mills resumed operations August 3d. The puddle mill, bar mill and 10-in. mill of the Andrews Brothers Company, at Haselton, also resumed. The Brown-Bonell Iron Company started its No. 3 and No. 4 puddle mills, 8-in. and 10-in. mill, No. 3 bar mill and sheet mill. Portions of the upper and lower mills of the Union Iron and Steel Company were put in operation.

TRADE CATALOGUES.

The Deane Steam Pump Company, of Holyoke, Mass., has issued a small circular in reference to their Automatic Receiver, frequently called "pump and governor." It is designed to automatically drain heating systems and machines or appliances used in manufacturing, which depend upon a free circulation of steam for their efficiency, and to automatically pump the water of condensation drained from such systems back to the boilers without loss of heat.

In another pamphlet their regular pattern Deane Triplex Power Pump is illustrated and described, and also their Deane Triplex Power Pump and Electric Motor.

MACHINERY AND SUPPLIES WANTED.

If any one wanting machinery or supplies of any kind will notify the "Engineering and Mining Journal" of what he needs he will be put in communication with the best manufacturers of the same.

We also offer our services to foreign correspondents who desire to purchase American goods, and shall be pleased to furnish them information concerning goods of any kind, and forward them catalogues and discounts of manufacturers in each line.

All these services are rendered gratuitously in the interest of our subscribers and advertisers; the proprietors of the "Engineering and Mining Journal" are not brokers or exporters, nor have they any pecuniary interest in buying or selling goods of any kind.

GENERAL MINING NEWS.

ALASKA.

ALASKA GOLD MINING COMPANY.—This company was organized recently at Ashland, Wis., by ex-Governor A. P. Swineford, of Alaska, and local men. The property of the company is located about 14 miles from Sitka. Operations will be commenced at once. They have a stamp mill, concentrator and other necessary mining machinery on the ground ready for business, says the *Alaska Mining Record*, and it is reported that they have already mined 800 tons of \$9 ore. The capital stock is \$80,000.

ALASKA TREADWELL GOLD MINING COMPANY.—This company reports its clean-up for the month of July, as follows: Period since last return, 30 days; bullion shipments, \$76,283; ore milled, 20,513 tons; sulphurets treated, 385 tons; of bullion there came from sulphurets, \$22,880; the working expenses for the month amounted to \$22,563. The average yield was \$3.72 per ton of ore milled.

PLACER MINES TRANSFERRED TO CANADA.—It is asserted that the richest gold placer mines of Alaska have been transferred to Canadian territory, and miners are now paying miners' taxes to British authorities. The territory in question is from three to eight miles in width, and embraces the rich placer claims on Glacier and Miller creeks, which heretofore were supposed to be in Alaska Territory.

ARIZONA.

GILA COUNTY.

UNITED GLOBE.—The company owning these mines is making extensive additions to its plant, among which is a 100-ton furnace.

PIMA COUNTY.

CERRO DEL ORO.—A French company is said to have purchased these mines at Racocoe, in the Arizpe district of Sonora, the reported purchase price being 1,200,000 fr. Officials of the company are now en route from Paris to inaugurate active operations at the mines.

YAVAPAI COUNTY.

COMMERCIAL MINING COMPANY.—This company's

smelter at Big Bug is reported to be making one of the most successful runs in its history, and has already turned out 60,000 lbs. of matte.

CALIFORNIA.

AMADOR COUNTY.

(From Our Special Correspondent.)

BELL-WETHER.—This mine is located one-half a mile from Jackson. The work on the new shaft, which is down 65 ft., has been suspended until the engine is placed in position for hoisting. The ore body in this mine is known to be 600 ft. in length and 50 ft. in width. Samples taken from the sides and bottom of the shaft average \$13 per ton.

CALAVERAS COUNTY.

(From Our Special Correspondent.)

MORGAN.—At this mine, on the mother lode, at the summit of Carson Hill, a rich strike has been reported in the south extension. The ore is said to assay very high. This property is being worked by Boston parties.

EL DORADO COUNTY.

(From Our Special Correspondent.)

MARTIN.—This mine, three miles west of Sheep Ranch, employs 30 men. The 5 stamp mill can be run several months on the pay gravel in sight.

MONO COUNTY.

(From Our Special Correspondent.)

GOLETA.—This mine is one of a group composed of the Montecito and Sterling, located six miles northeast of Lundy. A strike has been reported in the upraise from the combination tunnel in the Goleta ground. The ore is fair grade. The working force is to be increased and a new mill erected.

MONO.—This mine has changed hands. The entire board of old directors has resigned and a new board has been elected, consisting of N. Westheimer, S. L. Ackerman, G. C. Hickox, C. E. Paxton and A. Herman. N. Westheimer has been elected president, S. L. Ackerman vice-president, R. G. Brown superintendent and M. E. Willis secretary. The Eastern and San Francisco people represented by Mr. Westheimer now have control of the Standard Consolidated, Bodie Consolidated, Mono, Bulwer Consolidated, Summit and several other mines in the Bodie district.

NEVADA COUNTY.

OMAHA MINING COMPANY.—This company recently purchased the property of the Homeward Bound Mining Company, which adjoins the Omaha on the south. The Omaha has a shaft 1,400 ft. deep, which will furnish a seat of operations for entering the new claim.

(From Our Special Correspondent.)

ORLEANS.—This mine, 1½ miles southeast of Grass Valley, has 15 men employed. The shaft is down 700 ft., and at the 750-ft. level a crosscut will be run.

SAN DIEGO COUNTY.

(From Our Special Correspondent.)

NECTAR.—This group of mines, near Picacho, on the Colorado River, has been bonded by Eastern parties, who propose to develop the property at once. The ore averages about \$35 per ton. A large mill is to be erected on the bank of the river, one-half mile from the mine.

SISKIYOU COUNTY.

(From Our Special Correspondent.)

QUARTZ HILL.—This famous mine, which has been worked for many years, producing several millions from the surface workings, is to be opened up again by San Francisco parties. Several new shafts are to be sunk and a large plant put in.

SHINER.—This placer mine, eight miles below Selad, on the north side of the Klamath River, together with a tract of land below it, has been sold to Denver parties for \$15,000. A ditch and flume are to be constructed to bring water from Thompson Creek to the mine. An 18 in. pipe will cross the river. Ten dollars per day to the man was made while prospecting this ground.

Placer mining in the camps at Oro Fino and Quartz Valley are about ended for the year 1896. Among those which have already made their clean-ups are the following:

DEMING & GARDNER.—Work was partially interrupted upon this mine owing to the sudden death of Mr. Deming. The clean-up amounted to \$15,000.

EASTLICK.—This placer diggings is an old stand-by which for many years has given an annual clean-up of \$15,000. This year it rewarded its owners with \$10,000.

HOBART.—This mine has been worked with two giants since early in January. The ground worked is a 30-ft. bank, and had been standing idle for a number of years. The amount of bullion divided among the owners was about \$7,000. At no time during the piping season were more than three men employed; most of the time but two.

MINES OF THE CHINESE.—Some of these, notably the Montezuma, have had very large yields, but owing to the secretiveness of the almond-eyed Mongolians there is no way of ascertaining the amount of bullion they have secured.

WRIGHT & FLETCHER.—These people piped over very little ground this year, but they have just sent to the mint at San Francisco bullion to the value of \$10,000.

COLORADO.

DOLORES COUNTY.

EMMA.—The lessees of this mine at Dunton have 30 in. of good ore. They are shipping three cars of high-grade ore which, it is said, will run 125 oz. silver and 2 oz. gold. The owners of the Emma have received in royalties in the past three months over \$2,000, which represents 15% of the net output. The first and second levels are now in 500 and 700 ft. respectively, and the ore is improving in quality and quantity.

EL PASO COUNTY.—CRIPPLE CREEK DISTRICT.

(From Our Special Correspondent.)

ANCHORIA-LELAND COMPANY.—This company recently declared its first dividend of one cent per share, which means a payment of \$6,000 to a few persons in Colorado Springs, the stock being well held in that town. The properties show up well. July output was the largest in the history of the mine, the gross output having been close to \$40,000 and the net profit over \$20,000. It is the intention of the company to carry at least \$100,000 in the Treasury.

CHIEF.—This mine, on Raven Hill, has a shaft sunk 260 ft. and gives employment to 22 men. Shipments are regularly made. The vein is situated between two phonolite dykes.

CHRISTMAS.—This mine, adjoining the Legal Tender, has a shaft 217 ft. on a vein 9 ft. wide, 5 ft. of which is pretty well marked with seams carrying telluride. Some beautiful specimens have just been taken out. The vein is phonolite.

C. O. D.—This mine in Poverty Gulch, owned by the Rebecca Company, Limited, Paris, last week made its initial shipments for the year. Shipments may now be expected regularly. The pumps are not yet at work.

DOCTOR.—This property, on Raven Hill, has just communicated with the Raven Hill tunnel at a depth of 360 ft. The vein at that point is 3 ft. wide and assays \$150 per ton. The mine employs 68 men.

ELKTON.—It is stated that the output of this mine for July was \$40,000, of which \$25,000 is net profit.

GARFIELD GROUSE.—This property on Bull Hill, is owned and worked by the Bankers' Mining and Milling Company and gives employment to 18 men. The fight to put the mine in good condition and to be self supporting, after the lessees had "gouged" the mine, is a hard one. The ore is being found mainly in small pockets. The first-class ore samples about 20 oz., and the second class ore about 2 oz. From this 250 ft. of ground the lessees in seven months shipped ores of the value, after deducting freight and smelting charges of \$36,704.89, netting the company as royalties \$10,804.

GENEVA.—This property, on Gold Hill, worked under lease by Tutt & Penrose, is a steady shipper, and gives employment to 18 men. The shaft has been sunk 450 ft., and a drift is being extended north at the bottom to intersect the ore shoot which yielded so much ore above. The drift has been extended 115 ft. on a well-defined vein.

KATHERINE.—This mine has just closed down its workings for a week, but it is stated it will soon resume with the understanding that the Elkton will pump the water. The crosscut at the 412-ft. level has been driven 60 ft. within the West Boundary.

LEGAL TENDER.—This is one of the claims owned by the Golden Cycle Company. During July, 300 tons of \$30 and 50 tons of \$100 ore were shipped from a drift at the 210-ft. level, working 16 men. The shaft has been sunk 250 ft., a 130-H. P. boiler has recently been added to the surface improvements, a 80-H. P. steam hoist and a Norwalk air compressor are on the ground, and will be at work during the present month. This property bids fair to become one of the big producers. Mr. Core, the manager, has been at work on this property for over four years and has done several hundred feet of development work and at last has been rewarded.

RAVEN.—This mine now gives employment to 44 men. The output now is 85 tons a week. The second class ore averages \$30 per ton and the first class about \$55 per ton. The shaft has been sunk 180 ft., and sinking will shortly be resumed. In my notes last week of Raven Hill Tunnel the distance was stated to be 600 ft. instead of 900 ft.

UNION.—This mine, on Bull Hill, is the largest employer of labor there, it giving work to 120 men. This mine, in the hands of an efficient board of directors, who would discard the "penny wise and pound foolish" policy, would soon rank among the first on Bull Hill. The policy of the present board has been to distribute every cent in the treasury as dividends and let the mine take its chance instead of putting the mine in good shape, sinking a new working shaft in the middle of their ground (900 ft. on the vein), equipped with the best of machinery, and opening up the mine in a miner-like manner, as the present manager, who is competent, should insist on. The present working shaft, sunk by lessees, is on the extreme south end of their property, and has been sunk to a depth of 440 ft., the vein being 9 ft. wide. The ore shoots, six in number, are now well developed, and the veins are so nearly vertical that cross-cutting from a straight shaft would be expensive. The stockholders should insist that the mine be immediately put into condition to double the output at the same cost,

and dividends be paid as regularly as at the Victor and Buena Vista.

GUNNISON COUNTY.

NEW MARKET.—A shipment of about 15 tons of high-grade smelting ore was made from this mine recently. Two drifts are being run, one to the east and one to the west, at a depth of 250 ft. About 40 ft. have been run in each direction and the ore body is reported to be better than it was in the shaft.

LAKE COUNTY.

BANGKOK-CORA BELL MINING COMPANY.—At the annual meeting of the stockholders, held in Denver, Colo., on Thursday, August 6th, the following Board of Directors were elected for the ensuing year: James H. Crandell, L. C. DeMorse, N. Q. Tanquary, Louis H. Jackson, W. H. Huff, S. G. Collins and W. Toovey, all of Denver. At the meeting of the new Board of Directors, held August 7th, the following officers were elected: L. C. DeMorse, president; James H. Crandell, vice-president; W. H. Huff, secretary; W. Toovey, treasurer.

The following are extracts from the letter of the secretary in response to a request to the Union Leasing and Mining Company for a resume of the work done the past year in Bangkok-Cora Bell properties:

"The Union Leasing and Mining Company has been developing your properties up to the time of the present labor strike, which began on the 20th day of June last. The work done by it has been upon the upper or first contact. During the past year No. 3 level has been driven over 600 ft. in a northerly direction from the west side of No. 3 level. 'F' level has been driven in a southwesterly direction about 400 ft. to the west side of the Bangkok claim. From the end of this level an up-raise was put up to a height of 73 ft. The work done at the top of this raise developed ore from which shipments were in a small way being made when operations were suspended owing to the labor strike. Lower 3-E stope has been during the year continued northwesterly about 30 ft., prospecting in the large low-grade ore shoot, and a moderate tonnage of smelting ore was shipped therefrom. This stope was connected by a level with 'F' raise. Two raises through hard flint have been put up to a height of about 15 ft. each from the top or roof of 3-E stope. This work developed a small ore shoot containing good shipping ore, and the breasts of the workings in this particular part of the mine is still in ore, though small in tonnage. There is now exposed in your properties large ore bodies, the silver contents of which are not at the present price of silver sufficient to make pay ore. The development by our company has proven that the present ore bodies extend in northwesterly direction for several hundred feet, and also to the southwest from 3-E upper stope. There are exposed several small ore bodies, the average in silver being 40 to 60 oz., and about 15 tons daily could be extracted from these several places. Our company is engaged, or was until prevented by the labor strike, in sinking a shaft about 150 ft. north of the north end line of the Bangkok and about 750 ft. north of the present developed ore body in the face of No. 3 level, which is about 100 ft. north of the Morrissey shaft. This ore body assays from 2 to 8 oz. silver."

(From Our Special Correspondent.)

CLIPPER.—This mine will be started up this week by an entirely new company, thereby inaugurating an enterprise which has long lain idle. They will open up ground which it has been proved is rich in silver and lead. This new project means much to the general prosperity of the camp, and will be pushed ahead actively by Boston and Chicago capitalists. The decision of Judge Hallett in the Circuit Court of the United States in the case of Samuel L. Carleton, complainant, against the Delante Mining Company, defendants, in which the lode location of Mr. Carleton was held to be valid, is one of considerable importance, and sets at rest a controversy as to the validity of the famous Searl placer. The readers of the *Engineering and Mining Journal* will remember one phase of this great controversy by calling to mind the big race for mineral which was made in June of last year between the Delante, the Jason and other shafts on this ground. The owners have spent over \$55,000 in developments on the various lodes, which include the Capital, the Castle, Congress, Villa, Acme, Pilot, Jason, Whale, Neptune and Clipper, all of which have been sunk on an average of 250 ft. to the contact, but now that the question of title is about disposed of, it is intended to conduct operations more vigorously than ever. The lease from the Clipper Mining Company to the Northern Mining Company has been forfeited, and possession is now held by the Clipper Company, which has just granted a new lease to the Leadville Basin Mining Company. This company is headed by J. W. Newall, as general manager; S. M. Carleton, secretary and treasurer, and J. M. Maxwell, president. It is the intention to operate at once both the Clipper and Congress mines. In the former property it will be necessary to pump about a hundred feet of water at once, and as soon as this is done shipments can be resumed.

WELDON.—Since my special telegram of last week concerning the doings at this mine, but little that is new has transpired at this property. Receiver Griffith has taken sole charge of the property, and he found that the miners readily accepted the terms dictated by the court. Receiver Griffith at once commenced shipping ore, and as fast as possible is lower-

ing the amount of mineral in the bins. There is a large quantity of valuable ore blocked out in the Weldon, and it is doubtless the intention to put on additional men to work the property to its fullest extent, just as soon as the ore in the bins is disposed of.

The hope has been expressed that the decision in the Weldon case may be an opening wedge to the settlement of the strike, but whether or not the Weldon decision will prove of any assistance in the settlement remains to be seen. There are numerous rumors afloat to the effect that other properties will take advantage of the scale adopted by the Weldon, and will start up. These rumors, however, can be traced to no reliable source.

PITKIN COUNTY.

MAYFLOWER.—Brown & Caley, the leasers on this property, on Aspen Mountain, made their first shipment a few days ago. It comprised 60 tons, which returned an assay of 100 oz. The road the leasers were building to connect the mine with the Aspen Mountain road has been completed and shipments will be made over it regularly. Five men are at work on the property and the two veins uncovered recently are holding out well.

SAN JUAN COUNTY.

GREEN MOUNTAIN.—Pack trains are busy bringing down ore from this mine. Last month 100 tons were sent to the mill and several tons of first-class ore were sent to the smelters. The mill dirt goes about three and one-half into one, and last month the concentrates amounted to 23 tons.

LA PLATA COUNTY.

(From Our Special Correspondent.)

BROMINATION.—This mill, in Lewis Gulch, started up last month and is running nicely. The erection of this mill marks a new era in the La Plata mountains, as by this method it is claimed 95% of the gold values in the ore is recovered at a nominal cost. The mine owners, Pret, Trasehler & Company, have shown their faith in the possibilities of these mountains. Last year when their mill was completed they had no ores on which to run. The output of the camp at that time being practically nil, but instead of being discouraged they have this year leased and bonded a number of claims, which already, after only about 30 days' work, furnish more than enough ore for the mill.

DURANGO GIRL.—This mine made a shipment last month that sampled first class ore: 126 oz. gold, 763 oz. silver, and second class: 4 1/2 oz. gold, 24 oz. silver. The drift is now in 350 ft., with breast showing some high-grade tellurium ore as heretofore.

GOLD DOLLAR.—This mine is worked under lease and bond by Pret, Trasehler & Company, and shows a good streak of ore.

IRIDOS.—As the lower drift goes into this mine, a marked improvement takes place. The last 15 ft. shows a 6-in. streak of high-grade ore composed of quartz liberally spotted with free gold and tellurium.

LITTLE KATE.—This 20-stamp mill is pounding away on ore that is quarried from the hillside and is doing fine work. Nearly 70 tons of rock are crushed daily, leaving a handsome profit on \$8 ore, as mining and milling are cheaply done here. Reports have it that the total cost of mining and milling does not exceed \$3 per ton, while the saving effected is very great, the tailings, according to the mill assayer, showing only a trace.

MOUNTAIN LILY.—This mine is now a steady producer, the output being about one ton per day, with a force of five men. The ore averages \$90 per ton at the mill.

SHOE FLY.—This old claim, at the head of Tiburcis Gulch, is now worked under bond and lease by Pret, Trasehler & Company, and proving what a little energy backed by capital can accomplish. For many years it has been worked by a tunnel—only assessment work each year—but with no other results than proving the existence of a large vein of low-grade ore. When the leasers took possession they commenced by prospecting the surface for an ore chute with the result that they have a 4-ft. streak of high-grade ore in the shaft, over which a hoist is now being placed.

SMALL HOPE.—This is also worked under lease and bond by the above parties and with a force of eight men is producing about three tons per day of \$60 ore. The shaft is down 135 ft., but as soon as a pump is placed to handle the water, sinking will be resumed.

YANKEE GIRL.—This mine, at the head of Lewis Gulch, has in times past produced some very rich ore from small pockets encountered. It is now worked by Pret, Trasehler & Company, who will be able to profitably treat the low grades from this property, as the location is near their mill.

PARK COUNTY.

NEW YORK GROUP.—August Rische, owner of a third interest in this group, recently made a new discovery there which promises to pan out well. The New York is located at the head of Mosquito Gulch, very near the summit of Mosquito Pass, and is one of the highest mines in the State, the altitude being about 13,000 ft.

GEORGIA.

LUMPKIN COUNTY.

LOCKHART.—E. E. Crisson has leased a part of this gold mine at Dahlonega and will develop it.

IDAHO.

BLAINE COUNTY.

FORTUNA MINING COMPANY.—The tailing works of this company will be ready to be started up by September 15th. The works will use the cyanide process. There will be four oblong and 22 circular tanks. The oblong tanks will be 30 ft. long, 3 ft. wide and 2 ft. deep; the circular tanks 36 ft. in circumference, 11 ft. 6 in. in diameter, and 50 in. deep. There is said to be fully \$150,000 worth of tailings at the dump.

LATAH COUNTY.

CHECKMATE.—An important discovery is reported in this mine, in the Willow Creek District. Two feet of ore has been opened in a crosscut at the bottom that runs \$700 per ton in gold. The mine has been shipping regularly for some time, and the ore taken out is of good grade. The property is owned by F. L. Chapin, of Ogden, Utah, and a number of Union Pacific officials.

OWYHEE COUNTY.

DELAMAR MINING COMPANY.—The report of Capt. John W. Plummer, the manager for June, states that very little prospecting work was done until the last week in the month. In the milling department operations were resumed on June 9th, the first two days being spent in treating the accumulations of the pulp in the tanks. From then on until the end of the month the mill worked regularly. The work performed during the months of May and June was as follows: Crushed (wet), 3,087,96 tons; crushed (dry), 2,779.16 tons; assay value of the pulp, \$19.96, of which \$13 was in gold and \$6.96 was in silver; assay value of the tailings, \$5.66; percentage saved, total, 71.64%; Dore bars produced, 13; number ounces pure gold produced, 1,158.799; number of ounces fine silver produced, 23,367.16; value of gold produced, \$23,175.89; value of silver, \$15,188.63; ore sales, \$4,775; miscellaneous revenue, \$414.95; total receipts, \$43,554.47; expenses, \$37,389; estimated profits for two months, \$6,165.47.

SHOSHONE COUNTY.

HELENA & FRISCO MINING COMPANY.—This company is shipping about 50 tons of high-grade concentrates a day, and is milling about 500 tons of ore in the same time. A new 150-H. P. engine is being added to the plant at the mine and another pump is being put in. The regular monthly dividend, amounting to \$30,000, has just been declared.

