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* Illustrated.

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The new tariff bill was finally reported to the Senate by the Finance Committee on March 20th. in substantially the form which we have heretofore noted; that is, with a slight increase in the metal duties for the most part, with iron ore taken from the free list and subjected to a rate of 40 cents per ton, and with coal also taken from the free list and duties provided of 40 cents a ton on lump and 15 cents on slack. The Senate will begin to debate the bill on April 2d.

The English iron trade, like our own, is showing some improvement. In the Middlesbrough district the output of the furnaces in blast on March 1st was about 10 per cent. greater than on February 1st. In the West Cumberland district there was a gain of two furnaces in the March report. The greatest increase, however, has been in the Scotch furnaces, of which 65 were in blast March 1st, against 55 on February 1st, and 48 at the opening of the year. Prices have improved slightly, the latest quotations being \$8.66 per ton for Middlesbrough pig, \$10.32 for Scotch and \$10.84 for West Cumberland Bessemer iron.

Through the courtesy of Mr. R. M. Haseltine, Chief Mine Inspector of Ohio, we have received the official figures of the coal production in that State, amounting to 14,719,929 net tons in 1893. This is but 198,129 tons, or a trifle over one per cent. above the figures already given by us March 10th. A recent statement from an official in Pennsylvania notifies us of a serious error in his preliminary report, which reduces the bituminous production of the State to 49,942,532 short tons, as against 46,576,576 tons in 1892.

The total coal production of the United States in 1893, as thus revised, was 181,319,499 short tons, or 920,473 tons more than in 1892. The returns are still subject to revision, but it is not believed any material change will be made.

The Missouri Geological Survey is not to be abandoned. At a recent meeting of the State board it was decided that the money at the disposal of the Survey should be used to publish the report on lead and zinc in the State, and perhaps some others, in the most economical way possible, and the remainder should be applied to continuing the field-work, keeping together as many of the present staff as the limited amount will permit. At any rate the work is not to be given up, but is to be kept on, although upon a necessarily limited scale. This decision is a wise one, and will enable the Survey to keep up its present organization as well as to make some of the results of its past work available to the people. It is to be hoped that the next legislature will show appreciation of the work, and allow a reasonable amount for its maintenance; a course in which, we believe, it will be supported by public opinion.

The Poorman Consolidated Mining Company appears much disturbed over our recent reference to it, and objects to the statements that it has paid dividends and that our artist could find no mill at its mines. In these matters and others of much more serious moment we are continuing our investigations, and in due time will publish them. It is noteworthy that the company has not found fault with the assertion that it is a New Jersey corporation without responsibility in England; that it has not earned dividends and that it has but a few men at work at its mines.

We shall be greatly obliged to any of our readers who have knowledge of the mines of the Poorman Mining Company, of Idaho, and of the Bonanza, formerly the Nelson, mines of Sierra County, Cal., or who are acquainted with other enterprises floated by the same promoters, if they will communicate such facts to the editor of the "Engineering and Mining Journal."

The time for entering exhibits for the Antwerp International Exposition in Belgium is drawing almost to a close, and it is to be hoped that more of our manufacturers than have hitherto done so will respond to the invitation of the New York Committee, which we publish in another column. The exposition will open in May, and applications for space should be in, if possible, by the close of the present month. The buildings are substantially completed, and ample space has been provided for the United States. While it will not attain the dimensions, or, perhaps, the general representative character of the Paris or Chicago exhibitions, the Antwerp Exposition is intended to be especially a business affair, where the raw and manufactured products of various nations will be shown to the best advantage, and the opportunities for establishing and extending trade will be its chief feature. It seems to offer an opening which our manufacturers should not neglect.

The detailed report of the Witwatersrand Chamber of Mines gives the output of that district of the Transvaal for January at 149,814 ounces of gold from 55 mines. Of this yield 99,723 ounces were from mill working; 5,331 ounces from concentrates; 39,889 ounces from tailings; 148 ounces from alluvial workings, and 4,723 ounces from other sources. Of the gold from concentrates 4,015 ounces were obtained by chlorination and 1,316 ounces by the cyanide process. Of the 39,889 ounces taken from tailings all except 55 ounces were obtained by the cyanide process, which seems here to have found a most favorable field for its operation. The largest outputs from individual mines were 12,480 ounces from the Robinson

mine and 12,103 from the Langlaagte estate. The value of the product for the month is given at £518,050, the Chamber rating mill gold at £3 10s. and cyanide gold at £3 per ounce. The average return from mill working was 9.15 dwts. per ton, and from tailings 4.56 dwts. per ton, so that the large output of the district is from comparatively low-grade ores.

The Prussian State railroad authorities have evidently recognized the superior economy of American rolling stock, since they have adopted a standard coal car of 30 tons capacity which is in its general design entirely an American eight-wheel car. The general form, the construction of the trucks and the running gear are familiar, the main points of difference being the use of steel for the sills and bolsters of the frame, and of side doors instead of a hopper bottom for dumping. The adoption of this new standard car instead of the four-wheel and six-wheel cars now in use is doubtless one of the results of the visit to this country two years ago of two officers of the Prussian State Railroads, who made a thorough inspection of several of our leading lines, and afterwards prepared an elaborate report on our railroad construction and management. Herr von Borries, the leading member of this commission, is a high authority on rolling stock matters, and while he found something to criticise on our lines he found much also to commend, as his report shows.

COINING THE SEIGNIORAGE.

The passage of the Bland Bill, commonly called the "Vacuum Bill," for coining the so-called "seigniorage" on the silver in the Treasury, has aroused the attention of many of the commercial bodies of the country, and appeals have been sent in considerable numbers to the President from New York and elsewhere asking him to veto it. There is a widespread belief that the President will do this, though as Congress is not in session at the present writing, his final action is not yet taken, and it is, of course, impossible to say certainly what it will be; but all his previous actions and his well-known opinions incline toward a veto.

The passage of the bill through Congress has had a very unfavorable effect on business, and this would certainly be intensified should it become law, while its effect on our credit abroad is already shown in a large increase in the return of American securities and in the renewal of gold exports, the first of which we noted last week. It is not only that the bill reopens once more the question which most men hoped had been settled by the repeal of the Sherman law; the principle of coining the seigniorage—that is, of converting into money the difference between the actual cost of the silver bullion in the Treasury and its nominal or coinage value—is not a sound one. To put it in another form, it is putting into circulation the government's profit on the issue of depreciated coin, a proceeding in favor of which the arguments must necessarily be few and weak.

The bill itself has evidently been passed by men who voted for it in the hope of "placating" the so-called silver men, or, more properly, the fiat money men. It is not an act which can be supported or approved by the intelligent advocates of a true bimetalism; indeed, that cause is greatly injured by it, and its success postponed. Every act of this kind makes it more difficult to secure the adoption of universal bimetalism by international agreement, which is, as we have always maintained, the only possible permanent settlement of this all-important question.

THE BOSTON & MONTANA MINING COMPANY.

Considerable space is given in another column to an abstract of the report of the Boston & Montana Mining Company, not only on account of the importance of the company itself—which is now producing between 15,000 and 16,000 tons of copper yearly, no unimportant item in the world's supply—but also because this report marks the closing of a period of transition in the history of the company. In its earlier stage the company was a mining corporation simply, working the properties which it had acquired in Montana, and passing its ores only through the first stage of treatment, the resulting matte being sold or shipped for further treatment elsewhere. Since the payment of dividends was suspended, somewhat over two years ago, it has entered upon a new enterprise and invested a large amount of capital in the construction of extensive works for smelting and refining copper according to the latest and most approved methods. Shipments of matte ceased nearly a year ago, in May, 1893, and the product is now put upon the market in the various forms known to the trade as pigs, bars, plates and electrolytic copper.

The new works of the company have been erected, not in the neighborhood of the mines at Butte, but at Great Falls, Mont. This location involves a considerable yearly expense for the transportation of ores, but this is much more than counterbalanced by the use of the water power furnished by the Missouri River at Great Falls, which is more than sufficient to meet any demands likely to be made upon it. The expenditure on the new works has been large, but seems to have been judiciously made, and the present condition of the mining properties is such as to

justify a belief that they will furnish a sufficient supply of ores for a long time to come.

The total amount of the securities issued by the company up to the close of 1893 was \$3,750,000 in stock (of which \$625,000 was issued in 1893) and \$2,100,000 in bonds; of the bonds, however, \$644,000 had been retired by the sinking funds, leaving \$1,456,000 outstanding; that is, the total investment represented by securities at the close of the year was \$5,206,000. Up to the close of 1891 the company had paid \$2,075,000 in all in dividends on its original mining investments. Since that time the mining profits, with the amounts realized by the issue of new stock, have been used in paying for the new plant. The total cost of the Great Falls works, now substantially completed, has been \$2,105,254, and a further sum of \$858,460 appears to have been invested in the purchase and development of new mines. There has thus been very nearly \$3,000,000 used in preparing for future work on an extended scale.

The report under consideration, which covers a period of 18 months, including the second half of 1893 and the whole of 1894, is somewhat defective in one respect, as it does not give the data for ascertaining exactly the average receipt for the output nor the average cost of production. As nearly as can be ascertained, however, after deducting the gold and silver which formed part of the product, the copper produced cost about 7.7 cents, and sold for about 9.2 cents per pound. In another column a correspondent figures out a slightly different result, and also gives his own analysis of the company's financial position. It is to be hoped that in future reports the mining and other costs will be given in detail, since these, after all, form the basis upon which a judgment as to the success of the company's operations and management must be based. The financial statements are fairly full, and only the addition of some details of working are needed to make a most valuable report.

THE GAS ENGINE IN MINE AND MILL PLANTS.

The question of the best and most economical methods of applying power is one which has been much debated of late years among mechanical engineers, who are still divided in opinion as to the relative advantages of a single large motor or central station from which the power can be transmitted to various points, and of the subdivision system, in which many smaller motors are used, placed where they can give motion directly to a line of shafting or even a single machine. This discussion has had reference chiefly to factories and mills, where the conditions are usually rather in favor of the central power system; that is, the machinery is usually concentrated within a small space, and the distances over which power is to be transmitted are small. In mining work, on the other hand, in a great majority of cases, the opposite conditions prevail; the power is needed at points separated from each other by considerable distances, and not only these distances, but also the surrounding circumstances forbid the use of any of the forms of rope or belt transmission, which are successfully applied in mill work on the surface. The machinery used in mines—drills, hoists, hauling engines, pumps, coal cutters, etc.—must be placed at different points, and, moreover, much of this machinery has to be frequently shifted from place to place. In most cases the space is exceedingly limited, and there is no choice of position. In the great majority of cases also, there is no opportunity to use steam plants, and the power must be sent into the mine in some form from generating stations established on the surface.

The conveying of steam through long distances is usually attended by serious losses from condensation and leakage, and more attention has been given to the use of condensed air and electricity as methods of transmitting the power to the points where it is needed. Many successful plants of both these classes are in operation, and both will doubtless continue to be used wherever mining operations are carried on.

Within the past ten years a type of engine has come quite extensively into use in Europe, which is, as yet, comparatively little known or used in this country. This is the gas engine, in which the motive power is derived from the ignition and explosion of gas in a closed cylinder. Our mechanical readers are doubtless familiar from reading, if not from experience, with the general form and methods of operation of these engines, which are all based on the general principle of the explosive force of gas, though there are many different forms of valve gear and other details. At first designed for use where a small motor only was needed, their size and range of application have gradually been extended, until engines of 50 and 100 H. P. are common and those of 250 and even 300 H. P. are not unknown.

Mechanically the advantages of this type of engine consist chiefly in dispensing with the steam plant and in the possibility of placing machines of any required size at the points where the work is to be done, the conveyance of gas to the engine being a comparatively simple matter. Economically the gain is in the fact that rich gas—that is, the more costly gas required for illuminating purposes—is not needed to operate them. Producer gas, which may be made from almost any variety of fuel—lignites or coal of inferior quality, wood, sage brush, etc.—can be used, and in many localities this would be an important matter. It is

easy also, to make the smaller classes of engines portable, so that they can be moved from point to point without difficulty. The only requisites are the supply of gas and also a supply of water of moderate quantity for cooling the engine cylinder.

In England, France and Germany, gas engines often, as noted above, as large as 100 H. P. and over, are in use for operating electric plants, and very good results have been obtained economically. In three cases cited by M. Richard in his recent work "Les Moteurs a Gaz et a Petrole," the consumption of fuel for large engines running dynamos was 0.54, 0.60 and 0.65 kilos (1.19 lbs., 1.36 lbs. and 1.43 lbs.) of coal per horse-power per hour; in the last-named case the coal used for gas production being of an inferior quality. In other instances the consumption has been brought down to 1 lb. per horse-power per hour. In a series of experiments made at three English electric lighting plants, under the direction of Mr. William Siemens, the gas engines developed a useful effort equivalent to 15.5 per cent. of the theoretical, or nearly twice the proportion obtained in a steam engine of corresponding size doing similar work.

Another class of engine which has come largely into use in France and Germany is the so-called petroleum engine, which is similar in all respects to the gas engine, except that the power is obtained by the ignition and explosion of naphtha, or some of the lighter petroleum products introduced into the engine cylinder directly, without previously converting it into gas. This form of motor can be conveniently used in many cases where a supply of gas is not easily accessible, and especially in a portable engine, where a tank filled with the liquid could take the place of a boiler. Where the requisite care can be taken to guard the volatile naphtha from explosion, these engines have many advantages, chiefly from their simplicity. A beginning has been made in the introduction of the petroleum engine into this country, and, we are informed, with much success.

We do not mean to say that the gas or petroleum engine is likely to supersede compressed air, electricity, or other methods of transmitting power in mining plants; but we believe that there are many places in which it could be used to great advantage, not only in larger mines where power must be applied at many points, but also in small mines and works where an expensive plant is not possible or advisable. The adoption of a power system must always depend largely upon local circumstances and can be decided on properly only after an examination of each case, so that general recommendations are of doubtful utility. We believe, however, that there is a wide field open for the gas engine and that an examination into its advantages will secure for this type of motor a much wider adoption in mining—as well as in other branches of industry—than it has yet received in this country.

NEW PUBLICATIONS.

FINANCIAL REVIEW, 1894. COMMERCE, BANKING, INVESTMENTS. New York; William B. Dana & Co. Pages 275; with maps. Price \$2.

This is the annual "Red Book" issued by the "Commercial and Financial Chronicle." It furnishes an admirable compendium from year to year of all those matters that are needed for reference by every banker, merchant, investor and editor. It is very clearly arranged, and some of the titles of articles or chapters are as follows: Retrospect of business in the United States, with general statistics; Clearings and Speculation in 1893; Listings on the New York Stock Exchange; Business Failures in 1893; Reports of Secretary of Treasury, Comptroller of the Currency, Director of the Mint; New York Bank Movement; Great Britain in 1893; Trade and Commerce of the United States; the Money Market, 1885-1893; Gold and Silver Production of the United States; Product of Gold in Australasian Colonies; World's Gold Production since 1870; World's Silver Production since 1870; Foreign Exchange in New York, 1890-1893; United States Debt, 1793-1893; Railroad Statistics for the United States; Railroad Earnings in 1893 and 1894; New York Stock Market Review for five years, and highest and lowest prices of stocks and bonds monthly; Railroad Stocks and Bonds in Boston, Philadelphia and Baltimore. It is certainly a most useful handbook, and we may add that the previous volumes have stood the test of constant use and reference.

THE IRON FOUNDER SUPPLEMENT. By Simpson Bolland. New York; John Wiley & Sons. Pages 400; illustrated. Price \$2.50.

The present volume completes the work begun in "The Iron-Founder." The important subject of mixing cast iron is discussed on lines favorable to an established system of mixing by subsequent chemical analysis. Foundry equipment of new designs receives special notice in detail, as well as the various molding machines of note. Melting in cupolas and reverberatory furnaces occupies a prominent position, being supplemented by an original table of instructions for cupola management. Founding of car wheels, including annealing, as well as the production of malleable iron castings, with the theories of chilling and annealing, all subjects of deep interest to the molder, are treated at length. The measurement of castings necessarily introduces some arithmetic, but in a form easily understood and readily applied to the every-day experience of the active molder. In order to meet the growing demand for knowledge upon art castings and sculptural work, the author has inserted some chapters on statue-founding, pattern-modeling, and taking casts, etc. The subjects of pouring, feeding, flowing off, and handling work generally, all receive special attention.

Taken together, the two books constitute a guide for the molder, the coremaker and the cupola-man. The patternmaker also may derive some benefit from a careful study of the books, as well as the foundry proprietor. Mr. Bolland is usually safe and careful, and has evidently much practical knowledge of his subject.

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.

American Plumbing. By Alfred Revill. New York; the Excelsior Publishing House. Pages 224; illustrated.

The People's Atlas of the World, 1894. Springfield, O., and Philadelphia; Mast, Crowell & Kirkpatrick. Pages 224.

Annual Report of the City Engineer of the City of Minneapolis for the Year 1893. By F. W. Cappelen, City Engineer. Minneapolis, Minn.; published by the City. Pamphlet, pages 56; with map.

Buffalo Merchants' Exchange: Statistics of the Trade and Commerce of Buffalo, N. Y., for the Year 1893. Compiled by William Thurstone, Secretary. Buffalo, N. Y.; published by the Merchants' Exchange. Pamphlet, pages 144.

Bulletins of the Geological Society of America. Intrusive Sandstone Dikes in Granite. By Whitman Cross. Pages 6; illustrated. Age of the Auriferous States of the Sierra Nevada. By James Perrin Smith. Pages 16. Geologic Activity of the Earth's Originally Absorbed Gases. By Alfred C. Lane. Pages 22. Rochester, N. Y.; published by the Society.

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.

All letters should be addressed to the MANAGING EDITOR. We do not hold ourselves responsible for the opinions expressed by correspondents.

The Cyanide Process at Cripple Creek, Colo.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: I have read with interest your notes on the working of the cyanide process of gold extraction in New Mexico, and have also watched the work done in Colorado. I am no enemy to the process, but the credulity of the public and the ignorance of miners generally with reference to the elements of metallurgical processes should not be abused and traded upon. The Cripple Creek mill has always been a hopeless failure from its start two years ago or more. The subsidiary company owning the mill and the rights for the Cripple Creek district failed, and the mill fell into the hands of a Mr. McLeod, who is the present manager. It is now discovered, strange to say, that, after years of failure, the ore can be treated at 30-mesh, and \$5,000 are to be spent on overhauling the mill (the machinery is not yet in place). Statements published broadcast with regard to success achieved are not worth the paper they are written upon.

Whether or not, a stock company is likely to be formed I cannot tell. I can only predict failure in this case. Let me point to you that the French mill of 50 stamps adjoining the cyanide mill is adopting the bromide process for the treatment of its low-grade concentrates and tailings. The company which controls the process here is pursuing a policy of secrecy, which mining men should not tolerate. E.

Some Notes on Idaho Mines.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: that gold is disseminated through the gravels of Snake River for some 400 miles within the State has been known for many years. It mainly occurs in the floured form, so light as to float on water, and needing 20 or more "colors" to equal one from ordinary placers. The source of the gold is often attributed to the basalts bordering the river for the greater part of its length, but this opinion is not based on any systematic study of the rocks in question. As every mountain stream in Idaho tributary to Snake River has placers of greater or less economic value, it is not strange the bed of the main river should be auriferous from lighter and impalpable flakes that may be carried so far. By the working miners along the river this gold is not supposed to be distributed evenly from top to bottom of the gravel, but in concentrations at any level, usually on an impervious stratum acting as bed rock, varying greatly in area. Heretofore these deposits have not been worked except in a small way, where such rich pockets were found, resulting sometimes from reconcentration of the fine Snake River gold, or occurring as bars at the junction with a richer side stream. This spring there is unusual interest along the whole length of the river, and nearly 100,000 acres of land have been located as placer claims along its banks, the owners hoping to work them by various gold-saving machines, the Bucyrus dredge and amalgamator attracting most attention. So far these appliances are practically untried in Idaho. Small tests have been made but none representing results of a season's work from a large amount of gravel treated. The average value of this land is a matter of surmise, a favorite claim being 25 cents or over per yard; as the gravel is estimated at 15 ft. in thickness, this valuation places the gold contained in the claims at \$600,000,000. Engineers, however, are aware of the prospecting necessary to determine the value of mining ground; in this case almost none has been done. If the various projects now being formulated take definite shape, Snake River will present a busy scene this summer, and make wiser (we hope richer) men, by the end of the season.

The old and rich placer basins and gulches at the heads of the mountain streams, which made Idaho famous in the sixties, and which have been worked by the fading remnant of pioneers, will be rejuvenated. Two new companies are formed to rework the Boise Basin tailings, which are supposed to contain a large amount; and another company to work a large area of virgin ground at the lower end of Warren Creek. Various other companies at Leesburg, Salmon City and Fritchard Creek, with large and lately finished plants, will operate vigorously this summer. All this in connection with a generous snowfall to furnish plenty of water, will, we hope, inaugurate a new era for placer mining. Gold quartz has been almost ignored in the past, as the high grade lead and dry silver ores, affording the prospector opportunity to extract and turn their product immediately into money, have diverted him from the task of developing gold property. The great demand for gold mines by investors this spring and distaste for silver have given an impetus to quartz mining, so that

hundreds of gold claims are now being developed. The quartz veins at the head of the Pierce City, Elk City and Florence placers, and the veins feeding Boise Basin are being opened; the Neal district, near Boise City, has attracted capital; the granite area skirting the Wood River lead mines contains low-grade ores; the Salmon River country contains veins from 10 to 30 ft. wide, of low-grade ore, and Colorado men have made a number of investments. The older quartz camps of Gibbonsville, Warren's, Silver City and Murray are looking well, and the De Lamar Mine is steadily at work.

The silver mines are quiet. The Cœur d'Alene and a few in the Wood River district, and the Clayton Smelter property, favored by local conditions, maintain a steady output, but the yield from others will be light and little prospecting is being done. The copper mines are entirely silent and the lodes of the Seven Devils' district still await development and transportation facilities. Idaho seems changing from a silver to a gold State.

J. B. HASTINGS.

The Cyanide Process and Some Practical Tests.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: I have read with great interest the article by Mr. Stuart W. Cramer, in your issue of February 17th, on "Gold and Silver Mining in the Southern States," and noted with particular interest the allusions made to the seeming failure of the MacArthur-Forrest (cyanide) process at the Franklin Mine, at Creighton, Cherokee County, Ga., and at the Moratock mine, in Montgomery County, N. C. The impression obtained by a careful perusal of Mr. Cramer's remarks is that it was entirely due to the inability of the MacArthur-Forrest process to treat the ores that the mill was shut down and the mine abandoned in one case and a new plant for treating the ore by chlorination was ordered in the other. This impression is very erroneous, in the former case at least. I do not wish to criticize Mr. Cramer, but I would like to make a few statements in connection with the use of the cyanide process at the Moratock mine. As to the Creighton mill, I am not sufficiently familiar with the actual operations and results with cyanide there to give reliable information and statistics concerning it for the columns of your valuable journal. I will allow that matter to devolve upon Prof. W. Anderson, who was at that plant as a cyanide process expert.

With affairs at the Moratock mill, however, I am thoroughly acquainted, having been the chemist in charge of the operations by the cyanide method, and will say that I had no trouble in treating their ore by cyanide and making a high saving at a moderate cost, the bullion produced showing an extraction of over 95% of the assay value. The trouble which was encountered and which subsequently led to the closing of the mill, was inability to find ore of sufficient value to pay for the treatment. An average of assays made from 65 tons of ore, showed a value of \$2.10 per ton in gold; the same lot after treating with a 0.25% cyanide solution assayed a trace in gold. An average of another lot of 50 tons assayed \$1.20 per ton, while the tailings assayed only a trace. The total cost of treatment, including mining, milling and royalties, amounted to about \$3.75 per ton, which cost could not be noticeably reduced without greatly increasing the pulverizing and leaching capacity of the mill, and as they had no ore in sight that would justify such a proceeding, they decided to let the matter drop. To these facts alone is due the determination of the Moratock Mining Company to cease operations in their mill, and I fail to see how it can in any way be attributed to a failure of the cyanide process in treating the ore.

I am confident that in many other instances where failures of the cyanide process are reported, if the failures were traced to their real cause it would be found to lie much more frequently in the management and manipulation of the process than in the process itself; and I believe that the hand of justice and encouragement which you are always willing to extend to new as well as to established enterprises, will not be withdrawn in this case; I only ask in behalf of cyanide, that equity to which I think it is fairly entitled.

A new cyanide mill has just been erected here by the Lemhi Mining, Milling and Reduction Company for the purpose of treating the refractory gold ores which are produced in this camp. The mill has a capacity of 60 tons daily, and it is expected that it will be put in operation within a week from the present writing. Most of the mines here show veins of oxidized iron ore near the surface which is partially free from milling, but gradually becomes base in character as depth is gained, and finally runs into heavy iron pyrites, which carry 1½ to 5 oz. of gold per ton. Records of assays of both free and base ores from the books of the company show that the average value ranges from \$25 to \$60 per ton.

Several large bodies of high grade sulphurets are now being worked, and it is expected that extensive developments will soon be made on numerous other properties which will show that the mineral wealth of the Dahlenega mining district is, as yet, unknown. Judging from the general indications and the outlook at present, it seems highly probable that this camp will soon become the central point of a great mining district, which will do much toward placing Idaho's gold output for 1894 far ahead of that of previous years.

JOHN Q. MACDONALD.

GIBBONSVILLE, IDAHO, March 12th, 1894.

The Boston & Montana Company's Report.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: The report of this company, which has just reached the stockholders and the public, embraces a period of 18 months from July 1st, 1892, to January 1st, 1894. While former reports as a rule gave the amount of the mining expenses and the costs of smelting separately, and also stated the costs of mining and smelting per pound of copper, the trustees abstain this time from giving any costs at all. I shall endeavor to make up this deficiency and show the approximate costs of production and the selling price of the copper.

In the face of a report whose contents are more satisfactory than in any preceding report, there must be some cause for this action of the trustees, which it would be well to have explained at the next meeting of the stockholders. Usually such meetings are a mere "mutual admiration meeting," made up of directors acting as stockholders and their friends holding proxies. Let us hope that at the next meeting some independent stockholder will ask a few pertinent questions.

The shipments of matte and refined copper from Butte and Great Falls

were 30,266,540 lbs. which realized \$50,787.25, including the amount received for the contents of gold and silver, equal to 10 cents per pound of copper, a result which does credit to the administration, in view of the fact that 20,000,000 lbs. were in the shape of a 54% matte; 10,000,000 lbs. in pig copper and 20,000,000 lbs. in ingot, cake and cathodes. To find the true costs of the production of this copper, we take into consideration the total running expenses, \$4,234,449; construction at mine, \$77,981; bonds redeemed, \$211,000; interest on bonded debt, premiums on bonds redeemed, etc., \$289,000; making total of \$4,812,431. From this amount is to be deducted \$588,735 mining expense on 6,584,830 lbs. of copper on hand at Great Falls in the form of ores, and the mining and smelting expenses on 2,358,714 lbs. of copper in form of refined copper on hand, a detailed statement of which is given under the financial statement further on. This would leave \$4,225,696 for a product of 50,266,540 lbs., or 8.4 cents per pound of copper, produced and shipped in one form or another.

This figure represents the absolute cost, and it is about one cent per pound less than in previous years. For the year ending June 30th, 1891, the net cost of copper was 9.58c. per lb.; for the year ending June 30th, 1892, it was 9.21 c. per lb., which included also interest and amortisation of bonds and construction account. Taking into consideration the quality of ores treated at Great Falls, the experimental stage of the new smelting works, and that only a part of the product was handled there, 20,000,000 lbs. being treated still at Butte, there seems little doubt that the next annual report will show the cost of copper to be not more than 7½ to 7c. per lb. The cost of mining cannot be expected to be less. I have vainly looked for an explanation of the reasons why the highest grade ore was treated at Butte and the lowest grade shipped to Great Falls for treatment, increasing the expenses for freight by 50% on 46,230 tons and by 30% on 73,691 tons. Was it a lack of harmony between officers at Butte and Great Falls, or were the facilities at Butte inadequate for reducing low grade ores? The facts are that during the same period—July 1st, 1892, to July 1st, 1893—99,307 tons of ore containing 9.72% copper, were treated at Butte, while 46,230 tons containing 4.74% copper and 73,691 tons containing 7.05%, were shipped from Butte to Great Falls for reduction.