POORMAN & TIGER CONSOLIDATED MINING COMPANY.—This company's mill at Burke is nearing completion and the machinery is now being placed. A 150-H. P. Corliss engine is to furnish power when water is insufficient. It is believed that everything will be ready to run by the middle of October. In the mine the water is being lowered about 5 ft. every 24 hours.

ILLINOIS.

KANKAKEE COUNTY.

GARDNER WILMINGTON COAL COMPANY.—The boiler rooms and buildings of this company, at Clarke City, were destroyed by fire on August 7th about 10:30 a. m. The mine was working a full force. By the destruction of the machinery and hoisting apparatus 300 miners were entombed 500 ft. in the earth. The miners were placed in great peril by the shutting off of the supply of air. For a short time there was much excitement in the village among the friends and relatives of the imprisoned men. As soon as the fire had completed its work the miners escaped by climbing the long ladders in the air shaft. All of the men escaped without injury, none the worse for their experience.

KANSAS.

CHEROKEE COUNTY.

(From Our Special Correspondent.)

ADAMS & COMPANY.—On the Masten land this company is working only at shaft No. 2, where they are drifting at 96 ft., on a large face of lead and jack in hard ground and obtaining 20 tons of zinc ore and 20,000 lbs. of lead each week. They have developed a fine body of ore at 107 ft. in another shaft which they will work as soon as the company drains the ground.

BATTLEFIELD LEASE.—The A. L. Huff plant is running double shifts at present. During the day dirt is hoisted from his shaft, which yields over six tons of zinc ore each shift. At night he concentrates ore from the John Henry and Mary Anne shafts, and makes more than 8 tons of high grade zinc ore each shift. The plant is equipped with an electric dynamo which furnishes light.

BOUGHTONS.—This plant on the Midway lease is running steadily on rich dirt, and is producing about 8 tons of zinc ore each shift.

CROWN POINT.—This plant started up last week. They have a large face of ore at 115 ft. and will produce about 40 tons of zinc ore each week. The Freeman plant is running steadily on rich dirt and producing 7 tons of zinc ore and 7,000 lbs. of lead every 10-hour shift. The output of the North Empire lease for the week ending August 1st brought \$14,522, making the largest yield so far from the lease. This lease has been remarkable for the number of paying mines on it, and every shaft that has gone down 120 ft. has struck ore in paying quantities.

DANSINGBERG.—This plant started up last week. They hoist dirt from three different shafts, and will obtain about 75 tons of zinc ore and 50,000 lbs. of lead each week.

DEGRAFF BROTHERS COMPANY.—This lease is coming to the front as a producer, and so far every shaft that has gone down 115 ft. has struck ore in paying quantities. The company has a large pump that drains the ground thoroughly and furnishes water to wash the ore.

MATTHEWS & COMPANY.—These parties have leased 80 acres of the Bonanza land, and at present are hoisting from one shaft at 115 ft. They have several shafts in which they could drift on a large face of ore, but the one shaft keeps their plant mining steadily. They are obtaining 15 tons of zinc ore every shift. The ground had never been prospected for a lower vein of ore until Mr. Oliver Mathews took hold of it, and he has developed several bodies of ore at a little over 100 ft.

MCKINLEY COMPANY.—At this mine, on the Gault & Harrison lease, rich dirt is being hoisted, and this week about 75 tons of high-grade zinc ore will be obtained.

NORTH EMPIRE LEASE.—This company's plant is running day and night. During the day they concentrate the ore from their shaft, where they are drifting at 98 ft. on a 50-ft. face of lead and jack in shooting ground. They are producing 100 tons of zinc ore and 50,000 lbs. of lead each week. At night they concentrate ore from the other mines on their lease.

WHITE SWAN COMPANY.—At this company's shaft on the Richland they are hoisting very rich lead dirt that makes from 6,000 to 8,000 lbs. of lead each shift. They are drifting at 105 ft. in a large face of ore.

MISSOURI.

JASPER COUNTY.

(From Our Special Correspondent.)

JOPLIN ORE MARKET.—The ore market is still feeling the effects of an unsettled business condition. Zinc ore dropped to \$21 per ton, with an average of a little more than \$19 per ton. The surplus ore has nearly all been bought and shipped and the output of zinc ore last week was a little larger than the week before. The sales of ore for last week were \$666 more than the week before. The continued hot weather had a tendency to reduce the output. The price of lead dropped to \$14.50 with the usual 50c. for hauling. On account of the low price of lead quite a number of the operators have quit working their lead ground. There is a prospect that lead will go considerably lower, as the St. Louis quotation was \$2.55 per 100 lbs. for pig lead and the market was unsettled and weak. The following was reported from the different camps: Joplin zinc, 1,216,260 lbs.; lead, 131,440 lbs.; value, \$14,069. Webb City zinc, 300,080 lbs.; lead, 46,840 lbs.; value, \$3,552. Cartersville zinc, 938,690 lbs.; lead, 237,700 lbs.; value, \$12,476. Galena, Kan., zinc, 2,700,000 lbs.; lead, 398,900 lbs.; value, \$28,671. Mt. Vernon zinc, 26,710 lbs.; value, \$887. Oronogo zinc, 41,100 lbs.; lead, 5,490 lbs.; value, \$499. Zincite zinc, 16,710 lbs.; value, \$150. Totals for the district: Zinc, 5,303,550 lbs.; lead, 830,350 lbs.; value, \$60,319.

CENTER CREEK COMPANY.—This company's pumps are at work day and night, and are steadily lowering the water. When they get the water down so that the large pumps can be repaired, they will get the water out in a short time. Some of the miners have commenced to work the upper ground, and they will make a good turn-in every week. Several of the plants are working over the dump piles.

CENTER VALLEY COMPANY.—The seven pumps on the Oronogo bottom were started up last Monday, and after a few days were run steadily. In the course of a couple of weeks a heavy output of ore may be looked for from these mines. They have been idle for more than a year on account of litigation and high water.

DICKEY & COMPANY.—This plant is mining steadily on rich dirt and is producing over 25 tons of zinc ore each week. They are drifting at 128 ft. on a large face of red pebble jack in timbering ground and enough water to run their plant.

MCGILL & COMPANY.—These parties are drifting at 155 ft. on a 9 x 50 ft. face of lead and jack in hard ground, and are obtaining over 50,000 lbs. of lead and 10 tons of zinc ore each week.

NORTH STAR COMPANY.—The North Star plant is running steadily on rich dirt, and last week produced 45 tons of zinc ore. They are drifting at 175 ft. on a large body of zinc ore in shooting ground. They have a good run of zinc ore at 185 ft., but are unable to work it, as the water is up to the 178-ft. level; but it is going down.

REED & COMPANY.—This property, on the Midway lease, is mining steadily on rich dirt and yielding 10 tons of zinc ore each week. They are drifting at 135 ft. on a 12 x 16 ft. face of ore in timbering ground. This mine has been a large producer for a long time, and usually they have been mining double shifts.

VERNON COMPANY.—This company, on the Troup land, is mining its plant steadily on rich dirt, and producing about 25 tons of zinc ore every week. This mine has been a large producer for over 6 years, and has never missed a pay day. They are opening up a large face of lead and zinc ore in hard ground at 185 ft., and are getting their drifts in shape to handle large quantities of ore.

MONTANA.

DEER LODGE COUNTY.

CABLE.—This mine has been started up again after being idle for several years. Recent borings by Mr. Savary, owner of the mine, have proved it to contain quantities of high-grade ore.

SOUTHERN CROSS.—This mine has been put in shape for active work, and operations will be started soon.

JEFFERSON COUNTY.

FREE COINAGE, LIVERPOOL AND LITTLE NELL.—The men at these mines are on a strike on account of the owners of the mines not allowing them to board where they pleased.

LEWIS AND CLARKE COUNTY.

DIAMOND HILL.—This mine is reported to have been sold to a Scottish syndicate for \$2,000,000.

MADISON COUNTY.

EASTON.—This mine, situated about six miles southwest from Virginia City, is owned and operated by Major Henry Elling, of Virginia City. The vein has been followed down to a depth of 400 ft., and has enough ore in sight to keep the present force of 75 men employed for two or three years. The foundation for a concentrator is being laid, and the structure will be completed in about six weeks.

KNOX.—Knox & Reale are said to be taking out rich ore from this mine near Norris. The shaft is down 200 ft., and a good vein has been encountered. The mine is shipping about two cars of ore a week.

RAVALLI COUNTY.

CURLW.—A. M. Holter, who is interested in this mine, says the company is now milling from 120 to 130 tons of ore daily. Nearly all the best ore has been taken out of the present workings and the owners expect soon to commence to lower the shaft another 100 or 200 ft.

SILVER BOW COUNTY.

JONES PLACER.—John G. Currie, through his attorneys, Carroll & Leehey, recently commenced an action against the Montana Central Railway Company to recover possession of an interest in this placer ground located near South Butte, and for \$5,000 damages. The complaint in the case alleges that the plaintiff and defendant have been owners in common in the property since 1887, the plaintiff owning a third and the defendant two-thirds. It is alleged that on October 4th, 1887, the defendants, without the plaintiff's consent, wrongfully entered upon the ground and took exclusive possession of it and has ever since withheld it from the plaintiff, and has built numerous lines of railroad, switches, stockyards, etc., on the ground. The placer is said to be valuable as mining ground, the exact value of which is unknown. The court is asked to let plaintiff into possession with defendant to the extent of a third interest, and to decree him entitled to \$50 a month as his share of rental value, \$150 a month, from October 4th, 1887.

MOONLIGHT AND BLUE JAY.—A big mining deal has recently been consummated in Butte, James A. Murray having received from D. G. Bricker a check for \$360,000 in full payment of the bond on the Moonlight lode and the east 500 ft. of the Blue Jay claim. The two claims were bonded to Mr. Bricker nearly a year ago. Extensive development work has been in progress ever since. Two shafts have been sunk and a vein 60 ft. in width has been opened up, 8 ft. of which, it is said, will assay 40% in copper.

NEVADA.

LINCOLN COUNTY.

OLD TIMER.—The first shipment from this mine which is now being operated by Mr. W. V. Rice and others, of Salt Lake City, Utah, was made recently. It consisted of a carload of ore that, report says, carried 40% lead, 60 oz. silver and \$17 in gold. The mine has been known and worked for a great number of years.

NEW MEXICO.

COLFAX COUNTY.

GOLDEN AJAX.—The result of two weeks' run of a 10-stamp mill on ore from this mine on Old Baldy Mountain was \$1,250. The ore is magnetic iron, quartzite, and sulphides and is said to run from \$8 to \$45 per ton. A tunnel driven 76 ft. across the vein has not reached the hanging wall.

TAOS COUNTY.

FRASER GROUP.—The sale of this group of gold and copper mines in Rio Hondo mining district to an English syndicate represented by Mr. Thomas B. Gillespie for \$100,000 in cash and \$25,000 in stock is reported.

RIO HONDO COPPER MINING COMPANY.—This company, of Santa Fe, has been organized. Incorporators, Thomas B. Gillespie and Wilber F. Smith, residents of Taos, and William B. Cameron, a resident of Amizett; capital stock, \$5,000,000; life, 50 years; directors, Thomas B. Gillespie, Wilber F. Smith, William B. Cameron and Gustavus S. L. Smith, of Oregon; principal place of business, Santa Fe, with Geo. W. Knaebel as resident agent.

NEW YORK.

WESTCHESTER COUNTY.

CLAY BED.—A company has been formed at Sing Sing to commence the manufacture of glazed tile or brick on Croton Point. Its members have found a peculiar kind of clay at the bottom of the Hudson River, which they say surpasses anything ever before found in the country for taking the glazing

without cracking or having other defects. The officers are John Gibney, president; Albert W. Twigger, vice-president; Henry D. Swain, secretary; Smith Lent, treasurer; and Herbert Morehouse, superintendent.

OREGON.

BAKER COUNTY.

TOM PAINE.—The test run of 25 tons of ore from this mine is said to have resulted in 87 oz. of amalgam, which, when retorted and reduced into a gold brick, weighed 43½ oz., worth \$18.60 per ounce.

GRANT COUNTY.

BLACK BUTTE MINING COMPANY.—This company is making preparations to begin work on a more extensive scale. The company recently bought out all persons with whom it was involved in litigation.

MAGNOLIA GROUP.—This group of gold mines, in the Granite District, owned by Conde, Coyle & Jones, is reported to have been bonded to Henry Lonmaid, lessee of the Eureka and Excelsior mines, for \$40,000.

LANE COUNTY.

CHAMPION MINING COMPANY.—Mr. George Weatherston, the newly appointed manager of this company's mine, received instructions recently to resume development work at once.

UNION COUNTY.

A large placer mining deal was consummated recently. The property is the extensive placer grounds located on the headwaters of the Grande Ronde River in the southern part of this county. A number of locations, which cover a distance of about 6 miles, were syndicated last year and French capital was interested. In consummating the matter it is said about \$200,000 changed hands.

PENNSYLVANIA.

ANTHRACITE COAL.

LEHIGH COAL AND NAVIGATION COMPANY.—This company has made connections with the Logan and Centralia underground workings so that the former's output can be prepared for market through the Centralia breaker until the Logan breaker, which was burned to the ground on August 8th is rebuilt. By taking such action, 600 miners will not be compelled to remain idle.

LOGAN COLLIERY.—The Lehigh Valley Coal and Iron Company's large colliery breaker at Centralia, valued at \$90,000, was burned August 8th.

BITUMINOUS COAL.

Alfred Graham and W. A. Porter, of Clearfield, have just closed a deal with Robert Stewart, of Surveyor Run, for a tract of 3,000 acres of land in Girard township, Clearfield County, the consideration being \$40,000. The land is almost entirely underlaid with coal, and, in addition to a large sawmill and other buildings, there is a large lot of sawed lumber on it. On the tract there are 12,000,000 ft. of hemlock, 6,000,000 of white pine, 2,000,000 of white oak, 1,000,000 red oak, and about 70,000 railroad ties.

SOUTH DAKOTA.

CUSTER COUNTY.

One of the richest gold properties ever opened in the hills near Custer City, has been sold to Eastern parties for \$75,000. The find was made by William Farrant and Ed. Rogers, who located the ground in September of last year. Since they made their find the discoverers have preserved the utmost secrecy, and the news of the find comes with that of its bonding. It is a contact vein, and at the surface is some 12 ft. in width, with a seam of exceedingly rich granulated quartz over 2 ft. in width. The vein has been opened for 50 ft., and can be traced for a mile or more. Quartz taken from the outcroppings assays from \$585 to the ton up to \$2,500, and at one point all the quartz shows heavy free gold, distributed throughout the body of the vein.

DEMEREAUX MINING COMPANY.—This company was recently incorporated with \$5,000,000 capital. Its claims are at Pringle, south of Custer, where it has 21 locations. There is a ledge of ore 150 ft. wide, carrying gold, silver, copper and lead, and showing values of from \$4 to \$60. The vein is traceable on the surface for 4,000 ft., and little exploration has been done underground. A 400 ft. tunnel is being driven into the mountain, which will strike the vein 300 ft. down.

LAWRENCE COUNTY.

DEADBROKE.—The new tunnel on this mine is being extended at the rate of 6 ft. per day and the daily output of ore is nearly 20 tons. Three thousand feet of endless cable is being put in for the handling of the ore.

GOLDEN REWARD COMPANY.—This company has ordered an additional tank for its mill, which will increase the capacity 20 tons per day, giving the plant a capacity of about 150 tons every 24 hours.

HAWKEYE MINING & MILLING COMPANY.—This company, at Pluma, is treating from 40 to 60 tons of ore daily, with enough in sight, it is said, to guarantee a continuous run.

PENNINGTON COUNTY.

(From Our Special Correspondent.)

EGYPTIAN.—The suspension of work under the bond upon this and adjoining claims situated in the Keystone District, between the Keystone and Bismark mines, is said to be due to a disagreement between the promoter who secured the bond and the

parties who were furnishing the money. The story has it that the promoter was reserving for his personal benefit two of the claims included in the proposition, and when his principals learned of this fact, they refused to put up more money.

GOLDEN SUMMIT.—It is now authoritatively stated that this company will undertake no exploration of their property, under the direction of Dr. Rothermel. Parties connected with the company state that this expert's researches made in the line of the alleged affinity of gold for gold have resulted in the finding of no deposits of value. The company, it is said, will hereafter discard the divining rod, and fall back upon the primitive pick-and-shovel method of prospecting.

J. R.—The new shaft upon this property has reached a depth of about 135 ft. Mr. F. C. Crocker, who is exploring the ground in the belief that there are other pay chutes than the one lost below the 200-ft. level in the old workings will sink his shaft to a depth of 200 ft. unless the ledge is sooner encountered and then crosscut. Surface workings indicate the presence of several veins, some of which carry high values, and as the new shaft is well down the hillside, any ore body opened by the proposed drifts will have a depth exceeding 300 ft. The result of this systematic exploration is awaited with the greatest interest.

JUNIPER FRACTION.—During the month of May the discovery of a very rich vein was announced upon this property, lying about two miles west of the Keystone gold camp, and at no great distance from the Legal Tender and Ram's Horn gold properties purchased years ago by the Harney Peak Tin Company and allowed to remain undeveloped during the entire period of tin exploration. Something like \$2,000 worth of ore, it is said, was taken from a 26-ft. shaft upon the Juniper. The property was then bonded to a Minnesota investor at a price stated at \$60,000. A cash payment of \$3,000 was made for the privilege of exploration, and \$4,000 was deposited for development. During the past week a tunnel was driven into the hill side, upon which the Juniper is situated, running with the formation, a heavily mineralized and very hard slate rock, which, during the past week, encountered the ledge at a depth of about 70 ft. The driving of this tunnel was freely criticized by mining men; but as the ledge at a depth of 60 ft. below the discovery shaft is found to be about 7 ft. in width, with well-defined walls and fully as rich as at the surface, the method of development is justified by its success. The entire vein matter carries from \$5 to \$10, and a seam 18 in. wide, the same from which the bonanza rock was taken at the surface, yields an abundance of specimens and high-grade ore. The bonanzas are now drifting upon the ledge, and will soon begin stoping and milling ores, with an excellent prospect of taking out a large part of the remaining payments before the expiration of the bond. The Juniper is now regarded as one of the best properties in the Keystone District, not excepting such producers as the Holy Terror, Keystone, Bullion, Bismark and Custer.

KEYSTONE.—For some time past this company has been shipping concentrates to outside smelters. The seven-mile haul, sacking, freight and smelting charges consumes a considerable percentage of the values, and the directors have decided to put in a cyanide plant at the mill. The construction of the works will begin immediately, and will be done under the charge of McArthur & Forrest, experts connected with the Black Hills Gold and Silver Extraction Company, of Deadwood.

NEW ELDERADO.—Work in a limited way continues upon this promising claim, located in the Palmer Gulch District. The Eldorado established a record for \$25 ore by a mill-run early in the season upon ores taken from surface workings above 20 ft. in depth. The owners, declining the proffers of assistance in development, are working under present disadvantages, determined to make the property pay its own way. They now have some 50 tons of ore upon the dump, and will make another mill-run at the J. R. mill about the 15th of August.

TENNESSEE.

JEFFERSON COUNTY.

J. E. Gardner has found valuable deposits of zinc on his property at Friend's Station, and will develop the same, erecting a 50-H. P. mill for turning out blende.

KNOX COUNTY.

T. S. GODFREY MARBLE COMPANY.—This company has been incorporated with capital stock of \$50,000, by T. S. Godfrey, J. E. Hart, J. E. Willard and others, to continue the business of T. S. Godfrey, of Stennett Marble Company, and of Gray Knox Marble Company. The company is now only quarrying, but has privilege to saw and finish marble, etc.

MAURY COUNTY.

It is reported that a very rich find of phosphate has just been discovered a short distance from Columbia. The find is thought to be a solid bed two miles wide, and five miles long, the railroad following it almost its entire length. Dr. Swofford, the state geologist, analyzed the new find, and it is said pronounced it the richest that has been discovered in this country.

TEXAS.

BASTROP COUNTY.

Mr. C. Lasker has opened and commenced work.

ing his coal mines near Elgin. The coal is said to be of excellent quality and semi-bituminous in variety, and the vein being worked at present is 4½ ft. thick. The mine has recently been equipped with a complete modern mining plant.

UTAH.

BEAVER COUNTY.

MONTREAL MINING AND SMELTING COMPANY.—At the annual meeting of the stockholders of this company held in Salt Lake recently, C. P. Mason was elected president, C. M. Freed, vice-president and J. M. Breeze, secretary and treasurer. At the same time Joe Farron was made the general manager of the company, and it is promised that work will now be prosecuted with great regularity. The property is essentially a copper proposition, although associated with that metal are gold and silver. Last spring the company began the sinking of a new shaft, with which to tap the ore body below the water level, and which has now reached a depth of 360 ft. from the surface. The destination of the shaft at present is a level of 600 ft.

JUAB COUNTY.

YANKEE GIRL.—Reports from Silver City denote a strike in this mine in which the old workings are again encountered, and in which 2 ft. of ore that yields as much as 40% lead, 40 oz. in silver and gold of the value of \$1.60 a ton are exposed. The ore is said to have been discovered in a drift running from the new workings on the property, and at a depth of 225 ft. from the surface.

SALT LAKE COUNTY.

DALTON & LARK MINING COMPANY.—A strike was made last week in a crosscut from No. 4 shaft on the Dalton, and at a depth of 350 ft. from the surface. The ore, consisting of a fine gray carbonate, was encountered on the foot wall. On the 600-ft. level the ore body has been expanding with each shift, until in the breast of the workings are now 7 ft. of ore. From this level an upraise is being made.

VAN PATTEN GOLD & COPPER MINING COMPANY.—This company has filed articles of incorporation in the office of the county clerk. Capital stock is \$200,000. The life of the incorporation is for 50 years, and the principal place of business Ogden. The officers, directors and incorporators are as follows: A. Van Patten, president; William Pearce, vice-president; Thomas Champneys, secretary, and A. C. McKinney, treasurer; these, with T. D. Johnson, form the Board of Directors. The property of the company consists of a number of mining claims in the Argenta mining district, Utah, which are said to be rich in gold and copper. It is the purpose to develop the claims at once.

WINAMUCK.—The shaft at this mine in the Bingham district, which is being put down to the ore body that has been disclosed on the upper levels has now attained a depth of 250 ft., and is going down at the rate of 4 ft. a day.

UTAH COUNTY.