It is the first time in the history of the Boston & Montana mines that such a poor quality of ore as 4.74% was mined and treated. Great Falls deserves much credit for being able to treat it at such a low cost. These shipments brought the average copper contents of the ore down to 8.3% for the year, against 9.36% in 1889-90; 9.22% in 1890-91; 9.13% in 1891-92. At some other time I hope to express an opinion concerning the developments of the different mines, the estimate of copper ore in sight, the necessity for sinking a new shaft, etc.

I notice in the report on the Great Falls smelter that "a portion of the converting plant is now employed at converting the Butte & Boston matte," yet the trustees do not mention it, which no doubt is an oversight. The stockholders are certainly entitled to know what kind of an agreement has been made between the two companies for converting the matte of the Butte & Boston Company into pig copper, and what benefit they will derive from it, especially in view of the close relationship existing between the boards of the two companies. The trustees should not overlook the fact that the plant at Great Falls was built at the expense of the Boston & Montana stockholders and an official communication of the agreement is in order.

The financial statement of the company is much better than shown in the published report which states the balance of assets to be on January 1st \$350,174 in cash and copper ores in reserve at Great Falls, valued at \$400,000.

The true statement is as follows: Receipts for new stock, \$625,000, less commission to underwriters, \$62,500, were \$562,500. Deducting construction at Great Falls, \$478,620, we have a balance of cash on hand from new stock of \$83,880. The receipts for sale of shipments were \$5,078,725. Deducting total mining expenses, annual amortisation of bonds, etc., \$4,812,431, we have left at disposal in cash \$266,294. Adding this to the balance above, we have a total in cash of \$350,174. The copper ore, concentrates, calcines, and other material in stock or in process January 1st, 1894, with 6,584,830 lbs. of copper at Great Falls calculated at 6c. (mining cost only) amounted to \$395,090. The copper matte, pig copper, refined copper, anodes, etc., 2,358,714 lbs., on hand at Great Falls January 1st, 1894 (mining and smelting costs paid), calculated at 8½ cts. per lb. amounted to \$197,542. Adding these to the cash above, we have, as the total available assets, \$942,806, or almost \$200,000 more than the trustees' statement mentions. The company therefore would be safe in distributing a dividend of \$2 per share on May 1st, equal to \$300,000 on 150,000 shares, leaving the stock on hand valued at \$592,500 (not \$400,000) intact.

The value of the Great Falls plant, which has cost with its numerous changes and experiments about \$2,000,000, is correctly placed as an offset to the bonded indebtedness of \$1,456,000.

I cannot close these remarks without referring again to the advisability of adding to the actual cost of copper, interest on the capital, and an allowance for depreciation on account of the exhaustion of the mines. This measure has often been suggested in the columns of the "Engineering and Mining Journal," yet the mining companies have never taken any action on it. A 5% charge on the actual cost price would not be felt much by the stockholders, but would amount to a great deal after a lapse of 10 or 20 years in reducing the real estate account.

NEW YORK, March 20, 1894.

Q. E. D.

Thickness of Nuts.—On this much discussed question, "Industr." says: "There is an old rule, or rules we may say, respecting the thickness of a screw nut, the strength of which will equal that of a bolt to which the nut is applied. These rules vary from half the diameter of the bolt to the whole diameter for the thickness of nuts, and seem to be a fallacy in the fact that the tensile strength of bolts increases as the square of their diameter, but no one has proved that the strength of nuts increases in the same proportion or in any proportion not depending on a number of conditions that do not apply to the bolts at all. The angle and fit of the screw-thread and the elastic quality of the bolts have to be taken into account as well as their reduced diameter, but the main point of all is that notwithstanding numerous tables and rules, no one has ever had much confidence in them."

THE COAL MEASURES OF IOWA.*

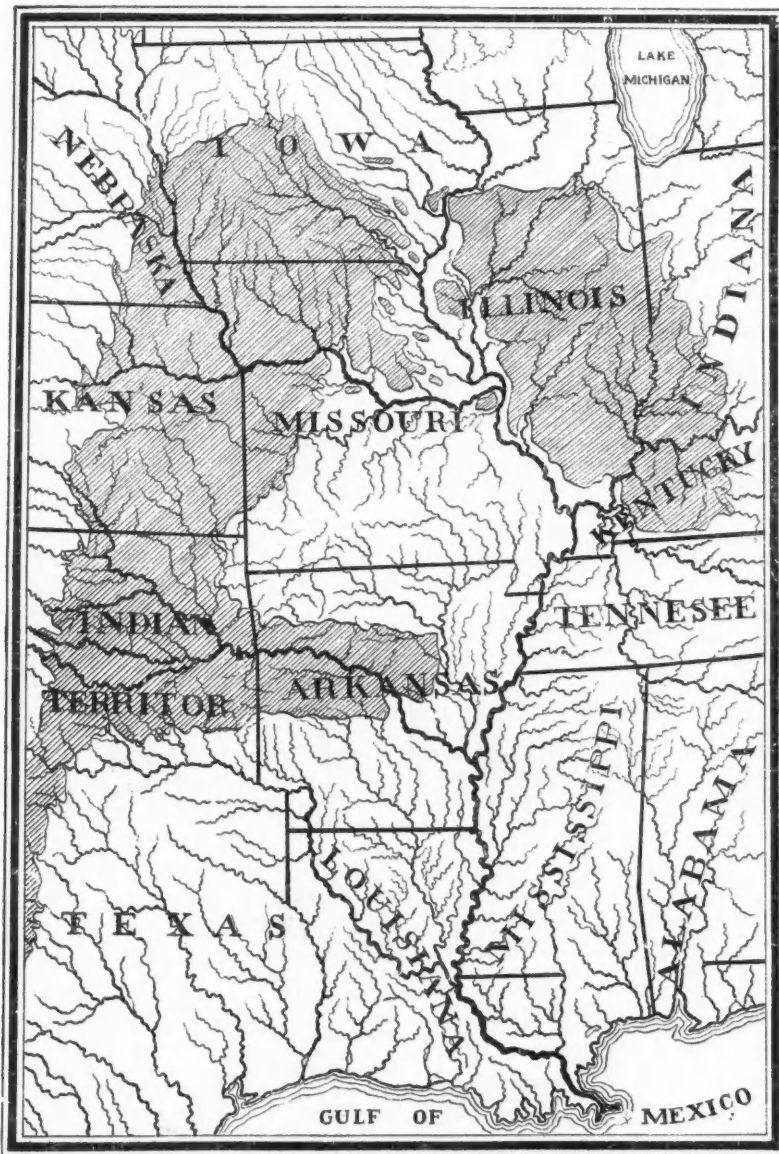
B. Dr. Charles E. Keyes Assistant State Geologist.

The coal bearing strata of Iowa form the northernmost extension of the great interior coalfield of the American continent. This basin comprises northwestern Kentucky, southwestern Indiana, southern and central Illinois, the southern third of Iowa, the northwestern half of Missouri, the extreme eastern border of Nebraska, Kansas and Indian Territory, western Arkansas, and extends still farther southwestward in a narrow belt into central Texas. The Mississippi River divides the area into two parts: an eastern district, including about one-third of the entire basin, and a western portion, embracing the remaining two-thirds. Along the dividing line the great water-course has cut its channel completely through the coal strata, exposing in a narrow border on each side rocks much older. Everywhere within the limits of the area just bounded along the borders of the stream outliers or pockets of the coal-bearing layers are found in ancient gorges and depressions, the connecting beds, if they ever existed, having

of Iowa, and in which there is more or less likelihood of obtaining coal, are distributed over one-half of the total number of counties in the State. The area covered by these carboniferous strata is not far from 20,000 square miles.

It must not be inferred, however, that the coal is equally distributed over all of this area, for such is not the case. The broad belt running southeast and northwest, and traversed its entire length by the Des Moines River from Fort Dodge to Keokuk, has heretofore been found to be much more productive of coal than other parts of the district. Lately in places outside of this belt coal has been discovered in abundance. Mines are rapidly being opened throughout this area, often where the presence of the commodity was unsuspected before.

The general surface of the region is an undulating plain moderately elevated and tilted slightly southward, the larger water courses having cut their channels to a moderate depth. The elevation varies from 625 ft. above sea-level at Keokuk to 1,138 ft. at Council Bluffs. The entire surface is covered with glacial debris. With the exception of a few seams in the Cretaceous rocks in the northwestern portion of the State, the coal-bearing strata belong to the medium portion of the Carboniferous age. The rocks of this formation are made up largely of argillaceous materials



SKETCH MAP OF THE INTERIOR COAL BASIN.

been almost completely removed through erosion, leaving only scattered remnants of their once greater extension. The strata referred to cover a little over one-third of the entire surface of Iowa. Geometrically the area is a trapezium with the entire southern boundary of the State forming one side; the Missouri river another; an irregularly curved line connecting Keokuk and Fort Dodge a third; while the fourth or northwesterly side is not as yet well defined on account of the deep deposits of drift materials covering the region, but it is probably approximately along a sinuous line running from Fort Dodge to Council Bluffs.

Beyond the boundaries mentioned, eastward especially, outliers of coal deposits are scattered even as far north as Jackson County, on the Mississippi River. Many of these isolated basins afford seams of coal sufficiently thick for profitable working.

The distribution of the coal-bearing rocks of the State, as briefly described above, is shown graphically in the accompanying sketch map. It will be noticed that the rocks having the same geological age as the coal

with sandstones and limestones, the coal measures forming an inconspicuous part of the series. It has been customary in Missouri and Iowa to divide the coal measures into: 3. Upper coal measures; 2. Middle coal measures; 1. Lower coal measures. The exact lines of demarcation are not clearly defined, however, and recent investigations seem to make it clear that their thickness has not been correctly estimated.

In considering the coal measures as a whole, two distinct classes of sediments are recognized: 1. Marginal or coastal deposits. 2. Beds laid down in the more open sea. These are sharply contrasted. The first is characterized by the rocks being predominantly clay shales and sandstones, with practically no limestones. The beds have a limited extent and replace each other rapidly. The sandstones often form lenticular masses, channeled on the upper surface, the indentations filled with coal-measure clays. All the indications, in fact, point to a shifting shore line and shallow waters. The second class, on the other hand, is made up of calcareous shales with heavy beds of limestone, evenly bedded and extending over considerable distances. The first class form the lower and the second the upper coal measures.

*Abstract from Report of the Iowa Geological Survey. For the illustrations we are indebted to the courtesy of the Survey.

In view of all the circumstances, it is proposed to divide the Upper Carboniferous or Pennsylvania series in Iowa into: 2. The Missouri Stage: 1. The Des Moines Stage.

The Des Moines formation represents the lower coal measures. The Des Moines River flows through it for more than 200 miles. It extends into Missouri and follows the northern and western boundaries of the Ozark uplift into Kansas and the Indian Territory.

The Missouri Terrance represents the upper coal measures, and is the formation typically developed in the northwest part of the State of Missouri. The Missouri River cuts through it for 400 miles.

If the two beds are contrasted it will be found that in lithological character the upper division is prevalingly calcareous, the lower argillaceous. The carbonaceous materials show a great predominance in the lower measures, which furnish the greater part of the workable coal in the State. The subdivisions being generally well distinguished, they are considered separately, the Des Moines, or lower beds, being taken first.

Clay shales make up the greater part of the formation in Iowa. They may be argillaceous, arenaceous, calcareous or bituminous. Those of the first class are usually light colored, massive and hard, grading on the one hand into sandy shales and sandrock, and on the other into calcareous shales, earthy limestone and limerock. In many places crystallized gypsum occurs.

The sandy material in the coal measures is usually mixed with clay, forming sandy shales, but in some cases forms a rock adapted for ordinary masonry. There are some notable exceptions, for instance in the Redrock sandstone, which rises in cliffs to a height of 100 to 150 ft. along the Des Moines River. The stone here is fine grained and massive, and has a thickness of 140 ft. maximum. With proper quarrying it forms an excellent building stone. What is known as the basal sandstone is also important. It is made up of a number of isolated masses usually found at the base of the coal measure series filling depressions in the underlying limestone, as shown in Fig. 1, which represents the relations of this sandstone and the St. Louis limestone at Fort Dodge. Fig. 2 shows bluffs capped by this coal measure sandstone at Des Moines. The organic remains found in the sandstones are almost entirely plants.

The limestones consist merely of a few thin beds, not of much importance, but extending over a wide area.

The coals of the State are all of bituminous varieties, though a few limited deposits of tolerably good cannel coal are known. The seams vary from a few inches to 7 or 8 and even 10 ft. in thickness, the average of the veins at present worked being between 4 and 5 ft. These beds are disposed, not in two or three continuous layers over the entire area, as has been commonly supposed, but in numerous lenticular masses from a few hundred yards to several miles in extent. As a rule the coals of the State are rather soft, and often contain some pyrites, besides frequently small flakes of lime or gypsum along the lines of stratification and fracture. Thin shaly seams also occur. Almost without exception the workable coal beds are underlaid by a soft white clay, which is often taken out along with the coal and made into firebrick. The fireclay has a thickness from a few inches to several feet. Usually, roots of lepidodendrons are found abundantly in the under clay. The roof of the coal beds is usually a bituminous fissile shale, intensely black below, but commonly

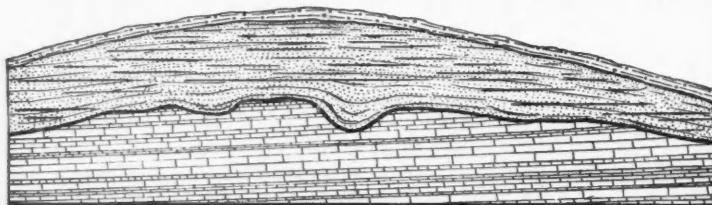


FIG. 1.—COAL MEASURE SANDSTONE AND ST. LOUIS LIMESTONE.

getting lighter colored upward. The thickness of the roof may vary from a few inches to 15 or 20 ft. For the most part the black shales are highly fossiliferous. There is present, also, more or less pyrites in irregular rounded nodules or in sharply bounded crystals. Frequently just above the coal in the lowermost layers of the roof, there is a black, nodular band of hard, calcareous material, the individual spherical masses being called, locally, "nigger-heads." These attain a measurement from 1 ft. to 10 ft. across. They are charged with fossils, chiefly lamellibranchs and gasteropods of great variety. The nigger-heads are quite distinct from the septarial masses often associated with the coal and having the same general appearance.

Associated with the coal beds in many places are dark-brown layers of compact massive rock, having a metallic ring when struck with a hammer. It is one of the ores of iron. At Flagler, in Marion county, one bed 10 in. thick separates a 5-ft. vein of coal into two parts.

The Coal Measures of central Iowa, in Marion, Polk and Dallas counties, are perhaps better understood geologically than in any other part of the State. Both the structure and arrangement of the coal-bearing strata have already received considerable attention. The phenomena presented may be taken as typical of a greater part of the Iowa coalfield. Quite recently a very detailed section was made from Harvey, in the southwestern part of Marion County, along the line of the Des Moines River to the capital city, and thence up the Raccoon River to De Soto, in Dallas County, a distance of 65 miles. The circumstances of its construction have been made very favorable by the numerous excellent exposures afforded by railway lines that have been built nearly the entire distance on each side of the two streams. These railway cuts, taken together with the natural outcrops on the rivers, permit the stratigraphy of the district to be very satisfactorily traced in all the minor particulars. This section is shown in Fig. 3.

(To be continued.)

Petroleum Shipments to China.—The Shanghai authorities have given permission to land petroleum from tank steamers, which was at first refused.

COAL MINING IN QUEENSLAND.*

By Edward S. Wright.

The coal-seams of Queensland lie in the Permo-Carboniferous formation, and are both numerous and thick, covering a large area around Bundamba and Ipswich. Coal has also been found in various other parts of the colony, including Jimbour, Townsville, Cooktown and Nosa, but this paper will be confined to the Ipswich coal-fields, as the writer has not visited any of the others; it excludes also the Burrum coalfield, near Maryborough, where a large quantity of coal is raised, and where the systems of working are much the same.

The most successful mines are owned by private individuals, who either own the land or have leased the coal at a royalty of about 12 cents per ton. The owners or lessees manage their own mines and perform part of the manual labor besides, as the price obtained for the coal will not pay the high salaries for manager, secretary, shipping agent, office rents, and directors' fees necessitated by companies; to make a profit, all must be workers. The principal collieries on the south side of the Bremer river, which divides Ipswich, are the New Chum, Lewis Thomas, Stafford Bros., and West Moreton. The shaft at West Moreton colliery, the deepest in the colony, is 640 ft. deep; it is of oblong shape, 15 ft. by 6½ ft., divided by a wooden brattice, 8 ft. being used as a winding and a down-cast shaft, the remainder being used as an upcast shaft. The winding engine has two direct-acting cylinders 22 in. in diameter, with two drums 11 ft. in diameter, one of which is fitted with clutch gear. The pulleys, 11 ft. in diameter, are set on a substantial and well-designed hardwood framing. The cages are two-decked, and carry two 7-cwt. tubs on each deck. This is the best winding-plant in the colony. The seam worked is 19 ft. in thickness, dipping westward at the rate of 1 in 3; only 7 ft. of this seam is at present worked, containing one stone band 8 in. thick; 5 ft., however, above this is workable coal if only proper means of cleaning it were erected. The coal contains about 7% of ash, and burns freely and well for



FIG. 2.—BLUFFS CAPPED BY SANDSTONE.

both steam and household purposes. The coal is seldom screened, the system adopted being that of riddling underground, and leaving the slack in the mine, as there is no market for the whole of it. The price paid to the miner is 80 cents per ton, which prevails all over the district; for this the miner gets and riddles the coal, sets his own timber, lays the road and wheels the coals, sometimes a distance of 900 ft. The miners earn \$2.16 to \$2.64 per day of 9 hours; other wages are about \$1.68 per day; mechanics, \$1.92 to \$2.06 per day; and boys, 72 cents to \$1.44, according to size.

The prevailing method of working is bord-and-pillar, leaving small pillars to crush, with no intention of taking them out. But some of the mines, with the seam at a less inclination, leave larger pillars which may be worked when coming back. In place of brattice, the miners form an intake and return airway by gob, composed of the slack left in the mine and kept up at the roadside by slabbing and props. The slack is liable to spontaneous combustion, and the gobs should either be levelled over after the bords are done, or each district securely sealed up; the latter plan is probably the better, as it enables air-currents to be shortened. An attempt was made by Mr. Lewis Thomas to utilize the slack in the manufacture of fuel briquettes; he erected a plant and made a few hundred tons of fuel, but owing to the high cost of pitch the system was abandoned. No attempt has been made to produce different sizes of coal; the two varieties being simply riddled coal (a ¾-in. riddle being generally used) and slack. The largest output from any one mine is 500 tons per day, but this has not been obtained from one shaft. There are numerous small mines opened by working men, who are afforded an opportunity of commencing for themselves in this way by the Government providing all rolling stock; and in fact nearly all the mines have been thus opened out by working men.

The coal on the south side of the Bremer river is non-coking, but on the north side another series of seams occur from which a very good coke is made and finds a ready market.

* Abstract of paper in "Transactions" of the Federated Institute of Mining Engineers.

THE OCCURRENCE OF GOLD IN THE ORES OF THE CRIPPLE CREEK DISTRICT.*

By Dr. Richard Pearce.

The Cripple Creek ore has the appearance of rhyolite, with similar characteristics to the silver deposits of Silver Cliff, Colo. At the latter place the joints and fracture planes of the rock were filled with psilomelane, carrying cerargyrite in sufficient quantities to make it a silver ore; at Cripple Creek the silver is replaced by gold. The material on which the investigations were made came from the Garfield-Grouse mine. It consisted of lumps of rhyolite, one or two of which were coated with quartz crystals, accompanied by clay and psilomelane, the latter occurring in small rounded or botryoidal concretions characteristic of this mineral. The rest of the sample, forming about 25% of the whole, was a soft, clayey material, inclosing lumps of softened rhyolite, which could easily be rubbed down by the hand to an unctuous clayey mass.

The free gold obtained by vanning, after separation of the loose material from the rest, was of a peculiar brownish color, brittle, crystalline, presenting a striking analogy to the habits of sylvanite, from which it was inferred that they might be pseudomorphs after that mineral. This conclusion was further strengthened when it was found that in the soft, clayey portion of the ore tellurium was found in an oxydized form.

On samples from the "Prince Albert" and "Independence" containing respectively 7 oz. and 9 oz. gold per ton it was found that the Prince Albert carried 0.14% of tellurium in the oxydized form and the Independence 0.17%. In support of the theory that the gold was derived from

Specimens coming from greater depths exhibited all the stages of transition from the mineral sylvanite to pure gold, with tellurium in an oxydized state. This free gold appears in a remarkable condition. It is very much like gold which has been precipitated and allowed to dry, being quite soft and yielding readily to pressure with the knife. Associated with the gold is a soft, yellow incrustation, containing strong evidence of the presence of tellurium in an oxydized form. In several pieces the free gold again showed distinctly the habits of sylvanite, of which mineral there were pseudomorphic impressions in a matrix of granular fluorite, the gangue being a metamorphosed rhyolite. It may be noted that pseudomorphs of gold, after sylvanite, were long ago observed by the writer in a specimen from one of the Boulder Mines.*

Sylvanite itself appeared in the Cripple Creek ore in little silver-white specks, disseminated through a mass of greenish rhyolite, accompanied by amethystine fluorite. A similar occurrence of sylvanite associated with fluorite was encountered some years ago in the tellurium belt of the Boulder district, notably in the John Jay and Melvina mines, and this recurrence of the same peculiar association suggests some intimate connection between fluorine and gold.

The gangue accompanying the ores examined appeared to be of two kinds, the white exemplified in the Garfield-Grouse mine and the green from the lower workings of the Anaconda. The following is the analysis of the two rocks: White rock: SiO₂, 61.25; Al₂O₃, 18.30; MgO, 2.23; alkalis, undetermined. Green rock: SiO₂, 56.30; Al₂O₃, 19.45; FeS₂, 6.90; MgO, 1.33; alkalis, undetermined.

The metamorphosed rhyolite coming from below the zone of oxidation

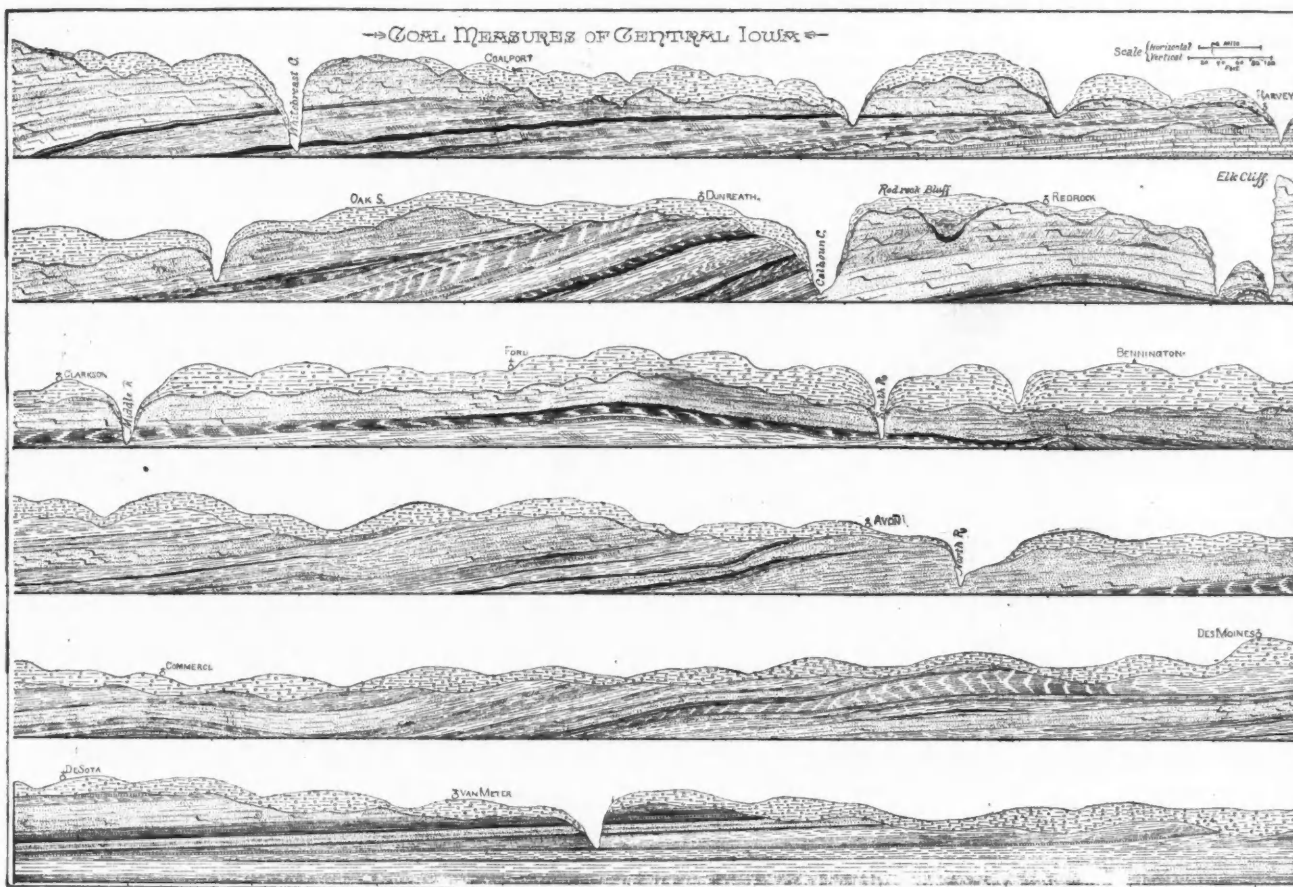


FIG. 3.—GEOLOGICAL SECTION ALONG THE DES MOINES AND RACCOON RIVERS IN CENTRAL IOWA.

sylvanite, a comparison is drawn between the ratio of gold to silver in their telluride minerals and that which exists in the Cripple Creek ores: Crystalline sylvanite, ratio Au to Ag 27:11; Massive calaverite, ratio 40:3; Krennerite, ratio 35:5. The results of sampling a great many tons of Cripple Creek ore show that the relation of the gold to the silver more nearly approaches the ratio which exists in sylvanite than in calaverite or krennerite.

The following figures showing the relative proportions of gold and tellurium in three samples of the oxydized material, will, however, prove the existence of a large excess of tellurium over the amount required to have originally formed sylvanite:

Sylvanite, ratio Au to Ag 1:2.454; Prince Albert No. 1, ratio 1:5.83; Independence, No 1, ratio 1:5.519; Prince Albert, No. 2, ratio 1:4.385. This excess of tellurium can only be accounted for, either by supposing that other tellurium minerals were present (probably native tellurium), or that a portion of the gold originally combined with it had been removed.

This latter theory seems not at all an unlikely one. The presence of binoxide of manganese, together with solutions containing alkaline chlorides, and sulphuric acid derived from the decomposition of the pyrite, would effect the removal of finely divided and precipitated gold by means of the chloride generated.

probably owes its peculiar greenish color to the presence of iron in a ferrous condition. In the Garfield Grouse mine the ore is mainly the white rock, which in itself is quite barren, or nearly so, but the joints of which are filled with high-grade auriferous material. Some idea of the richness of the latter may be had when it is stated that the lot of ore in bulk which furnished the samples on which the foregoing experiments were made carried 75 oz. of gold per ton. The greenish metamorphosed rock from the Anaconda in which the mineral sylvanite was observed assayed 12 oz. of gold per ton.

As to the origin of the Cripple Creek deposits, it may be reasonably inferred that they were caused by solutions brought up from below through the joints or lines of least resistance, the gold being, at the time, associated with silica and fluorine. These circulating solutions effected a marked chemical change in the rocks through which they percolated. In some cases the alteration can hardly be traced beyond the surface, as in the white rock of the Garfield-Grouse mine. In others, as in the Anaconda, the whole mass of rock became impregnated with pyrite and sylvanite, resulting in its partial metamorphism. As the Cripple Creek mines are explored to greater depths, remote from the zone of oxidation, it is not unreasonable to expect that the economic treatment of the ores by methods other than smelting, will offer greater difficulties than at present exist, on account of the association of the gold with tellurium as telluride.