KALAMAZOO.—Two shifts are working regularly at this mine. The labor being carried on is principally that of development work. The Kalamazoo miners have left the old workings and are now running in a southwesterly direction through new ground, leaving the old Sweeney works to the north and thereby cutting off about 400 ft. of them. This mine produced in 1890 and 1891 two carloads of float averaging 67 oz. in silver and 75% lead. The object now is to find the vein from which the float came. The present owners are Margetts Bros., John Peters, John C. Cutler and the heirs of W. H. Brown estate.

VERMONT.

ORANGE COUNTY.

ELY COPPERFIELD MINING COMPANY.—All the mining property owned by the Copperfield Mining & Smelting Company, formerly of Veshire, the mines of which have been in operation since 1820, have been purchased by a syndicate of New York and Boston capitalists. The new company is incorporated under the above title with head office in Boston.

WASHINGTON.

KING COUNTY.

SEATTLE COAL AND IRON COMPANY.—This company's bunkers have not been unusually pressed. A new vein of coal 9 ft. wide, was struck close to Newcastle and in consequence the output of the Newcastle mines has been increased 25% in the past month. The coal has been tested and found of superior quality. Cargoes have been taken to San Francisco by the steam collier "Willamette" and the steamer "City of Puebla."

PIERCE COUNTY.

TACOMA SMELTING AND REFINING COMPANY.—This company's product for July was 4,200 bars bullion, weighing 433,381 lbs., containing 2,705.31 oz gold, valued at \$55,919; 26,026.96 oz. silver at 68½c. per ounce, or \$17,828; 431,412 lbs. lead at 2.85c. per pound, or \$12,295, a total of \$86,042. There were 80 men employed, and the pay roll was \$5,747, and for woodchoppers and teams \$853, a total of \$6,600.

SPOKANE COUNTY.

At the last regular meeting of the Executive Committee of the Northwest Mining Association in

Spokane, the matter of a convention to be held early in October was thoroughly discussed. All of the mining districts of Washington, Idaho, Oregon, Montana and British Columbia will be represented.

The session of the association will occupy three days, and no pains will be spared to make it a representative meeting. Distinguished mining men from all the sections will be present and address the convention. The association has taken charge of the matter of making a mineral exhibit in connection with the fruit fair. Assurances have been received from all the districts in the jurisdiction of the association that they will surely be represented.

WEST VIRGINIA.

BELMONT COUNTY.

T. M. Barnsdale has purchased several thousand acres of oil lands, it is reported, and will develop them.

WOOD COUNTY.

Ogden Bros. of Ogden, have sold their farm of 156 acres to a company of Warren, Pa., operators, for \$145,000 cash. The farm has seven producing oil wells.

WYOMING.

SHERIDAN COUNTY.

FORTUNATUS MINING AND MILLING COMPANY.—A receiver has been appointed to take charge of this company, operating at Bald Mountain. It is said this action was not taken with any desire to embarrass the company, but simply to secure the creditors, and get an early settlement of accounts.

FOREIGN MINING NEWS.

BRITISH COLUMBIA.

(From Our Special Correspondent.)

CALIFORNIA.—This company, which has recently been reorganized with Mr. Lorenz as one of its chief promoters, has made a beginning for this year. The property is situated on Red Mountain, west of the Josie and Black Bear. The ledge is well defined. A tunnel was excavated through the ledge a distance of 56 ft. The work then stopped.

Lately the company has been preparing for considerable development work. A blacksmith and an assistant are now on the ground erecting a workshop and the tunnel is to be extended 200 ft., with a Burleigh rock drill. The California's location is regarded as one of the best in the camp.

Mr. Lorenz is temporarily absent just now, but on his return more particulars are promised. The situation of this property close to the Northport road, and only a mile from Rossland, to say nothing of its surface showing, invest it with special interest.

CITY OF SPOKANE.—The management of this property refused to give any information and curtly declined to discuss the matter. Judging from appearances considerable progress has been made with development work.

JUMBO.—This property is situated on the Jumbo Mountain, a spur of the Red Mountain, and it is located between the latter and O. K. Mountain. Its situation is favorably regarded by experts, among whom is Dr. Dawson, of Ottawa, who thinks that some very radical disturbance has taken place in the draw where the Jumbo Mountain is situated. Dr. Dawson visited this property on Saturday last, and expressed himself as highly pleased at the prospects of the company. The Jumbo some months ago created an excitement by the discovery in one of the tunnels of a large ore body. Your correspondent, having visited this property nearly a year ago, was enabled to make some comparisons. Then there was a shaft 15 or 16 ft. deep and the commencement of a tunnel. Now the shaft is down to a considerable depth, and tunnel No. 1 is 125 ft. deeper than the shaft. The first ore body was encountered at a distance of about 120 ft. and its direction is west. The management is now directing the work of a crosscut which will connect the shaft with the tunnel. There are two distinct ore bodies and the foot and hanging walls are well defined. One of these ore bodies is 15 ft. wide and the other 25 ft., and the value runs from \$15 to \$25 per ton, though there are some assays which run from \$30 to \$150. "There are stringers," said Mr. Haskins, the superintendent, "which run from half an inch to 18 in. wide. The total depth of tunneling and shafting is 450 ft."

Every thing about the Jumbo denotes prosperity. Comfortable quarters for the men have been erected, as also have been other buildings including the company's office. The company recently had a road cut 6,200 ft. from the mine to the Northport road. Two shifts of men are at work, comprising 14 in all. The management has not permitted any exaggerated reports to go out concerning the mine and its prospects. It has recently been examined by many experts, who have expressed their astonishment. Jumbo stock has been continually advancing, until it is now slightly above the par value figure, \$1.05 being the last quotation. The president of the company is J. S. Finch, M. R. Galusha is general manager, and W. H. Haskins, mine superintendent. Their headquarters are at Spokane, Wash.

Since the foregoing was written your correspond-

ent paid a second visit to the Jumbo. While there the men in the west crosscut uncovered the main ore body already found in the tunnel.

In company with Mr. Haskins, the superintendent, your correspondent entered the tunnel and made an examination of the exposure. It is a solid body of ore, at least 20 ft. in width. An assay will at once be made of this ore body. Assays of another part of the same body have already reached \$25 per ton. Whether these figures will be increased or not remains to be determined. One thing seems to be well defined, and it is that the ore body has lost nothing in size in the crosscut.

NEVADA and HIGH ORE.—The tunnels of these properties are situated close to the line of the Jumbo and near the works of the latter. The showing of these properties so far is said to be very good. Considerable development work has been done on both properties. This portion of the camp is fast rising in importance, and another year will undoubtedly place it with the advanced part of Red Mountains.

The Le Roi Mining Company is constructing a flume to carry good water from the Jumbo Mountain to that portion on its property whereon is to be erected the new compressor plant. The distance is at least a mile and a half.

ROSSLAND DISTRICT.

(From Our Special Correspondent.)

O. K.—A special visit to this mine, which is situated on O. K. mountain, about 2½ miles from Rossland, close to the Rossland and Northport road, was made yesterday by your correspondent. Mr. Warner, the chief superintendent of the mine, is at present absent on the coast. Mr. Newman, the mine foreman, is in active charge.

The site of this mine, located as it is on the side of the O. K. Mountain which towers high into the heavens is familiar to those who have jaunted by stage over the Northport Road. It is a great mountain, far loftier and more imposing than Red Mountain itself, but it has not yet reached the fame of the latter, but many predict for it a great future.

The history of the O. K. mine is familiar to many readers of the *Journal*. It is the only mine in the camp which has used a stamp mill—there being a bluish white quartzite which carries more or less free gold; it is called in the camp, according to Western phraseology, a free-milling proposition.

The present management of the O. K. began last fall, and under it the company has made considerable progress. The mine has been a constant shipper. It has shipped much of its ore to Tacoma, and recently it shipped about 30 tons to the Trail Creek smelter.

The O. K. ledge is about 7 ft. wide. The ore will average a width of 5 ft. The system of tunnels begins with the lowest level. There are three or these 11, 12 and 13, the first is in 200 ft., and the other two are in 400 ft. They all show a good ore body. The distance between 11 and 12 is about 120 ft. and that between 12 and 13 is 90 ft. Including a cross cut of 2.75 ft. the extent of ground penetrated is at least 1,500 ft. Viewed from the forks of the Northport and Jumbo road the buildings and work of the O. K. present the appearance of an industrial village.

The O. K. has, heretofore, been run with a five-stamp crusher, but this year is witnessing a great change in the plant of the mine. On a lower level from the old mill cite the foundation walls and the frames of the new buildings are already completed as well as the brick work for a 7-drill air compressor.

The new mill is adapted for 20 stamps, but it will for the present only contain 10. The dimensions of the mill complete are 92 by 46, which will comprise boiler-house and engine room. About 83,000 ft. of lumber will be used in its construction. The prospects of the company are steadily advancing, and they are equal to the occasion. The stock of the company has advanced at least to 35c., the par value of shares being \$1.

The new mill will be within 200 ft. of the Northport and Rossland branch of the Nelson & Fort Shepherd Railway, and its shipping facilities could not be better.

In its operations in the tunnels the company are using a diamond drill, and the general outlook for the company is very promising. Its producing capacity for the present year will at least be trebled and the output will probably be double that of last year.

SOUTH BELT.—One of the most important sales that has taken place in the camp was arranged for at the close of last week. No fewer than 14 claims in the South belt have been sold by the recent owners, Messrs. Carpenter & Soules, to ex-Mayor White, of Seattle, and his partner, Mr. Juffe. These mineral claims have heretofore been known as the Monterey, the Edera, J. and J. Jennie, A. B. C., Sidney, Mountain Lion, Philadelphia, Roman Eagle, London Belle, Sea Gull, S. and C., First Cliff and Early Worm. White and his associate have purchased a two-third interest in these claims for the year of \$12,000, but I have been unable to verify the figures. One-fifth has been paid down. This group lies close to the line of the Columbia & Western Railway, having the Mayflower and Lillie May to the west. They comprise an area equal to, if not greater, than a whole section.

The development of these claims, I have been informed from a reliable source, will begin within the next two weeks.

SLOCAN DISTRICT.

SLOCAN STAR.—In June 1, 140 tons of ore and concentrates were shipped from this mine. A new vein has been discovered in No. 4 tunnel. A drill compressor and plant has been ordered from the Rand Drill Company, and will be at work as soon as possible.

TRAIL CREEK DISTRICT.

WAR EAGLE.—The latest reports from this mine are to the effect that in the No. 2 tunnel there is a chute of ore 280 ft. long and 8 ft. wide, which will net \$35 a ton. There are said to be 60,000 tons in sight in this chute.

CANADA.

ONTARIO.

MIKADO.—John A. Paterson, a Toronto lawyer, has purchased this mine, at Rat Portage, on behalf of an English syndicate, paying for it \$25,000 cash.

CHILE.

A new nitrate syndicate has been formed in London. It is styled the Solar del Carmen Nitrate Syndicate and has a capital of £110,000. The purpose is to acquire the nitrate grounds in the Province of Tarapaca, Chile, from which the syndicate derives its name. The business will consist of mining, manufacturing and exporting nitrates, iodine and other products. The first directors of the syndicate are Wm. T. Morrison, Alfred Naylor, A. Williamson and Joseph Macandrew.

MEXICO.

LOWER CALIFORNIA.

VIZNAGO.—H. F. Hartzell, secretary and treasurer of the company, reports a rich strike in this mine, situated in the Alamo District, on the 200 ft. level. The shaft is now down 265 ft. and \$56,000 is said to have been taken out in the past nine months.

SOUTH AFRICA.

Mr. Klimke, the State mining engineer of the Transvaal, has issued a report from which we take the following: The total yield of gold for 1895 was 2,494,487 oz., of the value of £8,569,555, as against 2,239,865 oz., valued at £7,607,152 for 1894, an increase of 254,622 oz., valued at £902,403, or an advance of 11%. The increase is attributed chiefly to the extent of the development of the old Witwatersrand mines. The yield per stamp per day of 24 hours has increased from 3.627 oz. per ton to 4.609 oz. per ton, or almost 10%. In 1895, 3,903,333 tons of quartz were crushed compared with 3,269,462 tons in 1894, an increase of 633,871 tons, or 19.4%. The yield of gold from the mills was 1,636,135 oz., compared with 1,457,103 the previous year, an improvement of 172,932 oz., or 12.3%. Gold obtained from the mills comprised 68.8% of the total yield, compared with 68.4% in 1894.

The yield from tailings was 749,325 oz., valued at £2,282,903, equal to 26% of the total yield. About 3,015,986 tons of tailings were treated by the cyanide process and 193,256 tons by other processes. Concentrates gave 105,900 oz., valued at £383,998, equal to 4.4% of the total yield. The average yield of concentrates obtained from the Witwatersrand conglomerate was 3,072 oz. per ton, and from the quartz in the mines near Barberton, 6,394 oz. per ton. By the chlorination process 14,820 tons were treated, giving 4,710 tons, and from this 90% assay value was obtained. By the cyanide process, 19,558 tons were treated, with an assay value per ton of 1,535 oz. of which 91.6% was secured. Altogether there were 34,378 tons of ore treated by concentrates, which yielded 2,904 oz. per ton.

The gold yield of the placer mines shows a decrease of 3,666 oz., valued at £12,806—that is, 0.2% of the total yield in 1894, compared with 3,127 oz., valued at £10,982, or 0.12% of the total yield this year. In 1885 the yield in ounces was 1,737; 10 years later it had reached a total of 2,494,487. The grand total for the 12 years, from 1884 to 1895, inclusive, was 9,749,170 oz., representing a value of about 33½ millions sterling.

Mr. Klimke states that the Witwatersrand fields produced 89.77% of the total yield of the country, namely, 2,223,066 ounces, valued at £7,633,371. During 1894 they produced almost 88% of the total yield, so that last year there was a slight increase in the proportion. At the end of 1895 there were in force on these fields 92,305 prospecting and 3,283 digging licenses.

The mining companies at the end of last year numbered 170 (not calculating the mines worked by syndicates and private persons). There was a nominal capital of £43,544,983 invested in the industry, an issued capital of £40,737,029, and a working capital, including cash payments to vendors, of \$12,637,225. The working capital, therefore, amounted to about 29½ per cent. of the issued capital. The increase of capital during 1895 amounted in round numbers to £18,000,000 sterling, or about 78 per cent. of the aggregate issued capital of the previous year.

WALES.

GLAMORGANSHIRE.

A despatch from Neath, states that an explosion

of firedamp occurred in the Bryancoach colliery there on the morning of Aug. 4th. Forty miners are imprisoned, but whether they are alive or dead is not known. Every effort is being made to reach them.

A later despatch from Neath says that 20 of the imprisoned miners have very little chance of being taken out alive.

LATE NEWS.

The Bethlehem Iron Company has shipped gun materials weighing 22½ tons to the Washington Navy Yard.

MR. ROBERT MULFORD has been appointed agent to represent MESSRS. FRASER & CHALMERS in this city in succession to MESSRS. YOUNG & PARK. MR. MULFORD has been with MESSRS. FRASER & CHALMERS in Chicago and abroad for five years.

The miners of the Enterprise, Allison and Boone mines, near Canonsburg, have quit work and joined the campers at Husbelt. The miners' officials visited that district Saturday and persuaded the men working for the 60-cent rate to quit. About 400 men are out of work.

(Special to the Engineering and Mining Journal.)

BY TELEGRAPH.

PITTSBURG, Pa., July 14, 1896.

Charcoal furnaces in blast, 22; weekly production 7,267 tons; anthracite and coke furnaces in blast, 35; weekly production, 23,596 tons; bituminous in blast, 112; weekly production, 148,323 tons, August 1st, out of blast, 291; capacity, 164,647 tons. Bessemer shade firmer.

The hoist works at the Poulin mine, near Butte, Mont., have been destroyed by fire, entailing a loss estimated between \$5,000 and \$10,000. Through the heroic efforts of the hoisting engineer and several assistants the six men at work sinking the shaft below the 1,000-ft. level were safely brought to the surface. No lives were lost.

The Dixon Mining Company has been formed to conduct a general mining business. Principal place of business, Los Angeles, Cal. Directors—Frank H. True, Milton Santee, Francis E. King, F. W. De Van, Edward T. Wright, John Goldsworthy and Harry Scofield, all of Los Angeles. Capital stock, \$500,000, all of which has been actually subscribed.

The Canadian Pacific Mining and Milling Company has completed arrangements with the Carterville machine works for the erection of a concentrator near Ainsworth, B. C. The contract price of the new mill is said to be \$10,000. M. A. Holman, representing the Carterville, Mo., Company, is now on the ground. He expects to have the mill running in 90 days.

Announcement is made of the failure of the coal firm of Watson, Little & Company, 140 Dearborn street, Chicago. This firm had the contract for supplying Chicago with soft coal, and the failure is due to a strike in their mines in Brazil, Ind. Until an examination of the accounts has been made, no accurate statement of the assets and liabilities can be obtained. It is stated, however, that the company does not owe much above \$100,000, and probably has assets nearly sufficient to cover the amount.

Articles incorporating the following mining companies have been filed with the secretary of State:

The Volcano King Mining Company, capital stock, \$1,000,000; location, El Paso County, Colo.; offices, Kansas City; incorporators and directors, G. W. Strong, H. B. Berkey and J. L. Rodgers.

The Little Montana Mining Company, capital stock, \$1,000,000; location, El Paso County, Colo.; offices in Cripple Creek; incorporators, Charles D. Fuller, William Carey and John F. Sanborn.

MR. CHARLES W. GOODALE, of Butte, Mont., has been for some time engaged in a complete examination of the properties of the Butte & Boston Company, undertaken for the reorganization committee of that company. As the mines are extensive and the examination is to include measurements and estimates of ore reserves, suggestions as to further developments, opinions of future prospects and a discussion of pending litigation, the work involves much labor and responsibility, and MR. GOODALE'S report will doubtless be highly influential in the further proceedings of reorganization.

The John P. Allis Machinery Company has recently installed an electric light plant in the Gold Coin mines of Central City, and the mine is to be worked vigorously during the next few months. Manager J. C. Dickey recently put in a new compressor in the property, and the output of the company is entirely satisfactory. The Gold Coin Mines Company is working the in-

diana, which it owns, and the Hidden Treasure, which it has leased. The Indiana has been partly developed to the depth of 1,200 ft., but below the 900-ft. level all is practically virgin ground. The Hidden Treasure, lying parallel with and next to the Indiana, has been developed to the depth of 2,250 ft. In one piece of ground a little over 100 ft. on the vein in both the Indiana and Hidden Treasure, ore to the amount of \$102,000 was taken out.

The company is working a full force of men.

John Hoover, who has been in the western parts of Fergus County, Montana, reports that Montana sapphires are in demand, and that fairly good prices are being paid for them. He sold \$300 worth of the stones in the rough recently to Helena jewelers. That, however, was but a trifling sale compared to one he made recently to Tiffany & Company, of New York, who bought at one time 16,000 carats and offered to take more.

Since the Montana sapphire became known a few years ago it has taken a place in the front ranks of gems of that sort. They are admittedly as fine as Oriental stones, are exceedingly hard and lustrous, but many of the stones have not the rich coloring of the Oriental gems. A great many of the Montana sapphires are almost colorless and others are yellow or pale blue. Several claims are being worked in the vicinity of Phillipsburg. The stones are found in the porphyry and a red clay. Nearly every class of mineral has been found.

The Link Belt Machinery Company, Chicago, Ill., has been operating its machine shop with two gangs of men during the past three months, both day and night. The foundry as well is worked to its utmost, one order for casting alone requiring 987,000 lbs. of iron. Another order is for the Chicago Sugar Refinery, Chicago, consisting of complete equipment machinery for handling coal from cars to iron bins, whose storage capacity is 650 tons; the coal is spouted directly on to chain grates in the furnaces. An order from the Huron Iron Company, Mich., for two 8-ft. spirally grooved hoisting drums together with 11½-in. x 25-ft. shaft, friction clutches, base plates, etc., and brake bands for running the drums independent of each other, both for hoisting and lowering, is nearing completion. The two friction clutches and brake bands are so arranged that they can be operated by one man without moving from one place to another, the operating mechanism being brought to the center of the frame.

Notwithstanding the unusual lateness of the present mining season, says the *Alaska Mining Record*, there is every prospect that the increased activity in mining operations visible on every side will bring the annual mineral product up to a figure exceeding the expectations of a few weeks since, and that, too, aside from the output which may accrue from such new discoveries as may be made during the summer. In short, the increase in output through development of established properties will far more than compensate for the losses due to the late beginning of active operations because of climatic conditions and the aggregate production from these properties will doubtless far exceed that of any previous year. Then, again, these mines are many of them being placed in such condition that hereafter the severities of the Alaskan winter season will not necessitate a suspension of operations and continuous development will be carried on. Altogether there has been, all things considered, no season in our mining history bearing greater promise than the present.

The placer grounds of Glidden & Schaeffer, in Emigrant Gulch, Park County, have been bonded to R. H. Floyd-Jones and M. Flannigan, St. Louis and English parties, for \$30,000, of which \$3,000 of that amount has been paid down, says an exchange. Representatives of this syndicate were on the ground last fall and made a thorough examination of the property, and it was understood at the time would make a favorable report on the property to their principals. Since then little has been heard concerning it until recently, when the deal was finally made. The tract bonded consists of 300 acres, extending from Emigrant Gulch to Yellowstone River. It has always been considered very rich placer ground, but the parties who had control had no capital with which to push the work. It is understood that the parties interested will make extensive improvements on the property, beginning at once. They expect to construct a large ditch from Mill Creek to Emigrant, a distance of six miles, and work the ground by hydraulic process. The cost of construction of the ditch will exceed \$30,000. Two bids have been submitted at about this figure.

It is reported that the interests having the bond on the War Eagle and Iron Mask mines at Rossland, B. C., have been given a brief extension of time by the owners of the property. It is believed in mining circles here that the deal will be

consummated, and that this extension of time is for the purpose of enabling the bonders to carry out some minor details, says the Spokane Review.

These properties were bonded in May last—the War Eagle for \$1,000,000 and the Iron Mask for \$500,000. The bond was taken by President D. C. Corbin, of the Spokane Falls & Northern Railroad, who is said to represent New York and London capitalists. It is difficult to get at the exact facts. One report is that the War Eagle is bonded for \$1,000,000 cash, and that the present shareholders are to receive in addition one-fourth of the capital stock of the new company. Another report is that the cash consideration is to be \$800,000, and that the rest of the \$1,000,000 is to be taken in stock in the new company.