* A abstract of a paper read before the Colorado Scientific Society, in Denver, January 8th, 1894. Our attention has been called to the fact that this paper was written before the appearance of Mr. Blake's "The Gold of Cripple Creek," which appeared in the "Engineering and Mining Journal" of January 13th, 1894.

** "Proceedings" of the Colorado Scientific Society, January 7th, 1885.

ABSTRACTS OF OFFICIAL REPORTS.

BOSTON & MONTANA CONSOLIDATED COPPER AND SILVER MINING COMPANY.

This report covers a period of 18 months, ending December 31st, 1893, the fiscal year having been changed to end with December instead of June. At the close of the year the company had \$3,750,000 capital stock (150,000 shares of \$25 each); \$856,000 in first mortgage 7% bonds, and \$600,000 in general mortgage 7% bonds. The receipts for the year from copper, silver and gold product were \$5,078,725. The running expenses at Butte and Great Falls were \$3,155,956; freight and all other charges, \$1,078,493, making a total of \$4,234,449, and leaving a mining profit of \$844,276. Receipts from sale of new stock were \$625,000, making total net receipts \$1,469,276, accounted for as follows: Construction at mine, \$77,981; construction at Great Falls, \$322,018; interest, premiums, etc., \$351,500; bonds redeemed and canceled, \$211,000; total, \$962,499; balance, \$506,777. Deducting balance of liabilities June 30th, 1892, which was \$156,603, leaves balance of assets December, 31st, 1893, at \$350,174. The assets at that date included cash and balances receivable at Boston, \$494,165; cash and supplies at Butte and Great Falls, \$115,811; total, \$609,976. Liabilities were \$63,471 at Boston, and \$191,331 at Butte and Great Falls; total, \$259,802, leaving balance of assets \$350,174, as above.

The report of Mine Superintendent Thomas Couch says that since December, 1892, the Upper Smelting Works at Butte have been closed. The Lower Works continued in operation till June, 1893. Since that date the whole of the smelting operations have been carried on at Great Falls. At the mines development work included: Sinking shafts, 262 ft.; winzes, 1,697 ft.; drifting, 11,507 ft. 6 in.; stoping, 17,322½ cubic fathoms. The total ore mined was 331,630 tons, of which there was reduced at Butte 99,305 tons, and shipped to Great Falls, 232,325 tons. From the 99,305 tons of ore reduced at Butte, including the ore shipped, there was produced, according to assays, as follows: Copper matte, 26,603,919 lbs., 54.62% or 14,531,674 lbs. copper; silver matte, 8,645,026 lbs., 53.71% or 4,642,444 lbs. copper; silver ore shipped, 116,122 lbs., 64.82% or 75,266 lbs. copper; copper ore shipped, 81,694 lbs., 65.70% or 53,673 lbs. copper; making a total in fine copper of 19,304,057 lbs. This gives 97.1958% of copper in the ore, a fractional gain over the previous year, the latter being 97.176%. The silver contained in the matte and ore shipped equalled 236,840½ oz. Gold equalled 513.35 oz.

After making ample deductions for contractions, lean spots, etc., which are found at intervals in all of the mines, the following recapitulation of ore reserves is given: Mountain View Mine, 150,000; Pennsylvania Mine, 30,000; East and West Colusa Mines, 175,000; block between Mountain View and Colusa, 250,000; total reserves of ore, 605,000 tons. There have been added two new pumps to the mines. In the Pennsylvania, at the 600-ft. station, a Snow pump, built in Buffalo, N. Y., calculated to raise 400 gallons of water per minute against a 700-ft. head. It has two high pressure steam cylinders, and two low pressure, the former 16 in. in diameter, and the low pressure 25 in. in diameter, and four 8 in. water plungers, all of 18-in. stroke. At the Leonard shaft a Reidler pump was put in operation about six months ago. The engine of this pump is 16 × 25 × 24. Pump plungers are 8 and 5½ × 24. The Reidler pump having boilers for its exclusive use enables them to tell the exact cost of running it, and the difference so far has been in fuel, of nearly 60% in favor of the Reidler, as compared with the old pumps. This pump works admirably. Its capacity is about 90 revolutions, and it does the work with about 33 revolutions. This pump is double in its construction. One side can be operated independently of the other if it becomes necessary to do so. The Reidler pump has a copper column, and all of the pumps should be similarly furnished, as the water in both the Mountain View and Pennsylvania Mines is very bad on iron. Wires are being stretched to all the mines and down to the stations for the installation of electric lighting. The sinking of a new shaft between the Mountain View and West Colusa is recommended, to save cost by reducing the tramming now required.

The report of Superintendent Frank Klepetko, of the Great Falls Works, says that the total smelting for the 18 months has been equivalent to 218,958 tons of ore, and the production 33,398,915 lbs. of copper, which is accounted for as follows: Matte shipments, 4,781,440 lbs.; in pig copper shipments, 10,557,340 lbs.; in ingot and cake shipments, 7,246,834 lbs.; in electrolytic cathode shipments, 8,375,675 lbs.; in sundry small shipments not reported, 1,194 lbs.; on hand January 1st, 1894, matte, pig copper, refined copper, anodes, solutions, etc., 2,358,714 lbs.; furnace refinery loss in refining 19,825,538 lbs. ingot and anodes, 77,118 lbs.; total, 33,398,915 lbs.

Shipments of matte were discontinued from the Great Falls Works in May, 1893; after that date all shipments were in the form of pig copper, ingot, cake, or cathodes. The inventory of copper in ore, concentrates, calcines and other material in stock, or in process, taken January 1st, 1894, showed 6,584,830 lbs. of copper at the Great Falls Works. Over 2,500,000 lbs. of this is in ore. The reserves of ore consist of about 4,200 tons first class, and 4,600 tons concentrating ore.

Improvements and additions included a pair of 36-in. and a pair of 30-in. Victor turbines; a duplex 72 × 48 in. Tod blowing engine; three Thomson-Houston 165-K. W. dynamos for electrolytic work; a 60-K. W. electric generator; an electric crane and several pumps. The furnace house and two blast furnaces were completed, a new refinery building and three refining furnaces built. The furnaces have a capacity of 14 tons per day each. New gas producers and four 100-H. P. boilers were put in. The electrolytic refinery, which was originally planned for a capacity of 1,000,000 lbs. monthly, has been gradually worked up in capacity until now it is producing at the rate of 1,600,000 lbs.

The boilers intended for supplying steam for the electrolytic plant were put into the smelter boiler house, and three smaller boilers, obtained from the Butte works, replaced them. Recently there was added a silver slime plant, which is working fairly well. There is now being added to the electrolytic plant an air-compressing plant for the purpose of forcing solutions to a higher level for circulation. The completion of this will be of undoubted benefit in the electrolytic operation, giving a more rapid circulation at a much cheaper cost. The cost of this is all being charged to the cost of producing electrolytic copper.

The entire plant is working in a fairly satisfactory manner. The future construction will be small in amount, and more in the nature of

minor changes, as such changes seem to be of benefit. All such costs will be charged to the running cost of the plant.

The trustees' report says: "Considering all the delays incident to the establishment of a new plant and the peculiar difficulties which were encountered at Great Falls, both from the character of the location and from the many new experiments which were undertaken, your trustees feel well pleased in presenting this report. Notwithstanding the great depression in business during 1893 and the consequent low price of copper, we have come through it all successfully, and the plant has more than met our expectations. Especially is this the case with regard to the electrolytic plant, the production of which is a great deal larger than it was supposed to be capable of, and we still feel that we have not yet reached the limit of its productiveness; nor the still further reduction of cost of operation in all departments of the whole plant.

"We wish to call the attention of the stockholders to the fact that in the statement of assets we make no mention of the value of the Great Falls plant, which has cost, in all, about \$2,000,000. We have very little doubt but that this plant could be sold for enough to take up the bonded indebtedness, to be used as an independent smelting plant for treating custom ore; a sufficient quantity of which could be readily procured from the various localities in Montana. The bonded indebtedness has been reduced to \$1,456,000 through the operation of the sinking fund. Another item of which we take no account in our assets is the amount of ore and copper in its various stages with which the Great Falls plant is stocked. January 1st, 1894, this amounted to over 6,500,000 lbs., on which there is a net value to the company, after all future expenses are paid, of over \$400,000. This stock would enable us, in case of any accident to the mine or railway, to run the Great Falls plant for about two months, keeping up the regular product.

"The operations of the plant during the last six months of 1893, when all the smelting was done at Great Falls, have proved very satisfactory, showing a large gain over past operations, and the latter half of the six months shows a gain over the first half. Towards the accomplishment of this, great credit is due our Superintendent, Mr. Klepetko, for his careful and intelligent supervision, and we feel well convinced that he will make still further gains. In regard to our mines at Butte, everything has gone on there most satisfactorily, as will be seen by Captain Couch's report. At the present rate of production we should have three years' supply from our reserves of ore opened up. At the time of our last report we figured up about a year and a half's supply."

FRENCH COAL AND IRON TRADES IN 1892.

The French Commission on Mineral Statistics and Steam Engines, consisting of M. Lorieux, Inspector-General of Mines, President; M. Michelot, Chief of the Division of Mines; M. Keller, Chief Engineer of Mines; and M. Zeiller, Chief Engineer of Mines, Secretary, have reported to the Minister of Public Works upon the data furnished by the statistical bureau of the Mines Division for the year 1892, giving the principal results. As regards mineral fuel, which constitutes five-sixths of the mine production, coal, anthracite and lignite were extracted to the amount, in round numbers, of 26,179,000 tons, the increase over the figure for the previous year being only 154,000 tons. The Commission, however, regards this result as not so unfavorable on the whole, seeing that French consumption declined, in 1892, by 57,000 tons, and the exports by 11,000 tons. The fact is recalled incidentally that the production of coal was also reduced in neighboring countries. The mean diminution in the selling price of coal at the pit mouth was 0.85 francs (17c.) for the whole of France, and 1.47 fr. (29c.) in the Nord and Pas-de-Calais, and yet coal was sold on the spot at a high price, 12.40 fr. (\$2.48) per ton, compared with the period 1885-1889, the mean of which was only 10.85 fr. (\$2.17). Notwithstanding the depreciation of the products, miners' wages advanced, and the cost of labor generally increased in 1892.

Of all the French collieries only those of the Pas-de-Calais increased their output, which was 9,802,000 tons, an increase of 1,181,000 tons over the figure of the previous year. There was an appreciable diminution in all the other departments, especially that of Le Tarn, where the Carmaux miners went out twice on strike for a total period of nearly four months. Out of 294 collieries worked, 136 showed a loss, and consequently did not contribute to the 5% royalty on the net profits from the concessions. The whole of the mineral substances conceded—including coal, anthracite, lignite, pyrites, bituminous shales, asphaltic limestone and rock salt, with the ores of iron, argentiferous lead, zinc, manganese and antimony—produced 30,287,000 tons, valued at 359,048,000 fr. (\$71,809,600) in 1892, against 30,050,000 tons, valued at 380,350,000 fr. (\$76,070,000) in 1891. On the whole, the quantities raised slightly advanced, while, on account of the lower price of coal and most of the ores, a diminution in value exceeding 21,000,000 fr. was recorded. The number of persons engaged in mines increased by about 1,000.

The year 1892 was a favorable one as regards accidents, as no catastrophe occurred in mines, open-workings or quarries, while fire-damp caused no fatal accident—a fact which has not been noticed for 50 years. This result may be attributed to the increased precautions taken in fiery mines, and especially to the improvement in ventilation, the use of safe explosives and greater watchfulness with respect to fire-damp.

The blast furnaces produced 2,057,000 tons of pig iron, or 160,000 tons more than in 1891, while the production of finished steel also advanced from 638,000 to 682,500 tons; but finished iron, including plates, slightly declined to 829,000 tons. The selling prices of finished iron and steel remained about the same, while those of pig iron decreased. The total value of the various iron products was in round numbers 457,000,000 fr. (\$91,400,000), showing an excess of 18,000,000 fr. (\$3,600,000), as compared with the previous year's results. Indigenous consumption increased as regards pig iron, finished iron and steel, while exports, which had increased considerably during the previous few years, fell off after 1891.

There were in use, during 1892, in France and Algeria, 89,116 steam boilers, on which there were made 23,871 official tests by the hydraulic press.

A NEW STONE-BREAKER FOR ROADMAKING.

The Farrel Foundry and Machine Company, of Ansonia, Conn., has brought out a new pattern of stone-breaker for crushing macadam and ballast for use in roadmaking or such other purposes as may be found desirable. In general design the machine follows the Blake type, built by the same company, the essential difference being in the distribution of weight and the material used. The crusher, as usually built, consists of a strong iron frame, near one end of which is a powerful movable jaw of iron. By means of a toggle-joint and eccentric, this jaw is moved back and forth a slight distance from the frame. As it recedes the opening increases and the stone descends, and as it again approaches the frame the stone is crushed. By an adjustable toggle-joint the length of the stroke of the jaw can be regulated while the machine is in motion so as to produce stone of any size. The pitman and swing-jaw are made of steel and are lighter and stronger than the usual cast-iron ones. The swing-jaw shafts and eccentric shafts are made unusually large, the jaw-plates are of the best quality of charcoal iron and the cheeks and other wearing parts are made of steel. The machine is simple and built to meet the requirements of contractors who need a strong and substantial breaker, so arranged that the wearing parts are easy of access and readily renewed. Three sizes are made, 15 by 9 in., 20 by 10 in., and 30 by 13 in. opening.

EXPLOSIONS FROM COAL-DUST IN ENGLISH MINES.

Written for the Engineering and Mining Journal by S. H. North.

A recent report made by one of the inspectors of mines upon certain experiments carried out with reference to the effect of gunpowder on

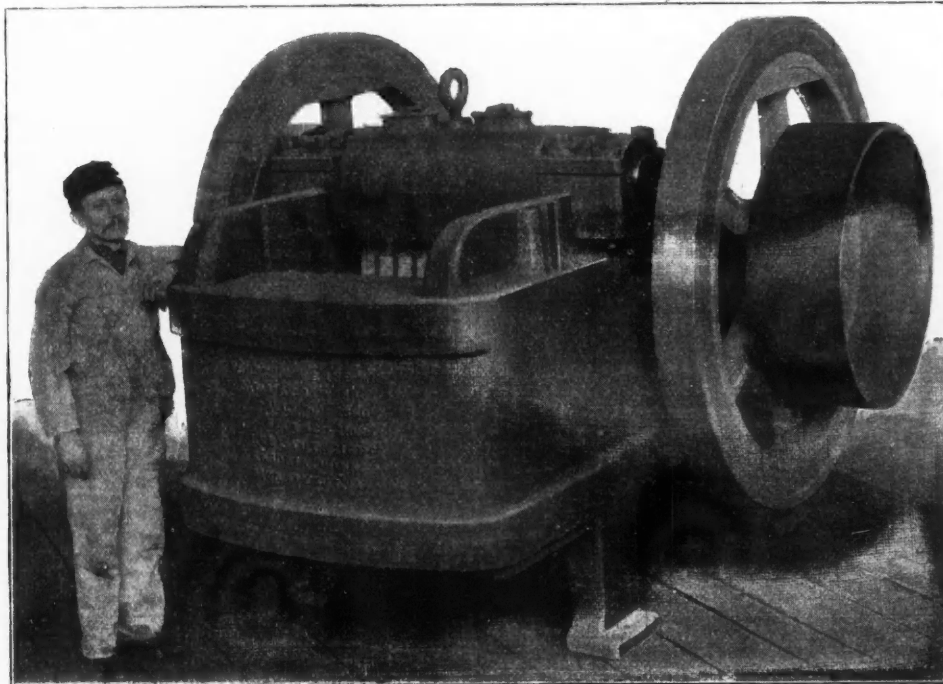
coal most sensitive to explosion was that of the higher qualities, and the coal dust freest from impurities. Nearly all the most disastrous explosions have occurred in seams producing the highest class of coal, such as the Durham Hutton seam, Barksley and Silkstone seams, Yorkshire; the Tarly seam, Lancashire; and the Aberdare seam, South Wales.

In the experiments the dust from the Albion Colliery, Scotland, was most violent in exploding, the disasters at this colliery having been, in past years, the worst in the kingdom since 1845. Some 1,600 persons have lost their lives in this mine.

An important and unfortunate item is mentioned by the inspector in regard to coal dust explosions, that the supply of oxygen produced by the ventilation makes the explosions more frequent and more severe. This is a difficulty which it will be hard to obviate, for a brisk ventilation under present conditions is absolutely necessary for the comfort and safety of the miners.

The handling of gunpowder cartridges alone has caused the loss of no less than 400 persons in 20 years, through accidental ignitions by stemming, drilling out, a setting alight by candle sparks, while the explosions themselves during the same period have numbered 4,098, and out of these about 50% are probably attributable to the use of gunpowder.

These experiments show that there are several problems involved, of not a little difficulty. The chief medium of these fatalities can be removed, that is roborite and other high explosives can be substituted for gunpowder. But unfortunately this does not include the whole matter, for it is proved that the coal dust itself from high class seams is almost as combustible as gunpowder. The only method in existence at present, of obviating the firing of the dust, is that of damping it, but it is quite impossible to bring the dust from all quarters and lodg-



THE FARREL ROCK BREAKER.

coal dust in the shafts and workings of mines, has some important bearings upon the use of wasting mediums for mining purposes. Fifty-two samples of coal dust were selected for the experiments obtained from 36 separate seams. The dust was either that lodged on the timbering or on ledges underground, or above the screens on the surface, gathered not by the shovel but by hand. Five cwts. of each variety was collected, placed in bags of 1 cwt. each. It was suggested in gathering the samples that they must be fine and dry, and should be the dust from the seam of the district which has been most liable to colliery explosions, and also from the one that has suffered least in this respect. The shaft used for the experiments was 150 ft. deep, 7 ft. in diameter; struts of timber 6 ft. long and 7 in. broad were fixed from top to bottom of the shaft at intervals of 6 ft. to represent the timbering on an underground roadway. Ventilation was obtained by a small fan on the surface driven by hand and forcing fresh air to the bottom of the shaft through 10-in. iron tubes. The quantity of air passed was about 750 cu. ft. per minute. For firing the dust, a wrought iron cannon was used, measuring 2 ft. 11 in. in length, having a bore-hole 2 in. in diameter and 2 ft. deep. The quantity of gunpowder used was 1½ lbs., which was tamped lightly with coal dust. This proportion of gunpowder was believed to be sufficient to develop a similar flame to that produced by the ignition of a small quantity of fire-damp in a mine. The higher explosives used, such as roborite and ammonite, were fired from an iron tube tamped with coal dust, or in one or two cases with clay instead. In the first place the sample was tested in suspension, and in the second test, it was allowed an interval of 15 or 20 minutes to settle. These experiments proved conclusively that gunpowder as a blasting agent was the most dangerous explosive, and that the high explosives produced no explosion of the coal dust at all, but only a charring of the woodwork, etc. It was found also that the

ments under the hose, especially when the mass that first takes fire is in suspension in the air, in extremely fine particles. Once inflamed, the coal dust continues to burn and carry its load of death out to very great distances. If gunpowder is not used there still remains the presence of the fire-damp, which would give the first spark to the floating dust around. What seems to be needed is something to intervene between the flame and the nearest dust that will stay its course.

Changes in Patent Office Rules.—In some recent changes in the "Rules of Practice" for the United States Patent Office, rule 64 has been repealed. It read as follows: "The first step in the examination of an application will be to determine whether it is, in all respects, in proper form. If, however, the objections as to form are not vital, the examiner shall proceed to the consideration of the application on its merits, and in such case he must, if possible, in his first letter to the applicant state all his objections, whether formal or otherwise, and until the formal objections are disposed of, further action will not be taken upon the merits without the order of the Commissioner." Instead of this the following rule has been adopted: "Where the specifications and claims are such that the invention may be understood, the examination of a complete application and the action thereon will be directed throughout to the merits, but in each letter the examiner shall state or refer to all his objections. Only in cases presenting patentable substance will requirements in matters of form be insisted upon." The meaning of this seems to be that while an examiner may still specify incorrectness in form as one of the reasons for rejecting an application, specifications or drawings will not be sent back for correction unless the examiner believes, after inspection, that there is some patentable point in the application.

THE FERTILIZER INDUSTRY IN 1893.

Written for the Engineering and Mining Journal by Gustavus Memminger.

Prior to 1833 bone and bone-meal had been used in Europe for fertilizing, but their value in this capacity was supposed to be due to the amount of grease and gelatine contained. In that year Poet ascertained the presence of phosphorus in seeds and showed that it was a universal and probably essential, element in plant growth. In 1840, Baron von Liebig, who had been experimenting with fertilizers, suggested the use of sulphuric acid with bones, to make the calcium phosphate more easy of assimilation by plants. Extensive field experiments were carried on in 1847 and the value of phosphate of lime as a plant fertilizer definitely established. In consequence of this, its use increased rapidly and, with the discovery of coprolites in England and cheaper methods of manufacturing sulphuric acid, the fertilizer industry grew rapidly.

In 1867 phosphate beds were discovered in South Carolina, and during the following year 11,862 tons were mined. From that date to the end of 1893 the total output of the State has amounted to 7,442,737 tons, all of which has been consumed in the manufacture of super-phosphates. At the time these beds were opened there were indications that the West Indian phosphates and Peruvian guano might be exhausted, and consequently the new and abundant supply gave a decided stimulus to the industry. This was added to, also, by the lower cost of sulphuric acid, which was being made from pyrites instead of the more expensive sulphur used before, and further, the opening of the Strassburg potash deposits and the nitrate deposits of Chili all enabled the manufacturer to greatly increase his product, while materially decreasing the price of the fertilizer. Then the discovery of phosphate in Florida and the development of these deposits, which are the most extensive yet found in the world, provided a new and practically inexhaustible supply of raw material.

As phosphorus is a necessary constituent in the greater number of plants, the amount which is removed each year from the soil by the constantly increasing crops must be renewed. In his work on "Phosphates in America," Dr. Wyatt estimates that the crops of the United States alone take annually from the soil 1,840,000 tons of phosphoric acid; in France about 150,000 tons, and in Germany 200,000 tons; a total of 2,190,000 tons, which must be replaced each year in order that the productive value of the soil may not be impaired.

In the United States the manufacture and consumption of chemical fertilizers has increased rapidly ever since the opening of the South Carolina deposits; fully one-half of the product is consumed in the cotton States, but as the rich soils of the North and West are gradually being exhausted the use of fertilizers in those sections is increasing. The following tables show the production and consumption of fertilizers in the United States since 1888.

Consumption:	1888.	1889.	1890.	1891.	1892.	1893.
Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Alabama.....	45,000	43,000	40,000	55,000	40,000	45,000
Florida.....	15,000	18,000	20,000	25,000	20,000	35,000
Georgia.....	170,000	185,000	200,000	230,000	175,000	280,000
South Carolina.....	115,000	120,000	125,000	130,000	140,000	115,000
North Carolina.....	30,000	35,000	35,000	105,000	50,000	90,000
Tennessee.....	28,000	29,000	30,000	35,000	30,000	35,000
Kentucky.....	15,000	18,000	15,000	20,000	15,000	20,000
Mississippi.....	12,000	8,500	12,500	15,000	10,000	15,000
Arkansas.....	7,500	8,000	10,000	10,000	10,000	15,000
Louisiana.....	12,000	9,000	10,000	15,000	10,000	25,000
Texas.....	10,000	10,000	12,500	10,000	5,000	10,000
Virginia.....	60,000	65,000	70,000	80,000	55,000	50,000
West Virginia.....	30,000	25,000	25,000	30,000	25,000	25,000
New England States.....	56,000	110,000	105,000	120,000	100,000	115,000
Western States.....	70,000	85,000	75,000	80,000	75,000	80,000
Middle States.....	210,000	370,000	350,000	360,000	305,000	285,000
Total.....	975,500	1,199,000	1,195,000	1,340,000	1,070,000	1,225,000
Production.....	990,000	1,230,000	1,250,000	1,360,000	1,365,000	1,350,000

Prior to 1888 the estimated production was 1,020,000 tons in 1885; 1,099,500 tons in 1886; and 975,000 tons in 1887. In 1862 Great Britain manufactured 200,000 tons of chemical manures and in 1890, 800,000 tons. The production for 1893 is estimated at 850,000 tons, about one-half being consumed in the United Kingdom and the remainder exported.

The world's supply of crude phosphate and guano as given by the best official sources is as follows: South Carolina, 560,000 tons; Florida, 425,000 tons; Belgium, 400,000 tons; France, 400,000 tons; West Indies, guano, 30,000 tons; South America, guano, 45,000 tons; Russia, 70,000 tons; Germany, 50,000 tons; Spain, 40,000 tons; England, 30,000 tons; Canada, 15,000; Norway, 20,000 tons, and North Carolina, 2,000 tons; total, 2,087,000.

The countries of Europe are estimated to have produced during 1893 the following amounts of acid phosphates: France, 440,000 tons; Belgium, 275,000; Germany, 550,000 tons; Holland, Sweden and Norway, 150,000; Italy and Switzerland, 100,000; other countries, 100,000.

The world's consumption of commercial manures is as follows: United States, 1,225,000 tons; France, 1,000,000 tons; Germany, 1,445,000 tons; Great Britain, 1,000,000 tons; other European countries, 800,000 tons; total, 5,470,000 tons. The consumption in Germany of the various kinds of fertilizers is given as: Acid phosphates, 500,000 tons; slag, 350,000 tons; bone meal, 70,000 tons; sulphate of ammonia, 50,000 tons; potash salts, 220,000 tons; nitrate of soda, 250,000 tons; precipitated phosphates, 5,000 tons; total, 1,445,000 tons.

THE ANTWERP INTERNATIONAL EXPOSITION.

At a meeting of the members from New York of the United States Honorary Commissioners to the Antwerp International Exposition, held at their offices in New York, on Wednesday, March 14th, it was resolved to again call the attention of American manufacturers and producers to the fact that the Antwerp Exposition will open promptly on May 5th next. This is assured, as all the main buildings of the exposition are now completed. Intending exhibitors (and especially those from the State of New York), are urged to make their applications for spaces or concessions immediately, if possible before April 1st, at the New York headquarters. For our manufacturers and producers who are now seeking the markets, not only of Continental Europe but of Latin America

and Australia, the commissioners believe that exceptional opportunities can be had at the Antwerp Exposition for placing the samples of their goods before the buyers from these markets, because this is a business exposition.

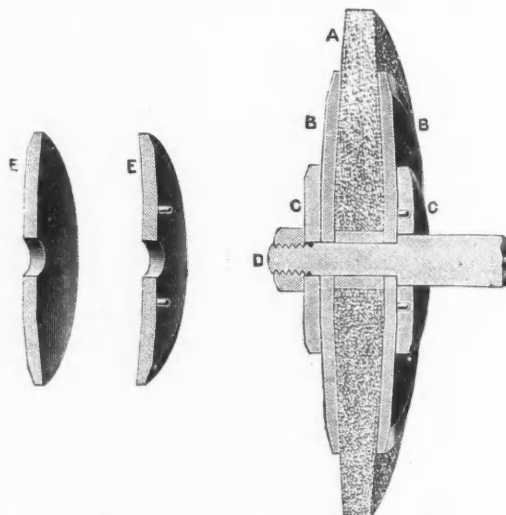
The representatives of the commission will (where such services are required) have the general supervision of the reception and care of exhibits during the term of the exposition. Exhibits should be ready for shipment not later than April 10th. Special low rates for shipment to the exposition direct have been obtained.

For further particulars application should be made to the New York headquarters of the Antwerp Exposition at 14 and 16 Church street, New York. Mr. T. A. Matthews is the commissioner in charge.

A SAFETY EMERY WHEEL.

The accompanying illustration shows a new method of mounting emery wheels adopted by the Safety Emery Wheel Company, of Springfield, O. The drawing is a section through the center of a wheel. D represents the spindle wheel is to be used on. C C represent the tight and loose collar on the spindle, which are usually from 2 in. to 8 in. in diameter, according to size of machine. B B represent the safety collars, which are made concave to within 2 in. of the center. This leaves a 4-in. flat spot at the center which gives a good bearing for the safety collar against the face of the fast collar on machine; also a good bearing for the loose collar or nut against the loose safety collar. In the collar next to the fast collar on the machine there are two pins which fit into two holes that are drilled in the fast collar, thus making a fast collar of the safety collar also. The wheel A is made convex on the same taper the collars are made concave. As the wheels are accurately turned in a lathe on each side, they fit the collars when they are clamped up tight by the nut.

In practice one or more additional sets of safety collars can be provided, so that as the wheel wears away, smaller collars can be put on until the wheel is entirely worn out. A pair of these additional collars is shown in the illustration at E E. When the safety collars are used, it will be seen that it is impossible for the wheel to scatter when broken. If the wheel



SAFETY EMERY WHEEL MOUNTING.

should be 2½ in. thick at center and 2 in. at the periphery of the collars, for instance, it could not fall in pieces, even if broken before starting.

This company also makes a sectional wheel on a new plan, of emery and corundum arranged in alternate sections. In manufacture this wheel is divided up into sections from ½ in. to 1½ in. apart, one section being made of corundum and the other out of emery. For tool-room work, for use on universal grinding machinery, or for any kind of cylindrical grinding, it is claimed that these sectional wheels remedy troubles usually found. The corundum section wears just enough in advance of the emery or harder section to make practically cutting teeth out of the harder section, thus making a wheel that will hold its size and never glaze.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

Supreme Court of Montana.

Location and Acquisition of Placer Mining Claim.

It is not necessary that a separate discovery, separate marking of boundaries, separate recording, and separate work should be made and performed on each of the 20 acres contained in a 160-acre placer claim, authorized by Revised Statute United States, to be located under one location by an association of persons.—McDonald vs. Montana Wood Company, 35 Pac. Rep., 668.

Supreme Court of Iowa.

Assumption of Risk by Employee.

While several cars in a mine were being propelled to the shaft, one of them ran through a switch, left open by mistake, into a side track, killing an employee. The switch was left open by a gang of night men, and it was the duty of the employee to see that it was properly adjusted for the work of the day. His failure to have the switch in proper position caused his death. He was an experienced miner; had been employed in the mine for a year and a half, and was familiar with the switch and the place where he worked; knew that the night men often left the switch

open, and that loaded cars were frequently shoved to the shaft, as this one was without being attached to other cars or to the cable; and he neither made any complaint nor asked any changes. By so doing he assumed the risks incident to such condition of things.—Beckman vs. Consolidation Coal Company, 57 N. W. Rep., 889.

United States Circuit Court, District of Maryland.
Duty on Sulphate of Ammonia for Fertilizers.

In Baltimore, March 15th, Judge Morris decided in the United States Circuit Court that imported sulphate of ammonia sold for the purpose of making fertilizers is dutiable at the rate of a ½ cent a pound. The amount of duty assessed on sulphate of ammonia imported into the United States in 1891, 1892 and 1893 was \$218,631. The right of the government to much of this duty depended upon the decision of Judge Morris, which is the first rendered in favor of the United States directly on the question involved. George C. Bartol & Co. imported 470 bags of sulphate of ammonia, which was made in England. One section of the tariff law provides that sulphate of ammonia shall be dutiable at ½ cent a pound. Another section says guano, manures and all substances expressly used for manure shall be admitted free from duty. The sulphate of ammonia in this case was manufactured into fertilizers and, it was claimed, should be admitted free. Collector Marine decided it was dutiable. The Board of General appraisers reversed the collector's decision and admitted the sulphate of ammonia free. On appeal to the United States Circuit Court the decision of the collector was sustained by Judge Morris.

Court of Appeals of Colorado.
Mines and Mining Liens.

When the statutes, as amended by laws of 1889, give to persons who do work on mining property operated by lessees a lien for their labor, unless the owner files for record, "before the commencement of work under the lease," a notice that the property is being worked under a lease, does not apply where the lease was executed and the work performed before the passage of the act.—Gardner vs. Resumption Mining and Smelting Company, 35 Pac. Rep., 674.

Liability of Corporation for Acts of General Manager.

The general manager of a mining and reduction company employed men to open a mine of his own, and to construct a wagon road and ore chute from such mine to the company's reduction mill, transferred miners and tools from the company's mine to his own, reduced his ore at the company's mill, and sold it mixed with ore from the company's mine. As he acted within the scope of his employment, though without the knowledge and in fraud of the company, the company was liable for the wages of the men who were employed by him in the name of the company, and who believed that they were serving the company when working for him.—Oro Mining and Milling Company vs. Kaiser, 35 Pac. Rep., 677.

A Peculiar California Landslide.—A landslide at Sausalito, in Marin County, January 20th last, says "Industry" of San Francisco, caused a good deal of damage, carrying away some houses and sweeping out a cañon for a quarter of a mile below. The circumstances were peculiar, and may not have a parallel once in a century. In a large circular basin, several hundred feet in diameter, forming the head of a cañon, about 200 ft. above the ocean, the land had, by reason of clay strata beneath, started and subsided in terraces. A short distance below the cañon narrowed to a gorge of not more than 40 ft. in width, with heavy timber on each side. The broken earth started and formed a dam at this narrow point in the cañon, the water filling in behind until the dam gave way, and the result was the same as in the case of an ordinary dam breaking and discharging a flood of water in a mass. The catchment area of the cañon is not more than half a square mile, and is much less than that of adjacent valleys in which there was no damage done by water. It was an unusual circumstance and one that no person could have conjectured or foreseen.

Smokeless Powders.—The ingredients of the new Leonard smokeless powder, according to the patent specification, for the United States 30-caliber rifle are given as follows: 150 parts by weight of nitro-glycerine; 50 of gun cotton; 10 of lycopodium; 4 of finely-triturated urea crystals, but the proportions are varied according to the caliber of the gun which is to use it. If dinitrobenzol be employed in the manufacture instead of finely-triturated urea crystals, a similar quantity, namely, four parts, should be used. The several ingredients named above are first mixed together, and there is then introduced as a solvent either acetone alone or acetone combined with acetate of amyl or acetone combined with acetic ether. The solvent is evaporated by agitation, and the material is formed into a cake or granules by pressing in molds. The analysis of Cordite, which we give for the sake of comparison, is as follows: Gun cotton, as previously used at Waltham Abbey, 37 parts; nitro-glycerine, 58 parts; vaseline, 5 parts. The solvent here used is again acetone, the proportion being 19.2 parts. The mixture is incorporated for three and a half hours, and is then squeezed into threads. If the scouring and pitting actions which accompany the use of Cordite are obviated in the Leonard powder, a great improvement has been secured.

Russian Railways.—The first railway constructed in the Russian Empire, says London "Engineering," was the Tsarskoe-Selo line, which was inaugurated in 1838. In 1843 the construction of the Nicholas line was undertaken. This line was opened for traffic in 1851, and it has been from the first one of great political and commercial importance. At the commencement of 1860 Russia still possessed only 1,250 versts of railway, and in 1865 the total had only expanded to 3,360 versts. Between 1865 and 1875 a great impetus was given to the work of construction, and 13,652 versts were brought into operation. This mileage was constructed exclusively by companies enjoying a guarantee of interest from the Russian treasury. In 1875 a total of 17,012 versts had been constructed. During the next 10 years 6,010 versts more were brought into operation. Since 1885, the establishment of Russian railways has again

proceeded with accelerated rapidity, and the Russian network now comprises 31,804 versts (21,200 miles), while 3,213 versts, or 2,142 miles are in course of construction. This does not include the line now in progress in Siberia.

The New Plant of the Carnegie Steel Company.—The Carnegie company's new Harveizing plant, for which it has spent about \$1,000,000, is completed. The secret of its completion has been carefully guarded, and of late passes to the works have not been granted. It is learned that the seven Harveizing furnaces and all the accompanying machinery have been in operation for several weeks. All the machinery, including the 10,000 ton press, had to be imported. Recently a test of the new plant has been going on, and this accounts for the special guards and precautions. It is expected that the test plate will be shipped soon to the naval proving grounds at Indian Head, under the 1893 contract. All plates must be Harveized.

These plates are divided by the naval ordnance officers into what is known as ballistic groups, containing from eight to 20 plates. Out of each group one plate is used as a test plate, and upon the success of this plate depends the acceptance or rejection of the entire group. The ballistic plate which is to be shipped this week will be tested at Indian Head some time next week. In the new contract calling for Harveized plate is included the armor for the new battleships "Indiana," "Massachusetts" and "Iowa." When finished these vessels are expected to be the crack ships of the United States Navy. On the old contract the plates for the "Monadnock" and "Puritan" are still at the Homestead, Pa., works.

The Princeton Geological Expedition.—The geological expedition sent out by the Princeton University last summer was so successful in every way that it has been decided to again go to the same district the coming season. Mr. Hatcher, who will have charge of the expedition this year, has been in the West since March 1, finishing up work supplementary to that done last summer and completing arrangements for the start next June. He is at present engaged in removing fossils which were located but not taken up last year. The headquarters for the coming expedition will probably be at Chadron, Neb. Starting from that point on horseback, its members will work northward across into South Dakota for about 40 miles to the same locality that was covered last year. They will probably spend about three weeks there, directly east of the Black Hills. They then expect to travel through the Hills to Devil's Tower, in northeastern Wyoming, where they hope to accomplish some good work. From Devil's Tower they will work southward along the western slope of the Black Hills, where the country is much wilder and good deer and antelope shooting is to be found, and will return to Chadron by way of Hot Springs and Buffalo Gap. The work will consist, as last year, mainly of collecting vertebrate fossils, but considerable attention will also be paid to obtaining specimens of the animal and plant life of the region and possibly something will be done in the mineralogical line. The expedition will start in June, and will be gone about two months. The camps will be made for the most part in the Black Hills proper, where good water is to be found in abundance. The number of men is limited to 8 and it is expected that the following will comprise the party: J. W. Garrett, treasurer; H. W. Garrett, W. Moses, J. H. Brooks, D. Q. Brown, P. E. Richards and T. H. Pierson, from the class of '95; F. H. Smith, '94.

PATENTS PUBLISHED IN GREAT BRITAIN.

The following is a list of patents published by the British Patent Office on subjects connected with mining and metallurgy:

- WEEK ENDING MARCH 10th, 1894.
- 5,163 of 1893. Treatment of Gold and Silver Slimes. C. Raleigh, Johannesburg, South African Republic.
 - 5,164 of 1893. Soldering, etc. Lamp. A. B. McIlriddle, Glasgow.
 - 7,512 of 1893. Permanganate of Soda and Potash. J. Brock and F. Hurber, Widnes.
 - 7,730 of 1893. Tempering Armor Plates. A. Longson, London.
 - 19,663 of 1893. Mineral Cars. M. Heron, Cleator.
 - 20,789 of 1893. Mining Machines. J. A. Jeffrey, Columbus, Ohio, U. S. A.
 - 23,186 of 1893. Electric Welding. C. L. Coffin, Detroit, Michigan, U. S. A.

PATENTS GRANTED BY THE UNITED STATES PATENT OFFICE.

The following is a list of the patents relating to mining, metallurgy and kindred subjects issued by the United States Patent Office:

- TUESDAY, MARCH 13TH, 1894.
- 5'6,184. Coke Oven, Frank Brunck, Dortmund, Germany.
 - 516,226. Apparatus for Manufacturing Water Gas. John R. Peters, Georgetown, Pa.
 - 516,267. Founder's Molding Machine. Edward Grant, Kankakee, Ill.
 - 516,282. Engineer's Tape Reel. Joel H. Shedd, Providence, R. I., Assignor to Edward W. Shedd, Worcester, Mass.
 - 516,295. Explosive. Herbert M. Chapman, Trimley, England.
 - 516,306. Brick Kiln. Hardy L. Hayes, St. Joseph, Mo.
 - 516,312. Process of Electric Metal Working. Hermann Lemp, Lynn, and Walter S. Moody, Chelsea, Mass., Assignors to the Thomson Electric Welding Company, of Maine.
 - 516,334. Boiler Furnace. Clarence L. Lorraine, East Jordan, Mich.
 - 516,350. Mining Shaft Cage. Nicklaus Haller, Pittsburg, Pa.
 - 516,351. Furnace for Producing Fuel Gas. John Harleman, St. George, near St. Joseph, Mo., Assignor of five-eighths to Edw. H. Collins, Stephen J. Collins and Frank Collins, Rock Island, Ill.
 - 516,369. Steam Boiler. Robert E. Dietz, New York, N. Y., Assignor of one-third to William K. Palmer, same place.
 - 516,371. Dust Collector and Separator. Moses F. Gale, Brooklyn, N. Y.
 - 516,375, 516,376, 516,377. Brick Machine. Joseph J. Kulage, St. Louis, Mo.
 - 516,378. Process of Manufacturing Brick. Joseph Kulage, St. Louis, Mo.
 - 516,397. Foundry Plant. Silas Merchant, Cleveland, O.
 - 516,406. Rotary Pump. Charles Rumley, Helena, Mont.
 - 516,411. Double-Acting Pump. Hiram C. Stouffer, New Lisbon, O., Assignor of one-half to De Witt C. Spencer, Mohawk, N. Y.
 - 516,440. Separators. Robert W. Jessup, Los Angeles, Cal., Assignor of one-half to Fairfax H. Wheelan, Santa Barbara, Cal.
 - 516,442. Blowing-Engine. Charles A. Klotz, Vallejo, Cal.
 - 516,460. Transfer-Table for Rolling Mills. Francis H. Treat, Chicago, Ill.
 - 516,469. Process of Finishing Metal. Nathaniel L. Bradley, Meriden, Conn., Assignor to The Bradley & Hubbard Manufacturing Company, same place.
 - 516,512. Coal-Drill. George W. Thayer, Ottumwa, Ia.
 - 516,551. Process of Coating Cast Iron With Other Metals or Alloys. Lucian R. Nourse, Elgin, Ill.
 - 516,573. Gas Apparatus. Scott M. Mullin and Stephen C. Green, Liberty, Ind.
 - 516,615. Brick-Kiln. John M. Shuck and Thomas E. Martin, Des Moines, Ia.
 - 516,623, 516,624. Amalgamator. Erastus S. Bennett, Denver, Colo.

PERSONALS.

Mr. W. C. Tonkin, of Helena, Mont., has been visiting several Eastern cities.

Mr. Thomas Weir, late superintendent of the Granite mine in Montana, has resigned and removed to Salt Lake, Utah.

Mr. James C. Hallsted has removed from Chicago to Philadelphia, where he has charge of the Eastern business of G. W. G. Ferris & Co.

Mr. Moss and Mr. Heikes of the firm of Moss & Heikes, mining engineers, Chicago, have returned to that city after an extensive trip in the South and Southwest.

Mr. Harry M. Gorham has been elected superintendent of the Potosi Mining Company, Virginia City, Nev., in place of Mr. A. C. Hamilton, who recently resigned that position.

The firm of Manns & Tatarian, chemists and assayers, of Chicago, have sold their entire plant to Mr. George H. Ellis, who will in addition to analytical business conduct a school for practical assaying.

Mr. Francis T. Freeland, superintendent of the Aspen Contact Mining Company, in addition to his duties at Aspen, has been appointed general manager of the Isabella Gold Mining Company, of Cripple Creek, Colo.

Mr. Charles C. Osborn, manager of the Quincy Coal Company, has taken charge of the Terris Mining Company, at Colchester, Ill., and will run it hereafter. Mr. Osborn has employed John C. Rudle as mine superintendent.

Mr. Eckley B. Cox, of Drifton, Pa., recently delivered a very interesting lecture on the "Use of Small Anthracite Coal," a subject of which he has made a special study, before the students of Lehigh University at Bethlehem, Pa.

Mr. J. W. Pinder, mining engineer, has been appointed general superintendent of the Cachivi Gold Mining Company in Ecuador, and will extend the company's operations largely. Mr. Pinder sailed from New York, March 20th, on his way to the mines.

Mr. Thomas Jones, late superintendent of the Bertha Zinc Company, is now at work upon a new furnace, situated in the town of Pulaski, Va. Mr. Jones has purchased from the Pulaski Land and Improvement Company a number of acres of land for his plant.

OBITUARY.

R. Neilson Clark, a member of the firm of White & Clark, consulting engineers, Pittsburg, Pa., died suddenly in that city on March 17th.

Henry S. Spence, a pioneer mining man of Nevada, died at Cambridge, Nev., March 4th, of consumption, aged 72 years. He was a native of County Armagh, Ireland.

Joseph Kerr Johnson died at Pelham Manor, N. Y., on March 17th, aged 86 years. He started life as a farmer near Akron, O., and while there located a coal mine on his farm, from which he reaped a fortune.

George L. Johnson, superintendent of the Broadwater group of mines at Neihart, Mont., died there on March 9th. He was an old resident of Montana, having located at Virginia City during the stampede to Alder Gulch in 1863. Subsequently he removed to Silver City. He became identified with the mines at Neihart some eight years ago and was selected to superintend the Broadwater Mines from his thorough familiarity with the work and the class of ores being mined.

A cable message was received in Johnstown, Pa., on March 18th, from Darmstadt, Germany, announcing the death there of James J. Fronheiser, one of the best-known steel manufacturers in Pennsylvania. Mr. Fronheiser left his home in good health for Europe about six weeks ago in the interest of the Cambria Iron Company, with which he had been closely identified for many years. The first spiegel-eisen ever manufactured by the Cambria Iron Company was made by Mr. Fronheiser. For several years he was the general superintendent of the Cambria Iron Company. He was born in Johnstown in 1804.

Allan Campbell died in New York City on March 18th. He was born of Scotch parents in 1815, in Albany, N. Y. He was noted for his ability as an engineer, having been chief engineer of a railroad when he was but 21 years old. He was employed as a civil engineer on the Erie Canal and on the Ohio River improvement. In 1850 he went to Peru and built the railroad from Callao to Lima, which is said to be the oldest railroad in South America. Six years later he returned to this city and became, first, chief engineer, and later president of the Harlem Railroad. He continued as president of that corporation for six years. During the war he was employed in connection with the harbor defences of this port. The reputation of Mr. Campbell as a skilled engineer secured his appointment as chief engineer of construction of the Union Pacific Railroad. He was also chairman of the Board of Engineers having the supervision of the Fourth avenue improvement—the construction of the present viaduct and de-

pressed ways. In 1876 he was appointed Commissioner of Public Works of New York City. He was president of the Consolidation Coal Company of Maryland for several years, and chairman of the Finance Committee of the Board of Directors of the Ohio & Mississippi Railroad.

SOCIETIES AND TECHNICAL SCHOOLS.

Electrical Engineering Society of Lehigh University.—This Society, at a recent meeting, decided to invite prominent electricians to address it. So far favorable replies have been received from Prof. Houston, Nicola Tesla and Louis B. Stillwell.

American Society of Mechanical Engineers.—At the meeting held in New York March 14th, Mr. J. Sellers Bancroft read a paper describing the latest form of the Emery testing machine. Following the paper there was some general discussion on the subject of testing machines, and stereopticon views of a number of machines of historical importance were shown.

Engineers' and Architects' Club of Louisville.—This club, organized at Louisville, Ky., has the following officers: J. M. Johnson, president; D. X. Murphy, vice-president; Granville W. Shaw, secretary; Bank of Commerce, treasurer; directors: Charles Hermans, C. L. Cornwell, F. W. Moberly, J. K. Zollinger, Edward Mead and C. G. Sneed. The club meets on the second Thursday in each month. Its rooms are 16 and 18 Norton Building, Fourth avenue and Jefferson street. The next regular meeting will be held on April 12th, at which time Mr. J. B. Atkinson, vice-president of the St. Bernard Coal Company, will read a paper on "Western Kentucky Coal and Its Preparation for Market."

American Society of Civil Engineers.—A meeting of the society was held March 2d, President Wm. P. Craighill in the chair. The paper presented was on the subject of the "Electric Light Station of the Citizens' Light and Power Company, of Rochester, N. Y." It was read by the writer and discussed by Messrs. Craighill, Brinckerhoff, B. R. Green, Geo. Hill, Emery and Cartwright. A paper by A. S. C. Würtele on "Spirals and Their Use on Railroads," was not read for the want of time, and it will be printed in the "Transactions."

The board of direction has determined upon Niagara Falls as the place at which the annual convention for 1894 will be held between the 10th and 30th of June; the exact date will be announced hereafter.

American Chemical Society, New York Section.—The regular monthly meeting was held March 9th, Prof. Peter T. Austen presiding. Dr. Henry A. Mott read a review of prevailing ideas about "Matter, Force and Energy," criticising several of the theories in use and suggesting some new explanations. Mr. Emil Greiner exhibited a new form of "Automatic Pipette," which appeared to be destined to become a useful piece of laboratory apparatus. Mr. Thomas S. Gladding read a paper on the "Determination of Sulphur in Pyrites," in which the various methods were discussed, and elaborate tables of analytical data given. Mr. W. M. Grosvenor, Jr., spoke on "New Solvents for Perchromic Acid," giving the results of numerous experiments on the behavior of this acid toward organic solvents. The New York Section of the American Chemical Society meets at 8 P. M. on the second Friday of each month at the University Building, New York. Visitors are always cordially welcome.

Civil Engineers' Club of Cleveland.—The regular meeting was held March 13th. Letters were read from Mr. O. Chanute, transmitting translation of a letter to the General Committee of Associated Engineering Societies from the Society of German Engineers, Berlin, expressing their appreciation of the courtesies extended to them at the World's Fair; also transmitting the final report of the General Committee of Engineering Societies, Columbian Exposition. The annual reports of the secretary and treasurer were read and accepted and ordered spread on the records. Reports from Programme Committee were read by Mr. George E. Clifford, chairman, and by Mr. C. W. Hopkinson on the subject of "Architecture." These reports were accepted and referred to the Library Committee for publication. A report from the Local Committee on Columbian Exposition was presented by Mr. W. H. Searles, secretary, which was received, adopted and ordered spread upon the records. A report from the Committee on National Public Works was made to the effect that the committee could at this time do nothing further, and asking that it be discharged. The report was accepted and the committee discharged. A report was received from the Committee on New Quarters to the effect that the needs of the club were being considered in the proposed remodeling of Case Library Building. President A. H. Porter read the annual address entitled, "The Engineer and His Work." The tellers announced the election of officers as follows: President, Ambrose Swasey; vice-president, John N. Richardson; secretary, F. C. Osborn; treasurer, C. P. Leland; librarian, C. H. Benjamin; directors, C. W. Wason and Walter Miller. Messrs. Henry E. Riggs, Edward Grant Lane, Isaac Knapp Pierson and Chas. Frederic Mabery were elected members. Mr. C. P. Leland, chairman of the Banquet Committee, announced that the banquet would be held on Wednesday

evening, March 21st, at the Hollenden Hotel. The retiring president made some remarks thanking the officers of the club, and also the members for the cordial support and co-operation given him during his administration, and extended thanks particularly to Mr. W. H. Searles for advice and assistance given him. A vote of thanks to the retiring officers for their labors and devotion to the interests of the club during the year was unanimously carried.

INDUSTRIAL NOTES.

The puddlers at the Wheeling Steel and Iron Works at Benwood, W. Va., on March 17th accepted a reduction to \$4 per ton in wages. About 600 men returned to work this week.

All the departments of the Pennsylvania Steel Works, Steelton, Pa., resumed operations March 19th for the first time in three months. More than 4,000 men went to work.

The differences between the management and the employees of the rolling mill of the Roanoke Iron Company, Roanoke, Va., have been adjusted, and work there was resumed March 19th.

An order for Mason air brake regulators has been given by the Belgian State railroads to the Mason Regulator Company, Boston. A large number of Mason regulators was shipped to Australia recently.

Furnace No. 2 of the Carrie blast furnace plant at Keating, Pa., was blown in on March 19th, and will cast iron by to-morrow. The furnace has been out of blast for nearly 10 months. During its idleness it has been improved and repaired.

The American Mineral Wool Company has been chartered in New York with a capital of \$21,000. Frederick H. Prentiss, of Chicago, Ill.; Charles H. Rockwell, of Cleveland, O.; Wallace C. Andrews, W. F. Weiss, Bailey Whipple, Henry Franz and W. J. Townsend, New York City, are directors.

The mills of the Pennsylvania Bolt and Nut Company and the East Lebanon Rolling Mills, at Lebanon, Pa., resumed March 19th, the men going back at the reduced scale of \$2.50 per ton. The Lebanon Iron Company's men accepted a reduction of \$2.75 a ton for puddlers, and the mill resumed the same day.

The Coronet Steel Company has been incorporated in Baltimore by Wm. O. Saville, Irving A. Buck, Henry G. Turnbull, Jr., Pierce B. Wilson, John E. Semmes, Albert C. Isaacs, Edgar K. Legg and Jacquelin M. Buck. The aggregate capital stock is placed at \$250,000. The company proposes to manufacture steel under a new process.

A dispatch from Easton, Pa., says that the Ingersoll-Sergeant Rock Drill Company, which recently moved its big plant to that place from New York, has decided to erect another brick structure 160 ft. long and 100 ft. wide. It will be used for machine work. This will be put in operation as soon as completed, giving work to over 100 new hands.

The Shickshinny Tube Company, of Shickshinny, Pa., capital \$40,000, has been formed for manufacturing seamless drawn copper, brass and bronze tubing. The directors are: R. M. Tubbs, N. B. Crary, E. W. Garrison, M. H. Arnold, A. W. Stackhouse, C. W. Buckley, G. M. Beadle, E. S. Stockhouse and J. J. Richards, of Bloomsburg, Pa.

The Stedman's Foundry & Machine Works, Aurora, Ind., have just closed a contract with the Tennessee Coal, Iron & Railroad Company, Tracy City, Tenn., and Birmingham, Ala., for a coal disintegrating plant of 50J tons daily capacity, including one 60-in. Stedman coal disintegrator and one pair of 14 x 16 in. cylinder engines. This machinery is for disintegrating the coal to a uniform fineness, to improve the structure density and uniformity of the coke made from this coal.

The New Jersey Zinc and Iron Company, at Newark, N. J., has placed the order for the iron roofs on their new buildings with the Berlin Iron Bridge Co., of East Berlin, Conn. The furnace room will be 50 ft. wide and 400 ft. long, made entirely of brick and iron. The engine-room, fan-room and boiler-room will be 60 ft. wide and 187 ft. long, the engine-room covered with slate, and the fan room and boiler-room with corrugated iron. The Philadelphia Gas Improvement Company has also placed the order for the iron roof over the new coal shed with the Berlin Iron Bridge Company.

MACHINERY AND SUPPLIES WANTED.

If any one wanting machinery or supplies of any kind will notify the "Engineering and Mining Journal" 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.

The total exports of mineral oils from the United States in February are reported by the Bureau of Statistics, Treasury Department, at 81,734,352 gals., an increase of 32,556,118 gals., or 66.4%, as compared with February, 1893. For the eight months of the fiscal year, from July 1st to February 28th, the total exports were 612,780,443 gals., an increase of 20.3% over the preceding year.

ALABAMA.

Cleburne County.

(From our Traveling Correspondent.)

Hicks-Wise.—This property has been idle since last summer when the option lease held by A. N. Turner, of Colorado, expired, without any sale being perfected owing to the depressed condition of finances; but negotiations have been opened again with the owners by an experienced metallurgist, who proposes, if he can perfect arrangements, to repair the 10-stamp mill on the property, and at once commence active mining and milling operations.

Red River Gold Mine.—Last week some Ohio capitalists who are interested in the Blair Mining and Milling Company and own the mining property known as the Red River Gold Mine near the base of Turkey Heaven Mountain on the northwest side, visited that property and made arrangements to continue prospect work under the superintendence of Colonel Febr, of Cincinnati. This work had been discontinued during the winter, but the owners proposed developing sufficiently to determine the advisability of erecting a plant for treatment of the ore. No attention had ever been paid to this property until last fall when Colonel Febr purchased it for his company, and by prospecting has determined its value. The same company is also prospecting at other points in the same vicinity, which is near the Hicks-Wise mine; where the ore body has been sunk on 122 ft., the deepest workings on any mine in the state.

ARIZONA.

Yuma County.

Golden Eagle.—The opening of this mine in connection with the new developments in the Gold Hill, the double compartment working shaft, the 10 additional stamps to the mill—now 40—and other enlarged facilities, the former production of \$50,000 per month will be increased, says the Yuma "Sentinel." Several important discoveries have been made in Harqua Hala lately, chief among which is the Delhi claim, near Harrisburg. Charles Hall, of Goldfield, is continuing his developments on the Quinn Brothers' mine, an extension of the Bonanza. The Delhi property, adjacent to the Bonanza, is being worked on bonds, and the transfer will probably be made.

CALIFORNIA.

Amador County.

Albany Gold Mine, Jackson.—At this company's property the Astoria tunnels leading from the crosscut north and south are being extended on vein matter, the face of some carrying stringers of quartz which give low assays.