It is said that a question was raised by the capitalists who took the bond as to their authority, under the law, to receive title in fee simple to the mines. Of course there was no question as to the authority of those stockholders who voted the option to convey the stock in the mines; but some doubt existed as to the authority of the present company, through their officers, to require the small shareholders who failed to vote on the proposition to exchange their holdings under the plan of reorganization. It is said that all doubts upon this point have been swept away, and that it is the opinion of leading lawyers that the action of the majority of the stockholders in voting the option gave the Board of Directors a clear right to bring in all the stock under the plan of reorganization.

(Special to the Engineering and Mining Journal.)

BY TELEGRAPH.

LEADVILLE, Colo., August 13, 1896.

All the leading mine managers to-night issued a proposition to the miners to return to work at once, agreeing to pay \$3 per day to all miners for every calendar month that the average silver quotation is 75c. It is not known if the miners will entertain this proposition. Yesterday the Miners' Union passed resolutions agreeing to take the same wages as paid by the receiver of the Welton mine, viz.: \$3 per day to miners underground and to topmen, and \$2.50 to all other surface men.

Manager Bohn, of the Bohn mines, caused excitement yesterday by posting a notice that he would resume work in his mine on Monday at \$2.50 a day. Miners' Union officials declare he can't get men here to work for that sum.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, August 14.

Statement of shipments of anthracite coal (approximate) in tons of 2,240 lbs., for the week ending August 8th, 1896, compared with the corresponding period last year:

	1896.		1895.
	Week.	Year.	Year.
Pennsylvania Railroad.....	61,269	2,062,540	2,184,001

PRODUCTION OF BITUMINOUS COAL, in tons of 2,000 lbs. for week ending August 1st, and for years from January 1st, 1896 and 1895:

	1896.		1895.
	Week.	Year.	Year.
Shipped East and North:			
Allegheny, Pa.....	39,692	1,398,291	2,216,277
Barclay, Pa.....	558	24,638
Beech Creek, Pa.....	48,784	1,830,937	1,727,108
Broad Top, Pa.....	4,165	245,158	247,283
Clearfield, Pa.....	61,838	2,913,428	3,037,139
Cumberland, Md.....	77,216	1,861,655	1,712,012
Kanawha, W. Va.....	164,673	1,860,313	1,691,888
Phila. & Erie.....	533	45,604	39,706
Pocahontas Flat Top.....	61,143	2,138,422	1,836,657
Totals	362,412	12,337,846	12,408,050

* Week ending July 25th.
† Week ending July 21st.
‡ Week ending Aug. 1st.

	1896.		1895.
	Week.	Year.	Year.
Shipped West:			
Monongahela, Pa.....	20,385	616,711	471,617
Pittsburg, Pa.....	31,771	1,199,622	1,066,197
Westmoreland, Pa.....	36,791	1,183,045	1,066,429
Totals	88,947	2,999,378	2,604,243
Grand totals	451,359	15,337,224	15,112,293

Production of coke on line of Pennsylvania Railroad for the week ending August 8th, 1896, and year from January 1st, 1896, in tons of 2,000 lbs.: Week, 66,465 tons; year, 2,651,347; to corresponding date in 1895, 3,402,321 tons.

Anthracite.

The condition of the anthracite coal trade remains the same as previously reported, only sufficient being mined and forwarded to destination to meet present requirements. Prices are being firmly held, so far as can be learned. Sufficient coal is on hand to meet demands, though one company reports a shortage on egg and broken coal. The July circular of prices is still being adhered to, and efforts to obtain information as to the possibilities of the September schedule resulted merely in the statement that there was no talk now of what might then be done.

The July circular of prices is as follows: \$3.75 for

broken; \$4 for egg; \$4.25 for stove and \$4 for chestnut, subject to the usual commission of 15c.

Bituminous.

There is very little business doing in the soft-coal trade. Orders come in few and far between, and nobody seems to have much show of increasing activity for prompt shipment. An improvement in trade conditions is not looked for this month. It is thought that fair stocks of coal are held by all the consumers, and with general trade conditions as they are, no one feels like increasing his stocks on hand to any great amount. The coal trade feels the pulse of the general business conditions about as quickly as any of the trades that go to make up a whole, and are "blessing" the causes for the general business depression. The consumption of coal is not as great at this time as it usually is, and therefore the holes made in the piles of coal in the consumers' yards are not such as will bring orders in the numbers that would be desired. The various consuming territories seem to be affected in about the same ratio by the general trade conditions, but it is supposed that one will fluctuate at one time and another at another, in sending orders forward, as is usual in dull periods. The far East is taking a little more than the others, if anything, with New York harbor business next and the Sound trade bringing up a lagging rear. It would seem that the inducement of the very low ocean freights combined with the low f. o. b. prices from the lower shipping ports is the only reason for practically any shipments to the Sound points at the present time. There is little, if anything, doing in local trade to the shipping ports and nothing is heard of South American shipments at this time.

All-rail business remains about the same as it has been in the last month, inactive and pretty nearly half in volume.

There was to have been a meeting of the Bituminous Association members, of which little, if anything, can be learned. It is not thought that many members were present on account of the hot weather and vacations. The gossip of the trade was that some sharp inquiries were going to be made regarding contracts reported taken. It has been found heretofore, however, when the members get together and talk frankly with one another about trade where it was thought that one or the other had been injured that a majority of the reports and the information which is put forward by the injured party is incorrect and, therefore, misunderstandings are easily straightened out. There are fair stocks of coal reported at and on the way to the shipping ports, but not in quantity enough to hinder transportation or prompt shipments from the wharves.

There is not the talk of outside coals taking much, if any, trade now, and it is believed by a number of people that these coals are now pretty well contracted for.

Transportation from mines to tide is unchanged, coal running through in good time, indeed, much better than some of the shippers like; as they find it difficult to take care of the coal arriving, the orders in some cases not being on hand to do it.

Car supply is much the same as transportation—plenty of cars for requisitions, with the railroads believed to be holding back on sidetracks many empties.

In busy seasons there are certain points off the main line roads on foreign roads which are embargoed. This has not been so this summer, though the railroads have left them to be considered as embargoed points and have raised the embargoes on them from time to time for stated periods by communications.

In the coastwise vessel market on the Atlantic seaboard things are unchanged. Vessels are in good supply, fully up to all demands, and orders for charters scarce. This is especially so with the larger class of vessels, which seem to be in better supply than earlier in the season.

We quote current rates of freight from Philadelphia as follows: To Boston, Salem, Portland and the Sound ports, 50c; Portsmouth and Bath, 50@55c; Wareham, 75c; Lynn, 60@75c; Newburyport, 60@65c; Dover, 90c, alongside and towage; Saco, 75c, alongside and towage; Gardiner, 55@60c, and towage; Bangor, 55@60c. Five and ten cents above these rates are asked from Norfolk, Newport News and Baltimore.

The Association prices remain as follows: F. o. b. Philadelphia, Norfolk and Newport News, \$2.35; Baltimore, \$2.28; New York Harbor shipping ports, \$2.80, alongside; New York Harbor, \$3. There is a 20c. differential in favor of Clearfield and Beech Creek coals.

Buffalo. August 13.

(From Our Special Correspondent.)

The anthracite coal trade continues to exhibit the summer dullness. Dealers are taking their outings, as a rule, bracing themselves up for the fall and winter business. Quotations are unchanged.

Lake shipments of coal continue of meager proportions at ruinous rates of freight. Supply on docks very light. There are no indications of any improvement at present.

Bituminous coal is selling in car lots for the immediate necessities of manufacturers, who are not disposed to anticipate the future in view of the financial situation and the features connected with the presidential campaign. Stocks are ample and not accumulating to any material extent.

The condition of the employees on the mines of the Gogebic Range meets with much sympathy. A communication from Bessemer, Mich., says: "There are less than 1,000 men at work on the range, where at one time over 3,000 men were employed. It is certain that a few months of idleness will find hundreds of families in destitution. The several mining companies have allowed their employees all unoccupied lands for use as 'Pingree Farms,' but the army worms have destroyed the last hope of the miners of having at least vegetables to keep body and soul together the coming winter."

The subject of developing the water front of our port between the breakwater and the lighthouse pier, also the waterfront extending a long distance down Niagara River, has been an exciting topic of interest for many a day. Mayor Jewett has appointed a large, influential and intelligent committee to advise him on the matter and make suggestions that may occur to them.

The shipments of coal westward by lake from Buffalo from August 2d to 8th, both days inclusive, aggregated only 46,625 net tons, distributed as follows: 20,950 tons to Chicago, 5,650 tons to Milwaukee, 3,500 tons to Duluth, 500 tons to Gladstone, 750 tons to Lake Linden, 400 tons to Saginaw and 450 tons to Portage. The rates of freight were 20c. to Chicago, Milwaukee, Duluth, Green Bay, Superior, Gladstone, 75c. to St. Ignace, 50c. to Ludington, 40c. to Saginaw, 20c. to Toledo, 25c. to Bay City, 30c. to Lake Linden and Portage. Closing dull and heavy. It will be noticed that a decline of 5c. took place on coal freight to all Michigan and Superior ports.

There passed through the Sault Ste. Marie Canal this season to August 1st, 176,391 net tons of anthracite and 1,301,796 net tons of bituminous coal; total, 1,478,097 net tons, as compared with 806,523 net tons in 1895 and 532,677 net tons in 1894. The increase in tonnage generally this year over 1895 is 1,789,712 net tons.

The Lehigh Valley Coal Company has completed the alterations and improvements of its immense dock at West Superior.

Pittsburg. Aug. 13.

(From Our Special Correspondent.)

Coal.—The wage difficulty still delays business; there seems to be little prospect of coming to a satisfactory understanding. An investigation of the situation among the striking miners along the Monongahela River shows no decided changes; the men are everywhere organized and refuse to give one point to the operators toward a settlement of the strike. The operators are working a little, although it is being done at a great loss, but they are determined to keep running at any cost. A large number of foreigners are at work in the Stockdale mines. The men are confident of success and claim they will win in the end, but operators are not pushed at present; the Southern market will soon be in a more favorable position, and increased demand from that source will undoubtedly bring about a more stable mining rate. In the railroad coal mining things have remained about as they were before, though little coal is being bought from independent operators; direct lake shippers say that the output and shipment are about the same as last year.

Martin's Ferry, O.—The Wheeling and Lake Erie and Pittsburg Coal Company has suspended work indefinitely on the new coal plant on Knob Run on account of the free-silver scare. A large force of men were at work grading, and the company expects to have the big works ready by fall. Three miles of track had been laid. The machine mines are enjoying a season of prosperity, due to the strike for the 70-cent rate; more miners are out for it than last week. Trade is dull. The river markets are overstocked, and the only large movement is to the lakes, where stock is being accumulated prior to the winter closing of the ports.

Connellsville Coke.—Business is slumping, the general trade dullness extending to that industry. The strikes and closing down of furnaces in Ohio and Western Pennsylvania are making themselves felt in the coke trade. The last report shows 1,168 ovens blown out and a decrease of shipments of 420 cars; next week's report will show the effect more fully, a great many of the ovens blown out having continued to operate until Saturday. The continued troubles of the iron men will cause more ovens to blow out, and a number more went out this week, some whole furnace coke plants being closed down. With nothing in sight to encourage prospects of a resumption, the coke operators will not store any more coke in their yards, but as the orders fall off they will blow out additional ovens to reduce the production so as not to exceed the demand. Dunbar.—The great depression in the coke trade has caused an exodus among the foreigners in this region, and hundreds of them are leaving weekly for the West Virginia coal fields, where work is more plentiful and wages are better.

At present there are only 8,975 ovens in blast and 8,972 out of blast. During the week 1,168 ovens were blown out. Production of the region, 91,758 tons; decrease, 4,797 tons. In the running order of the ovens in blast 2,627 ovens made six days, 5,979 ovens five days, 150 ovens four days, 750 ovens two days and 150 ovens three days; average, 517 days. Week's shipment, 5,024 cars, against 5,444 the preceding week, distributed as follows: To Pittsburg and river points, 1,980 cars; to points west of Pittsburg, 1,928 cars; to points east of Emerson, 1,116 cars; total, 5,024 cars. Prices show no change.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Aug. 14, 1896.

Pig Iron Production and Furnaces in Blast.

Fuel used.	Week ending		From Jan., '95.		From Jan., '96.	
	Aug. 16, 1895.	Aug. 14, 1896.	Tons.	Tons.	Tons.	Tons.
Anthracite.	39	21,501	39	24,100	664,780	814,840
Coke.	133	142,804	130	153,959	4,367,064	5,002,114
Charcoal.	17	3,731	23	6,600	125,918	172,525
Totals	189	168,036	192	186,650	5,157,792	5,989,479

The situation in the iron and steel market during the past week may be said, for all practical purposes, to be unchanged. Inquiries are few and far between, actual sales are small, and the outlook for the future is anything but encouraging. It is not expected—in fact, the mills and furnaces do not look for any improvement while the country is agitated over the money question and the coming election. The production of pig iron in the vicinity of Pittsburgh and the Mahoning and Shenango valleys has virtually ceased for the time being, but two furnaces being in blast in the two valleys. This is a serious state of affairs, and has not been paralleled before in many years. In connection with starting the furnaces again, the men must accept a reduction in wages, otherwise the furnaces may be kept out of blast.

Pig Iron.—The market developed considerable weakness during the week, caused largely by the very little buying going on. Many furnaces have gone out of blast, and others are following. Manufacturers claim present prices do not cover cost of production, and that it is cheaper to be out of blast than running at a loss.

Prices nominally are the same as last quoted, as follows for tidewater delivery: No. 1 Northern, \$12 @ \$13; No. 2 Northern, \$11.75 @ \$12.25; No. 2 plain, \$10.75 @ \$11; gray forge, \$10.75 @ \$11. No. 1 Southern we quote \$11.25 @ \$11.50; No. 2 Southern, \$10.75 @ \$11; No. 3 Southern, \$10.50 @ \$10.75.

Cast-Iron Pipe.—But one transaction is reported in cast-iron pipe for the week: 3,000 tons for the Boston Water Board, awarded to the Warren Foundry & Machine Co., of Easton, Pa. The sizes of the pipe are 16, 20 and 30 inches. The town of Le Roy, N. Y. is in the market for 750 tons, and bids will be opened August 15th.

Spiegeleisen and Ferro-Manganese.—This market reported very quiet; hardly anything doing. Prices nominally \$19.50 @ \$20 per ton for foreign spiegeleisen, and \$4 @ \$4.75 for ferro.

Steel Billets and Rods.—The billet market remains unchanged with no special sales to report. Prices unchanged \$21.75 New York delivery. Rods, \$29.

Merchant Steel.—The local market for merchant bar and finished steel is reported quiet. The contracts for the agricultural manufacturers will soon be in the market, which will have a tendency to make business in this channel better. Prices are quoted as follows: For common bars 1 1/4 @ 1 1/2 c.; refined bars, 1 1/2 @ 1 5/8 c.; soft steel bars, 1 1/2 @ 1 3/4 c. Other quotations are: Steel hoops, 1 5/8 @ 1 7/8 c.; steel axles, 1 6/8 @ 1 8/8 c.; links and pins, 1 6/8 @ 1 7/8 c.; tire steel, 1 8/8 @ 1 9/8 c.; spring steel, 2 @ 2 2/8 c. All prices are for delivery on dock, New York.

Plates.—No important sales of plates are reported for the week and no change in prices, which are as follows: Universal mill plates are 1 1/4 @ 1 5/8 c. For other sorts we quote: Tank, 1 1/4 @ 1 5/8 c.; boiler shell, 1 1/4 @ 1 5/8 c.; good flange, 1 6/8 @ 1 7/8 c.; firebox, 2 @ 2 4/8 c. Charcoal iron plates are 2 2/8 c. for shell, 2 7/8 c. for flange, and 3 2/8 c. for best firebox. Rivets are 2 1/2 @ 2 2/8 c. for steel and 3 @ 3 2/8 c. for iron.

Structural Iron and Steel.—Business in structural steel has held its own remarkably well. Notwithstanding the depression in many other lines, structural work has gone steadily along, keeping the mills fairly busy. No new contracts are reported as having been placed during the week. Latest quotations are as follows: Angles, 1 1/4 @ 1 5/8 c.; channels, 1 7/8 @ 1 8/8 c.; tees, 1 6/8 @ 1 6/8 c.; beams, 1 7/8 @ 1 8/8 c. in quantities, with a slight advance for small lots.

Wrought-Iron Pipe.—There is nothing of any consequence to report on this market, and prices remain virtually the same. Discounts are named as follows: Out of stock, 1 1/2 smaller black, 57, 10, 10, 10, 10; 1 1/2 larger black, 47, 10, 10, 10, 10; 1 1/2 smaller galvanized, 52, 10, 10, 10, 10; 1 1/2 larger galvanized, 53, 10, 10, 10, 10. The above discounts are slightly steadier in large lots and for mill shipments.

Nails.—The nail trade continues dull, with no changes in prices. The pool price is still maintained at \$2.55 for wire nails. For cut nails \$2.30 per keg is quoted, f. o. b. Pittsburgh.

Steel Rails and Rail Fastenings.—The rail market is extremely quiet, and will probably continue so for some time to come. No orders worth mentioning have been placed so far this month. Prices are maintained at \$23.75 per ton at tidewater, and girder rails at \$28 to \$30, same delivery.

Old Rails.—But little to report in the old-rail market for the past week. Prices quoted are \$12.50

@ \$13.50 for old iron rails, and \$11 @ \$12.50 for old steel rails. Old rails for relaying purposes are held at \$19 @ \$22, all New York harbor delivery.

Scrap Iron.—Scrap-iron market unusually dull, with hardly any business doing. Prices unchanged at \$10 @ \$11.50 per ton for good machinery scrap Ordinary cast-iron scrap \$9 @ \$10; and stove-plate and mixed, \$6 @ \$7.50.

Cleveland, O. August 12

(From Our Special Correspondent.)

Iron Ore.—A few sales of ore have been reported during the last week, but all of them were so small that the dealers do not consider that they have done any business. At all the offices the same story is told; that the market is practically dead and will probably remain in that condition until after the election. Usually the mills in this section of the country are closed during August for repairs, but it was said to-day that some of them would not re-open September 1st and not until after the election unless the indications pointed favorably toward the mill owners. Notwithstanding the dull condition of business, the standard scale of prices agreed upon early in the season prevails. Standard Bessemer bring \$4, non-Bessemer hematites \$3 and \$3.25 and Mesabi non-Bessemer \$2.45 and \$2.60.

There has been no change in the lake freights during the past 10 days. Only a few vessels have been tied up this week so far, which the vessel-owners consider as a hopeful sign for them. Until the mills in the valley resume operations, however, the indications are that the lake rates will not strengthen.

Pig Iron.—The pig-iron business is practically at a standstill, although there has been no change of prices since last week. Following are the quotations: Lake Superior charcoal, \$13.50 and \$14; bituminous coke, No. 1 foundry iron, \$12.25; No. 2, \$11.75; Ohio Scotch, No. 1, \$22.25; No. 2, 11.75; Bessemer pig, \$12.25.

Philadelphia. Aug. 13.

(From Our Special Correspondent.)

Pig Iron.—Brokers speak of improving prospects based upon inquiries since Monday from large consumers. A curtailment of production is likely to influence buyers. Private quotations on both foundry and forge irons have been made within a day or two at very attractive figures. No 1 foundry for average makes is \$12.50; No. 2, \$11.75; forge, \$10.75, delivered.

Steel Billets.—The sales of billets, so far as ascertainable, have been of small lots at \$21.50. Broken lots are being offered.

Merchant Bar.—During the week production has been increased a little, but the general conditions are unfavorable. Refined iron is offered for early delivery in large lots at 1.20. Steel bars have been sold this week in small lots at 1.40.

Skelp.—The manufacturers' representatives are patiently awaiting results as to the prosecution of schemes long under advisement. A good fall business is looked for.

Sheet.—Though business is reported to-day as depressed, manufacturers are not cast down. They say that, considering everything, this branch of the iron trade has been well sustained. Prices are naturally low, and there will be a sharp competition for September business.

Pipes and Tubes.—Machine-shop and boiler-shop work has not been urgent or active. Sharp canvassing and close shading keeps mills going, but far from capacity limits.

Merchant Steel.—Business is dull to-day. Several shipments have been made this week to finish up old orders.

Plate and Tank.—Manufacturers had hoped to be at work on a few new orders running, one said, close to 1,000 tons in all. About this much business is counted upon for the next week or two. Tank plates are 1 1/4; shell, 1 5/8; flange, 1 6/8; fine bar, 1 7/8 to 3c.

Structural Material.—The work in prospect for September affords hope that this branch will soon emerge from its protracted dullness. It is true there has been an enormous production of shapes, but manufacturers are not satisfied unless all the furnaces are at a white heat.

Angles are nominally 1.40.

Steel Rails.—What the railway managers will do regarding voted repairs or main tracks and yards this fall it would be useless to predict. A good deal of business ought to be done, rail makers say, but they must bide their time and the pleasure of the railroad managers.

Old Rails.—Dull at \$11.14.

Scrap.—There is an abundance of all kinds of scrap.

Pittsburg. Aug. 13.

(From Our Special Correspondent.)

Raw Iron and Steel.—Business during the week has continued dull. Producers and manufacturers have been reluctant to increase obligations in view of the unsettled conditions affecting the future of the money market and their own ability to meet such indebtedness at maturity. Operations in all lines have consequently reflected very closely the actual necessities of trade. The pig-iron market

has not been so quiet or so much depressed this year as it is at present; buying is very light, and while some furnaces are making an effort to keep the bottom from falling out of the market, others are willing to make concessions in order to effect sales. Stocks of pig iron are admittedly heavy and are decreasing slowly all the while; as for buyers, they frankly state that, with the market in its present condition, manufacturing with them being dull, they are not desirous of buying. The volume of business in iron and steel continues to shrink, but the productive capacity is well maintained and will soon be increased, as a number of furnaces have been repaired and are about ready to resume operations. There seems to be little prospect of any change for the better in the near future, as the disposition to place orders becomes less as the business situation becomes more disordered; although concessions in prices are occasionally obtained, there is little disposition to force sales at an extreme sacrifice. The market while weak is in such a position that any improvement in general business would cause a sharp advance in prices, as certain stocks are not excessive, and those holding them are apparently not pushed to realize. In pig iron—Southern manufacturers are competing sharply for what business there is, but Northern makers try to maintain an appearance of steadiness. Steel billets are dull; sales are of a limited description; prices show no change so far; the middlemen still have billets for sale; sales show a wide range in values. The puddling department of Zug & Company started up on Monday with 42 furnaces double turn; that of the Republic Iron Work on Tuesday with 54 furnaces; this shows confidence in the future.