Amador Queen No. 2, Jackson.—The nine tributors who have leased the Amador Queen No. 2, have their ore bin full of ore and are repairing one battery of the mill; they expect to commence crushing in a short time.

Hardenburg Mining Company.—According to the Jackson "Ledger", the north drift of the 800 ft. level in this property is being advanced. The ore chutes so far encountered are very short. There is considerable virgin ground yet unexplored.

Butte County.

According to the Oroville "Register," the mining outlook in Butte County is bright. The Standard Company will build a new mill next month. The Banner mill will be ready to begin crushing quartz in a few weeks. The Palo Alto has a good ledge and will employ a large number of men. The Mascot is paying well. The Phoenix at Hurlston is doing well and work is being pushed with energy on the Pactolian. The Forbestown mills will all be running on full time as soon as the weather is better. The mines at Gravel Range will be extensively worked this season. There is a rumor that the Pershbaker will be opened and worked during the spring. The Bangor mines are turning out a good deal of gold. On the Lumpkin ridge there will be a very active season and on the Mountain House ridge everything looks promising.

Calaveras County.

The Calaveras "Prospect" thinks the mining prospect never looked brighter for the Angels district than it does at present. Outside of the Utica, Stickle and Tullock, which are keeping their product up to the standard, numerous other mines are developing into paying properties. The old Gold Hill mine, at Smith's Flat, is again proving its richness after some time of unproductiveness. The Carson Creek mine, better known as the Jones mine, has struck very rich rock. The mill has not been running for some time, but 20 stamps have been added to it and the work of sinking and exploring has been pushed. The result of this work has been to develop some of the richest rock ever found in the mine. The monthly output of gold is increasing.

Sheep Ranch.—According to the Calaveras "Prospect" this well-known mine, which for over 20 years has been a bullion producer, has closed down and

its future is doubtful. A recent strike encouraged the belief that the mine had not been worked out, and preparations had been made for a winter's run, but the last storm caused such a flood of water that it was found impossible to keep the lower levels clear. The pumps have been taken out and the mine allowed to fill with water. It will be a big undertaking to clear the mine again, and very likely it will never be done.

Nevada County.

Nevada City.—The drain tunnel, upon which work has been going on at this mine in Nevada City for some time past, has been completed and the work of opening a station on the 500 level has been commenced, says the "Transcript." When this is finished the shaft will be sunk another 100 ft. The mine is said to be looking well throughout.

Placer County.

Mayflower Gravel Mining Company, Forest Hill.—A bullion shipment valued at \$5,600, the result of a two weeks' run, has been received at the San Francisco office of this company.

Riverside County.

Santa Rosa.—The main shaft on this mine, near Perris, is now down 225 ft. A station has been established at that point, and from it a force of men is at work night and day, drifting north and south. Between the upper level, at 125 ft., and the lower level the vein has enlarged from 2 to over 3 ft., and a good grade of ore is said to be exposed the entire distance.

San Bernardino County.

There never was a time in the history of our gold mines, says the Needles "Eye," when the prospects were as bright as at present. The new work done during the winter is opening up some fine properties. Considerable excitement prevails at Needles over the new gold fields at Goldstone. Assays from five claims run very high in free gold. Good strikes are also reported from the desert country 60 miles from San Bernardino.

Siskiyou County.

Siskiyou Coal Mine.—This mine at Willow Creek, near Ager, shows some good coal prospects lately, with steady improvements in the tunnels as the work progresses. At present a ledge of coal has been found, over 34 in. thick and suitable for blacksmiths' use.

Shasta County.

Bully Choop, Redding.—The cost of mining, milling and chlorinating at Bully Choop, according to the Shasta "Democrat," is \$3.50 per ton of raw ore. The milling and concentrating plant at Bully Choop handles 30 tons per day, and the whole plant represents an expenditure of about \$20,000. The mine is a large producer of good ore, and the capacity of the plant will probably be increased within a year.

Gladstone Mining Company, French Gulch.—The superintendent of this company writes us to correct an item concerning the property which appeared in the "Engineering and Mining Journal" of March 3d. He says: The Gladstone mine has produced yearly one-fifth of the total product of Shasta County, as shown by the report of the director of the mint in San Francisco. Twenty stamps are running continuously and 20 more stamps will be added in a few weeks; also a chlorination plant, using the Thiess barrel process very successfully. We are employing about 70 men at the present time, using electric drills.

Stanislaus County.

La Grange Placers.—The placers near La Grange have long been supposed to be exhausted, says the Modesto "Herald," but H. L. Dominici and Eli Leach have found a strip of ground on the north side of the Tuolumne River about a third of a mile long by 150 yards in width, with the bed rock from 15 to 20 ft. down. The finders are mining the deposit by the old-time flume washing process, and the surface earth is said to be yielding at the rate of 12 cents to the wheel-barrow load, the pay increasing as depth is attained.

COLORADO.

Clear Creek County.

Bellevue-Hudson Mining Company.—An important suit involving valuable mining property in Clear Creek County was begun in the United States Circuit Court at Denver, on March 10th. William T. Phillips claims that the Bellevue-Hudson Mining Company has taken ore of the value of \$75,000 out of certain claims belonging to him and he sues to recover that amount. The properties of the parties to the suit adjoin, but Phillips sets forth that he located the Congress and the Prince Albert lodes before any of the claims of defendants were located. About six of the latter claims run into his, and the contention is that the ore taken out by the company is not from veins on their property. The plaintiff's attorneys are of opinion that defendant was not permitted to come within plaintiff's side veins. The question has not, it is said, been passed upon in this State.

El Paso County.

The miners' strike at Cripple Creek and Altman over the question of an 8 or 9 hour day became so threatening on March 17th that Sheriff Bowers called upon Governor Waite for troops. Ten companies of militia were ordered to co-operate with the county officials in preserving order. The militia was recalled by the Governor on the 19th, the miners having agreed to submit to arbitration.

Work Mining Company.—On March 14 a controlling interest in this company passed from F. H. Pettigrell to W. P. Bonbright, J. J. Hagerman and J. Arthur Connell. The price named is 5c. per share. This property has been closed down for over a month but will now, it is said, be developed systematically. The underground survey of the Anaconda tunnel has just been completed. The tunnel is now in over 1,000 ft. It will be pushed directly in for 50 ft. more, a crosscut to the right will then be made to strike the Rustler vein, and 100 ft. to the left to catch the Anaconda vein.

Lake County.

Big Six Mining Company.—Another gold strike has been made in the gold belt at Leadville, in the Nettie Morgan shaft of this company, on Brece Hill, near the Brece iron mine. Of late years the company's three claims, which cover 14 acres, have been worked but very little. The company owns the Big Six, Little Prince and Nettie Morgan. Last summer parties leased and began developing the Nettie Morgan, sinking a shaft 200 ft. There had been several drifts run and bodies of ore blocked out, but no shipments made. The ore runs as high as 3 oz. gold and 200 oz. in silver. The present strike is very rich in gold. No assay returns has yet been given out. The ore body is 8 ft. across.

(From our Special Correspondent.)

Garbutt.—These people, it is understood, have passed through the first ore body encountered several weeks ago, and are now in the second contact.

Golden Eagle.—Walsh and Slavin have secured a lease on a portion of this property. The shaft is down 150 ft. in contact, this contact being a decomposed porphyry and quartz.

Humboldt.—These people are not shipping at present, but are sinking a winze about 170 ft. from the shaft to explore the formation at a greater depth. All ore in sight carries gold in paying quantities.

Leadville Gold Belt.—Great interest is being manifested in the Brece Hill section, now commonly known as the Leadville Gold Belt. The opening of spring, which is now near at hand, will see Brece Hill covered with gold miners and properties that have lain idle for years will be developed for their gold resources. Prominent mining men and mining engineers predict a most active season of gold explorations with assured good results.

Leases Closing Up.—Owing to the low price of the white metal a large number of lessees have been compelled to close down. Many lessees have been working at a loss all this month in hope that silver might at least go up enough to clear their expenses. They have become tired of waiting and are now closing down and looking for gold properties.

Little Vinnie.—This shaft belonging to the Golden Eagle Mining Company is now shipping 30 tons daily of very excellent lead ore, and an increase in shipments next month is announced.

Lost Canon.—Some very good strikes have recently been made in what is known as Lost Canon, a new district lying about six miles above Granite. The formation of the new district consists of a granite country rock which is interlaced with fissure veins and porphyry dykes. Some of these dykes assay from \$2 to \$5 a ton gold, and if handled by a suitable process can be made to pay handsomely. Of the fissure veins that are opened there are at least sixteen that assay from \$40 up per ton. There are six of these ready to begin shipments as soon as spring opens. All these veins have been opened up since August, 1893, and they show from four to ten inches of high grade gold.

Mineral County.

Chloride Mining Company.—This company, with a capital stock of \$100,000, has filed articles of incorporation. It proposes to conduct a general mining business in Mineral County. The principal office of the company is in Denver, with a branch office at Creede. The directors for the first year are Edgar P. Hershey, Cassius R. Manning, Henry N. Lee and William Thom, of Arapahoe County, and E. R. Mosher, of Mineral County. The company at present owns Chloride lode in Mammoth Mountain, near D. H. Moffat's Mammoth lode claim, and is at work developing it.

Pitkin County.

Bonnybel Mining Company.—In the Court of Appeals, at Denver, on March 14, the case of J. J. Hagerman vs. John C. Bates was argued. This case involves the ownership of ore valued at about \$350,000, taken out of the shaft of the Little Giant, but supposedly belonging to the Bonnybel Mining Company, whose property adjoined. A contract for delivery was drawn up, covering the transaction and it is to enforce specific performance that suit is brought.

Saguache County.

Midnight.—Olson and Jonson have resumed work on the Midnight Sun lode on Treasure Mountain, about a quarter of a mile north of the Eureka extension. The croppings have assayed \$14 in gold and not quite an ounce in silver. Its closeness to the Eureka, from which such high gold assays have been reported increases interest in that section of Creede and it will be given careful attention.

FLORIDA.

Citrus County.

Orange Canal and Transit Company.—An Ocala despatch states that Charleston capitalists have se-

cured an option on this company's canal running from Panasoffee Lake to Floral City, for which they are to pay \$300,000 and agree to continue the canal to Inverness and make it navigable. It also states that the bottom of Floral Lake at Inverness is a bed of hard-rock phosphate, and the syndicate has filed all the necessary papers with the State authorities to control the mining of same in connection with the canal. They will not only partially drain Floral Lake, but use the canal as a means to transfer their rock via Lake Panasoffee to the Florida Central & Peninsular Railroad.

GEORGIA.

Lumpkin County.

Hand.—Mining operations at this mine were resumed last week, says the Dahlonega "Nugget," and the 20-stamp mill is now running on full time, 24 hours a day. The ore is being sluiced into the mill with water from the cut above the mill. J. H. Hughes is foreman of the cut.

Yahoola.—The 20-stamp mill at this mine was started up last week by the company after a shutdown of several months.

McDuffie County.

Georgia Mining Company.—The stockholders held a meeting in Augusta recently, and elected Lyman B. Goff president and Geo. R. Stearns secretary and treasurer. This company has options on about 1,500 acres of mineral lands in McDuffie County upon which it has expended a large sum of money during the past year. The company has sunk shafts in several veins, and is now taking out ore from the 100-ft. level, and at the same time sinking working shaft to a depth of 200 ft. Steam appliances are used for pumping water, hoisting, etc. Work is carried on night and day, about 25 men being employed. J. H. Huntington, who has had experience in mining in Colorado, New Mexico and California, is in charge at the mines. Several hundred tons of the ore are now being tested, and if the tests are satisfactory it is the intention of the company to erect a large crushing mill with the most approved apparatus for extracting the gold.

IDAHO.

Ada County.

Dynamite.—This claim and five others, forming a group on Willow Creek, near Boise City, have been bonded to Denver parties for \$210,000, according to a dispatch. These claims have their chief value in gold.

Golden Star.—A cross-cut in this mine, near Boise City, last week struck a vein which assays well in gold.

Lemhi County.

(From an Occasional Correspondent.)

Yellow Jacket Gold Mining Company.—This company has just completed its winter operations. Judge Julius Thompson, of Denver, Colo., a large owner in the property, has, since September, 1893, personally superintended the rebuilding of the stamp mill, the extension and enlargement of the water ditch, and the construction of a 400-ft. flume in connection with it, whereby the water power has been increased to 120 H. P. The developments on the mines have been extensive, and at the present writing the vein belonging to the company has been explored for a length of 2,000 ft., and three main levels have been driven on the vein, the lowest at a depth of 650 ft. The average width of the pay streak is over 20 ft., the output averaging about \$12 saved on the plates at the mill. The mine, with its present developments, is capable of sustaining a production of 150 tons a day, allowing for continual increase in the reserves; the company owning a little over 6,000 ft. on this vein. It is the purpose of the company, on June 1st, to receive bids for an addition of 40 stamps to go on the property; the present capacity being 40 tons a day. The mill is situated at an altitude of 6,000 ft., the workings of the mine being connected with the mill by a 300-ft. Huson tramway. The properties are situated at Yellow Jacket, which is 130 miles distant from Ketchum, and 125 miles from Red Rock, which are the nearest available railroad points. The general offices of the company are in New York City; W. M. Tuttle, treasurer. The company, during the past year, has cleared off its indebtedness arising from the purchase of the mine and improvements. Mr. Chartier and several other mining experts, representing a French syndicate, propose visiting the mines in June, for the purpose of completing a report on the same.

Owyhee County.

De Iamar Mining Company, Limited.—The following is the return for the month of February: Crushed during the month 3,091 tons; bullion produced in the mill, \$70,041; estimated value of ore shipped to smelters, \$12,000; miscellaneous revenue, \$295; total revenue, \$82,336; total expenses, \$36,197; profit for the month, \$46,139.

Shoshone County.

Bunker Hill & Sullivan Mining Company.—The Reed tunnel is now 3,000 ft. long, westerly from the gulch, and is still being driven ahead at the rate of about 80 ft. per month. This has opened a good body of ore within the past 400 ft. on which stoping will shortly be commenced. A shaft is being sunk from the Richmond tunnel level through this ore body to connect with the Reed tunnel. A new electric hoist is being erected in this portion of the mine. There are now about 330 men employed at the mine and mill.

Frisco.—This mine is running steadily without interruption of any sort, turning out about 15 cars of concentrates weekly, says the Wallace "Miner." A late change at the mine is replacing the work of six men by the labor of two mules, which are used for tramming. Nearly all the power required at the mine and concentrator is furnished by the splendid water power possessed by the company. The mine now furnishes employment to about 120 men.

Gem.—This mine started up last week with a small force, which will be gradually increased.

Tiger.—This mine, at Burke, has started up again says the Wallace "Miner," and is now employing about 50 men in mine and mill. The latter has been running since last Monday week, but only on the day shift. They are running through about 70 tons of ore daily, resulting in about 15 tons of concentrates. Two shifts are working in the mine. In addition to the stoping in progress they are now sinking the main shaft from the seventh level.

ILLINOIS.

Schuyler County.

Pea Ridge Coal Company.—This company has secured coal leases covering 2,500 acres of land near Rushville.

INDIANA.

Sullivan County.

Linton Coal Mines.—These mines have closed down for the present, the company claiming that it is impossible to compete with other districts at present prices.

IOWA.

Wapello County.

Harrison Coal and Mining Company.—This company has been organized to open and operate coal mines. The office is at Wapello.

MAINE.

Piscataquis County.

Monson Slate Company.—At a meeting of the stockholders in Monson, last week, it was voted to authorize the directors to purchase the entire Merrill Slate Quarry property in Brownville. The exact amount to be paid for this property is not known but it is probably about \$300,000. It is believed that this consolidation of the most important quarries of Maine will result in an enlargement of the business both at Monson and Brownville.

MARYLAND.

Allegany County.

The wages question in the Cumberland region seems to be generally settled by the acceptance of 45 cents a ton for mining, with some allowances. The new scales will take effect April 1st.

Garrett County.

Local papers report the discovery of an outcrop of a vein of coal 13 ft. thick on the Johnson farm, four miles west of Frostburg. It is on the western slope of Little Savage Mountain, and is thought to be a continuation of the Northampton vein.

MICHIGAN.

By a decision made in Washington, March 9th, by Commissioner Lamoreaux, of the general land office, the title to about 69,000 acres of land entered and now controlled by various corporations in Michigan is declared defective. Chief among these corporations is the Portage Lake & Lake Superior Ship Canal Company. The company secured the grant as a bonus for constructing the canal across Keweenaw Point, which it afterward sold to the government. The act under which the grant was made expressly excluded any lands classed as "mineral." In making its selection, however, the company seems to have ignored this proviso and to have taken lands distinctly classed as mineral. Holdings of the Michigan Land & Iron Company and other corporations are also being investigated. The titles of many of the iron mines developed in recent years are affected by the prospective contest. The decision will be passed on by the Secretary of the Interior, and the case will probably be taken to the courts in some form.

Copper.

Atlantic Mining Company.—The February output was 221 tons of copper.

Buffalo Mining Company.—This company is steadily increasing its working force. A short time ago work was resumed in No. 2 Queen shaft with a force of between 15 and 20 men. Since then a few more men have been added each week, until now the force numbers about 75.

Calumet & Hecla Mining Company.—The new carpenter shop at the mine is rapidly approaching completion. The building is 148 x 45 ft., and has a wing 50 x 28; is one story high, and has a basement. A new band saw has been put in, and the building is wired for incandescent lights.

Franklin Mining Company.—The production of copper in February was 174 tons.

Gold—Marquette County.

Lake Superior Iron Company.—This company, says "Iron Ore," is treating about half a ton of gold-bearing quartz at its mining location. The rock is that obtained some time since at the Superior gold mine, upon the lands of the Lake Superior Company. Mr. Julius Stopes is looking after the work. He has constructed a rocker, has the regular riffles and blankets, and besides has a copper plate that

saves the fine gold by amalgamation with quick-silver. The blankets take up the greater portion of the coarse gold, and present a very pretty sight after a few hours' operation of the rocker. They have a small Gates rock crusher to reduce the quartz, the latter being fed from a hopper in the rocker.

Iron.—Marquette Range.

Lake Superior Iron Company.—This company has arranged for the use of Nos. 1 and 4 shafts at the Winthrop mine. These will be used in developing the ore body at Section 21. The Winthrop at this portion of the company's property has been abandoned.

Osceola Mining Company.—The production of the mine for February was 320 tons of copper.

Quincy Mining Company.—The product for February was 701 tons of copper.

Quincy Mining Company.—The E. P. Allis Company, of Milwaukee, Wis., has contracted to erect a new hoisting plant at this mine, Hancock, Mich. The engine will have a pair of 52 x 84 in. cylinders. There will be a separate engine, 16 x 30 in., for working the brake, and another engine, 14 x 24 in., for operating the reversing gear. The winding drum is to be of steel, 26 ft. in diameter and 15 ft. face, with two brake bands, each 15 in. wide. The construction of the drum will be interesting. The shaft will be 26½ in. in diameter and 28 ft. long. On this will be keyed a heavy hub, 7 ft. in diameter, from which three sets of spiders will radiate, each having 12 arms made of 7½ in. steel tubes, with their outer ends secured in a cast steel rim. On these rims will be riveted 1-in. steel plates, which will form the surface of the drum, in which the grooves will be cut. The rope will be of steel, 1½ in. in diameter at first, will be increased to 1¾ in. as the depth of the shaft requires it. The arrangement is such that the drum will be continually full of cable. As the rope of the descending car reels off from the upper surface of the drum, it is followed up immediately from the under side by the cable of the ascending car. The weight of the rope on the drum will be 22 tons. The engine is guaranteed to hoist a load of 10 tons at a speed of 2,500 ft. per minute. The engine will be provided with a special safety stop mechanism, which will shut down and stop the cars within a space of 40 ft. when at full speed, in case the engineer should neglect to stop the engine at the proper time.

Tamarack Mining Company.—The production for February was 910 tons of copper, against 900 tons in January.

Wolverine Mining Company.—For the month of February this company reports a production of 72 tons of copper.

Iron—Menominee Range.

Vulcan.—The discovery of a body of ore at the West Vulcan in territory supposed to be barren is a matter worthy of some comment, says the Norway "Current." At this time there are two jasper formations running in the same general direction, the distance from each varying from 400 to 200 ft. Some time ago a crosscut was begun from the north vein to the south at a point when the two formations were about 200 ft. apart, and where it would pass under No. 2 shaft, which is an inclined one between the two veins. After cross-cutting in the jasper slates about 90 ft. a lens of Bessemer ore was struck. The size of this lens is so far matter of conjecture, the more so because of its peculiar position, but Capt. Bond feels very hopeful that the present width of 7 or 8 ft. will be materially increased.

Iron—Vermilion Range.

Minnesota Iron Company.—This company, it is stated, has sold Canton and Iron King ore at the price of \$2.25 per ton, ore delivered on dock at Lake Erie ports. The Canton ore is what may be termed a second grade Bessemer, and the product of the Iron King that has been sold is of the same grade. The same company has disposed of Chandler mine ore, on the Vermilion range, for \$2.90 per ton.

MISSOURI.

Audrain County.

Farber Coal Company.—This company has filed articles of incorporation to open and operate coal mines near Farber, in which town the headquarters of the company are located.

Jasper County.

(From our Special Correspondent.)

JOPLIN, March 19.

The mines of this lead and zinc mining district made a large production of ore during the past week, but the market opened with a reduction in the price of zinc ore. The smelters are reported to have a surplus stock of zinc ore on hand and can now bear the market, and the operator must concede to the smelters' terms or hold his ore. The average price paid for zinc ore in the district was about \$18 per ton, while some sales were made early in the week at \$19.50. Owing to strong competition the lead ore market advanced from \$17.50 to \$18.25 per thousand, and the general feeling is that there will be a strong advance this week.

Following are the sales of ore from the different camps: Joplin, 1,275,310 lbs. of zinc ore and 335,420 lead, value \$17,631; Webb City, 685,310 lbs. of zinc ore and 45,970 lead, value \$6,995; Centerville, 945,150 lbs. of zinc ore and 173,440 lead, value \$11,648; Zinc-ite, 6,280 lbs. of lead ore, value \$117; Oronogo, 54,590 lbs. of zinc ore and 64,200 lead, value \$1,229;

Galena, Kan., 1,360,000 lbs. of zinc ore and 236,400 lead, value \$14,083; district's total value, \$51,695. Peoria, I. T., 23,090 lbs. of zinc ore and 30,960 lead, value \$638; Newton County, 512,520 lbs. of zinc ore and 53,250 lead, value \$5,316; Wentworth, 36,960 lbs. of zinc ore, value \$332; Aurora, 840,190 lbs. of zinc ore and 177,070 lead, value \$8,086; lead and zinc belt's total value, \$66,067.

The new mining district of Spring City, five miles south of Joplin, is very active and producing a large amount of ore. With the opening up of the fine weather considerable prospecting is being done and some new strikes made. McAntire & McKee have recently developed up a prospect that they opened last fall, and now have a steam plant in operation and producing 20 to 25 tons of ore per week. Morrow & Sherwood's mine still continues to be the leading producer and are reported to have a large amount of ore in sight. The Badger Company is still producing a large amount of lead and some zinc ore.

MONTANA.

Beaver Head County.

Jay Hawk & Lone Pine Consolidated Mining Company.—The recent cessation of operations on the company's properties was due to the breaking of the dam which furnishes motive power for the mill, and operations will be resumed as soon as the necessary repairs can be made. The company has in its employ nearly 100 men. It is stated by the Butte "Miner" that the company is producing, mining and milling the white metal at a cost of less than 35 cents per ounce, but the authority for this statement is not given.

Deer Lodge County.

A very rich mining district in Deer Lodge County, known as Granite Butte, has recently been opened up. It is situated about 13 miles from Marysville, and already about 75 men are working in the camp. Murray brothers, Joe Villard, N. Des Rosier, Joe Gilbert, George Frost, L. L. Lush, Hartmiller brothers, Dick Lahay and others are the principal owners of the claims that have been so far opened up. It will become a great camp in a few months.

Galt Coal Company.—The trouble between this company and its miners has been settled by a compromise, and work will be resumed at once.

Gloster.—This mill is still idle, says the Anaconda "Standard." A. J. Seligman, of Helena, owns the property, and he has recently given to Lanley & Sheard a right to work the tailings. Some 20 men are now employed by them. The tailings will be worked by the cyanide process.

Jay Gould.—It is understood that the Jay Gould mine and mill has been purchased or bonded by the Granite Mountain Company, of Granite. It is a valuable property, rich ore enough in sight to run the 30-stamp mill some time.

Jefferson County.

Elkhorn Mining Company, Limited.—The following is the return for the month of February: Mill worked 26 days and crushed 930 tons; bullion produced in the mill, \$21,430; 183 tons of smelting ore sold, \$11,034; total produce, \$32,464; total expenses, \$21,700; estimated profit for the month, \$10,764. The directors have declared an interim dividend of 9d. per share, free of income tax, for the three months ending February 28th, 1894. Dividend warrants were posted March 22d to all shareholders registered on the books March 3d.

Katie Mining Company.—This company will commence work on a concentrator at the mine, near Basin, in April. The building will be 70 by 100 ft., with an addition 30 by 20 for a wheelhouse. The capacity of the plant will be 150 tons a day, but the building will be so arranged that the capacity can be doubled at any time that it is found necessary. There will be six sets of Frue vanners, jigs, crushers, rolls, separators and trummels. Electric power will be used at both the concentrator and the hoist, and the electricity will be generated by water power from the Boulder River. Engines will be provided, however, for use in case of a break. The plans for the concentrator were prepared by G. F. Bartlett, of Butte, formerly superintendent of the Parrot concentrator, and J. L. Buskett, assayer for the Katie company. The Western Iron Works, of Butte, will furnish the machinery, and the plant will be in operation in about six months.

The following notes of the Basin district are from the Basin "Times":

N. B.—This mine is away up on the Cataract, close to the Manchester. It is owned by Mike O'Donnell, of Basin, and Thomas McDonald, of Cataract. It has an average lead of much promise. The ore carries gold, silver and other minerals.

North of N. B. is the Juniper, Carbonate and the Morning Star, all on the same ledge and owned by Thomas McDonald. The ledge crops out prominently all along the surface, and is from 14 to 36 ft. wide. The average assays from these claims showed \$10 in gold and 13 oz. in silver. There has been but little development done on any of them, but the surface indications are as good as any in the district.

Wolverine.—This mine is the property of Sam Moore, Pat Bahan and Mike Farley. The lead is 4 ft. wide, and averages \$9 in gold. There is a streak 1 in. wide on the footwall that runs rich in gold. The claim is in an almost inaccessible locality. There is no road or trail, and one has to scramble as best he can up the steep mountain side. It is ex-

pected a road will be made this spring up Cataract Creek.

Lewis & Clarke County.

The following items are from the Marysville correspondence of the Anaconda "Standard":

A big strike has been made in the Tansley district, about four miles from Marysville. While Wallace Birkhead and Warren DeCamp were working in an abandoned shaft on the Tansley lode they encountered a lead or pocket rich in gold. The owners of the property are Hon. C. E. Dudley, William Muth, of Helena, and Jim Sullivan, of Marysville. The extent of the find is not yet fully known.

Belmont.—This mine and mill that have been idle for the past eight months, are soon to change hands, and will start up in April under new ownership and management. This mine has been a rich producer in the past.

Big Ox.—This mine is the only silver proposition in this vicinity, and though they have some very rich rock on the dumps the management claims that it will not pay to work the mine at the present price of silver. The mill is now leased to the St. Louis Mining & Milling Co.

Piegan.—This mine is still idle and no sound of the miners' pick is heard in the mine. This is a very reliable property, the lowest assays being \$39 per ton and running from that figure up to \$500. Dissensions among the officers of the company keep it out of the market and prevents it being worked.

Madison County.

Golden Reef Mining and Milling Company.—This company has been organized to operate mines at Norris. The main office of the company is in the Unity Building, in Chicago.

Silver Bow County.

Anaconda Mining Company.—At the Anaconda mines, says the Butte "Miner," all is running as usual, the Anaconda, Green Mountain and Mountain Consolidated mines supplying most of the ore at the present time. A hoisting plant of greater capacity than any of the mammoth hoists already on the hill will be installed on the High Ore shaft No. 2. A three-compartment shaft is being sunk under the direction of Sam Hull on this mine. It is understood connections will be made from this shaft to a number of mines in that vicinity, and most of the hoisting of ore will be done from this shaft. Three and four trains of ore are shipped daily from the hill and everything is running smoothly.

The retort room of the company was recently robbed of \$12,000 in silver bullion, but the thieves were caught and the silver recovered later.

Czarina.—Two sets of leasers are working on the Czarina mine. Maloney & Co. are taking out some gold ore of good grade.

Oneida.—T. M. Adams and others who have a lease on the Oneida mine at Butte are building a smelter to treat their own ore. It is understood to be the intention to make this smelter of about 40 tons capacity daily.

NEVADA.

Eureka County.

(From our Special Correspondent.)

Diamond Mining Company, Eureka.—This company having found it impossible to make their vein pay under the present low price of silver, have cut miners' wages down to \$2.50 per day, with the promise to restore the former rate of \$5 per day whenever the price of silver advances to justify them. Rumor has it that the company will be compelled to close down the mine as soon as they can safely do so. The main shaft of the mine is down 524 ft., with the bottom of it in shale and water to contend with. A drift is being driven on the 500 ft. level toward the limestone. When the limestone is reached there will be no danger of the water rising in the shaft to do any damage, and orders may be received at any time to close down the mine until the price of silver will justify them in resuming operations.

Eureka & Palisade Railroad Company, Eureka.—During the month of February this company received 820 tons of ore in transit to Salt Lake City, Utah, from the mines of Eureka District, as follows: From the Diamond mine, 531 tons; Eureka Consolidated mine, 140 tons; Jackson mine, 76 tons; Richmond mine, 40 tons; Hamburg mine, 23 tons; Whittenberg mine, 10 tons.

Received from Reveille, Nye County, 3 1/4 tons of very rich ore.

Storey County—Comstock Lode.

The Nevada mill has resumed the crushing of ore from the Chollar mine after a short shutdown.

The bullion yield of the Potosi mine for the past fiscal year was as follows: Total production, \$294,732.20; of this \$88,342.10 was in gold and \$206,390.10 in silver. The discount was 2%, or \$83,097.79; net returns, \$211,634.41; less cost of milling, \$91,849.35; net returns over cost of milling, \$119,785.06.

Consolidated California and Virginia Mining Company.—The official statement of the ore worked and bullion produced for account of this company during the recent crushing at the Morgan Mill shows that the quantity of ore worked was 632 tons and 1,390 lbs. The bullion produced was valued in gross at \$17,120.01, of which \$8,309.88 was gold and \$8,810.13 silver. The average yield of the ore per ton in bullion was \$25.04. The average assay value of the ore per battery samples was \$33.53 per ton.

Hale & Norcross Silver Mining Company.—The annual meeting of this company was held in San Francisco, Cal., on March 14th, and 105,390 shares were represented. N. T. Messer, W. Edwards, John W. Twigg, E. L. Parker, W. S. Lyle, Charles H. Fish and Herman Zadig were elected directors. Nat T. Messer was reappointed president; W. S. Lyle, vice-president; A. B. Thompson, secretary, and Joseph R. Ryan, superintendent. The company up to March 1st had \$13,069 in its treasury, or enough, as President Messer explained, to run the mine three months without necessity for an assessment, and there are besides 1,000 tons of \$30 ore at the mine available for reduction. Mr. Messer announced to the stockholders that the 26,451 shares of stock forfeited to the company for non-payment of the last assessment were sold in the open market and realized the net sum of \$23,365, or a profit of \$9,541 above the amount of the assessment upon that number of shares.

Potosi Mining Company.—At the annual meeting of this company held in San Francisco, Cal., on March 14, 101,869 of the 112,000 shares of capital stock were represented, and the old management was unanimously re-elected, the only change in the official staff being the appointment of Harry M. Gorham as superintendent of the mine, in place of A. C. Hamilton, who resigned. The directors are: A. K. P. Harmon, Thomas Cole, Thomas Anderson, E. P. Barrett and D. C. Bates. A. K. P. Harmon continues as president, Thomas Cole, vice-president, and Charles E. Elliott, secretary. The company has a cash balance on hand of \$1,059, and is collecting an assessment. Rich ore is said to have been struck on the 450 level of the mine.

Following are extracts from the latest weekly official letters of the superintendents of Comstock mines:

Alta Mining Company.—The raise has reached the height of 100 ft., and at that point we have started a drift south in the vein. This drift is now in 9 ft.; face in porphyry, clay and quartz. We are making a connection between winzes No. 1 and No. 2 at the depth of 24 ft., and saving a little ore of fine quality; average value of car samples, \$30 per ton.

Belcher Mining Company.—On the 850 level we have cleaned out and retimbered 30 ft. of the north drift, making its total length 195 ft. from the shaft. Fourteen tons of fair-grade ore has been hoisted during the week.

Chollar Mining Company.—The raise from the 100 level is connected with the surface, which gives good ventilation to that part of the mine. A winze has been started from the 100 level stope which is now down 28 ft.; bottom in porphyry and quartz showing streaks of pay through it. Extracted and sent to the mill the past week, 56 tons and 1,600 lbs. of ore from the 100 level. On hand at mill, 91 tons and 1,600 lbs. Average of car sample assays, \$18.58.

Consolidated California & Virginia Mining Company.—"1,650 level.—From the end of the crosscut running east, 63 ft. in from the drift run north from the east crosscut No. 1 from the north drift from the winze, down 52 ft., a north drift has been started and advanced 12 ft. in a porphyry, clay and quartz formation of low assay value. Have extracted in our workings in the vicinity of the winze, down 20 ft., 18 tons of ore assaying \$35.50 per ton. Have shipped to the Morgan mill 517 tons and 120 lbs. of ore, the assay value of which, per car samples, was \$36.08 per ton. The assay value, per battery samples, of the ore worked at the mill during the week (610 tons) was \$33.78 per ton. 1,000 level.—At a point 353 ft. south of the shaft station the upraise has been carried up 30 ft. The sill floor sets of the raise, as already reported, showed streaks and bunches of ore of fair value. In working upward we passed through the ore into quartz and porphyry assaying from \$2 to \$10 per ton. In the top of the raise openings the formation is porphyry, clay and quartz of some assay value. The east crosscut No. 2 started at a point in the southwest drift at a point 527 ft. from the shaft station, or 117 ft. north from the Best & Belcher connection, has been advanced 40 ft., passing through porphyry, clay and quartz formation of low assay value.

Crown Point Mining Company.—The connection between the southwest drift on the 600-ft. level and the northeast drift from the top of the 700-ft. level raise has been made, but it will take a few days longer to complete it. We continue to extract a few tons per week of fair-grade ore from the 300-ft. level, north stope.

Hale & Norcross Mining Company.—In working off from the winze below the 1,300 level we extracted, the past week, seven cars of ore, assaying \$18.12 per ton per car sample.

Justice Mining Company.—The Blaine tunnel has been sunk a total depth of 94 ft. and stopped. From the bottom we have started to drift north and south on the vein. The north side shows a width of 4 ft. and the south side 2 ft. of free-milling ore.

Kentuck Consolidated Mining Company.—On the 1,100 level the incline raise from the south for an air connection is up 18 ft. in quartz of fair grade, with bunches of good ore. Started in the 1,200 level a joint lateral drift with the Yellow Jacket running south in the west ledge; face in good ore of fair grade.

Potosi Mining Company.—We have not yet begun the work of crosscutting, sinking and upraising in the ore-vein on the 450 ft. level. It was deemed best by the management to first run on the vein some distance farther before starting this work. During

the last few days we have been drifting north in the vein toward the Chollar. The best showing, however, is toward the south or in the direction of the Bullion.

Savage Mining Company.—On the 1,050 level the east crosscut from the southeast drift started at a point 170 ft. from the station was advanced to a total length of 45 ft.; face in porphyry and quartz giving low assays. On the 1,100 level the west crosscut from the north drift started at a point 132 ft. north from the station was advanced to a total length of 169 ft.; face is in porphyry. The south prospecting drift from the 12th floor of this level was advanced to a total length of 55 ft.; the face is in quartz giving some fair assays. The south drift started in the east drift from the 15th floor was advanced 12 ft.; total length, 30 ft.; face is in quartz giving low assays. The south prospecting drift from the 18th floor was advanced to a total length of 40 ft.; face in quartz, some of which is being saved for pay.

Segregated Belcher & Midas Mining Company.—The raise from the south drift, 1,150 level, has been continued and connected with the drift on the 1,100 level, but it will require several days to properly enlarge and timber the connection. The top of the raise shows a width of from 2 to 3 ft. of fair-grade ore. The east crosscut from the foot of the raise is out 24 ft. The face is in exceptionally hard ground.

(From our Special Correspondent.)

The following is the weekly tabulated statement of ore hoisted from Comstock mines and milled, with the average car and battery sample assay values, bullion, shipments, etc.:

Mines.	Ore Hoisted	Car Sample Assay.	Ore Milled	Av. Bat'ry Assay.	Bullion for Week.	Total.
Alta.....	1	30.00				
Belcher.....	27 ²					
Con. Cal. & Va.....	18	38.50	610 ³	33.78		
Chollar.....	56	18.56 ⁴				
Hale & Norcross.	7 ⁵	18.12				

¹ Small quantities of ore being saved.
² Fair grade ore.
³ Car sample assay, 33.08.
⁴ On hand at the mill, 91 tons.
⁵ Cars of ore.

NEW MEXICO.

Grant County.

What used formerly to be known as the White Quartz Gold District, adjoining the Cow Springs District, is now being reorganized by the claim owners, and has been named the White Signal District, says the Silver City "Southwest Sentinel." A good many of the claims are showing up well, and promise to develop into good gold properties. There are 11 claims in the camp that would pay to work steadily now if there were a mill on the ground to treat the ore. As it is the ore has to be hauled all the way to Gold Hill or Hanover.

San Miguel County.

The New Mexico Mining Exchange has been incorporated at East Las Vegas, with the following officers: John Shank, president; C. Wiegand, vice-president, and Robt. L. M. Ross, secretary and treasurer. The exchange acts as a broker in the purchase or sale of mining properties. It will promote and organize mining companies.

NORTH CAROLINA.

Moore County.

Black Diamond Coal Co.—This company is now opening up the old coal mines at Carbondale which have not been worked since the war. Pumps have been put to work freeing the shaft from water.

OHIO.

Corrected returns received from Mr. R. M. Haseltine, chief mine inspector of the State, give the production of coal for the year 1893 as follows, in tons of 2,000 lbs.: Lump, 10,998,333 tons; nut, 1,920,602 tons; pea and slack, 1,800,983 tons; total, 14,719,922 tons. This is 193,129 tons, or 1.3%, in excess of the figure given in the "Journal" two weeks ago.

Columbia County.

Card & Prosser Coal Company.—This company has purchased the mine formerly operated by the Sterling Coal Company, near New Lisbon.

OREGON.

Josephine County.

Great Divide.—This claim, recently located by W. L. Bailey, joins on the west end of the famous "Mountain Lion" group of mines, and bids fair to be one of the most remarkable discoveries made in that district, says the Rogue River "Courier." The location is on the southwest side of the mountain, and extends down toward the noted placer mines of Hayes, Swinden and Custer, and has every indication of being the lode that furnished the large nuggets of gold found in these rich placers. At the point of discovery the ledge appears to be from 10 to 20 ft. wide, and carries a large per cent. of sulphurets, the value of which has not yet been determined.

PENNSYLVANIA.

Anthracite Coal.

The Buck Mountain vein of coal 7 ft. thick, was struck on March 19th at Hazleton, by J. S. Wentz & Co.

A case of much interest to miners and laborers throughout the anthracite region was decided at Pottsville on March 21st by Judge Bechtel. The suit arose over the action of the Leisenring Store Company which is run by Leisenring & Co., operators of a large colliery near Minersville, in deducting from the wages of James Delaney and S. C. Adams money due them for a store debt contracted during the previous month. Delaney and Adams were discharged by the operators on account of some misunderstanding, and when they went for their pay they objected to the store bills being withheld from their checks. The company refused to pay the full amount due and the suit followed. The jury brought in a verdict in favor of the plaintiffs under the act of 1881, which provides that the wages of miners and laborers be paid in lawful money of the United States.

About April 1st the Pennsylvania Canal will be opened for navigation. At the close of the year ended December 31st, 1893, the number of boats owned by the company in whole or in part was 255, of which 26 were condemned or abandoned during the year. There were 80 boats repaired at the company's yard during the year 1893. Of these 12 were partially rebuilt and 40 repainted. The average amount of repairs to each boat was \$88.84, as against \$76.91 in 1892. The company's boats transported during the year 1893, 176,145 gross tons of coal and 9,862 gross tons of lumber. The average tonnage of all kinds was 316,552 net tons. The steamer and barge were replaced by new boats at a cost of \$2,503.79. These boats are now in condition to be operated for 10 or 12 years at little expense for repairs. The repair docks have been partly rebuilt and are now good. On January 1st, 1893, the entire amount of the funded debt outstanding was 2,553 of the general mortgage bonds maturing 1910, of the par value of \$2,553,000, which amount remains the same.

The report of Mine Inspector John M. Lewis, of the Fifth Anthracite District, for the year 1893 is as follows: Total production, in tons, of coal, 6,239,068.10; total number tons shipped, 5,591,633.06; average number of days worked, 239.9; number of persons employed, 17,540; number of fatal accidents, 58; number of non-fatal accidents, 99; number of kegs of powder used, 106,224; number of pounds of dynamite used, 680,450; number of steam boilers used, 1,373; number of horses and mules used, 1,929; number of mine locomotives used, 90. As compared with the statement of 1892, there is an increase of 10 fatal and a decrease of 11 non-fatal accidents. There is also a material increase in the coal production, amounting to 396,343 tons. A peculiar feature of the report shows that while underground work becomes more dangerous with the increased openings the loss of life is greater on the surface, where the inexperienced labor is employed. This is confined largely to stripping operations.

Chamberlain Coal Company.—The engines contracted for with the Philadelphia Engineering Works are a pair of 34x60 in. Corliss hoisting engines, cut-off actuated by governor at designated speed. The drums will be 10 ft. diameter to wind 2,000 ft. 1½ in. steel rope, one drum fast, one loose; will be two years meshing into each other. There will be steam and foot brakes, steam reverse, etc. The winding speed will be about 1,000 ft. per minute. These engines follow good Western practice, but they will be somewhat new in the anthracite district. The boiler equipment will commence with 600 H. P. of Stirling boilers in 200-H. P. units, and will carry a pressure of 125 to 150 lbs. per square inch. Mr. Francis A. Pocock is superintendent in charge.

Silverbrook Coal Company.—This company, of Silverbrook, Schuylkill County, having exhausted the workings in the No. 1 stope mine, was preparing to remove the pillars, but has stopped operations and closed the stope at the suggestion of Mr. Wm. Stein, the mine inspector, who considers that the percentage of coal already taken out is enough, and that attempts at further robbing would be dangerous to the workmen.

Williams Coal Company, Duncanville.—This company is operating in the old Spencer slope, which was abandoned about 46 years ago. A little to the south of the Thurton tract lies the Ronaldson tract, where Reese G. Brooks, representing Scranton capitalists, will sink shafts, beginning work early in April.

Bituminous Coal.

A mass meeting, attended by 3,000 miners, was held near Phillipsburg on March 19th. The meeting was addressed by Thomas Bradley, president of the miners' district organization, and by local speakers. Most of the speeches were temperate in tone, and advised that the reduction be accepted for the present. A resolution was adopted accepting the reduction and giving notice to the operators that they may look for a demand for an advance in the near future, the idea of the leaders being to have a general strike for an advance in wages throughout the soft coal regions of Pennsylvania, Maryland, the Virginias, as well as in the Western States, just as soon as the men are sufficiently united.

SOUTH DAKOTA.

Lawrence County.

Iowa.—A test run of 65 tons of ore from this property was completed recently at the Columbus mill on Sawpit. The clean up gave an average of \$7 gold per ton. The property is situated at the head of Poorman gulch and is now owned by Henry

Frawley of Deadwood. The ore is free milling in character, and with present openings 200 tons per month can be extracted, says the "Times." This free milling ore is capped by a strata of silicious ore 10 ft. thick, carrying from \$18 to \$45 gold per ton.

Red Cloud Group.—Charles Story, of Central, has obtained an option for 20 days on the Red Cloud and Nancy Hanks claims, on Dead Dog Hill, belonging to Jos. Card and Chas. Weedon, the Pay Streak Nos. 1 and 2, the Burlap, the World's Fair and two others, all in one group. The consideration is understood to be nearly \$40,000, says the Deadwood "Times."

Thusnelda Mining Company.—At the annual meeting of stockholders of this company, held in Deadwood on March 13th, the following board of directors were chosen to serve for the ensuing year: Franklin R. Carpenter, Theodor Kuntzen, Carl Ahrens, Louis Walter and Hy. John Ainly. The property of the company is situated in Bare Butte mining district, and consists of 13 claims, about 140 acres in one body, extending from the Anchor mine westerly to Two Bit gulch, says the Deadwood "Times." The porphyry contact, in which the better grade of ores of the district are found, is plainly visible and extends the entire length of the group. In a short time development work will be resumed.

TENNESSEE.

Marion County.

Battle Creek Coal Company.—This company has been chartered to mine coal at Battle Creek. The incorporators are W. C. Houston, P. E. Faller, B. F. Patton, J. R. Winn and W. F. McDaniels.

Polk County.

(From our Special Correspondent at Chattanooga.)

Ducktown Sulphur, Copper and Ore Company.—This company has contracted for the building of 100 sheds for the purpose of roasting ore, and will also build another furnace. The company is now smelting 160 tons of ore per day.

Tennessee & Pittsburg Copper Company.—This company is also increasing its capacity and will in a few weeks begin the construction of a short line of railroad, running from Ocoee Station, on the Marietta & North Georgia Railroad, to the mines.

TEXAS.

Cherokee County.

Cherokee Iron Manufacturing Company.—This company's property was sold at public auction March 6th, to satisfy a judgment rendered by the Federal Court in favor of the Farmers' Loan and Trust Company, of New York. The furnace plant (including the site of 20 acres, situated midway between Rusk and New Birmingham; 440 acres of ore lands, pipelines and right of way from furnace to reservoir, 1½ miles distant; right of way and narrow-gauge track to ore beds same distance) was sold to Frank A. Daniels, of New Orleans, for \$32,250. The plant was erected in 1880 by the company. It went into blast in November, 1890, and was closed down in January following. In April, 1891, it was placed in the hands of a receiver, P. W. Dielman, of New Orleans being appointed under decree of the Federal Court. It was offered for sale last May at a price \$115,000, but there being no bidders the court ordered it sold to the highest bidder.

UTAH.

Salt Lake City.

The shipments of ore and bullion from Salt Lake City during the week ending March 10th were: Bullion, 588,650 lbs.; silver and lead ores, 2,197,440 lbs. The receipts of ore and bullion at Salt Lake City for the week ending March 14th were to the aggregate value of \$89,754, of which \$63,804 was in bullion, and \$28,950 was ore. The receipts of Pennsylvania bullion amounted to \$16,477; Hanauer bullion, \$6,100; base bullion, \$21,200; Ontario bullion, \$17,027.

Ore receipts were \$650 by Wells, Fargo & Co., \$12,700 by McCormick & Co., and \$15,600 by T. R. Jones & Co.

WASHINGTON.

The following is the production of coal in the year 1893 from the mines in the second district, composed of the southern half of the State, as prepared by Mine Inspector Joseph James: Carbon Hill, 267,545 tons; Wilkeson, 77,516 tons; South Prairie, 52,541 tons; Acme, 7,200 tons; Ouimette, 345 tons; Bucoda, 9,451 tons; Florence (Centralia), 1,423 tons; Eureka (Centralia), 1,000 tons. Total, 417,031 tons.

WEST VIRGINIA.

State Mine Inspector D. M. Harr of the First District has made his report to the Governor for the year ending June 30th, 1893. The following is condensed from the report: Notwithstanding the general stagnation in business throughout the country the almost total suspension for several months of the trade in coke, and some local troubles, including strikes, and unavoidable accidents, there has been a very satisfactory increase in the production of coal, and a slight increase in the production of coke in the First District over that of the preceding year. The production of coal was 2,782,970 long tons, 2,240 lbs., as against 2,427,662 last year, an increase of 355,308 tons. The production of coke was 364,373 tons, an increase of 16,148 tons.

There was one strike during the year in the district, in which were involved the mines in 'four

counties: Marion, Marshall, Ohio and Brooke. In Marion County the differences between the men and the operators lasted about two months and seriously curtailed production. In Marshall, Ohio and Brooke counties the strike extended over a period of about seven months. During said period operators in Pennsylvania and elsewhere secured the contracts for coal which had been sold from these mines, and their production was reduced to a minimum, and so still remains.

One mine, the Mountain Brook shaft at Newburg, Preston County, has been abandoned, and seven new ones are reported, viz., Blanche, in Brooke County; Glendale, in Marshall; King, in Marion; Briar Hill and Findlay, in Harrison; Thomas shaft, in Tucker; Pierce, in Mineral.

FOREIGN MINING NEWS.

BELGIUM.

Imports and exports of coal and coke in January were, in metric tons:

	Imports.	Exports.
Coal	113,000	3,800
Coke	25,000	75,000
Briquettes		45,000

Imports show an increase and exports a decrease as compared with last year.

BRITISH GUIANA.

The gold production of this colony, which was first reported 10 years ago, has grown rapidly. It is reported to us by Mr. Van Eswald, of the Surinaamsche Bank, as follows:

1884	250 oz.	1889	28,282 oz.
1885	939 oz.	1890	62,615 oz.
1886	6,578 oz.	1891	101,298 oz.
1887	11,906 oz.	1892	129,615 oz.
1888	14,570 oz.	1893	142,788 oz.

The production last year was almost 10 times that of 1888. The total output for 1893 was valued at \$2,542,506.

During 1893 the following companies were organized to work placer mines in the colony: Marima Gold Mining Company, \$300,000 capital, on the Arakaka Creek; Arakaka Placer Gold Mining Company, \$250,000 capital, to work placers operated by Messrs. Drayton & Cumtuis under the name of Barima Vale; Gold Fields of British Guiana, capital \$95,000; Barima Development Syndicate, capital \$30,000; Arakaka Development Syndicate, capital \$50,000; Warimba Development Syndicate, capital \$30,000; Manicura Development Syndicate, capital \$30,000; Bartley Gold Mining Syndicate.

The Kanimapoo Gold Mining Company, organized in March, 1893, with \$250,000 capital stock, is the first company to undertake quartz or vein mining. This company has ordered a 20-stamp mill, which will be the first in the colony.

The gold exports from January 1st to February 8th, 1894, were 6,731 oz., valued at \$119,676.

DUTCH GUIANA.

Through the courtesy of Mr. W. Van Eswald, of the Surinaamsche Bank, Paramaribo, we are informed that the export of gold from Dutch Guiana for the year 1893 was 35,289 oz. in all. For the month of January the export was 936 oz.

GERMANY.

Imports and exports of coal and coke for the month of January are reported by the "Kohlen Zeitung" as below, in metric tons:

	Imports.	Exports.
Brown coal (lignite)	477,339	1,259
Coke	38,757	208,832
Coal	290,330	78,187
Briquettes, etc.	7,905	18,289

Exports show a considerable gain and imports a small decrease from January, 1893.

GREAT BRITAIN.

Imports of Spanish iron ore into the Clyde for January and February were 54,425 tons, against 93,167 tons for the corresponding months in 1893.

Australasian Ore Reduction Syndicate, Limited.—This company has been registered in London, with a capital of £150,000, in £1 shares. Object: To acquire, by purchase or otherwise, the patent rights for Australia, Tasmania and New Zealand relating to a certain invention and process for recovering gold and silver from refractory ores. The process is that known as the Hannay electric cyanide process.

Scotland.

There is now a prospect, it is said, of the gold-fields in Sutherlandshire being reopened. A committee of eight members of the county council is negotiating with the Duke of Sutherland for a lease of Suisgill Farm, through which runs the burn in which most of the gold was got in 1869 and 1870. Gold has also been got in the Kimbrace and Kildonan burns. Indeed, it was in the Kildonan that Mr. Gilchrist, a native returned from Australia, first discovered gold in 1869, the news of which gave rise to a short-lived rush. At one time about 500 people were engaged at the diggings there. The late duke, however, after having given them a fair trial, considered them unremunerative, and ordered them to be closed in 1871. The total value of the gold got then has been estimated at £12,000.

LABRADOR.

Acting upon the advice of Dr. Selwyn, chief of the Canadian Geological Survey, the Dominion

Government nearly a year ago sent a special expedition to explore the interior of Labrador, in charge of A. P. Low. He left Ottawa, June 5th, 1893. A letter was received from him last August. Since that time no word was received until March 9th, when Dr. Selwyn was handed a report sent by Low from Rigolet, a Hudson Bay post at Hamilton Inlet, on the extreme north shore of Labrador. It is to the effect that the climate in the interior, where there are many large sheltered valleys, is far milder than was supposed. The vast district, he says, is thickly wooded with spruce trees, interspersed with poplar. Throughout the country, he says also, there are indications of deposits of rich iron ore. Low started from Quebec by way of Lake St. John, and, about 100 miles north of the lake, entered the wilderness with an assistant, a dozen voyageurs and Indians and six canoes. They followed the streams into the interior of Labrador, finding the country in stretches extremely rough and the rivers dangerous. The trip was nearly 1,000 miles in length. Low said he expected to leave his quarters early this spring and return home during the fall. He will try and make the return trip overland through the southern part of Labrador, just above the Quebec boundary.

MALAY PENINSULA.

Perak.—The exports of tin from Perak in 1893 are reported to have been 14,766 metric tons; those of tin ore were 4,406 metric tons. The tin royalties for the district amounted to \$1,345,000.

MEXICO.

Hidalgo.

Santa Gertrudis.—The extraordinary meeting of the stockholders took place last month at Pacuca. The report of the board shows the mine in general to be in good condition. The grade of the ore has fallen off of late, although it is not so low as it has been at other periods of the mine's history. The depreciation in the quality of the ore will be compensated by an increase in the output. Mr. Roberto Nunez made a sharp attack on the board for having, without any justification in the condition of the mine and without consulting the shareholders, declared a dividend for January of \$1 only, instead of \$1.50 as usual. He furthermore alleged that the interest of the present members of the board in the mine was insignificant. Resolutions were carried to the effect that the regular monthly dividend shall in future be \$1.50, and that the February dividend shall be \$2, to make good the curtailment of that for January. The board shall in no case declare a dividend of less than \$1.50 without convoking the shareholders to a general meeting. A committee of three experts was appointed to inspect and report on the mine.

San Luis Potosi.

Trinidad.—This mine, at Catorce, situated on a continuation of the famous San Agustin vein, is being operated through a tunnel which has been driven for a distance of 200 meters along the vein, and which is provided with a track to facilitate the extraction of the ore. At the point where it is being now worked the vein has a width of 1 meter, and the ore taken out runs from 4 and 5 up to 14 marcs in silver.

SOUTH AFRICA.

De Beers Consolidated Company.—This company has £3,400,000 bonds outstanding, carrying 5½% interest. It is proposed to retire these bonds, the company having the option of redeeming them at 10s., and to put out an issue of new 4½% debentures.

Transvaal.

The Klerksdorp district reports for the year 1893 a total output of 24,406 oz. gold from seven mines. The production increased rapidly during the year, rising from 269 oz. in January to 5,665 oz. in December.

De Kaap District.—The total production of this district in 1893 is reported at 70,386 oz. gold. The largest producer was the Sheba mine, from which 40,464 oz. gold were taken. The largest monthly output was 8,352 oz. in December.

SPAIN.

Silver Mining.—In the silver district of Hiendelaencina, where one mine made last year a clear profit of £80,000, a rich lode has recently been struck. A sample of the average ore of the lode has assayed 7 kilos, of silver per ton of ore. The lode is only at a depth of about 70 meters.

(From our Special Correspondents.)