The Latest.—Market is dull, with prices favorable to consumers, who show little inclination to take advantage of low prices. Bessemer touched the lowest figures this year with sales below the eleven-dollar mark. Billet's prices nominal, \$19 @ 19.75. The silver craze has demoralized business to an alarming extent. There is but one furnace, the Briar Hill, in blast in the Mahoning Valley. There will be a meeting of the directors of the steel-billet pool in Pittsburgh on Monday to discuss the situation.

Tons.	Cash.	Tons.	Cash.
500 Billets, Aug., at mill	19.75	500 Billets, spot, at mill	19.50
400 Billets, spot, at mill	19.80	300 Billets, Aug., at mill	19.00
100 Billets, spot at mill	19.30	SHEET BARS.	
800 Delivered, Pits.	\$22.25	500 Aug., at mill, Pits.	21.95
200 Aug., at mill, Pits.	22.00	MUCK BAR.	
450 Neutral, deliv'd, Pits.	\$20.00	BLOOMS, BILLETS, BAR ENDS.	
600 Billet and bars, deliv'd, Pits.	\$13.60	FERRO-MANGANESE.	
50 80 per cent., deliv'd, Pits.	\$19.00	SPELTER.	
50 Pure, Pits.	\$3.75	SKELP IRON.	
500 Narrow grooved, Pits.	\$1.22 1/4 m.	350 Sheared, Pits. 1.40 1/4 m.	
250 Wide grooved, Pits.	1.22 1/4 m.	SKELP STEEL.	
400 Sheared, Pits.	\$1.27 1/4 m.	375 Wide grooved, Pits.	
300 Narrow grooved, Pits.	1.07 1/4 m.	700 Delivered, Pits.	
500 Slabs, Aug., Sept., at mill	\$21.50		
500 Billets, Aug., at mill	19.75		

METAL MARKET.

NEW YORK, Friday Evening, August 14, 1896.
Gold and Silver.

Prices of Silver per Ounce Troy.

August.	St. Ex.	London Pence.	N. Y. Cts.	Value of sil. in \$.	August.	St. Ex.	London Pence.	N. Y. Cts.	Value of sil. in \$.
8	4 78 1/2	31 1/4	68 1/2		12	4 87 1/2	31 1/2	67 1/2	
10	4 87 3/4	31 3/4	68 3/4		13	4 87 1/2	31 3/4	67 1/2	
11	4 87 3/4	31 1/2	68		14	4 87 1/2	31 1/2	67 1/2	

Weak Chinese exchanges, together with liquidation of some speculative holdings, have caused the decline in silver market closing flat in London at 31. The United States Assay Office in New York reports the total receipts of silver at 49,000 oz. for the week.

Gold and Silver Exports and Imports.

At all United States ports, June, 1896, and years from January 1st, 1896 and 1895:

	Coin and bullion.		In ores.		Total excess, Exp. or Imp.
	Exports.	Imports.	Exports.	Imports.	
GOLD					
June.	\$6,915,066	\$809,325	\$13,470	\$95,681	E. \$5,933,530
1896.	42,935,551	25,233,959	260,979	719,977	E. 17,252,594
1895.	35,231,438	25,994,940	318,469	830,594	E. 8,723,967
SILV.					
June.	4,347,778	1,206,951	95,638	1,379,246	E. 1,857,219
1896.	29,927,230	6,163,065	685,554	8,616,181	E. 15,839,568
1895.	23,897,427	4,312,425	35,202	6,075,803	E. 13,544,401

This statement includes the exports and imports at all United States ports, the figures being furnished by the Bureau of Statistics of the Treasury Department.

Gold and Silver Exports and Imports, New York

For the week ending August 13th, 1896, and for years from January 1st, 1896, 1895, 1894, 1893 and 1892:

	Gold.		Silver.		Total Excess, Exp. or Imp.
	Exports.	Imports.	Exports.	Imports.	
W'k	\$8,800	\$84,300	\$717,945	\$230,766	E. \$411,679
1896.	40,564,948	17,601,637	23,963,525	1,728,145	E. 44,998,671
1895.	39,410,632	24,269,262	25,668,198	1,135,768	E. 39,673,850
1894.	81,281,935	11,890,409	22,954,325	1,688,122	E. 91,257,729
1893.	69,225,427	37,588,778	20,390,593	1,556,256	E. 50,470,986
1892.	53,829,363	6,420,311	13,611,260	1,336,563	E. 59,683,746

Average Monthly Price of Silver

in New York and London, per ounce Troy, from January 1st, 1896, and for corresponding months, 1895 and 1894.

Month.	1896.		1895.		1894.	
	Lon-don. Pence.	New York. Cents.	Lon-don. Pence.	New York. Cents.	Lon-don. Pence.	New York. Cents.
January.	30 69	67 13	27 36	59 69	30 81	66 63
February.	31 01	67 67	27 47	59 90	29 18	63 43
March.	31 34	68 40	28 33	61 98	27 22	59 49
April.	31 10	67 92	30 39	66 61	28 95	62 92
May.	31 08	67 88	30 61	66 75	28 69	62 96
June.	31 16	68 69	30 47	66 61	28 68	62 59
July.	31 45	68 75	30 48	66 75	29 82	62 45

FINANCIAL NOTES OF THE WEEK.

The statement of the New York banks—including the 6 banks represented in the Clearing House—for the week ending August 8th, gives the following totals, comparisons being made with the corresponding weeks in 1895 and 1894:

	1894.	1895.	1896.
Loans and discounts.	\$484,622,700	\$510,976,100	\$468,037,600
Deposits.	581,036,600	573,677,300	477,164,500
Circulation.	9,784,900	13,173,000	14,963,200
Specie.	91,052,700	65,480,500	46,545,800
Legal tenders.	121,209,300	116,879,600	86,560,900
Total reserve.	\$212,267,000	\$182,360,100	\$133,106,700
Legal requirement.	145,259,150	143,419,422	119,291,125
Surplus reserve.	\$67,007,850	\$41,950,678	\$13,815,575

The demand for money and the reluctance to part with it, noticeable at the end of last week, has somewhat disappeared with a slight return of confidence in the Stock Market. At the same time, the bad feature which tended to bring about the stringency is still evident, viz., the steady withdrawal of gold from the Treasury. This amounted yesterday to \$319,840, leaving the net balance of this morning at \$106,246,757, which amount has further been reduced to-day by about \$100,000.

The following table gives the amount of gold and silver coin and bullion held by the leading European banks, as per their statements of this week, in comparison with last week and a year ago:

	1896.	1896.	1895.
	August 13.	August 6.	August 15.
Bank of England—			
Gold.	\$235,690,000	236,720,000	195,180,000
France—			
Gold.	414,890,000	414,760,000	409,820,000
Silver.	250,470,000	251,130,000	251,870,000
Germany—			
Gold and silver.	226,520,000	224,810,000	254,490,000
Austro-Hungary—			
Gold.	139,760,000	137,480,000	102,310,000
Silver.	64,442,000	64,475,000	66,481,000
Netherlands—			
Gold.	13,173,000	13,170,000	21,422,000
Silver.	34,404,000	34,573,000	34,655,000
Belgium—			
Gold and silver.	20,274,000	19,308,000	20,848,000
Spain—			
Gold.	42,029,000	42,028,000	40,021,000
Silver.	54,967,000	56,605,000	60,204,000
Total.	\$1,496,189,000	\$1,494,059,000	\$1,457,301,000

N. B.—The German Imperial Bank and the Bank of Belgium do not report their stocks of gold and silver separately.

The foreign commerce of France for the six months ending June 30th is reported by the Ministry of Commerce as follows:

	1895.		1896.	
	Imports.	Exports.	Imports.	Exports.
Food.	474,663,000	532,341,900	474,663,000	532,341,900
Raw materials.	1,067,760,000	1,181,392,000	1,067,760,000	1,181,392,000
Manufactures.	272,432,000	314,522,000	272,432,000	314,522,000
Total.	1,814,855,000	2,028,255,000	1,814,855,000	2,028,255,000

Shipments of silver from London to the East for the year up to July 30th are reported by Messrs. Pixley & Abell's circular as below:

	1895.	1896.	Changes.
	India.	£2,198,330	£1,990,578
China.	1,100,767	574,413	D. 526,354
The Straits.	503,403	517,532	I. 14,129
Totals.	£3,802,500	£3,082,523	D. £719,977

Arrivals for the week this year were £204,000 in bar silver from New York and £50,000 from Chile, a total of £254,000. Shipments for the week were \$77,000 in bar silver to Bombay.

Domestic and Foreign Coins.

The following are the latest market quotations for the leading foreign coins:

	Bid	Asked.
Mexican dollars.	\$0.52	\$0.54
Peruvian soles and Chilean pesos.	.47 1/2	.49
Victoria sovereigns.	4.90	4.94
Twenty francs.	3.88	3.92
Twenty marks.	4.78	4.85
Spanish 25 pesetas.	4.78	4.85

Other Metals.

Copper.—There has been an excellent export demand, but home trade remains very quiet, and little is doing. Prices have, however, kept up fairly well, and had it not been for some pressure on the part of a few smaller producers to market their copper, hardly any change could have been reported. As it is we must quote prices to-day as follows:

Lake copper is still being held by first hands at 11c., though some rumors which we could not, however, verify are to the effect that this price has been slightly shaded; second-hand lots of ingot copper a trifle below.

For electrolytic copper considerable concessions have been made, and we have to quote to-day for cakes, wirebars and ingots 10% to 1/2% and for cathodes 10% to 10 1/2%. At these prices only a few of the producers have been sellers, while others are holding much higher, and must practically be considered out of the market.

In strong contrast to these prices are the figures for casting copper, which being scarce, is firmly held at from 10% to 10 1/2%.

Arizona pig copper is not offered for either August or September shipment, and the prices asked for forward delivery do not admit of business.

Exports have been very heavy and all available copper is being shipped as quickly as possible. The London market opened rather firm for G. M. R. copper, but these brands, being now considerably too high, there is no demand for consumptive but only for speculative purposes. These circumstances have not failed to influence values, and prices have declined about 1/2, closing at £47 1/2s. to £47 17s. 6d. both for spot and three months' prompt.

American copper has been pressed for sale on the other side, but at the lower prices large contracts have been made. Consumption is as good as can be desired, and manufacturers in copper have orders up to the end of the year, and probably much longer. For refined and manufactured we quote: English tough, £50@£50 10s.; best selected, £51@£51 10s.; strong sheets, £52@£52 10s.; India sheets, £55@£55 10s.; yellow metal, 4 1/2d.

The figures of production and export of copper for the month of July are as follows, viz: Produced by United States reporting mines, 15,395 tons; produced by outside sources (estimated), 1,200 tons; produced by foreign reporting mines, 7,847 tons, exports, 10,885 tons; all in tons of 2,240 lbs. of fine copper.

Tin.—There is a continued good demand, and the arrivals here, though fairly large, are going quickly into consumption. We have to quote 13 1/2 to 13 60 for spot and August, while later months are obtainable at 13 45 to 13 50.

The London market shows a slight falling off in values in spite of the large and regular business which has been done. Straits of Malacca tin is obtainable at £59 17s. 6d. to £60 spot, £60 10s. to £60 12s. 6d. for three month prompt.

Lead remains flat and the lower prices have so far not tempted buyers very much. Reliable re-

ports from the West indicate that production has already been materially curtailed, and it is likely that this will be still more the case in the near future, unless indications should point toward higher values. With the present feeble demand the market is, however, flat, and we have to quote 2 75 to 2 80 New York.

The foreign market has again declined, and Spanish is quoted in London at £10 16s. 3d; English lead 5s. higher.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: No improvement in pig lead; if anything, it is worse, Common sold as low as 2.52 1/2c., and even at this buyers are unwilling to load up.

Spelter showed quite a big break during the week. Producers find it difficult to make progress with sales and in spite of the further reduction in the production, stocks are increasing. This has led to considerable concessions and we have now to quote 3 75@3 80 delivered New York.

The foreign market has been depressed and declined rapidly to £16 10s. for good ordinaries and £16 12s. 6d. for specials in London, at which prices there are sellers.

Antimony is neglected and only a retail business has been done at the prices last named.

Nickel.—Business is rather light, but prices are firmly held, and we continue to quote 34@35c. per lb. for ton lots and 33@38c. for smaller orders. London prices are 13 1/2@14 1/2d. for large orders and 14 1/2@16d. per lb. for small lots. The New York price is on a parity with London, allowing for the United States duty of 6c. per lb. on the metal.

Platinum.—Demand is steady and prices are again a little higher, say \$14.50@15.50 per oz., New York. London quotations are 57s. 6d.@59s. per oz. For chemical ware, best hammered metal, Messrs. Eimer & Amend, New York, furnish the following quotation, the prices given being respectively for orders of over 250 grams; for orders of over 100 grams and less than 250 grams, and for orders of less than 100 grams: Crucibles and dishes, 50c., 51c. and 52c. per gram. Wire and foil are 47c., 48c. and 49c., per gram. The current retail price for crucibles is 60c. per gram.

Quicksilver.—The price is unchanged at \$35.50 per flask, New York. The London quotation is also unchanged at £6 7s. 6d. per flask, with the same price from second hands also.

The Minor Metals.—Quotations for these metals are given in the table below, the prices being for New York delivery:

	Price
Aluminum:	
No. 1, 99% pure rolling ingots, per lb.	50@55c.
No. 1, 99% pure ingots for re-melting, per lb.	48@53c.
No. 2, 97% pure, " "	38@42c.
Ingots from scrap, per lb.	35@40c.
Aluminum-nickel casting metal, per lb.	40@45c.
Bismuth, per lb.	\$1.30@1.75
Phosphorus, per lb.	50@55c.
Platinum, per oz.	\$14@15
Tungsten, pure, powder per lb.	70c.
Tungstic acid, per lb.	45c.
Ferro-tungsten, 60% in ton lots, per lb.	60c.

Imports and Exports of Metals.

New York.*	Week, Aug. 7.		Year, 1896.	
	Expts.	Impts.	Expts.	Impts.
Aluminum, short tons.	41	10,000	2,010	
Antimony ore, short tons.	45	10,000	2,536	
" regulus, casks.			1,371	
Brass, old, short tons.		167	59	
Copper, fine, long tons.	1437	19	45,658	2,429
" matte, " "	1310		10,639	1,756
" ore, " "				4,592
" sulphate, " "			4,431	
Iron ore, " "		99		2,769
" pigs, bars, " "				4,700
Iron pyrites, " "	100	116	409	1,200
" sulphate, " "				610
Ferro-manganese, " "				499
Ferro-silicon, " "				
Manganese ore, " "	3,150			5,244
Spiegeleisen, " "	973			23,108
Lead ore, " "				
" pigs and bars, " "	1100	1968	4,536	25,280
Magnolia metal, " "			42	
Nickel, " "			491	30
Steel, billets, rods, " "			303	17,358
Tin, " "			175	9,286
Tin and black plates, boxes, " "	36,713			557,832
Zinc (spelter), long tons.			1,156	12

* Metal Exchange Reports. † Week ending Aug. 13.

Philadelphia.††

	Imports.	
	Week, Aug. 6.	Year, 1896.
Antimony, casks.		102
Copper ore, long tons.		10,081
Ferro-manganese, long tons.	80	460
Ferro-silicon.		60
Iron ore, long tons.	11,850	169,080
" pig, " "	25	425
" and steel scrap, long tons.		618
Manganese ore, long tons.		4,564
Spiegeleisen.		134
Tin.		541
Tin and black plates, boxes.		27,073

†† From New York Metal Exchange Reports.

Baltimore.**	Week, Aug. 13.		Year, 1895.	
	Exp.	Imp.	Exp.	Imp.
Bismuth metal, cases.....			40	52
Chrome ore..... long tons			20,173	4,891
Copper, fine..... "	64		50	
" matte..... "			2,44	
" sulphate..... "	39			
Iron ore..... "		6,358		250,427
" pigs, bars..... "				2,076
" ingots, blooms..... "				300
Iron oxide..... bags			150	
" pyrites..... long tons				
Ferro-nickel..... "				1,357
Ferro-silicon..... "				70
Lead..... "			2,947	
Limestone..... short "	21		21	2,743
Manganese metal, long "				6,518
Spiegelisen..... "				415
Steel..... "	3		21	
Steel wire, bundles..... "		926		7,379
Tin, long tons..... "	66		173	238
Tin and black plates, boxes		10,101		113,295
Zinc (spelter) long tons.....			211	

**From our special correspondent.

Average Monthly Prices of Metals

In New York since January 1st, 1896, and for the corresponding periods in 1895, 1894, 1893 and 1892, in cents per pound.

Month.	1894.	1895.	1891.	1893.	1892.
Copper:					
January.....	9'87	10'60	10'13	12'13	11'09
February.....	10'34	10'00	9'63	12'00	10'00
March.....	11'03	9'75	9'81	11'88	10'38
April.....	10'98	9'75	9'50	11'38	11'50
May.....	11'15	10'25	9'80	11'00	11'63
June.....	11'67	10'63	8'91	11'00	11'86
July.....	11'40	11'25	9'00	10'88	11'50
Tin:					
January.....	13'62	13'25	20'16	19'99	20'50
February.....	13'44	13'35	19'66	20'30	20'00
March.....	13'30	13'20	19'09	20'71	20'25
April.....	13'34	11'00	19'75	20'81	20'50
May.....	13'54	11'65	20'21	19'96	20'80
June.....	13'59	11'15	19'75	19'76	22'00
July.....	13'63	11'40	19'22	19'15	21'00
Lead:					
January.....	3'08	3'10	3'19	3'87	4'20
February.....	3'19	3'12	3'31	4'22	4'12
March.....	3'11	3'12	3'37	3'96	4'21
April.....	3'07	3'08	3'43	4'08	4'15
May.....	3'03	3'16	3'39	3'89	4'22
June.....	3'03	3'25	3'31	3'77	4'16
July.....	2'96	3'21	3'50	3'8	4'13
Spelter:					
January.....	3'75	3'28	3'56	4'39	4'69
February.....	4'05	3'20	3'85	4'39	4'69
March.....	4'20	3'23	3'89	4'28	4'89
April.....	4'19	3'30	3'62	4'38	4'68
May.....	3'98	3'50	3'47	4'41	4'79
June.....	4'10	3'65	3'49	4'27	4'71
July.....	3'97	3'75	3'43	4'13	4'78

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, August 14.

Heavy Chemicals.—The condition of this market remains the same as it was last week and as it was some weeks previous—dull and quiet. Indications now are that this state of affairs will continue for some time to come, certainly until the advent of the cooler fall months. Nothing is being done in futures, and the trade from day to day is in quantity sufficient to meet only the immediate requirements. Prices in all lines remain firm, no changes being reported. Quotations are as follows: Caustic soda, 60%, \$2.22½@2.42½; 70, 74@76%, \$2.12½@2.37½ per 100 lbs. Alkali, 58%, 80@85c. for 50-ton lots and over, and 90c.@\$1 for smaller quantities; 48%, \$1.20@1.40 for jobbing lots. Bleaching powder, prime brands, \$1.75@1.87½; Continental, \$1.65@1.75 per 100 lbs. Bicarb. soda, English, 1'50 @1'60c.; American, bulk, \$1.50@1.50 per 100 lb. Sal-soda, English, 70@72½c.; American, 65c. (in barrels), 80c. (in kegs) per 100 lbs.

Acids.—As a whole there is no change in the acid market to report since last week. Orders are as numerous as can be expected in a season of dullness; some of these orders are reported to be of fair size. More business has been done in muriatic than in other acids, some large inquiries having been received. The firm state of the brimstone market should make sulphuric acid firm also, and the price of that article is certainly not expected to change to lower figures.

Quotations show no change, and are as follows: Acetic acid (in barrels or carboys), \$1.25@1.40; muriatic acid, 18°, 75c.; 20°, 75@85c.; 22°, \$1.10@1.25, according to make and quantity. Nitric acid, 36%, \$3.25 @4.36; 40%, \$4@4.50; 42%, \$4.50 @5.50. Oxalic acid, \$7.25 ex-dock and \$7.50 ex-store. Mixed acids, according to mixture. Sulphuric acid, 68°, 75@95c., 10@15c. higher for small quantities. Chamber acid, 80@86.50 per ton at factory. Blue vitriol, \$4@4.25, according to grade and order.

Brimstone.—This market continues very strong, the quotation of one dealer for best unmixed sec-

onds being \$23 for spot. For August (to arrive) the quotations are \$21, and for thirds, 60c. per ton less. For October shipments the quotation is \$19 per ton for best unmixed seconds. Though prices have recently had an upward tendency, the market must still be referred to as quiet. Arrivals of Sicilian brimstone are expected next week, all of which has already been contracted for. No sulphur is at present coming from the Louisiana source of supply, as operations cannot be carried on until the work of putting in new machinery is completed.

Fertilizing Chemicals.—This market shows no change of any kind since our last report. What business is being done is at previously announced prices. We quote: Sulphate of ammonia, gas liquor, \$2.25@2.27½; bone, \$2.15@2.20 per 100 lbs. Dried blood, high grade, \$1.55@1.60 per unit, low grade, five ground, \$1.40@1.42½ f.o.b. Chicago. Azotine, \$1.65 @1.70 basis New York. Concentrated phosphate 60% available phosphoric acid, 60c. per unit. Acid phosphate, 13% @15%, av. P₂O₅, 54@65c. per unit at seller's works in bulk. Dissolved bone black, 17% to 18%, P₂O₅, 87½@90c. per unit. Acidulated fish scrap, \$9@9.50, and dried scrap \$18.50@19 f.o.b. fish factory. Tankage, high grade, \$18½@19; low grade, \$17½@18. Bone tankage, \$21; ground bone, \$22@22.50. Bonemeal, \$19.50@23.

Sulphate of Potash: 90-95%, New York and Boston, \$1.90½; Philadelphia, Baltimore and Norfolk, \$1.90; Southern ports, \$2.

Double Manure Salts: 48-53%, New York and Boston, \$1.01; Philadelphia, Baltimore and Norfolk, \$1.02; Southern ports, \$1.03½.

Muriate of potash: The new prices are 1'78c. at New York and Boston; 1'79½c. at Philadelphia, Baltimore and Norfolk, and 1'81½c. at New Orleans for 80@85% (basis of 80%), in lots of 50 tons and upward.

Kainit.—Quotations for 1896 are as follows: New York, Boston, Philadelphia and Baltimore, \$8.80 per ton; Norfolk, \$9.15, and New Orleans, \$9.30 per ton, for 25 tons and upward. Sylvinit at the same ports is quoted at 36½c., 37½c. and 38c., respectively.

Nitrate of Soda.—The prices quoted are 1'77½@1'80c. for spot, according to quantity; 1'80c. to arrive, and 1'82½@1'85c. for futures.

Liverpool. Aug. 4.

(Special Correspondence of Joseph P. Brunner & Co.)

The chemical trade drags along in a listless fashion, and the market is devoid of interest.

Soda ash is steady, as manufacturers have the market pretty much in their own hands, but buyers are only operating from hand to mouth. For tierces, the spot range as to market, is about as follows:

Leblanc ash, 48%, £4@£1 5s. per ton; 58%, £1 5s.@£4 10s. per ton, net cash. Ammonia ash, 48%, £3 5s.@£3 10s. per ton; 58%, £3 10s.@£3 15s. per ton, cash; bags 5s. per ton less. Soda crystals selling to a fair extent at £2 7s. 9d. per ton, less 5% for barrels, and 7s. less for bags. Caustic soda languid, the nearest spot value, as to market, being about as follows: 60%, £6 5s.@£6 7s. 6d. per ton; 70%, £7 5s.@£7 7s. 6d. per ton, net cash; 74%, £8 5s.@£8 7s. 6d. per ton; 76%, £9@£9 5s. per ton, net cash.

Bleaching powder stagnant, and hardwood is quoted at £6 12s. 6d.@£7 per ton, net cash, as to destination. Chlorate of potash very idle, and nominally quoted at about 4½d.@4½d. per lb. Bicarb. soda without special feature, and held for £8 15s. per ton, less 2½% for the finest quality in 1-cwt. kegs, with usual allowances for larger packages. Sulphate of ammonia about stationary, at £8 2s. 6d.@£8 7s. 6d. per ton, less 2½% for good gray, 24% @25%, in double bags f. o. b. here, as to quality.

Nitrate of soda in limited request at £8@£8 2s. 6d. per ton, less 2½% for double bags f. o. b. here, as to quality. Carb. ammonia, lump, 3d. per lb.; powdered, 3½d. per lb., net cash.

MINING STOCKS.

Complete quotations will be found on pages 166 and 167 of mining stocks listed and dealt in at:

- New York. Aspen, Colo. St. Louis.
- Boston. Colorado Springs. Paris, France.
- Philadelphia. Duluth, Minn. Mexico.
- Baltimore. Helena, Mont. Shanghai, China.
- Pittsburg. Salt Lake, Utah. Valparaiso, Chile.
- Denver, Colo. San Francisco. London, England.
- Cleveland, page 164

NEW YORK, Friday Evening, August 14.

Nothing has happened during the past week which would in any way relieve the utter deadness of the mining stock market, although another attempt is being made to form a new mining exchange in this city. On the 10th inst. a meeting was held at the office of Wooster, Barrett & Rogers at No. 30 Broad street, to effect the permanent organization of the new exchange. The following officers were elected: Dr. William Brandreth, president pro tem. and permanent treasurer; Floyd B. Wilson, vice-president; M. E. Wooster, secretary, and John Gray, chairman.

Committees were appointed on building, membership and organization. The Building Committee has practically decided on the location for the new institution. The new exchange will not be a corporation, but will be an association modeled after the New York Stock Exchange.

It has also been reported that a new mining exchange to handle American mining properties will soon be opened in London. It will be operated the same as American exchanges. Negotiations have

been started which, if carried out, will bring the two institutions into close relations.

The amount of business done during the past week will demonstrate the stagnation which now exists, there being only 9,380 shares dealt in, while the week previous shows 9,770, and the week ending July 31 showed sales of 31,740 shares.

A report has been received from the Standard Mining Company's superintendent which states that at a recent clean-up by the cyanide process \$7,000 was netted by the company, which added to the surplus in the treasury of the company brings the cash on hand up to \$9,000.

The Comstocks were in better demand than they have been for several weeks and we record sales of 400 shares of Best & Belcher at 95c.@93c. Chollar also appeared this week with one transaction of 100 shares at \$2.25; 15.0 shares of Comstock Tunnel were traded in at 7c., this being a decline of 1c. since last week. Consolidated California & Virginia appears on the list with 150 shares sold at \$1.90@1.80; Consolidated Imperial returns to the list with 500 shares at 3c. while Crown Point shows transactions of 300 shares at 35c.; 100 shares of Eureka Consolidated changed hands at 28c., while Hale & Norcross shows sales of 200 shares at \$1.15. Of the other Comstocks, Gould & Curry records sales of 300 shares at 60c.; Ophir, 500 shares, at \$1.10 to \$1, the stock opening at \$1.10 on Monday and closing at \$1 to-day. Potosi shows transaction of 300 shares at \$1.10. Savage had sales of 100 shares at 70c.; Sierra Nevada 700 shares at 50c., and Yellow Jacket 200 shares at 41c. California stocks disappeared from the list during the week.

Of the Colorado stocks we have to record transactions in several which have long been strangers in this market. Small Hopes appears with sales of 200 shares at 75c. Lacrosse entered the market on Monday at 8c. and advanced to 9c. with sales of 900 shares, while Leadville Consolidated was sold at 12c. to-day with 500 shares changing hands at that price.

The Cripple Creek group records the following transactions: Anaconda, 500 shares at 52c.; Creede & Cripple Creek, 700 shares at 6c., and Cripple Creek Consolidated, 500 shares at 12c. Pharmacist opened at 9c., and sold down to 8c., with sales of 700 shares, while Victor records one sale of 30 shares at \$7.

Boston. Aug. 13.

(From Our Special Correspondent.)

The market for mining shares continues extremely dull, and in the early dealings prices were decidedly weak, with considerable pressure to sell stocks. Boston & Montana sold off to 86½, later rallied to 70½, and then declined to 68. A little better feeling has prevailed the past two days, and to-day the stock sold up to \$74, declining in the last hour to 73½. The dealings in Old Dominion have been very light this week. Early in the week the stock was depressed to \$10½ by persistent selling, but it quickly recovered and was strong at \$12½@12½. Calumet & Hecla is firm at \$300, at which price all offered is taken. Quincy declined to \$104, but later sold up to \$108. Scrip at \$74.

Tamarack continues to decline, touching \$65 on heavy pressure to sell.

Oceola declined to \$20½, but later was strong at \$23. Kearsage fell off to \$9, with an odd lot selling later at \$10. Franklin sold at \$8½ and declined to \$8. Atlantic was steady at \$15 and later advanced to \$15½.

Tamarack, Jr., sold at \$8 and Wolverine at \$6. Butte & Boston dull at \$1½. The silver stocks are neglected, Pioneer being the only one in which there is much doing. The stock has ruled steady at \$3½ to \$3½, and to-day touched \$4. Santa Ysabel sold at \$7 and Merced \$3½ and \$4 for small lots.

Cleveland. August 12.

(From Our Special Correspondent.)

A drop in the price of Minnesota stock created considerable business for the Cleveland brokers during the past week, and quite a number of shares changed hands. The buying price fell from \$57 to \$50, and the selling price from \$59 to \$52. Charles H. Potter & Company, the investment brokers, reported that the indications were somewhat brighter on the whole this week than last. The quotations follow:

Name of Company.	Par val.	August 12.	
		Bid.	Ask.
Adams Iron Company.....	\$10	\$1.50	\$2.00
Aurora.....	25	6.00	8.00
Biwabik.....	100	32.00	34.00
Champion Iron Company.....	100	10.00	30.00
Chandler.....	25	34.00	35.00
Clark Iron Company.....	100	2.00	3.00
Cincinnati Iron.....	25	10.00	13.50
Cleveland-Cliffs Iron Company.....	100	45.00
Jackson Iron Company.....	25	70.00	75.00
Lake Superior Iron Company.....	25	30.00	31.00
Lake Superior Consolidated.....	100	20.00	21.00
Mesabi Mountain Iron Company.....	100	21.50	22.50
Mesabi Chief Iron Company.....	100	.75	1.25
Minnesota.....	100	50.00	52.00
Pittsburg & Lake Angeline.....	25	75.00
Republic Iron Company.....	25	18.00

Salt Lake City. August 8.

(Special Report of James A. Pollock.)

A slight improvement in the tone of the local mining stock market was noticeable during the past week, although some of the stocks, including some

of the investments, suffered some loss, due almost entirely to heavy realizations. The market stood the hard selling remarkably well, however, and closed with fair firmness. The listed stocks of this State are now paying a quarter of a million dollars in dividends monthly, which is certainly a splendid record.

Ajax was without special feature, but at the close was slightly lower. Light offerings of Anchor caused the quotation of that stock to continue strong. It is reported that the ore bins of the company are now fairly well filled with a good grade of ore. Alliance continued weak. Bogan was shaded materially, although no depressing reports were received. Bullion-Beck paid a special dividend of 15c. per share Thursday. It is understood that this increase in the distribution was due to the recent selling of the company's store and to increased shipments. The management reports that the regular dividend will be declared on the 20th.

Little real change was noted in Centennial-Eureka, although the stock was slightly lower. Shipments are being increased slightly. Daly was materially higher at the close, the cause being the resumption of dividend payments, the Board of Directors having posted a dividend of 25c. per share, payable on the 22d. No announcement has been made as to just how often dividends will be paid. The property of the Daly company is in first-class condition, the recent ore developments having been of an important nature. The stock closed stronger than it has for many months. Little business was done in Daly West, but the quotations were strong as usual.

Geyser did practically nothing. Horn Silver is reported to be looking very well. The prospecting work is showing up some promising ground.

Notwithstanding the fact that Mammoth paid its usual dividend on August 1st, the stock sold slightly off. Shipments of ore have not been heavy during the past two weeks. In common with most of the other heavy stocks, Mercur continued inactive. Operations are being conducted to full capacity. Ontario maintained its strength of the previous week, although the business done in the stock was not heavy. Overland is making a good showing.

Silver King paid its August dividend of 25c. per share August 7th. The increase in the capacity at the Sunshine mill is now being made. On the 600-ft. level of the mine a large ore body higher in grade than any the company had previously found, has just been opened. Swansea sold down to a low point, the close being at the \$2 mark. The company is making regular shipments. Recent developments in the Tetra have been of an encouraging nature. Utah will pay its usual dividend of 2c. per share on the 10th.

British Columbia.

(From Our Special Correspondent.)

ROSSLAND, July 31.

The activity in mining stock matters, which many predicted would be continuous, has been merely temporary. The fact that it is the mid-summer season and the time for excursions and visitations is sufficient to keep mining stock sales a subject for action later on. It is the season of enquiries and of investigation, personal and otherwise—and these are really necessary before any marked change can take place in the mining situation here. There was some activity shown last week in real estate at the east end of Columbia avenue—the favorite direction of the business part of the town—and the amounts at which eligible properties are held show increasing confidence in the future of the town itself. There has been no decrease in the outside activity. A strike on the Northfort-Rossland branch of the Nelson & Fort Shepherd Railway, now in course of construction, was a matter of only a few hours. The strikers began at the Northfort end of the line and they sought to influence those working north from Northfort to Rossland and they succeeded for a few hours. The men were chiefly Italians, and those working on the Canadian side of the line, as they were getting 25 cents a day more than the others, did not wish to keep up the strike, which ended by the latter returning to work after a brief display of the red flag, which, however, suddenly disappeared on the approach of the police.

There is now a population of at least 6,000 within the railroad district proper. These, of course, include railway employees and the continuous arrivals which are on the increase, as they are including excursionists who are combining business with pleasure.

Compared with this time last year, great progress must be noted. There are at least 20 stores and double the population, not to mention the railway improvements, and the mining machinery and development which must soon make the output a reality instead of a prophecy. Prophecies have been numerous here, but many of these are going to be verified, though there will be some failures and much that has been unexpected will happen.

At stock-mining headquarters, I learn that the inquiries are many and from all parts of the continent as well as from Europe.

The part that London, New York, Chicago and San Francisco is going to take in the Kootenay country is now a subject which occupies much attention.

In many forms capital from all over is finding its way into the Trail Creek country, and at no time in the past has there been on Columbia avenue,

the principal street of Rossland, more representatives of Eastern wealth and intelligence than there is just now. It would seem that the energy of three great peoples is concentrated here to make an industrial and prosperous community, with the gold branch of the mineral industry as the motive power.

Two new companies are reported as having been recently incorporated in Spokane. The Alberta is the name of one; it has a capital of \$1,000,000. Its property adjoins the Columbia and Kootenay. I have not learned the name of the other company, but its property is also in the Trail Creek camp.

In the list of mining companies given elsewhere there are some which have yet to comply with the necessary conditions of the mining laws, but their stock is on the market, and its price is what it will bring. The list is what may be found in the office of the Litchfield-Wilmot Company of mining brokers, or what may be seen on the bulletin boards of most of the brokers.

A place is given all these companies here, because there is yet no regular mining exchange to list these properties, and their standing is at present determined by the quotations, though in a new and promising camp like this, it is difficult to foresee what is going to happen, and to place any arbitrary rule in force against any company, the stock of which is not considered unlawful to sell.

London. Aug. 1.

(From Our Special Correspondent.)

The interest in the South African market has centered round Chartered, whose shares have formed the chief object of speculation. Bears passed round all kinds of adverse rumors, such as defeats by the Matabele, probable indemnities of £3,000,000 required by the Boers, etc. Those who desire to sustain the market met these reports by a counterblast in the form of a definite announcement that Rhodes & Beit will pay the cost of the campaign and the Boer indemnity, and that the company will not be called on to meet any unusual expenditure. This had some effect in stopping the slump, and the quotation did not fall below £2 12s. 6d. The new debentures, however, sank to £94, so that we have the odd phenomenon of an ordinary share being at 150% premium while the debenture stock is below par. This is to be explained by the fact that the ordinary shares are easier to speculate with than redeemable debentures. The statement above referred to that Rhodes & Beit will bear the cost of the campaign and the indemnity is, of course, premature and crude, for until the matters in question are settled permanently nobody knows the cost, or can estimate it even approximately. All that they have said is that they are fully prepared to provide funds from their private resources in order to considerably reduce the financial difficulties of the company. The result of the trial of Dr. Jameson and his associates, and the appointment of a parliamentary commission to inquire into the history of the chartered company and the raid, have had no effect on the market, as they were both foregone conclusions. In the South African goldmine market there has been nothing of interest to record, but on the whole the position has strengthened with the prospects of peace.

The West Australian market has been fairly active, chiefly on the report that buying of shares has commenced in Adelaide and has already attained considerable proportions. This report may not be founded on very solid fact, for it emanates from people who are more noted for market manipulations than for anything else. New Zealand has not been much to the front, as the approach of the August bank holiday has temporarily checked the efforts of those who are engaged in making the market.

Americans have not done much good this week, as the most prominent features have been in connection with three failures, viz., Springdale, Jackson Goldfields and Poorman. The first named has sunk to nothing on the practical inanition of the management; the second has got into unenviable notoriety by a proposed reconstruction, and the third has held its meeting and determined to accept the reconstruction scheme brought forward by the directors. In addition to these, there is the expected collapse of Jay Hawk. On the other hand, the dawn of a new era in American mining schemes is fast approaching. Every day I hear of options being secured on British Columbian and Mexican properties by leading people in London who do a genuine business.

It is pleasant to be able to record that an excellent new strike has been made at Dolcoath mine. Captain Thomas is of opinion that the vein is as rich as any ever worked in the mine. This result of the recent introduction of new capital on the limited liability system will go far to reconcile Cornishmen to the new system.

MEETINGS.

Equitable Mining Company, at the office of Edwin Van Cise-Moody & Washabaugh Block, Deadwood, S. Dak., on September 7th at 7:30 p. m.

Horace Greeley and Sacred Mining and Milling Company, at the office of the company, 507 McCornick Block, Salt Lake City, Utah, on August 29th, at 2 p. m.

Inter Alta Mining Company, at 205 E. Commercial avenue, Anaconda, Mont., on September 14th, at 2 p. m.

Jennie Lind Mining and Milling Company, at the office of Pritchard & Cole, 216 Bennett avenue, Gardner Building, Cripple Creek, Colo., on August 31st, at 2 p. m.

Lew Wallace Mining Company, at the office of Edwin Van Cise, Moody & Washabaugh Block, Deadwood, S. Dak., on September 7th at 8 p. m.

Transit Mining Company, at the company's office in Central City, S. Dak., on August 24th, at 8 p. m.

MISCELLANEOUS DIVIDENDS.

American Coal Company, semi-annual dividend of 4% on the capital stock, payable September 1st.

ASSESSMENTS.

Name of Co.	Loc'n.	No.	Divq.	Sale.	Amt.
*Alpha Con.....	Nev.	17	Sept. 7	Sept. 29	.10
Anita Gold.....	Cal. ..	14	Aug. 25	" 15	.07
*Argonaut.....	" ..	3	" 10	" 12	.05
Baltic Gravel....	" ..	2	Sept. 2	" 19	.0094
Best & Helcher..	Nev. ..	60	Aug. 6	Aug. 27	.25
Channel Bend....	Cal. ..	3	July 31	" 22	.05
Con. Imperial....	Nev. ..	37	Aug. 27	Sept. 22	.01
Eureka Con.....	Utah..	"	July 8	" 5	.10
Gold Bar.....	Cal.	"	" 13	Aug. 20	.02
Granite Hill.....	" ..	15	" 23	" 19	.05
Hale & Norcross	Nev. ..	109	Aug. 14	Sept. 4	.15
Hartery Con.....	Cal.	19	" 3	Aug. 22	.02
Jameson.....	" ..	8	" 10	" 31	.05
Lucky Bill.....	Utah..	20	" 17	Sept. 15	.02
Marguerite.....	Cal.	3	July 28	Aug. 28	.10
Orient Gold.....	" ..	"	" 26	Sept. 5	.50
Placer.....	" ..	"	Aug. 28	" 21	.10
Orleans.....	" ..	"	" 24	" 21	.10
Rocky Peak.....	" ..	"	" 24	" 21	.02
Ruby, G. & S....	S. D. ..	9	Sept. 1	" 19	.01
*Sevier.....	Utah..	"	" 9	Oct. 9	.05
*Stone Creek.....	" ..	"	" 1	" 1	.005
Copper Belt....	Mont.	6	Aug. 17	Sept. 17	.61
West Cable.....	Utah..	6	Aug. 31	" 15	.15
Ybarra Gold.....	Mex.	6	" 31	" 15	.15

* New assessment.

DIVIDENDS.

NAME OF COMPANY	Current Dividends.		Paid since Jan. 1, 1896.	Total to date.
	Date.	Amount.		
Aetna Con.....		\$20,000	\$20,000	\$60,000
Alaska-Mexican	Aug. 1	\$18,000	5,120	155,031
Alaska Treadwell	" "	75,000		2,950,000
Anaconda.....		750,000		
Aurora Iron.....		50,000		700,000
Bangkok-Cora Bell		6,000		107,610
Big Six.....		2,500		2,500
Boston & Mont.	Aug. 20	450,000	1,050,000	4,475,000
*Bullion Beck & Ch	" 6	15,000	125,000	2,075,000
*Calumet & Hecla..			1,500,000	45,850,000
*Cariboo.....		32,000		95,000
*Centennial-Eureka		240,000		1,770,000
C. O. D.....		5,000		25,000
*Dalton & Lark....		75,000		75,000
Daly.....	Aug. 22	37,500	37,500	2,887,500
D-minion Coal....		600,000		
Elkton Con.....		20,000		65,000
Florence.....		54,390		89,348
*Galena.....	Aug. 10	5,000	26,100	46,000
Gold Coin.....		65,000		80,000
*Golden Fleece....		126,000		527,179
Gold & Globe Hill..		19,500		28,875
Hecla Con.....		30,000		2,130,000
Highland.....		25,000		3,153,912
*Homestake.....	Aug. 25	51,250	51,000	5,862,500
Hope.....		10,000		
Horn Silver.....		50,000		5,150,000
Iowa.....		20,000		20,000
Iron Mountain....		30,000		440,000
*Isabella.....	Aug. 25	22,500	157,500	180,000
*Jackson.....		7,500		
Le Roi.....		100,000		175,000
*Mammoth.....	Aug. 1	20,000	20,000	1,090,000
*Mercur.....		125,000		475,000
*Minnesota Iron....		495,000		3,240,000
*Mont. Ore Pur. Co.		280,000		440,000
Moon-Anchor.....		18,000		18,000
Moose.....		6,000		186,000
*Napa Con.....		50,000		790,000
*Ontario.....	Aug. 7	15,000	120,000	13,295,000
*Osceola Con.....		125,000		2,072,500
Otaqueachy.....		1,000		1,000
Portland.....		120,000		743,000
Quincy.....	Aug. 17	130,000	70,000	8,370,000
*Silver King.....	" 7	37,500	300,000	750,000
Slocan Star.....	Sept. 1	100,000	200,000	200,000
Small Hopes.....		25,000		3,275,000
*Smuggler-Union..		100,000		100,000
*Tamarack.....		150,000		4,320,000
Union.....		23,500		73,000
*Utah.....	Aug. 10	2,000	17,000	149,500
*Victor.....		140,000		605,000
Victor M. & L....		12,000		42,000
War Eagle.....		25,000		157,500
Wasp.....		20,000		20,000
Totals.....		\$1,148,750	\$8,890,550	\$19,690,111

* June dividend paid. † Extra dividend of \$2 included.

This table does not give all the dividends paid by mining companies, as it is impossible to obtain a complete list of dividends declared. Many companies are close corporations and refuse to give the information. Readers of the *Engineering and Mining Journal* will confer a favor on the publishers if they will notify the *Journal* of any errors or omissions in the above table.

STOCK QUOTATIONS.

BOSTON, MASS. Table with columns for Name of Company, Location, Par value, and dates from Aug. 7 to Aug. 13. Includes companies like Allouez, Arnold, Atlantic, etc.

NEW YORK. Table with columns for Name of Company, Location, Par value, and dates from Aug. 8 to Aug. 14. Includes companies like Adams, Ajax, Alamo, etc.

* Official quotations Boston Stock Exchange. Total sales, 4,147.