Sierra Almegrera District.—Great enthusiasm is at present manifested in this silver district. These mines produce the richest argentiferous ore in Europe, but on account of the quantity of water they have been almost at a standstill for some years. A Hamburg firm has undertaken to unwater the mines in consideration of securing 16% of the produce of all the district, payable from the moment the pumps start work. On account of the peculiar geological formation of the district, one pumping installation will drain the mines for several miles. Many of the mines have been working at a depth of over 1,000 ft., and the ore produced varies from 50 to 100 oz. of silver per ton. It is the general opinion that notwithstanding the low price of silver the undertaking will be a success. The company guarantee, among other things, to sink their draining shaft to a depth of 160 meters below the sea level and to pump a minimum of 8,000 cubic meters of water per 24 hours.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, March 23.

Statement of shipments of anthracite coal (approximated) for week ending March 17th, 1894, compared with the corresponding period last year:

	1894.	1893.	Difference.
Wyoming region	266,611	429,651	Dec. 163,040
Lehigh region	107,312	112,581	Dec. 5,269
Schuylkill region	189,683	221,097	Dec. 31,414
Totals	563,606	763,329	Dec. 199,723

Total for year to date. 6,357,825 8,300,422 Dec. 1,942,597

PRODUCTION OF BITUMINOUS COAL, in tons of 2,240 lbs., for week ending March 17th and year from January 1st:

	1894.		1893.	
	Week.	Year.	Year.	Year.
Shipped East and North:				
Phila. & Erie R. R.	622	12,804	32,658	
Cumberland, Md.	63,586	616,273	736,854	
Barclay, Pa.	510	5,206	16,576	
Broad Top, Pa.	9,727	79,020	176,209	
Clearfield, Pa.	63,021	712,080	869,164	
Allegheny, Pa.	28,821	294,921	261,886	
Beech Creek, Pa.	45,273	525,315	442,169	
Pocahontas Flat Top	56,687	533,119	556,009	
Kanawha, W. Va.	41,672	515,004	688,118	
Totals	309,819	3,296,942	3,774,538	

	1894.		1893.	
	Week.	Year.	Year.	Year.
Shipped West:				
Pittsburg, Pa.	24,206	251,241	281,836	
Westmoreland, Pa.	26,582	310,743	434,901	
Monongahela, Pa.	8,109	97,345	162,705	
Totals	58,897	669,329	879,462	

Grand totals. 368,716 3,966,071 4,654,000

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending March 17th, 1894, and year from January 1st, in tons of 2,000 lbs.: Week, 75,207 tons; year, 695,064 tons; to corresponding date in 1892, 1,222,064 tons.

Anthracite.

In no wise has the condition of the anthracite coal trade changed since our last report. The market continues very dull, and there is no probability of an improvement for a fortnight or so. The anthracite coal sales agents will hold a meeting on next Thursday, at which the question of opening Spring prices will be discussed. In the mean time producers continue to adhere strictly to a policy of restriction of output.

It is scarcely to be expected that the schedule of prices to be made at the coming meeting will be any lower than the selling prices which rule at the present writing. While the companies maintain that they are not willing to sell at lower figures than were "officially" established, namely on the basis of \$4 for stove and chestnut, they admit that some independent operators are "shading" these prices—a fact which has been known for some time to everyone interested in the coal trade. Stove coal can be bought openly for \$3.75, and there is no telling what "concessions" from this figure could be obtained by a shrewd buyer. However, the volume of business continues small, showing that many consumers consider that when the opening prices are made there will be a reduction in the official schedules of the companies, so that while the companies will openly do what some individuals are supposed to do *sub rosa*, the latter will nevertheless continue to undersell the companies.

The chief topic of discussion during the week was a press dispatch from Philadelphia dated March 20, stating that the Lehigh Valley Railroad had completed its settlements with coal shippers for the month of February and had adjusted with all on the basis of 40% of the selling price of coal in New York Harbor. In other words, that the company had in fact returned to the method in vogue before the Interstate Commerce act went into effect, and the fixed rate of \$1.75 from the mines to Amboy is abrogated. This was not officially announced, however. A meeting of the freight agents of coal carrying railroads was held in this city on Thursday. Full particulars were difficult to obtain and some conflicting reports were circulated.

The Reading Railroad reports that its coal shipment (estimated) for last week, ending March 17th, was 211,700 tons, of which 18,000 tons were sent to Port Richmond and 25,000 tons were sent to New York waters.

It is reported from Philadelphia that the Philadelphia & Reading Coal and Iron Company has reduced the price of coal to iron furnaces along its line, and that the Lehigh Valley Coal Company will do likewise. The Philadelphia & Reading and the Lehigh Valley railroad companies have, it is said, also reduced freight rates on coal and ore to the furnaces.

The Bureau of Anthracite Coal Statistics makes the following statement of shipments of anthracite coal for February and the two months to February 28th, from the returns furnished by the mine operators:

	February.		Two months.	
	1894.	1894.	1894.	1894.
Wyoming region	1,771,916	1,213,792	3,647,411	2,615,818
Lehigh region	455,487	369,784	863,282	779,978
Schuylkill region	856,753	707,896	1,643,443	1,498,484
Total	3,084,156	2,291,472	6,153,736	4,914,280

In February the total decrease was 792,084 tons, or 25.7%; for the two months it was 1,239,456 tons, or 20.1%. The stocks of coal on hand at tidewater shipping points on February 28th were 859,509 tons; on January 31st they were 881,550 tons, showing a decrease of 22,041 tons, or 2.5%, during the month. The large decrease in shipments this year shows

the effect of the mild winter, and also shows that the restriction in production is being enforced by the companies. This restriction, however, seems to have been more thoroughly carried out in the Wyoming region than in either the Schuylkill or the Lehigh region.

NOTES OF THE WEEK.

The Lehigh & Wilkes Barre Coal Company asks for offers to sell to it all or any part of \$166,000 of its 5% bonds of 1912 for the sinking fund. Proposals will be received at the company's New York office until April 2d.

Bituminous.

There is nothing new to report of the bituminous coal market this week. Practically there has been no change in the situation as outlined in our last review of the trade.

The Seaboard Steam Coal Association has issued its circular of prices for bituminous coal delivered on board vessels at tidewater, and also delivered in vessels alongside the docks in New York harbor, for the season of 1894-5, which begins on April 1st next. The prices agreed on are as follows: F. o. b. Philadelphia, Norfolk, Newport News, Baltimore and Georgetown, \$2.25 per ton of 2,240 lbs. For points outside the harbor of New York, and on the Hudson River north of Fifty-seventh street, and East River east of Hell Gate, the f. o. b. price is \$2.75 at Perth Amboy, South Amboy, Elizabethport and Port Reading, or \$2.80 at Jersey City, Weekawken, Hoboken, Harsimus and Port Liberty. On North River south of Fifty-seventh street, and East river west of Hell Gate, the f. o. b. price is \$2.75 at South Amboy, Perth Amboy, Elizabethport and Port Reading, or \$2.80 at Jersey City, Weekawken, Hoboken, Harsimus and Port Liberty, but all sales made as delivered alongside in the harbor of New York, south of Fifty-seventh street, North river, and on East river west of Hell Gate, shall not be less than \$3.00 per ton of 2,240 lbs. The new rates of tolls on soft coal to the line and city trade will be announced shortly, and are expected to be less than last year's rates. It is stated that the Pennsylvania Railroad Company will make a concession of from 15 to 20c. per ton. As we have previously stated, sellers have been acting on this understanding, and have closed contracts at Philadelphia at prices lower than last year by the same margin.

In speaking of this cut a person who is well posted on the subject says that the attitude of the West Virginia and Pocahontas producers in view of this cut in freight rates has not been asserted. The Chesapeake & Ohio and the Norfolk & Western railroads, which tap these fields, have a haul of about 200 miles more than those roads tapping the Cumberland and Clearfield districts, with whom their operators have to compete in the New York and New England markets. These Southern roads have built up a trade within a comparatively short time and in the face of strong competition. They have done this through concessions in freight to their operators. It is claimed that the rates which they have made were the minimum. If they are to retain their position in the Eastern market in the face of a cut of 15c. by the Pennsylvania and the Baltimore & Ohio they must make further concessions in rates, an action which in all probability they cannot afford to take.

We quote vessel rates as follows from Philadelphia: To Boston, Salem and Portland, 70@75c.; Providence, New Bedford, Fall River, New Haven, 70c.; Allyn's Point and Norwich, 75c. The lower ports are quoted from 5c. to 10c. higher.

Buffalo.

March 22.

(From our Special Correspondent.)

The very mild weather experienced here for about three weeks is not conducive to coal consumption. Trade in anthracite is very dull, and bituminous is only very moderately active. Prices without variation for anthracite, and nominally unchanged for bituminous. Dealers expect a reduction in the quotations for anthracite on April 1st, or by the 15th at latest.

There are no signs of any movement of vessels from this port at present, for the reason that news has come that the Straits of Mackinaw are not open, and not likely to be for some time. The report originated from the fact that a strip of ice extending from Port St. Ignace to or near Cheboygan had been driven out of sight into Lake Huron. Line boats began to run regularly last Monday to and from Cleveland and Detroit. Lake freights on coal are not reported yet, vessel owners awaiting developments as to the amount of coal to go forward, as upper lake ports are reported to be well stocked.

With a view to meeting, to some extent, the low contract freight rates on iron ore 80c. per ton from the head of Lake Superior to Lake Erie ports, a general reduction of wages of captains, engineers and all hands employed has been made. This cut in wages amounts to about three cents per ton of the carrying charges on the ore.

It is reported that Messrs. Morris, Ellsworth & Co. will send about 140,000 tons of soft coal to Fort William; Algoma Mills, Rosport and Huron Bay and Messrs. M. A. Hannan & Co., about 165,000 tons of soft coal to Owen Sound this season. This fuel will be used by the Canadian Pacific Railway Company. The contractors are residents of Cleveland, O.

The annual report of the Buffalo Merchants' Exchange for 1893 has been published. It was compiled by Secretary Thurstone, who will send a free copy

to any subscriber to the "Journal" who will apply to him for one. The report contains several pages of interesting coal statistics.

Superintendent Hannan states that the canals of this State cannot be opened before the end of April or May 1st at latest, as extensive repairs are in progress.

Mr. M. H. Colby, the well-known coal dealer of Medina, N. Y., has assigned. Assets nominally \$9,000 including 500 tons of coal. Bad debts the cause.

Chicago.

March 21.

(From our Special Correspondent.)

The prevailing state of the Chicago coal market is not apt to give the impression that times are really improving, for the coal business is almost at a standstill, both in hard and soft coal. The total tonnage of the week is far below the average, and dealers are all of the opinion that business has never been so dull. Withal the railroads continue to keep up the same freight rates, and prefer to lose business rather than give their aid to the coal dealers in the matter of cutting rates a trifle, and thereby give the coal people a chance to make a small profit out of the present prices. We have had another week of very mild weather, several of the days the thermometer reaching 65°, and this has naturally helped to make the week one of the poorest so far this year.

Anthracite prices are: Egg, range and chestnut, \$5.75. Retail prices being: Egg, range and chestnut, \$6.75@7.00.

Bituminous Coal tonnage for the week has been limited. Prices continue to be low, and yet are being cut in numbers of cases. Some hope is afforded this week by the fact that the Illinois Steel Company has again started up their entire plant at South Chicago. This will undoubtedly open a considerable business for some dealers. It is hoped that the resumption will stimulate other manufacturing concerns and soon create a market for bituminous coal. Quotations are per ton of 2,000 lbs. f. o. b. Chicago: Youghiogheny, \$3.15; Pittsburg, \$3.25; Hocking Valley, \$3; Brazil block, \$2.70; Raymond, \$3.65; Shawnee, \$3; Cumberland smiting, \$3; Mt. Olivet, \$2. Cannel coal quotations are: Pinkney, \$4; Bird-eye, \$5; Kentucky, \$5.

Coke has not met with much favor during the week, sales being limited to a few carloads. Prices are: Connelville crushed, \$4.15; furnace, \$3.90; Ellsworth, \$3.75.

Pittsburg.

March 22.

(From our Special Correspondent.)

Coal.—There has been a good stage of water in the Ohio most of the time since our last report. Several tows have departed for the southern markets, notwithstanding the low prices that govern the markets of the south. The stock of Pittsburg coal at New Orleans is being steadily increased, and there is not much danger of a coal famine for some time to come: the low price at which it is being sold has caused it to supplant southern coal in that market.

The big J. B. Williams with her immense tow for New Orleans, over a million bushels, passed safely out of the Ohio, and at last accounts was going along all right. Lake trade has opened but the outlook for the coal business is not encouraging. The Turtle Creek miners are again idle. The mines of the New York & Cleveland Gas Coal Company here are idle, and some 800 or 900 men are out.

Connelville Coke.—The large coke producers do not look with disfavor upon the organization of the coke workers. The Frick Coke Company and the McClure Company regard it with favor, and will interpose no objection to a scale. The Frick Coke Company, especially, desires uniformity.

There are now about 12,000 coke workers in the Connelville region, of whom about 7,500 are working. The new organization claims to have a membership of 4,000. The ovens in the region show about 12,000 in blast, and 6,300 idle; in the 60 active plants over 6,500 ovens made 6 days; 23 plants, 4,600 ovens, 5 days. The shipments in cars amounted to 5,857 cars. The cars for the week were distributed as follows: To Pittsburg, 1,935 cars; to ports East, 1,227 cars; to ports West, 2,695 cars. Prices are unchanged.

On March 21st, a number of operators in the Connelville region made known their intention of resisting the labor organization formed March 20th at Scottdale. The operators have an agreement to refuse to employ organized labor which they threaten to carry out.

IRON MARKET REVIEW.

New York, Friday Evening, March 23, 1894.

Pig Iron Production and Furnaces in Blast.

Fuel used.	Week ending		From Jan., '93	From Jan., '94
	Mar 21, 1893.	Mar. 23, 1894.		
Anthracite.	F'ces. 74	Tons. 34,010	Tons. 32,547	Tons. 177,282
Coke.	145	131,320	84	91,507
Charcoal.	35	8,155	18	4,096
Totals.	254	176,485	134	112,507
			2,100,319	1,255,586

Pig Iron.—There is little of interest to report this week. The trade has been quiet, and its volume small here, but New York is always a dull iron market, and our reports from the chief iron markets show that consumption is growing steadily; in fact, manufacturing all over the country is reviving, and the consumption of iron is increasing and promises to

do so at an accelerating rate. Were the tariff bill out of the way, business generally would certainly recover more quickly from the depression which prevailed during the latter months of 1893. More furnaces are blowing in, and there is greater activity among consumers of pig iron. As we have stated in these columns, the probabilities for higher values are still remote; the concessions which the furnaces have been able to get in the way of freight rates and cheaper ore will make present rates fairly remunerative with a large output. It is reported that the Lehigh Valley and the Philadelphia & Reading companies have reduced the price of anthracite coal and the freights on ore to the furnaces along their lines. If the protest of Southern producers count for anything, the railroads handling their freight must also reduce their rates.

Prices are unchanged from last week. Quotations continue nominally as follows: Northern brands: No. 1, \$13@14; No. 2, \$12.50; gray forge, \$12. For Southern iron we quote: No. 1, \$13@13.75; No. 2, F., \$12@12.50; No. 1 soft F., \$12@13; gray forge, \$11@12—all at tidewater. Scotch irons are quoted: Coltness, \$21.50@22; Eglinton, \$19.50@20; Summerlee, \$20.50@21.

Billets and Rods.—No improvement can be reported of this market, although advices from other centers indicate that the reduction in freights from Pittsburg has made lower prices, and thereby caused a better business. Quotations are nominally: Domestic billets, \$17@18; wire rods, domestic, \$26.50@27.50; foreign rods, \$30@34.

Manufactured Iron and Steel.—A fair business has been done in manufactured iron and steel this week, but prices continue low and more or less unsettled for some forms. We quote nominally: Angles, 1'30@1'50c.; axles, scrap, 1'40@1'60c. delivered; steel, 1'40@1'55c.; bars, common, 1'20@1'30c.; refined, 1'40@2c. on dock; beams, up to 15 in., 1'35@1'50c.; channels, 1'40@1'60c. on dock; steel hoops, 1'50@1'75c., delivered; links and pins, 1'50@1'75c.; plates, flange, 1'60c.@1'80c.; fire-box, 1'80@2'10c.; flange, 1'60@2c.; marine, 2'45@2'70c.; sheared, 1'80c.; shell, 1'40@1'60c.; tank, 1'25@1'35c.; universal mill, 1'20@1'50c.; tees, 1'50@1'65c., all on dock.

Merchant Steel.—Manufacturers report an improved business. Prices continue as last reported. We quote: Tool steel, 5'75@6'25c.; tire steel 1'75@1'80c.; toe calk, 1'80@2c.; Bessemer machinery, 1'30@1'50c. open hearth machinery, 1'90@2c.; open hearth carriage spring, 1'90@2c.; crucible spring, 3'50@3'75c.

Old Material.—A better inquiry is reported in this market and some sales were made this week. Prices, however, show no advance and we quote nominally as follows: Old steel rails, street, at \$9.75 f. o. b. cars Jersey City; old iron tees, \$12.50 per ton New York; railroad scrap, \$12 per ton delivered at mill, and yard scrap at \$10 vessel New York; old iron T rails, standard sections, \$11.75@12.00, New York delivery; wrought turnings, delivered at mill, \$9; railroad scrap, also delivered at mill, \$12; No. 1 wrought scrap at \$9.50@10, and No. 1 machinery cast scrap, \$9.50@10.50, delivered to vessels at this port; old steel rails, \$9@10; old wrought tubes and pipe, \$7.50@8.50; wrought turnings at \$8.50@9 delivered at mill; old car wheel, \$10.50@11 New York; cast borings, \$5.50@6 delivered at mill.

Rail Fastenings.—We do not hear of any business in rail fastenings. The market continues dull, with quotations as follows: Fish and angle plates, 1'30@1'50c. at mill; spikes, 1'70@1'90c.; bolts and square nuts, 2'10@2'30c.; hexagonal nuts, 2'30@2'50c., delivered.

Spiegeleisen and Ferromanganese.—There is nothing of interest to report of this market. It continues very quiet, with prices unchanged. We quote nominally: Spiegeleisen, 10@12%, \$21@22; 20%, \$25@26. Ferromanganese, \$51.50@53.

Steel Rails.—We do not hear of any sales of consequence this week. The market continues quiet. The official or combination price for standard sections is still \$24.80 tidewater, or \$24 at mill.

NOTES OF THE WEEK.

At the meeting of the Southern Railway and Steamship Association in New York this week, the differences between the Louisville & Nashville and the Cincinnati, New Orleans & Texas Pacific, which threatened a rate war, were adjusted and provision made to maintain rates. This will affect rates from the Southern furnaces to Western points.

Argument was begun on March 19th before the United States Circuit Court of Appeals in Philadelphia, in the old dispute over the right to \$350,000 in bonds of the Lackawanna Iron and Steel Company, of Scranton, Pa. In brief some of the stockholders of the former Scranton Steel Company charge that \$350,000 in bonds of the new company, paid to W. W. Scranton, president of the old company, and Walter Scranton, its vice-president, under an agreement that the Scrantons should not re-engage in business in competition with the new company, should not have been paid to them, but to the old company itself. The Scrantons claim that the \$350,000 worth of bonds were a bonus to them personally, and the Circuit Court at Pittsburg awarded them the bonds. The dissatisfied stockholders of the old company took an appeal, which is now on trial.

Aside from the vessels of Pickands, Mather & Co. and other iron ore concerns, says the Cleveland

"Marine Review," capacity to the amount of about 1,100,000 tons has been engaged up to this time on contract business from the head of Lake Superior at 80 cents. Added to this there is 150,000 tons of Escanaba ore, which was taken some time ago by the Inter-Ocean Transportation Company of Milwaukee at 60 cents, and 150,000 tons of Marquette ore, covered within the past week by J. H. Outhwaite & Co. at 80 cents for the season. This latter block will be carried by Curtis & Brainard's boats "Cherokee" and "Chippewa" and by the steamer "Ketchum" towing Capt. James Davidson's schooner "Aberdeen" and the schooner "Becker." These figures are based on very careful estimates, and if it was thought advisable the names of all boats under contract could be published. The estimate includes the whalebacks, but none of the boats of the ore companies. If the latter were included, the amount covered from all ports would be considerably over 2,000,000 tons.

Buffalo. March 22.

(Special Report of Rogers, Brown & Co.)

There appears to be more of a disposition on the part of buyers to enter into long engagements ahead; and as furnaces see further into their probable cost of manufacture for the season, there is more willingness on their part to take such orders when prices are not too close. The market, however, continues to be very much in the hands of those buyers who will take round lots for cash and early delivery. Prices continue to be on the lowest basis ever known in this market, and pig iron certainly is a safe purchase to any one who expects to run during the balance of the year. We quote on the cash basis, f. o. b. cars Buffalo: No. 1 foundry strong coke iron, Lake Superior ore, \$12; No. 2 foundry strong coke iron, Lake Superior ore, \$11.50; Ohio strong softener No. 1, \$12; Ohio strong softener No. 2, \$11.50; Jackson County silvery No. 1, \$15.50@17; Lake Superior charcoal, \$14.75; Tennessee charcoal, \$15.50; Southern soft No. 1, \$12.25; Southern soft No. 2, \$11.75; Alabama car wheel, \$16@17.50; Hanging Rock charcoal, \$18.50.

Chicago. March 21.

(From our Special Correspondent.)

The iron market in Chicago has developed no new features during the week. Buying is still confined to small lots for immediate consumption. Some lines of trade report an increase in the way of inquiries for their manufactured products, but for the most part business is light. The tariff measure continues to be a decided factor in trade and all are anxiously looking for Congress to act one way or the other. Freight rates on iron such as bar, boiler rods, nuts, axles, plates, hoods, malleable castings, wagon skains, plow-points and wings, plow-wheels, steel teeth (harrow or rake), plow-beams (iron and steel), wrought or cast iron pipe, horseshoes, and fence wire in straight carloads, minimum weight 40,000 lbs., have been reduced to 12 1/2 c. per 100 lbs. from Chicago, with a corresponding reduction from other points. The Illinois Steel Works at South Chicago started up yesterday, giving employment to 3,000 men. The works have been idle since last September. They pay now 33 1/2% less wages than last September, with a proviso in the contracts that in case Congress reduces the duty on raw materials all contracts for wages now made with the men will be declared off and new schedules introduced which will be based on the new tariff, whatever it may be. It is not known how long the entire works will be kept in operation, a great deal depending on future business conditions.

Pig Iron.—Sales continue to be for carloads and small lots for quick or early delivery, consumers still pursuing the policy of buying just a sufficient quantity for present use. Very low prices continue to be made by the Northern coke furnaces whenever large consumers are prepared to figure on round blocks. In Southern irons a few grades are scarce, such as No. 3 foundry and No. 2 soft, but the higher grades of foundry metal are plentiful. Prices are, per gross ton f. o. b. Chicago: Southern coke, foundry No. 1, \$12@12.25; No. 2, \$11.25@11.50; No. 3, \$11; Southern coke foundry soft, No. 1, \$11.25; No. 2, \$10.75@11; Southern car-wheel, \$18@18.25; Tennessee charcoal No. 1, \$15@15.50; Southern silveries No. 1, \$13@13.50; No. 2, \$13@13.50; Bessemer, \$13.25; Ohio Scotch softeners No. 1, \$14@15; Lake Superior charcoal, \$15@15.50; Lake Superior coke No. 1, \$11.75@12.25; No. 2, \$11.25@11.50; No. 3, \$11; Jackson County silveries, \$14.50@15.50.

Structural Iron and Steel.—Business remains as at last report, a fair demand for material coming in from out of town. Quotations are as follows, Chicago delivery: Angles, 1 1/2@1 1/4; tees, 1 1/2@1 1/4; universal plates, 1 3/8@1 1/4; beams and channels, 1 1/4@1 1/2.

Plates.—The market for plates remains dull, with but few orders, and those mostly for small quantities. Prices are, Chicago delivery: Flange steel, 1 80@1 90; best firebox steel, 4 00@4 25; tank steel, 1 45@1 50; iron or steel sheets, 10 to 14, 2 00@2 15.

Merchant Steel.—No increased movement is discernible in merchant steel. Business continuing very slow, with no signs of early improvement. Quotations are, carload lots: Smooth finished machinery steel, 1 80@1 90; tire steel, 1 90@2 00; ordinary Bessemer bars, 1 40@1 50; toe calks, 2 15@2 25; ordinary tool steel, 6 40@6 90; special brand tool steel, 12@20; crucible spring, 3 40@3 65.

Galvanized Sheet Iron.—Business from store is better on account of good weather. Mill business has not improved. Prices are 75, and 5% off for mill shipments on Juniata. Jobbing quantities are selling at 75% discount.

Black Sheet Iron.—Inquiries continue to be numerous, but sales have not increased proportionately. Still there is a slight improvement over the previous week. Some of the mills continue to hold to prevailing prices and lose business rather than go any lower. Prices are still low, which are: Carload lots, f. o. b. Chicago, No. 24, 2 40c.; No. 26, 2 50c.; No. 27, 2 60c.; with an advance of about 10c. per 100 lbs. for steel over corresponding gauges in iron.

Bar Iron.—Business has gained some over previous week, the cut in freight rates having helped. Orders are coming in with more frequency and for larger quantities. Wagon manufacturers are now buying and many of them are endeavoring to contract as far along as July at the present prices. Mill prices f. o. b. Chicago are 1 15@1 25c. for iron and 1 25@1 30c. for soft steel bars.

Billets.—Some good-sized orders for billets have been received, and the conditions are much more favorable than for some time past. The new billet mill of the Illinois Steel Company at South Chicago has been completed, and it is expected that it will be soon operated. Prices remain at \$17.25@17.75; rods are quoted at \$25.

Steel Rails.—Signs of improvement in rails are numerous, the chief one being the resumption of the Illinois Steel Company's mill at South Chicago. Business for the week has improved somewhat, one noticeably large order being observed. Quotations are \$25@27, for standard sections.

Nails.—The demand for wire nails is fairly good, with steel cut nails a good second. Prices per keg \$1.15@1.25.

Scrap.—No better conditions prevail, business being yet very dull. Prices are: Railroad, \$10 75; No. 1 forge, \$8.50@9; cast borings, \$4.50; wrought turnings, \$6 50, axle turnings, \$6; mixed steel, \$5.50@6; tires, \$13; iron axles, \$13@13.50.

Old Rails and Wheels.—Demand for old rails continues fairly good, with an occasional good sized order noted. Quotations for old iron rails are \$10.50@11, old car wheels being \$10.

Philadelphia. March 23.

(From our Special Correspondent.)

Pig Iron.—Most of the No. 1 Foundry that has been sold this week went at \$13, and in these sales were some few brands that have been bringing \$13.50. Brokers here are interested in some New England deliveries in which Southern pig will figure. No. 2 is offered at \$12.25. The market for it is exceptionally dull. Forge iron is \$11.25 for the average, but mills are doing very little.

Steel Billets.—The cut in freight rates has resulted within two days in big orders for this market, and at present writing it is impossible to tell what amount of business will be done on recent quotations. Before this cut \$17 was offered, and \$17.50@18 asked. The reduction has turned all eyes to western Pennsylvania, and it is impossible to tell the outcome not only on billets but on other products. Brokers and agents are busy in negotiations and sales.

Muck Bars.—Small orders are coming in at \$21.

Merchant Iron.—The unsettling factors are uncertain freights and shaded prices over those of two weeks ago. With offerings of bar iron at 1 10@1 20c, buyers do not know what to do. Any effort to make contracts for later than 30 days' delivery fails. The general feeling is that demand will show a sharp improvement within 60 days.

Skelp.—Small orders for skelp have been placed this week; price not given.

Sheet Iron.—There is a further increase in small orders in Eastern mills, but at prices that barely cover cost.

Merchant Steel.—Outside competition is being felt in this market and our local mills are not holding quite all their trade.

Plate and Tank.—Steel tank is quoted at 1 20, and selling at 1 10c. Heavier plates are sold at 1 30c., and orders are on the increase to cover the requirements of two large engineering operations. Flange (steel) is quoted at 1 75, but there is close competition on the business coming along.

Structural Material.—It is almost impossible to quote prices publicly. Specifications are coming along in a way showing that new business of considerable magnitude is near at hand. Angles can be had at 1 10c. or less and beams, ties and channels are nominally 1 50.

Steel Rails.—Girder rails are in good demand, and several large orders have been placed this week. Rumors of a drop in standard sections continue, but quotations are given at \$24.

There is a great deal of work on paper that is likely to be entered upon at any time. Builders are preparing for work and the indications point just now to larger operations than last year. Railroad managers are anxious to have a great deal of necessary engineering and repair work done.