INDUSTRIAL COAL AND COAL RAILROAD. Table with columns for Name of Company, Par value, and dates from Aug. 8 to Aug. 14. Includes companies like Balt. & Ohio, Ches. & Ohio, etc.

* Official quotations N. Y. Stock Exchange. Total shares sold, 109,569.

Table with columns for Name of Company, Location, Par value, and dates from Aug. 8 to Aug. 14. Includes companies like Adams, Ajax, Alamo, etc.

* Official quotations N. Y. Stock and Con. Stock & Petroleum Exchanges. Total shares sold, 9,380.

COLORADO SPRINGS, COLO. Table with columns for Name of Company, Par value, and dates from Aug. 3 to Aug. 8. Includes companies like Ajax, Alamo, Am. Ric, etc.

* Official quotations and sales Colo. Springs Mfg. Stock Assoc. * Board of Trade Exchange. † Holiday.

ST. LOUIS, MO. Week ending July 23. Table with columns for Name of Company, Company's Office, Par value, Bids, Asked, and Last Dividend.

SAN FRANCISCO, CAL. Table with columns for Name of Company, Location, Par value, and dates from Aug. 8 to Aug. 14. Includes companies like Alta, Belcher, Best & Belcher, etc.

* Official telegraphic quotations, San Francisco Stock Exchange.

BALTIMORE, MD. Week ending Aug. 13. Table with columns for Name of Company, Location, Par value, Bids, Asked, and Last Dividend.

* Official quotations Baltimore Stock Exchange.

BRITISH COLUMBIA. Week ending July 17. Table with columns for Name of Company, Par value, Selling price, and Name of Company, Par value, Selling price.

* From our special correspondent.

LONDON, July 31.

Table with columns: NAME OF COMPANY, Country, Product, Capital Stock, Par value, Last dividend, Quotations. Lists various mining companies from Alaska to South Africa.

DENVER, COLO.,

Table with columns: NAME OF COMPANY, Par val, Aug. 3, Aug. 4, Aug. 5, Aug. 6, Aug. 7, Aug. 8, Sales. Lists various mining companies and their stock prices.

PARIS, Week ending July 31.

Table with columns: NAME OF COMPANY, Country, Product, Capital Stock, Par value, Divs. year, Prices. Lists various mining companies from France, Spain, and Russia.

MEXICO, Week ending July 30.

Table with columns: NAME OF COMPANY, State, No. of shares, Last dividend, Last assessment, Prices. Lists various mining companies from different states in Mexico.

VALPARAISO, CHILE, July 9.

Table with columns: NAME OF COMPANY, Capital, Share value, Last dividend, Prices. Lists various mining companies from Chile.

SHANGHAI, CHINA, July 3.

Table with columns: NAME OF COMPANY, Country, No. of shares, Value, Last dividend, Price. Lists various mining companies from China.

SALT LAKE CITY, UTAH, Week ending Aug. 8.

Table with columns: Stocks, Par value, Bid, Asked, Actual selling price. Lists various mining stocks and their prices.

PHILADELPHIA PA.,

Table with columns: NAME OF COMPANY, Location, Par val, Bid, Asked, Shares sold, Price. Lists various mining companies and their stock prices.

HELENA, MONT., Week ending Aug. 7.

Table with columns: NAME OF COMPANY, Location, Company's office, Par value, Bid, Asked, Shares sold, Price. Lists various mining companies from Montana.

PITTSBURG, PA., Week ending Aug. 11.

Table with columns: NAME OF COMPANY, Location, Par val, Bid, Ask, Selling price. Lists various mining companies and their stock prices.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Main table with columns for Name and Location of Company, Capital Stock, Shares (No., Par Val), Assessments (Total Levied, Date and Amount of Last), Dividends (Total Paid, Date and Amount of Last), and Name and Location of Company, Capital Stock, Shares (No., Par Val), Assessments (Total Levied, Date and Amount of Last).

G., Gold. S., Silver. L., Lead. C., Copper. B., Borax. * Non-assessable. * The Deadwood previously paid \$275,000 in eleven dividends and the Terra \$75,000.

† Previous to the consolidation in August, 1884, the California had paid \$31,320,000 in dividends and the Cons. Virginia \$42,380,000.

NOTE.—Corrections to this table are made monthly. Correspondents are requested to forward changes or additions so as to reach us before the end of each month.

CLASSIFIED LIST OF ADVERTISERS.

Air Compressors and Rock Drills.
 Bullock, H. C. Mfg. Co. | Leyner, J. Geo.
 Burleigh Rock Drill Co. | McKiernan Drill Co.
 Clayton Air Compressor Works. | N. Y. Diamond Drill Co.
 Fraser & Chalmers. | Philadelphia Eng. Wks., Ltd.
 Ingersoll-Sergeant Drill Co. | Rand Drill Co.
 Laidlaw-Dunn-Gordon Co. |
 (See Diamond Drills.)

Air Hoists.
 Whiting Foundry Equipment Co.

Amalgamators.
 Bucyrus Steam Shovel & Dredge Co. | Fraser & Chalmers.

Amalgam Plates.
 Western Plating and Mfg. Co.

Anti-Friction Metals.
 Besley, Chas. H., & Co. | Chester Steel Cast. Co.

Architects and Builders.
 Berlin Iron Bridge Co. | Shifler Bridge Co.
 Pittsburg Bridge Co. | Walker Co.
 Pollock, Wm. B., & Co.

Assays and Chemists' Supplies.
 Anworth, Wm. | Penn. Sm. & Ref. Wks.
 Baker & Adamson. | Penna. Salt Mfg. Co.
 Baker & Co. | Roessler & Hasslacher
 Hecker, Christian. | Chemical Co.
 Bullock & Crenshaw. | Sargent, E. H., & Co.
 Denver Fire Clay Co. | Solway Process Co.
 Eimer & Amend. | Taylor, John, & Co.
 Henry Bell Chem. Co. | Trocmer, Henry.
 Neiden Judson Drug Co. | Western Chemical Co.

Attorneys, Corporation.
 Emig, C. E. | Hammersley, Hamilton & La Maistre.

Automatic Boiler Feeds.
 Penberthy Injector Co.

Rabbit's Metal.
 Besley, Chas. H., & Co.

Bankers and Brokers.
 Arkell, E., & Co. | Fartridge & Storer.
 Bartlett & Co. | Peck, Frank G.
 Bonbright, W. P., & Co. | Prentice, Russell.
 Bretting, E. N. | Proudft, J. W., & Co.
 Crooks, E. C. | Rope, Key & Co.
 Dorsey Investment Co. | Sheldon, E. C.
 Grant & R. | Still & Still.
 Handy & Harman. | Smith C. H. & Co.
 Hendrickson, W. J. | Snow, E. P.
 Heron Bros. | State Trust Co.
 Kinney, M. | Weyand Bros.
 Leibelmer, N. | White, Samuel.
 Mayer, Andrew. | Williamson, W. W.
 Miller, J. W., & Co. | Woods Investment Co.
 North Investment Co. | Wyoming Mg. Bureau
 Northwest Mg. & Investment Co.

Belting.
 Hercules & Bolthoff Mfg. Co. | Jeffrey Mfg. Co.
 New York Belting & Packing Co., Ltd.

Belt Lacing.
 Bristol Co.

Blasting Caps.
 Metallic Cap Mfg. Co. | Rhenish Westphalian Explosive Co.
 Schroeder, Fr.

Blasting Batteries, Cars and Buses.
 Climax Fuse Co. | Metallic Cap Mfg. Co.
 Lau, J. B., & Co. | standard Fuse Co.
 Macbeth James, & Co.

Blows, Pressure.
 Connorsville Blower Co.

Boilers.
 Denver Eng. Wks. Co. | Ridon Iron Works.
 Fraser & Chalmers. | Stillwell-Bierce & Philadelphia Eng. Wks., Ltd.
 Pollock, Wm. B., & Co. | Standard Boiler Co. (See Machinery.)

Brattice Cloth.
 Besley, Chas. H., & Co.

Brick Machine.
 Freese, E. A., & Co.

Bridges.
 Berlin Iron Bridge Co. | Shifler Bridge Co. (See Machinery.)

Car Wheels.
 Whiting Foundry Equipment Co.

Carbons.
 Fisher, Victor, & Co. | New York Diamond Drill Co.
 Lexow, Theodor.

Chain and Link Belting (See Belting.)
 Chemicals | Penn. Salt Mfg. Co.
 Baker & Adamson. | Roessler & Hasslacher
 Bullock & Crenshaw. | Chemical Co.
 Eimer & Amend. | Solway Process Co.
 Henry Bell Chem. Co. | Western Chemical Co.

Chemists.
 Simonds & Wainwright. | Chilled Castings. | Whiting Foundry Equipment Co.

Coal.
 Maryland White Coal Co. | Maryland Coal Co.
 Potts, F. A., & Co. | Stickney, Conyngham & Co.
 Ward & Olyphant.

Coal Cutters (See Machinery.)
 Ingersoll-Sergeant Drill Co. | Jeffrey Mfg. Co.
 Leyner, J. Geo. | Link Belt Machinery Co.

Compressors.
 Clayton Air Compressor Works. | Laidlaw-Dunn-Gordon Co.
 Norwalk Iron Works Co. | Rand Drill Co.

Concentrators, Crushers, Pulverizers, Separators, Etc.
 Allis, Edw. P., & Co. | Bradley Pulverizer Co.
 Colorado Iron Works. | Denver Eng. Works Co.
 Dodge Mining Machinery Co. | Fraser & Chalmers.
 Fraser & Chalmers. | The Vanner Concentrator.
 Hendrie & Bolthoff Mfg. Co. | Krupp, F.
 Link Belt Machinery Co. | McCully, R.
 Scoville, H. H., & Co. | Stedman Foundry & Mach. Co.
 Walburn-Swenson Co. (See Machinery.)

Contractors. (See Machinery.)
 Conveyer Belts. | Robbins Conveyer Belt Co.

General Dealers and Producers.
 American Metal Co. | Elliott's Metal Co., Ltd.
 Arizona Copper Co. | James & Shapapere.
 Atlantic Mining Co. | Lambert's Wharf. Co.
 Balbach S. & Ref. Co. | Lewisohn Bros.
 Baltimore Cop. Wks. | Orford Copper Co.
 Bath, H., & Son. | Pass, G., & Son, Ltd.
 Bridgeport Copper Co. | Penn Salt Co.
 Canadian Copper Co. | Phelps, Dodge & Co.
 Copper Queen Mfg. Co. | Vivian, Younger & Detroit Cop'r M. Co. | Bond.

Corrugated Iron.
 Berlin Iron Bridge Co. | Cincinnati Corrugating Co.
 Sykes Steel Roofing Co.

Crucibles.
 Whiting Foundry Equipment Co.

Crucibles, Graphite, Etc.
 Denver Fire Clay Co. | Stedman Foundry & Machine Works.
 Dixon, Jos. Crucible Co. |
 Cyanide. | Roessler & Hasslacher Chemical Co.

Diamonds.
 Bishop, Victor, & Co. | Lexow, Theodor.
 New York Diamond Drill Co.

Diamond Drills.
 Bishop, Victor, & Co. | Bullock Mfg. Co., M.C.
 Lexow, Theodor.
 New York Diamond Drill Co. | Sullivan Machinery Co. (See Air Compressors and Rock Drills.)

Dredges.
 Bucyrus Steam Shovel & Dredge Co. | Marlon Steam Shovel Co. | Southern & Co.

Dryers.
 Brown, Horace F. | Denv. Eng. Wks. Co.
 Cummer, F. D. & Son Co.

Dynamo Cars.
 Denver Eng. Works Co. | Hunt Co., C. W.
 Hendrie & Bolthoff Mfg. Co. | Fraser & Chalmers
 Truax Mfg. Co.

Educational Institutions.
 Arizona School of Mines. | Columbia University.
 Michigan Mining School. | Chicago School of Assaying.
 International Correspondence Schools. | Lehigh University.
 Mass. Inst. of Technology. | Missouri School of Mines.
 Rose Polytechnic Institute. | Worcester Polytechnic Inst.

Electrical Batteries.
 Macheson, James, & Co. | Link Belt Mach. Co.
 Besley, Chas. H., & Co. | Oxonite Co., Ltd.
 Card Electric Co. | Repauno Chem. Co.
 Denver Eng. Wks. Co. | Electrical Engineering Co. | Westinghouse Elec. Mfg. Co.
 General Electric Co. | Jeffrey Mfg. Co.

Elevators, Conveyers and Hoisting Machines.
 Brown Hoist & Conv. Mach. Co. | Jeffrey Mfg. Co.
 Caldwell, H. W., & Co. | Link Belt Mach. Co.
 California Wire Wks. | Nelsonville Foundry & Machine Co.
 Cooper, Hewitt & Co. | Vulcan Iron Works.
 Crook, W. A., & Bros. Co. | Walkins, L. E.
 Denver Eng. Wks. Co. | Electrical Engineering Co. (See Wire Rope Tramway and Machinery.)

Emery Wheels.
 Besley, Chas. H., & Co. | New York Belting & Packing Co., Ltd.

Engineers, Chemists, Metallurgists (See Directory Pages 4, 5 and 6.)
 Engineers' Instruments and Supplies. | A. S. Co. | Gurely, W., & L. E.
 Buff & Berger. | Heer, Peter.
 Hullock & Crenshaw. | Keuffel & Esser Co.
 Dietzen, F., & Co. | Lietz Co.
 Fauth & Co. | Mahn & Co.
 Engine. | Ridon Iron Works.
 American Engine Co. | Stillwell-Bierce & Fraser & Chalmers. | Smith-Valle Co.
 Bullock, M. C. Mfg. Co. | Tod, William & Co.
 Fraser & Chalmers. | Union Iron Works.
 Hercules Gas Engine Co. | Webster, Camp & Lane Mach. Co. (See Machinery.)

Excavators.
 Bucyrus Steam Shovel & Dredge Co. | Marlon Steam Shovel Co. | Southern & Co.

Fire-Brick and Clay Furnaces.
 Brown, Horace F. | Hoskins, Wm.
 Dodge Mining Mach Co. | Moore, S. L., & Son Co.
 Denver Fire Clay Co. | Pollock, W. B., & Co. (See Machinery.)

Fuses.
 Climax Fuse Co. | Ingersoll-Sergeant Drill Co. | Standard Fuse Co.

Gas Engines.
 Hercules Gas Engine Co. | Norman, J. J., & Co.

Gas Works.
 Pollock, Wm. B., & Co. | Wood, R. D., & Co.

Gauges, Recording, Etc.
 Bristol Co.

Gearing.
 Besley, Chas. H., & Co. | Denver Eng. Wks. Co. | Chester Steel Cast. Co. | Fraser & Chalmers. (See Machinery.)

Grease, Graphite, Etc.
 Besley, Chas. H., & Co. | Dixon, Jos. Cruc. Co.

Heavy Machinery.
 Denver Eng. Works Co. | Fraser & Chalmers.
 Rose, Rubber, Etc. | New York Belting & Packing Co., Ltd.

Injectors.
 Jenkins Bros. | Penberthy Injector Co.

Insulated Wires and Cables.
 Okonite Co., Ltd.

Insurance Companies.
 Hartford Steam Boiler Inspect'n and Ins. Co. | Mutual Life Insurance Co.

Joint Fittings.
 Tight Joint Co.

Lead Linings for Chlorination Tubs.
 Raymond Lead Co.

Locomotives.
 General Electric Co. | Hunt, C. W., & Co.
 Porter, H. K., & Co.

Lubricators.
 Asbestos Paraffine Co. | Detroit Lubricator Co.

Machinery.
 Dealers in Mining and other Machinery.
 Allis, Edw. P., & Co. | Mecklenburg Ir. Wks.
 Bacon, E. C. | Merralls' Mill Co.
 Bealy, Chas. H., & Co. | Montgomery, J. H.
 Blake, T. A. | Mach. Co.
 Bradley Pulverizer Co. | Moore, Sam. L., & Son.
 Bullock, M. C. Mfg. Co. | Nelsonville Foundry & Machine Co.
 Caldwell, H. W., & Co. | New York Diamond Drill Co.
 Card Electric Co. | Norwalk Iron Wks. Co.
 Colorado Iron Works. | Parke & Lacy Co.
 Conveyer & Blower Co. | Crook, W. A., & Bros. Co.
 Denver Mg. Mach. Co. | Philadelphia Eng. Wks., Ltd.
 Dodge Mg. Mach. Co. | Field, F. R.
 Dodge Mg. Mach. Co. | Stedman Fdy. & M. Co.
 Fraser & Chalmers. | Hammond, Mfg. Co.
 Hammond, Mfg. Co. | Hendrie & Bolthoff Mfg. Co.
 Hercules Gas Engine Co. | Ingersoll-Sergeant Drill Co. | Jeffrey Mfg. Co.
 Ingersoll-Sergeant Drill Co. | Jessop, W., & Sons, Ltd.
 Jeffrey Mfg. Co. | Leyner, J. Geo.
 Lidgerwood Mfg. Co. | Lidgerwood Mfg. Co. | Krupp, F.
 McCully, R. | McKiernan Drill Co. | Taylor Iron & Steel Co.
 McKiernan Drill Co. | Johnson, Matthey & Co. | Lambert's Wharf. Co. | Lewisohn Bros. | Mathieson Smelting Co. | Mathiesen & Hegeler Zinc Co. | Lecloux & Co. | Montana Ore Purchasing Co. | Orford Copper Co. | Pass, G., & Son, Ltd. | Phelps, Dodge & Co. | Picher Lead Co. | Raymond Lead Co. | State Ore Sampling Co. | Tod, William & Co. | Vivian, Younger & Bond.

Metal Dealers.
 American Dev. & Mg. Co. | Johnson, Matthey & Co. | Lambert's Wharf. Co. | Lewisohn Bros. | Mathieson Smelting Co. | Mathiesen & Hegeler Zinc Co. | Montana Ore Purchasing Co. | Orford Copper Co. | Pass, G., & Son, Ltd. | Phelps, Dodge & Co. | Picher Lead Co. | Raymond Lead Co. | State Ore Sampling Co. | Tod, William & Co. | Vivian, Younger & Bond.

Metalurgical Works and Ore Purchasers' Processes.
 American Dev. & Mg. Co. | Fraser & Chalmers. | Kendall Gold & Silver Extraction Co. | Mathiesen & Hegeler Zinc Co. | Lecloux & Co. | Montana Ore Purchasing Co. | Orford Copper Co. | Pass, G., & Son, Ltd. | Phelps, Dodge & Co. | Picher Lead Co. | Raymond Lead Co. | State Ore Sampling Co. | Tod, William & Co. | Vivian, Younger & Bond.

Mine Cars.
 Denver Eng. Wks. Co. | Hendrie & Bolthoff Mfg. Co. | Hunt, C. W., & Co. | Nelsonville Foundry & Machine Co. | Whiting Foundry Equipment Co. (See Machinery.)

Mine, Mill and Smelters' Supplies.
 Denver Eng. Wks. Co. | Dodge Mining Machinery Co. | Gates Iron Works. | Parkhat & Wilkinson. | Roessler & Hasslacher Chemical Co. | Stieren, William E. (See Machinery.)

Mining and Land Companies.
 American Dev. & Mg. Co. | Copper Queen Con. Co. | Atlantic Mg. Co. | Detroit Copper Mg. Co. | Arizona Copper Co. | Eureka Co.

Nickel.
 Canadian Copper Co.

Ore Cars.
 Truax Mfg. Co.

Ore Hoisters.
 Brown, Horace F. | Cummer, F. D. & Sons Co.

Ore Testing Works.
 Hunt, F. F. | Ledoux & Co. | Montana Ore Purchasing Co. | Ricketts & Banks. | Robertson, W. F. | Simonds & Wainwright State Ore Sampling Co.

Packing and Pipe Coverings.
 Asbestos Paraffine Co. | Braund, Randolph. | Jenkins Bros. | Hine & Robertson. | Ricketts & Banks. | Robertson, W. F. | Simonds & Wainwright State Ore Sampling Co.

Refrigerated Metals.
 Aitchison, R., Perf. Metal Co. | Fraser & Chalmers. | Harrington & King Perforating Co.

Peroxide of Sodium.
 Roessler & Hasslacher Chemical Co.

Phosphor-Bronze.
 Phosphor-Bronze Smelting Co.

Pile Drivers.
 Bucyrus Steam Shovel and Dredge Co. | Ingersoll-Sergeant Drill Co.

Pipes.
 Pollock, Wm. B., & Co. | Wyckoff, A., & Sons.

Platinum.
 Baker & Co. | Johnson, Matthey & Co.

Powder.
 Atlantic Dynamite Co. | Lafin & Hand Powder Co. | Ingersoll-Sergeant Drill Co. | Hunt, C. W., & Co. | Repauno Chem. Co.

Pressure Blowers.
 Connorsville Blower Co.

Publishers.
 American Fertilizer. | Arms & Explosives. | Australian Mg. Stand. | Bullionist. | Denver Republican. | El Minero Mexicano. | Electrical Plant & Electrical Industry. | Financial Times. | Indian Engineering. | Iron & C. Trade Review. | McNeill's Code. | Mining Journal. | Scientific Pub. Co. | So. African Mg. Jour. | Zeitschrift fur Practische Geologie.

Pumps.
 Blake, Geo. F. Mfg. Co. | Cameron, A. S., & Co. | Pump Works. | Denver Eng. Wks. Co. | Fraser & Chalmers. | Jacksonville Iron Wks. | Stillwell-Bierce & Smith-Valle Co. | Tod, Wm., & Co. | Warrington, Henry R.

Quarrying Machines.
 Ingersoll-Sergeant Drill Co. | Rand Drill Co. | Sullivan Machinery Co.

Quicksilver.
 Sureka Co.

Railroads.
 Aitchison, Topeka & Santa Fe Ry. | Chicago & West. R. R. | C. R. & Quincy R. R. | Denver & Rio Grande R. R. | Denver, Leadville & Gunnison Ry. | Florence & Cripple Creek R. R. | Illinois Central R. R. | Midland R. R. of Kentucky. | Rio Grande Southern R. R. | U. P., D. & G. R. R.

Railroad Supplies and Equipments.
 Hunt, C. W., & Co. | Robinson & Orr. | Porter, H. K., & Co. (See Machinery.)

Regulators, Dampers, Heat, Etc.
 Eddy Valve Co. | Jenkins Bros.

Rock Drills. (See Air Compressors)
 Berlin Iron Bridge Co. | Phelps, Dodge & Co. | Cincinnati Corrugating Co. | Shifler Bridge Co. | Taylor Iron & Steel Co. | Sykes Steel Roofing Co.

Rubber Goods.
 New York Belting & Packing Co., Ltd.

Screens.
 Aitchison, R., Perf. Metal Co. | Denver Eng. Wks. Co. | Fraser & Chalmers. | Harrington & King Perforating Co. | Link Belt Machinery Co. | Ludlow-Saylor Wire Co. (See Machinery.)

Second Hand Machinery.
 Hine & Robertson. | Robinson & Orr.

Separators.
 Dodge Mining Machinery Co.

Shoes and Dies.
 Chester Steel Cast. Co. | Denver Eng. Wks. Co. | Chrome Steel Works. | Fraser & Chalmers. | Crescent Steel Co.

Shovels (Steam).
 Bucyrus Steam Shovel & Dredge Co. | Marlon Steam Shovel Co. | Southern & Co.

Smelting and Refining Works.
 Balbach S. & Ref. Co. | Orford Copper Co. | Baltimore Cop'r Wks. | Penna. Salt Mfg. Co. | Bridgeport Copper Co. | Penn Smelting and Con. Kas. City S. & P. Co. | Phosthor-Bronze Smelting Co. | Elliott's Metal Co., Ltd. | Mathieson Smelting Co. | Steel Rails, Castings, Molds, Drill Steel. | Bethlehem Iron Co. | Robinson & Orr. | Carpenter Steel Co. | Pollock, Wm. B., & Co. | Chester Steel Cast. Co. | Taylor Iron & Steel Co. | Chrome Steel Works. | Jessop, Wm. & Son Ltd. | Crescent Steel Co. (See Metal Dealers)

Tanks.
 Denver Eng. Wks. Co. | Walker Co. | Gates Iron Works. | Williams Mfg. Co. | Okonite Co., Ltd.

Teels.
 Besley, Chas. H., & Co. | Pratt & Whitney Co.

Tubes.
 Besley, Chas. H., & Co. | Pollock, Wm. B., & Co. | Williams Bros.

Tubing-Rubber.
 New York Belting and Packing Co., Ltd.

Turbine Water-Wheels.
 Leffel, Jas., & Co. | Pelton Water Wheel Co. | Stillwell-Bierce & Smith-Valle Co.

Valves.
 Eddy Valve Co. | Jenkins Bros.

Ventilators.
 Bullock, M. C. Mfg. Co. | Tod, Wm., & Co. | Fraser & Chalmers.

Vulcanite Emery Wheels.
 New York Belting and Packing Co., Ltd.

Water-Wheels.
 Leffel, James, & Co. | Pelton Water Wheel Co. | Stillwell-Bierce & Smith-Valle Co.

Well Drilling Machinery.
 Sullivan Mach'y Co. | Williams Bros.

Wharfage.
 Lambert's Wharfage Co.

Wheels, Car.
 Chester Steel Cast. Co. | Taylor Iron & Steel Co.

White Lead.
 Cookson & Co. | Foster, Blackett & Co.

Wire Cloth.
 Aitchison, R., Perf. Metal Co. | Harrington & King Perforating Co.

Wire Rope & Wire.
 Besley, Chas. H., & Co. | Hunt, C. W., Co. | Broderick & Hascon. | Hines, Dees & Co. | Rope Co. | R'Blinn, J. A. Sons & Co. | California Wire Wks. | Ropeways Syndicate. | Carpenter Steel Co. | Trenton Iron Co. | Cooper Hewitt & Co.

Wire Rope Tramway.
 Brown Hoist & Conv. Mach. Co. | Hunt, C. W., Co. | Machine Co. | Roebing, J. A., Son & Co. | California Wire Wks. | Ropeways Synd. | Colorado Iron Works. | Vulcan Iron Works. | Denver Eng. Wks. Co. | Fraser & Chalmers.

POSITIONS VACANT.

Metallurgists, Chemists, Mine or Furnace Foremen, or other assistance of this character, will be inserted in this column WITHOUT CHARGE, whether subscribers or not.

The labor and expense involved in ascertaining what positions are open, in gratuitously advertising them and in attending to the correspondence of applicants, are incurred in the interest, and for the exclusive benefit of subscribers to the ENGINEERING AND MINING JOURNAL.

Applicants should inclose the necessary postage to insure the forwarding of their letters.

1468 WANTED--A MAN WHO IS A THOROUGHLY competent Mechanical Draftsman and Chemist, who is willing to start with low wages, where chances for advancement are good: steady position. Address, stating references, experience and salary expected, XY, ENGINEERING AND MINING JOURNAL.

1472 WANTED--A FIRST-CLASS MILLWRIGHT accustomed to quartz mill for mine in Central America. Contract three years. Give terms and references. Address MILLWRIGHT, ENGINEERING AND MINING JOURNAL.

1473 WANTED--A GOOD BLACKSMITH for mining camp in Central America. Must understand shoeing. Contract three years. State terms and references. Address BLACKSMITH, ENGINEERING AND MINING JOURNAL.

1475 WANTED--MINING ACCOUNTANT in California, age about 30, unmarried and Scotch preferred. Undeniable references as to personal character and practical experience. Able to arrange and control the accounts, returns and general commercial business of a large concern. Good salary to a first-class man. Address CALIFORNIA, ENGINEERING AND MINING JOURNAL.

1476 WANTED--A FIRST-CLASS ASSAYER and ore sampler, also as assistant manager and engineer in the operating of a large deposit of manganese of the kind known as "wad" or "bog." Address with full particulars, references, etc. PRINCIPAL, ENGINEERING AND MINING JOURNAL.

1477 WANTED--A PRACTICAL MINING engineer and metallurgist to take charge of a gold mine and mill in one of the Northern States. Send references and name salary wanted. Address M. & L. Co., ENGINEERING AND MINING JOURNAL.

1478 WANTED--A FIRST-CLASS ASSAYER for custom sampling works in the Northwest; experience and credentials of the best class indispensable; acquaintance with the business of custom sampling would be an advantage. Reply, stating record, references and salary, to NORTHWEST, ENGINEERING AND MINING JOURNAL.

1479 WANTED--ASSAYER AND CHEMIST to take charge of laboratory connected with copper-smelting works in the East. Undeniable references as to ability must be given. Address, stating experience and salary wanted, COPPER, ENGINEERING AND MINING JOURNAL.

1480 WANTED--A SUPERINTENDENT who understands handling mica. Apply with particulars, etc., MICA, ENGINEERING AND MINING JOURNAL.

1481 WANTED--A COMPETENT MINING manager, by an American company, to develop a gold mine near Rat Portage, Ontario, Can., and erect a stamp mill if everything proves satisfactory; must assay and have knowledge of chemistry; age about 40 years; reference to persons in New York, Philadelphia or Cleveland; state salary. Address C. P. E., ENGINEERING AND MINING JOURNAL.

SITUATIONS WANTED.

Advertisements for SITUATIONS WANTED will be charged only 10 cents a line.

YOUNG MAN, THIRTY YEARS OF AGE, desires position as foreman or assistant superintendent of copper or lead silver smelter. Has practical knowledge of reverberatory and blast furnace work; practical builder of both furnaces. Address COPPER, ENGINEERING AND MINING JOURNAL. No. 17,463, Aug. 22.

WANTED--POSITION AS SUPERINTENDENT to sink shafts, drive tunnels, open up mines, etc. Fifteen (15) years' experience with largest companies in America. Can give best of references. Address H. J. S., ENGINEERING AND MINING JOURNAL. No. 17,472, Aug. 22.

MINING ENGINEER AND METALLURGIST, graduate of Lehigh University, '95, desires a position with reliable mining company. Address LEHIGH, ENGINEERING AND MINING JOURNAL. No. 17,488, Aug. 22.

A MINING ENGINEER WILL BE OPEN to engagement in a few weeks. Good references, including present employers. Specialties, millwright work and treating low grade ores. Practical assayer and surveyor, owning outfit. Can repair pumps or engines, if possible to be repaired. First-class mechanic; understands all details of mining and milling. Address MILLWRIGHT, ENGINEERING AND MINING JOURNAL. No. 17,497, Aug. 29.

WANTED-- POSITION AS RESIDENT manager or superintendent; 15 years' practical experience; now with the largest company in Northern Mexico as mine superintendent; Spanish American country preferred; highest recommendations. Address AMERICANO, ENGINEERING AND MINING JOURNAL. No. 17,492, Aug. 29.

A CIVIL ENGINEER WANTS TO REPRESENT manufacturers of mining and other machinery and supplies in the south and west part of the United States. Address C. E., ENGINEERING AND MINING JOURNAL. 17,466, Aug. 29.

CHEMIST AND ASSAYER, SIX YEARS in responsible positions now in charge of a Lake Superior laboratory, desires position in Southwest. Refers to present employers. Address "V," Box 399 Ironwood, Mich. No. 17,468, Aug. 29.

MECHANICAL ENGINEER AND METALLURGIST would like a change after July 31; has charge of furnace and concentrating works. Address F. H. A., care W. Hoegner, Indiana Hotel, Cincinnati, Ohio. No. 17,469, Aug. 22.

POSITION WANTED--BY YOUNG GRADUATE engineer. Has had one year's experience in active mining, mostly in Colorado. Can assay, survey, keep books, etc. Best of references. Address J. F., ENGINEERING AND MINING JOURNAL. No. 17,473, Sept. 5.

WANTED--POSITION BY METALLURGICAL chemist, four years' experience in silver, lead and copper smelters. Mexico or West preferred. Address C., Box A, Globe, Ariz. No. 17,474, Aug. 29.

WANTED--POSITION BY MINING ENGINEER and metallurgist. Several years' experience in gold, silver and copper mining. Can do his own assaying and surveying. Address E. B., Box A, Globe, Ariz. No. 17,475, Aug. 29.

PRACTICAL CHEMIST AND METALLURGIST, familiar with the cyanide leaching process, wants a position; best reference. Address H. P. C., ENGINEERING AND MINING JOURNAL. No. 17,478, Aug. 29.

CIVIL AND MINING ENGINEER, 15 YEARS' experience in mine work, wants position with a mining company. Will do anything to be useful to employer. Address ENGINEER, 545 Emerson street, Denver, Colo. No. 17,485, Aug. 22.

WANTED--POSITION, LONG AND varied experience in opening and working mines of coal, gold, silver, copper, lead and zinc ores; in concentration, smelting and milling; in planning and erecting works; in examination of mining lands. Address H. C., ENGINEERING AND MINING JOURNAL. No. 17,489, Oct. 10.

WANTED--SITUATION AS CHEMIST, ASSAYER or assistant, by a young engineer of thorough experience and education; neat, accurate, reliable and not afraid of work; correspondence solicited. Address ACTIVE, ENGINEERING AND MINING JOURNAL. No. 17,490 Sept. 5.

A POSITION WANTED IN SPANISH SOUTH America as chief accountant or representative of a mining or manufacturing concern. Experience for a number of years with one of the largest mining enterprises in Mexico; full knowledge of English, Spanish and German; also some French; 30-31 years; single; best references. Address SPANISH SOUTH AMERICA, ENGINEERING AND MINING JOURNAL. No. 17,461, Aug. 22.

Contracts Open.

TREASURY DEPARTMENT, OFFICE SUPERVISING ARCHITECT, Washington, D. C., August 8th, 1896.--Sealed proposals will be received at this office until 2 o'clock p. m., on the 8th day of September, 1896, and opened immediately thereafter, for all the labor and materials required for the erection and completion (except heating apparatus) of the U. S. Post Office Building at Youngstown, O., in accordance with the drawings and specification, copies of which may be had at this office or the office of the Superintendent at Youngstown, O. Each bid must be accompanied by a certified check for a sum not less than 2% of the amount of the proposal. The right is reserved to reject any and all bids and to waive any defect or informality in any bid if it be deemed in the interest of the Government to do so. All proposals received after the time stated will be returned to the bidders. Proposals must be enclosed in envelopes, sealed and marked, "Proposal for Erection and Completion (except heating apparatus) of the U. S. Post Office building at Youngstown, O." and addressed to WM. MARTIN AIKEN, Supervising Architect. Orig.

DREDGING.--U. S. Engineer Office, 39 Whitehall street, New York.--Sealed proposals for dredging in Canarsie Bay, New York, will be received here until August 24th, 1896. Information furnished on application. H. M. ADAMS, Major Engrs.

PIPE SEWERS.--Sealed proposals for constructing 3,700 ft. of pipe sewers on New and Drift Sts. in the City of New Brunswick, N. J., will be received at the office of the City Surveyor, 389 George St., by the Sewerage Committee of the Common Council of said city on Aug. 26th, at 2 p. m. Particulars furnished on application. THOMAS R. KENNEY, CHARLES A. OLIVER, JOSEPH M. MULLER, Sewerage Committee.

DREDGING.--U. S. Engineer's Office, Army Building, New York.--Sealed proposals for dredging 413,000 cu. yds., more or less, material from Harlem River and Spuyten Duyvil Creek, on the Harlem River improvement, and for furnishing materials and workmanship for construction of about 800 linear feet crib-work revetment for protection of west side of cut through meadow south of Fordham Bridge, will be received here until 12 m., September 10th, 1896. Information furnished on application. G. L. GILLESPIE, Colonel Engineers.

RIVETED STEEL PIPE.--Proposals will be received by the undersigned up to Aug. 27th, 1896, from makers only, for about 4,800 ft. of 30-in. riveted steel pipe, to be delivered f. o. b. cars at Redding, Cal. Specifications and further information can be obtained upon application. GEORGE KENT RADFORD, Consulting Engineer, 2312 Warring St., Berkeley, Cal.

DREDGING PLANT.--U. S. Engineer's Office, Morgan Building, Buffalo, N. Y.--Sealed proposals for furnishing dredging plant at Niagara River will be received here until 11 a. m., Sept. 7th, 1896. Information furnished on application. T. W. SYMONS, Major Engineers.

WATER-WORKS.--Sealed proposals will be received by the Water-Works Trustees, at Rockford, O., until 7:30 p. m., Aug. 27th, 1896, for constructing water-works, comprising a steam pumping plant, 11 x 100 ft., stand-pipe, reservoir, deep-well pump, and about 11,000 ft., 8-in. to 4-in. cast-iron pipe. Information furnished upon application to J. W. SMITH, Clerk of Water-Works Trustees, Rockford, O., or to BURTON J. ASHLEY, Engineer, 511 Opera House, Chicago, Ill.

BRIDGE.--Sealed proposals will be received at the office of Board of Street Sewer and Drain Commissioners, Norfolk, Va., until 6 p. m., Aug. 31st, 1896, for the construction of the superstructure of a highway bridge across Smith Creek, in this city. Information furnished on application to W. T. BROOKE, City Engineer for Board.

DREDGING.--U. S. Engineer Office, 537 Congress street, Portland, Me.--Sealed proposals for dredging at Lubec Channel, Camden Harbor, and Belfast Harbor, Me., will be received here until 3 p. m., Aug. 24th, 1896. Information furnished on application. A. N. DAMRELL, Lieutenant Colonel Engineers.

JETTY.--U. S. Engineer Office, 39 Whitehall street, New York.--Sealed proposals for dredging in Patchogue River and Brown's Creek, and for constructing jetty at mouth of Patchogue River, N. Y., will be received here until August 24th, 1896. Information furnished on application. H. M. ADAMS, Major Engrs.

DREDGING.--U. S. Engineer Office, 39 Whitehall street, New York.--Sealed proposals for dredging in Shoal Harbor and Compton Creek, New Jersey, will be received here until August 24th, 1896. Information furnished on application. H. M. ADAMS, Major Engineers.

SEE ANNOUNCEMENT ON PAGE 7.

THE ENGINEERING AND MINING JOURNAL. ADVERTISING RATES. (NONPAREIL MEASUREMENT.) Table with columns for Line, Inches, Regular Edition, One Month, Three Months, Six Months, Nine Months, Twelve Months, and Total. Includes SPECIAL POSITIONS section at the bottom.

LANDS AND MINES FOR SALE.

J. F. CROSETT,
Secretary, Gold Mining Exchange,
No. 628 Sacramento Street, San Francisco, Cal.
GOLD MINES FOR SALE.
On Pacific Coast. Correspondence solicited.

FOR SALE—Gold and Silver Mine in Montana

Now paying nicely. Cheap for cash, or part cash and short option. "No money no go." For full particulars, etc., etc., address

SLEDGEHAMMER,
ENGINEERING AND MINING JOURNAL.

IMPORTANT.

To be sold, the Mineral Property called
"DIOS TE GUIE,"

producing Silver and Gold, situated in the Section of Yepachi, Municipality of Famocachic, in the District Guerrero, State of Chihuahua, Mexico, by the Rascon Hermanos Co., of Nuevo Leon, Rayon District, State of Chihuahua, Mexico.

For information as to price and conditions of sale apply to RASCON HERMANOS.

SPECIAL SALE—GOLD MINE, good and well developed, with **WORKING PLANT.** Will pay good dividends from the start. Valued at \$50,000. Will be sold at a sacrifice to settle up business. Address **ROOTH & BRINTON,** 270 1/2 Morrison St., Portland, Ore.

FOR SALE.

MONO MINE, UTAH.

NOTICE OF SALE OF MINING PROPERTY.

Notice is hereby given that the undersigned, Receivers of the Charter Oak Life Insurance Company, acting under authority and in pursuance of an order passed on the 12th day of June, 1896, by the Superior Court of Hartford County and State of Connecticut, will, between the hours of 12 o'clock, noon, and 2 o'clock P. M. on Saturday, the 29th day of August, 1896, at the west front entrance to the City and County Building, in the City and County of Salt Lake, in the State of Utah, offer for sale, and sell at public auction, to the person or persons who shall make the highest bid therefor for cash, upon delivery of the deed therefor by said Receivers, within thirty days after said sale, all the right, title and interest vested in, and which they now as Receivers as aforesaid have, of, in and to the following described mining claim and machinery, and tunnel claim and other property connected therewith, situate in Ophir Mining District, Tooele County, State of Utah, described as follows, to wit:

That certain mining claim situate in said district commonly known as and called the Mono Mine, being more particularly described as follows, to wit: Mineral entry No. 165 in the series of the Land Office at Salt Lake City, Utah, designated by the Surveyor-General as lot No. 46, containing 3.07 acres of land, more or less, and according to the return on file in the General Land Office in said City of Salt Lake, described and correctly described, with magnetic variation at 16° 30' east, as follows, to wit: Beginning at corner No. 1 a post marked No. 1, Lot No. 46, thence south 83° 30' east, 1,600 feet to corner No. 2 a post marked No. 2, Lot No. 46, from which a fir tree 17 inches in diameter marked B. T. bears north 71° 30' west at the distance of 21.5 feet; thence from said corner No. 2 north 6° 30' east 100 feet to corner No. 3, a post marked No. 3, Lot No. 46, from which a fir tree 17 inches in diameter, marked B. T., bears north 76° west at the distance of 13 feet, and U. S. Mineral Monument No. 6 a fir tree 17 inches in diameter, marked U. S. M. No. 6 on the south side, and U. S. Mineral Monument No. 6 on a board nailed on the east side bears north 59° west at the distance of 462 feet; thence from said corner No. 3 north 83° 30' west 1,600 feet to corner No. 4, a post marked No. 4, Lot No. 46; thence south 6° 30' west 50 feet to a point from which discovery stake bears north 83° 30' west, at a distance of 800 feet, 100 feet to the place of beginning. A description of which is also found recorded in the Recorder's office in said county of Tooele, in Book BB of records on pages 632 to 636, inclusive. Nevertheless, however, reserving and excluding therefrom all that part thereof "which is situate east of the center of the ravine crossing said premises nearest the eastern boundary thereof, which ravine is further designated and identified as the one in which a living spring rises a short distance above the north boundary of said premises." Together with all and singular the tenements, hereditaments and appurtenances thereunto belonging or in any wise appertaining, including all hoisting works, engines and machinery, tailings and property therein and thereon.

Also in the same district and nearby the same, and once worked in relation to said mine, that certain mining tunnel commonly known and called in that vicinity "The Atna Tunnel."

Upon such sale being so made and the purchase money paid, said Receivers will convey said property to the purchaser within thirty days after said sale.

Dated this 7th day of July, 1896
ISAAC W. BROOKS & EDMUND A. STEDMAN,
Receivers as aforesaid.
MARSHALL & ROYLE, Salt Lake City, Utah,
Attorneys.
GROSS, HYDE & SHIPMAN, Hartford, Conn.,
Attorneys.

**MINER,
GEOLOGIST,
BUSINESS MAN,
See page 7.**

MACHINERY AND SUPPLIES FOR SALE.

SECOND-HAND RAILS.

If you have any Rails which are in good condition to relay—or if only good to be used as scrap—write us; we buy both kinds.

ROBINSON & ORR,
No. 419 Wood Street, Pittsburgh, Pa.

BARGAINS in Electrical Machinery.
All guaranteed and of Standard Make. One 325-light Jenney; one 325-light Mather, multipolar compound; two 360-light United States; one 425-light Westinghouse; one 450-light Thomson-Houston, H. I.; one 450-light Edison, 25 K. W.; one 500-light Western Electric; one 540-light Edison, 30 K. W.; one 550-light Mather, compound wound; one 600-light Western Electric, compound wound; two 1,000-light Standard, multipolar, compound wound; one 950-light Mather, 55 K. W., compound; one 1,000-light Mather, 60 K. W., compound. Also Dynamos for Incandescents and Arc Lighting, Alternators, Power Generators, Arc Lamps, Transformers, Instruments and Supplies. Send for our Bargain Sheet, **CHAS. E. GREGORY CO.,** 47 & 49 South Jefferson St., Chicago, Ill.

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SOUTHER STEAM SHOVEL, 1 1/4 cubic yards dipper, in good working order.

E. A. HERMANN,
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MISCELLANEOUS WANTS.

WANTED.

Two or three large Huntington Gold Mills, in good order, for mines in the South.
Address, giving full particulars, price, etc., **HUNTINGTON, ENGINEERING AND MINING JOURNAL.**

WANTED.

Good Gold and Copper Mines.

Must have ore "in sight" to justify the price, and those offering them must pay experts' fees if statements made are not substantiated on examination by competent engineers.

Address **AU. CU.,**
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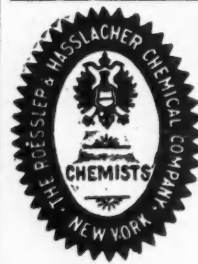
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