Pittsburg. March 22.

(From our Special Correspondent.)

Raw Iron and Steel.—If an enlarged inquiry for leading descriptions of raw and finished material means an important trade, then the industry is steadily growing better. Although there are unsettling features, freight rates are deranged, and prices are irregular, it is the general opinion that the consumption of pig iron as well as of finished material is greater than it was. The settling process is still going on, and when wages have reached the new basis that seems inevitable, and the establishments that cannot be operated profitably are closed, a more settled tone in the markets will be obtained. At present pig iron seems to have touched bottom, as makers are reporting a fair market for about all they can produce, though the low prices leave no profit except to those with exceptional arrangements for labor and material, or an advantage in the matter of location. The output of material is steadily increasing, and there is less fear that lower prices will be made.

There is no strengthening of prices, yet neither, it may be added, is there any weakening. In the western part of this State and in Ohio several furnaces have blown in since March 1st, the production of this county being very close to its capacity. This would seem to indicate that the makers of pig iron, in those sections at least, have confidence in the future of the market. When a concern manufacturing rails stops that department and runs on merchant steel it simply takes so much business from some smaller mill, and to do so it must make a lower price, so that it is a loss both ways, but when it starts on rails it is so much clean new business.

There is something grotesque in the spectacle of a big concern closing its works to force arbitrary prices on one class of its customers and at the same time running another department regardless of price, but presumably to crush its smaller competitors. This is one of the readjustments which many in the trade regard as imperative.

Iron Ore Sales.—Sales of 25,000 tons Bessemer ore at \$2.25@2.90 f. o. b. Cleveland docks are reported. Leading dealers report market firmer without change of values.

No. 1 stack of the Carrie Furnace Co. was blown in Monday. This furnace has been rebuilt and has a capacity of 300 tons pig iron per day, employing 175 men.

Coke Smelted Lake and Native Ore.		April, at mill.							
Tons.	Cash.	15.70	15.63						
3,000 Bessemer, March.									
April	\$10.50								
2,000 Bessemer, April.									
May	10 42								
1,500 Bessemer, March.	10 50								
1,500 Bessemer, March.	10 40								
1,000 Bessemer, March.	10 55								
1,000 Bessemer, March.	10 50								
April	10 50								
1,000 Bessemer, March.	10 50								
1,000 Bessemer, March.	10 50								
April	10 50								
1,000 Gray Forge, March.	9 60								
April	9 60								
800 Off Bessemer	9 80								
500 Gray Forge	9 60								
500 No. 2 Foundry	10 75								
500 Bessemer, March.	10 50								
April	10 50								
500 Gray Forge, March.	9 60								
April	9 60								
300 Gray Forge	9 65								
200 No. 1 Foundry	11 75								
50 Open Mill	10 60								
Charcoal.									
50 Cold Blast	21 50								
50 Cold Blast	24 00								
50 No. 1 Foundry	19 80								
50 No. 2 Foundry	18 60								
25 No. 2 Foundry	18 00								
Blooms, Billets and Slabs.									
2,500 Billets, April, May.	15 65								
at mill	15 65								
2,000 Billets, March.									
April, at mill	5 70								
2,000 Billets, March.									
April, at mill	15 35								
1,500 Billets, March.									
April, at mill	15 60								
1,000 Slabs, March.									
April, at mill	15 50								
1,000 Billets, March.									
April, at mill	15 50								
Metal Market.									
New York, Friday Evening, March 23, 1894.									
Prices of Silver per Ounce Troy.									
March.	St. Ex.	London Pence.	N. Y. Cls.	Value of sil. in \$.	March.	St. Ex.	London Pence.	N. Y. Cls.	Value of sil. in \$.
17	4 88 1/2	27 1/2	59 1/4	.459	21	4 88 3/4	27 1/2	59 1/4	.459
19	4 88 3/4	27 1/2	59 1/4	.461	22	4 88 1/2	27 1/2	59 1/4	.458
20	4 88 1/2	27 1/2	59 1/4	.459	23	4 88 1/4	27 1/2	59 1/4	.458

The London market was steady this week, but dull owing to Easter holidays. India Council bills were allotted in full on Wednesday at 13 1/2 d. per rupee. The Indian Budget published March 22nd shows an estimated deficit of 29,230,000 rupees; but this is better than was anticipated.

The United States Assay Office at New York reports the total receipts of silver for the week to be 171,000 oz.

Gold and Silver Exports and Imports at New York, Week Ending March 17th, 1894, and for Years from January 1st, 1894, 1893, 1892.

Week	Gold.		Silver.		Excess of Ex. or Imp.
	Exports.	Imports.	Exports.	Imports.	
1894...	\$1,836,818	\$183,709	\$579,179	\$13,182	E \$2,239,106
1893...	5,594,666	2,595,540	9,694,512	277,681	E 12,505,967
1892...	32,225,125	3,933,740	6,530,240	835,908	E 33,881,717
1891...	11,525,170	4,661,404	5,265,285	292,271	E 11,836,783

Of the gold exported for the week \$1,250,000 went to London, the rest to Havana; the silver went to London. The gold imported was chiefly from France, the silver from Central America.

During the five days ending March 22d the exports and imports at the port of New York were as follows: Exports, gold, \$127,766; silver, \$450,572. Imports, gold, \$201,022; silver, \$121,850. Of the gold exports \$124,031 went to the West Indies, of which \$7,350 was British coin and \$116,681 Spanish coin and bullion, the remaining \$3,675 being in American coin and bullion, which went to South America. Of the silver exported \$433,932 was American bullion and went to London; \$10,020 was Mexican coin, \$930 Peruvian coin, and \$5,640 was Chilean coin, all of which went to South America.

NOTES OF THE WEEK.

We have again to report a gradual improvement in the general business situation, and the number of mills and factories resuming work still increases. In many departments stocks have been brought down to a pretty low point, and any increase in demand must be met at once by an increase in production. The labor troubles are for the most part in gradual process of settlement. The weak points are the delay on the tariff and the renewal of the silver agitation, and a speedy settlement of these questions will help the revival of business materially.

The passage of the Bland bill for coining the silver is referred to elsewhere; at this writing the general belief is that the President will veto it and its passage over a veto is not possible.

The tariff bill, as noted in another column, was reported by the Finance Committee to the Senate on March 21st, and as now arranged the Senate will begin its discussion April 2d. Reference to the proposed changes has been made heretofore.

The statement of the New York banks for the week ending March 17th shows increases of \$1,668,925 in reserves, \$3,108,600 in loans, \$1,219,200 in specie, \$2,240,400 in legal tenders and \$7,162,700 in deposits; a decrease of \$224,800 in circulation. The reserve was \$212,368,900, or \$77,302,300 in excess of legal requirements.

The accumulations still continue large and the increase in deposits is partly due to the increase in amount of funds from other points sent here in hopes of finding employment. Rates continue naturally low, and the demand for loans is gradually increasing, but is not yet approaching the supply.

The statement of the United States Treasury on Thursday, March 22d, shows balances in excess of outstanding certificates amounting to \$130,716,448, made up as follows: Gold, \$106,588,201; silver, \$9,973,022; legal tenders, \$2,819,157; Treasury notes, etc., \$11,396,068. Changes from the previous week are decreases of \$2,613,243 in the total balance and of \$664,544 in the gold balance.

The Treasury receipts have been comparatively light thus far during March, while there have been heavy payments, especially for pensions. The gold reserve has been maintained, however, with but little change.

The Bank of England lost \$119,829 gold during the week. The total gold holdings on Thursday, 22d, were \$30,631,718, an increase of \$3,559,252 as compared with the corresponding date last year.

The London "Statist" of recent date says: The reserve of the Bank of England this week is \$22,893,135, the largest ever held. In 1879, after the Glasgow Bank crash, it reached nearly \$22,000,000; now it is considerably larger. Of course, it is to be recollected that the authorized issue has been added to considerably since 1879; but the fact remains all the same that the reserve of unemployed coin and notes in the Banking Department of the Bank of England is larger now than it has been since the Bank Charter Act was passed. The coin and bullion this week (March 10th) amount to £30,328,535. It is a very large amount, but it is nothing like as large as was held by the bank in 1879. Then the coin and bullion exceeded \$35,000,000, or say roughly about \$5,000,000 more than it is at present. There is every reason, however, to anticipate that the coin and bullion will go on increasing. The continental demand has ceased, and there seems to be good ground for anticipating that considerable amounts of gold will be shipped from New York. We do not doubt that the President will veto the Silver Seigniorage bill, but its passage tends to create an uncomfortable feeling, and therefore, it is likely to add to the reasons for exporting gold from the United States.

The new English government seems just at present in a somewhat precarious position, and so fully occupied with political maneuvers that no attention to silver or other purely financial questions is likely to be given at present.

The Bank of France, on Thursday, 22d, reported its total specie holdings, in sterling, at \$69,064,974 gold and \$50,754,972 silver; an increase of \$2,586,226 gold, and a decrease of \$38,614 silver as compared with the corresponding date in 1893. During the week the bank gained \$204,000 gold and \$152,000 silver, the latter being the first gain of silver reported for several weeks. The bank, it will be noticed, continues to accumulate gold and to add to its already enormous reserve. This process has been going on quietly but steadily for some time past. It is also noticeable that the policy of the French Government—represented by the Bank of France—appears to be to reduce the silver reserve.

The German government intends to issue new silver coins to the amount of 22,000,000 marks. This would complete the amount of silver circulation authorized by law. The law of July 9th, 1873, says silver coins must be issued up to the amount of 10 marks per head of the population. The census of December 1st, 1890, states the population at 49,428,470. This would authorize the circulation of silver coins to the amount of 494,284,700 marks. At the present day the total silver circulation amounts to only 471,632,574 marks. The new coinage will include 11,000,000 marks in five-mark pieces; 7,000,000 marks in two-mark pieces, and 4,000,000 marks in one-mark pieces.

The exports of silver from London to the East are given by Pixley & Abell's circular as follows, up to March 8th:

	1893.	1894.
To India.....	£1,732,880	£1,606,510
To China.....	12,440	468,780
To the Straits.....	534,200	144,600
Total.....	£2,279,520	£2,219,890

This statement shows a small decrease in the exports to India, a large one in those to the Straits, and a very large increase in shipments to China.

The effect of the closing of the mints to silver coinage in India has been to stimulate imports for the time and to diminish exports. The second half of 1893, as compared with the corresponding half of 1892, shows an increase in imports of all kinds amounting to 639 lakhs of rupees or 20.6%, while the exports decreased 183 lakhs, or 4%. Just now there is a large export of rice going on to China and Japan, owing to an unusual demand from those countries; but this is not expected to continue much longer.

The London "Statist" of recent date says: "The Japanese with their keen instinct for opportunity, are again placing large orders in this country for machinery. The closing of the Indian mints and the maintenance of the Indian exchanges at artificially high rates at a time when the exchanges of the purely silver-using countries have fallen so rapidly is enabling Japan to undersell India. Therefore Japanese capitalists are entering largely into new industries and are extending the old. Especially they hope to cut out the Bombay cotton manufacturers and even the Lancashire manufacturers in the Chinese market, and hence they have for a considerable time past been placing large orders for machinery in this country.

The Chinese are less alive to their opportunities than the Japanese, and no doubt the badness of their government makes it difficult to start new industries. For the present, at all events, therefore, China is not entering into the competition to any considerable extent. But if Japan is as successful as the Japanese hope, it is clear that the Indian and the Lancashire manufacturers will have to meet a very formidable competition in China. This was one of the contingencies which we have again and again pointed out in case the Indian mints were closed. But the Indian Government thought that it knew better.

A recent dispatch says that the Persian government has ordered that no more silver shall be coined at the mint, and all importations of silver will be prohibited after April 1st. Silver smuggled into the country will be confiscated if found.

Domestic and Foreign Coins.

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

	Bid.	Asked.
Mexican dollars.....	\$49	\$50
Peruvian soles and Chilean pesos....	.48	.50
Victoria sovereigns.....	4.87	4.89
Twenty francs.....	3.90	3.93
Twenty marks.....	4.75	4.74
Spanish 25 pesetas.....	4.85	4.90

Other Metals.

Copper.—Business in general is not any more active than it has been, but the conclusion reached by some of the producers of copper to book orders at such prices as the manufacturers felt justified in paying has resulted in a rather active market for copper. The Calumet & Hecla people are said to have sold several millions of pounds, most of the manufacturers taking a share, at 9½c. for delivery during March, April or May, and some of the other Lake companies have also booked orders on similar terms. The free selling of Lake copper at such a low figure has of course, interfered with the sale of electrolytic copper, as the difference in price is not sufficient to induce the manufacturers to take in the latter as freely as of late, and before they are

likely to do so again, either the price for it will have to decline, or that for Lake advance; which of the two things will happen will naturally depend on the course of the market, that is on whether the volume of business will increase or not.

We have to quote Lake at 9½c. electrolytic at 9¼c. casting at 9¼c. and Arizona pig at 8¼c.—a large business in the last named having been done at about 8½c.

On the other side of the water there has not been the strength displayed this week that there was last, and G. M. B. copper closes lower, at \$41 2s. 6d. and \$41 12s. 6d., respectively, for spot and future deliveries.

The demand for refined copper has almost entirely ceased within the last few days, partly because of the reluctance of American refineries to accept for their copper such low prices as are necessary in order to compete with those named by the English refiners, who are now endeavoring to realize on accumulated stock, leading consumers to believe that if they abstain from buying they may soon get in cheaper than it is possible to do now. Quotations are unchanged as follows: English tough, \$43 10s. @ \$44. Best selected, \$44 12s. 6d. @ \$44 15s.; strong sheets, \$50 10s. @ \$51; India sheets, \$49 @ \$49 5s.; yellow metal, 4½c.

The exports of copper from the port of New York for the week ending March 23d, as reported by the New York Metal Exchange, were as follows:

Newcastle-Marengo.....	Pigs	50 tons	
Rotterdam-Dubbedam.....	Ingots	20 "	
"	Plates	150 "	
"	Pigs	25 "	
Swansea-Mohican.....	Bars	100 "	
Liverpool-Nomadic.....	Ingots	55 "	
"	Tauric	Pigs	201 "
Rotterdam-Maasdam.....	Plates	50 "	
"	"	50 "	
"	Pigs	75 "	
Liverpool-Britannic.....	Pigs	100 "	
Havre-La Champaene.....	Bars	20 "	
Swansea-Wells City.....	Pigs	175 "	
Rotterdam-Spaarndam.....	Bars	100 "	

Exports of copper from Baltimore for the week ending March 22d are reported by our special correspondents as follows:

March 14.—Antwerp-Hermann.....	2,656 bars,	336,663 lbs.	
"	366 ingots,	4,480 "	
"	Bristol-Dago.....	3,341 plates,	67,300 "
"	16.—Liverpool-Parkmore	35 barrels,	35,000 "
"	"	475 ingots,	21,000 "
"	15.—Rotterdam-Chicago.	80 cask "	14,984 "
"	22.—Havre-Venango.....	431 cakes,	113,370 "
"	"	5,962 plates,	112,000 "
"	"	2,283 ingots,	44,800 "
"	"	508 ingots,	22,408 "

Tin.—The market here is steady, having been but little affected by the advance in prices abroad, and, with a fair demand, prices have ruled at about 19½c. for spot and March deliveries, which close at the figure named.

Abroad, the decline reported last week, from the higher figures of 10 days ago, has been checked, and a decided upward movement inaugurated. At the close we have to quote spot at \$69 2s. 6d. and futures \$69 17s. 6d. but as the silver market has not simultaneously improved, it does not seem reasonable to expect this advance to be maintained.

Lead.—The demand here is not very brisk, but the offerings of metal are so few, and the quantities so small, that the market is very firm at 3.45@3.50 New York and 3¼ in St. Louis.

Quotations abroad show practically no change, as Spanish lead is valued at \$9 3s. 9d. @ \$9 5s. and English 2s. 6d. per ton more.

The exports of lead from the port of New York during the week ending March 22d, as reported by the New York Metal Exchange, were as follows:

Leith-Critic.....	100 tons in bond.
Glasgow-S. of Nebraska.....	100 "
Antwerp-Rhyndland.....	100 "
Liverpool-Bovic.....	100 "
Hamburg-Lowento.....	150 "

St. Louis Lead Market.—The John Wahl Commission Company telegraphed us as follows: "Lead strong, but rather quiet, latest sales at 3 20c., with the majority of the sellers asking more money. Offerings being light, transactions have been of a retail character in last few days.

Spelter.—The market for this article is very quiet and without noticeable change, as we have still to quote 3.90@3.95 New York, while abroad the ruling figures are \$15 12s. 6d. for good ordinaries and \$15 15s. for specials.

Antimony has to be quoted at 10@10½c. for Cookson's, 9½@9¾c. for L. X., 8¾@9c. for Hallett's, 10c. for U. S. French Star.

Aluminum.—The makers quote No. 1, over 98% pure, 65c. per lb. for large lots, 75c. for small quantities; No. 2, from 94% to 96% pure, 60c. for large quantities, 73 for small lots. Wire from \$1 25 to \$2.58 per lb. according to size. Plates and sheets, 90c. @ \$1.50, according to width and thickness. The Neuhausen Company quotes \$1 per kilo. (45c. per lb.) at the works at Neuhausen, in Switzerland, but we have heard of no importations.

Magnesium.—The Aluminum und Magnesium Fabrik, Hemelingen, Germany, quotes prices as follows: Ingots and cubes, \$6.48 per kilogram; bar., \$6.24; powder, \$8.64, ribbon and wire, \$9.12 per kilo. These prices are at the works and for orders of over 10 kilos.; for less than 10 kilos, 24c. per kilo. must be added for ingots and bars, and 48c. for powder or wire.

Nickel.—Quotations are 45@55c. per lb., according to grade.

Platinum.—Messrs. Eimer & Amend, New York, quote platinum crucibles and dishes, hammered ware, French make, at 45c. per gram for smaller quantities, 43c. per gram for lots of not less than 100 grams, and 41c. for lots of not less than 250 grams. Wire and foil at 42c., 41c. and 40c. respectively for the quantities named. Current retail price for crucibles is 50c. per gram. At present platinum prices are steady.

Sodium.—Price, as quoted by the manufacturers in Germany and England, are 90c. @ \$1 per lb. at works.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, March 2.

Heavy Chemicals.—There are no new features to report of the heavy chemical market. The past week has been quiet, and the trading was light and interesting. There is a fair jobbing demand for the various chemicals on the list, but none was at all active. A better inquiry is reported. We quote: Caustic soda, 60%, 2.77½ @ 2.82½c.; 70%, 2.60 @ 2.70c.; 74%, 2.62½ @ 2.72½c.; 78%, 2.70 @ 2.80c. Carbonated soda ash, 48%, 1.10 @ 1.25c.; 58%, 1.05 @ 1.15c. Alkali, 48%, 1.05 @ 1.15c.; 58%, 1 @ 1.10c.; according to package. Sal soda, English, .95 @ 1c.; American, .80 @ 90c. Bleaching powder, 2.05 @ 2.50c.

Acids.—There is very little of interest to report this week of the acid market. It continues quiet, with prices a shade firmer, although no higher than last week. We quote: Acids, per 100 lbs. in New York and vicinity, in lots of 50 carboys or more: Acetic, in barrels, \$1.63½ @ \$1.75; muriatic, 18", 80c. @ \$1; 20", 90c. @ \$1.10; 22", \$1 @ \$1.25; nitric, 40", \$4; 42", \$4.50 @ \$4.75; sulphuric, 75c. @ \$1. Mixed acids according to mixture, oxalic, \$6.75 @ \$7.25. Blue vitriol is quoted all the way from \$3.37½ to \$3.75; glycerine for nitro-glycerine, 11½ @ 12½c., according to quality and quantity.

Brimstone.—This market continues quiet. There is no change in prices. We quote: Best unmixed seconds, on the spot or near due, \$17.50; futures, \$17. Thirds are \$1 less.

Fertilizing Chemicals.—An improved business is reported this week in the market for fertilizers. A number of sales were made which although individually small yet amount in the aggregate to a fair volume of business. Owing to the early spring there has been a better demand for finished fertilizers, and manufacturers find that their stocks of raw materials are not sufficient to meet the requirements of their trade. They are therefore coming into the market much more freely than a fortnight ago. We quote: Sulphate of ammonia, gas liquor, \$3.65 @ \$3.70; bone, \$3.55 @ \$3.65; dried blood, \$2.45 @ \$2.50 per unit for high grade and \$2.30 @ \$2.35 for low grade. Azotine, \$2.45 @ \$2.55. Concentrated phosphate (30% available phosphoric acid), 75c. per unit. Acid phosphate, 13% to 15%, av. P₂O₅, 60c. per unit at seller's works in bulk. Dissolved boneblack, 17% to 18% P₂O₅, 95c. per unit. Acidulated fish scrap, \$15 @ \$16, and dried scrap nominally \$25 f. o. b. fish factory; wet scrap \$15 f. o. b. fish factory. Tankage, high grade, \$23 @ \$24; low grade, \$21.50 @ \$22.50. Bone tankage, \$23 @ \$24; bone meal, \$24 @ \$25.50.

In lots of 50 tons on contracts we quote: Double marine salts, 48.53% (basis of 48%); New York and Boston, \$1.12; Philadelphia, \$1.14½; Charleston, Savannah, Wilmington, N. C., and New Orleans, \$1.17. High grade manure salts, 90-95% and 96-99% (basis 90%), respectively; New York and Boston, \$2.07 @ \$2.11; Philadelphia, \$2.09½ @ \$2.13½; Charleston, Savannah, Wilmington, N. C., and New Orleans, \$2.12 @ \$2.16.

Phosphates.—Charleston, S. C., quotations are: Acid phosphate 13% available, \$7 @ \$7.50 cash in bulk. High grade phosphate rock is \$4.75 @ \$5 f. o. b. vessel and cars at mines.

Muriate of Potash.—In lots of 50 tons, quotations are as follows: 80.85% and minimum 95% (basis 80%), respectively: New York and Boston, \$1.78 @ \$1.91; Philadelphia, \$1.80½ @ \$1.83½; Charleston, Savannah, Wilmington, N. C., and New Orleans, \$1.83½ @ \$1.86.

Kainit.—Prices for kainit (minimum 23%) in cargo lots for 1894 delivery, contracted prior to January 31st, are as follows for invoice and actual weights respectively: New York, Boston and Philadelphia, \$9 @ \$9.25; Charleston, Savannah, Wilmington, N. C., and New Orleans, \$9.75 @ \$10. For sylvinit, 27.35%, prices are as follows per cent. per gross ton, invoice weights: New York, Boston and Philadelphia, 37½c.; Charleston, Savannah, Wilmington, N. C., and New Orleans, 41c. Actual weights, 1c. more per cent.

Nitrate of Soda.—This market continues strong and is slightly higher. Stocks on the spot and near-by are light, and held by a few, owing to which fact there has been a certain speculative tendency. Spot and near-by is quoted at \$2.12½.

NOTES OF THE WEEK.

A dispatch from Saginaw, Mich., says that the Michigan salt trust has declared an advance of 10c. a barrel to take effect at once. Owing to sharp competition from manufacturers outside salt fell to 30c. a barrel. Now the old stock has been gradually diminished, leaving the market practically clear and the advance of 10c. a barrel on all grades except solar and dairy salt was the result.

The Permanent Nitrate Committee in London, England, have issued their first public statistical circular. It shows:

Total exports to Europe, February (including steamers, 1,000,000 Qtls.)	Qtls.	1,830,000
Loading for Europe, 1st March	"	890,000
Arrivals in Europe, February	Tons	76,700
Divertries in Europe, February	"	142,000
Visible supply, Europe, 1st March, stocks and afloat	"	385,000

The visible supply on 1st March, 1893, was 410,000 tons, against 510,000 tons in 1892, and 545,000 tons in 1891.

The half-yearly meeting of Brunner, Mond & Co. was held at Liverpool last month. Mr. H. Coghill presided, and moved the adoption of the report, which recommended a dividend on the ordinary shares at the rate of 30% per annum. The amount carried forward was £32,000. The fact that the six months' working had not been as satisfactory as they might like was owing to the coal strike and the depression of business in America. Mr. Watson protested against the baldness of both the report and the chairman's remarks, and called attention to the fact that last year £165,000 was called up and only £7,400 of it was accounted for in the report. It was further proposed this year to call up £27,000, while the investments had been decreased by £25,000. Dr. Hewitt, a director, in reply, pointed out that the balance-sheet was made up to the 31st of December, and the capital called up on the 1st of January could not have been included. What Mr. Watson had said about the calling-up of capital was quite wrong. They had paid out of the profits over to the shareholders £160,000 necessary for the purpose of the business. It was really a distribution of the profits; and not a calling up of capital. In two and a half years the capital had been returned to the shareholders. The loss of profit as compared with the previous half year was £105,000.

Charleston, S. C. March 21.

(From our Special Correspondent.)

Everything in the fertilizer line remains about the same, except, perhaps, that it is a little duller. The shipments have fallen off about 18,275 tons short from September 1st, 1893, to February 8th, 1894, inclusive, as compared with the corresponding period of the previous season, and I think we will probably carry over 30,000 to 40,000 tons of acid phosphates, which might be quoted at the same price, \$7 @ \$7.50 bulk cash, or May 1st next. In phosphate rock very little is doing. A sale of 70,000 tons of Coosaw River Rock was made by one of the mining companies there. Hot air dried land rock f.o.b. vessels and cars at mines Ashley River, \$4.75; wet, \$4.25 @ \$4.50 f.o.b. mines.

MINING STOCKS.

[For complete quotations of shares listed in New York, Boston, San Francisco, Aspen, Colo.; Baltimore, Philadelphia, St. Louis, London and Paris, see pages 280 and 283.]

NEW YORK, Friday Evening, March 23.
The exchanges were closed to-day, and to this fact must to some extent be attributed the small volume of business done in mining stocks this week. The market was dull and featureless. No particular stock or group of stocks was in demand.

The Comstocks were neglected this week and somewhat lower in price. Consolidated California & Virginia was traded in to the extent of 245 shares, the price declining from \$3.50 to \$2.50. Yellow Jacket shows sales of 400 shares at 70 @ 85, the former being the closing selling price. There was a single sale of 100 shares of Ophir at \$2.75. Of Best & Belcher there were sold 150 shares at \$1.85. The official lists record total sales of 2,000 shares of Comstock Tunnel at 8 @ 9c. Other sales were 200 Consolidated Imperial at 15c. and 200 shares of Mexican at \$1.45 @ \$1.60.

The only California stock to show any transactions this week was Standard Consolidated, of which 300 shares were sold at \$1.15 @ \$1.20.

Of the Colorado stocks Little Chief was the most active, 1,000 shares being sold at 10 @ 12c. Of Leadville Consolidated 100 shares were sold at 10c.

Moulton returns to the exchange this week, after quite an absence, with a sale of 250 shares at 20c.

Sales of Phoenix of Arizona this week amounted to only 300 shares at 12c.

Boston. March 22.

(From our Special Correspondent.)

There is but little change to note in regard to the market for copper stocks. Transactions continue light, but prices show a good degree of firmness and there is some buying for investment of the better class of stocks, while the speculative list, with the exception of the Montana stocks, is entirely neglected. Calumet & Hecla sold at \$296 @ \$298 in a small way, which is a shade lower than last week. On the other hand Tamarack has been very strong and advanced from \$158 @ \$165 on moderate transactions. Quincy declined from \$130 @ \$125, rights on, and this price is considered quite as much as the stock is worth under the recent circular issued to the stockholders. Franklin sold at \$99 @ \$10, and Osceola was quite steady at \$26 @ 26½. Atlantic sold at \$10½, a gain of the fraction. Centennial declined to \$4. Tamarack, Jr., sold up to \$18½ on small lots. Wolverine sold at \$2, same as last week.

The Montana stocks have been fairly active, and at slightly improved figures. Boston & Montana advanced from \$26 to \$27½, and closed at \$27½. Butte & Boston touched \$11, subsequently declined to \$10, and rallied to \$10½.
Sales for the week were about 3,700 shares.

3 P. M.—The market closed fairly strong. Boston & Montana, \$27½ bid, \$27½ asked; Butte & Boston, \$10½ bid, \$10½ asked; Tamarack, \$162 bid, \$165 asked; Quincy, \$120 bid.

San Francisco. March 16.

(From our Special Correspondent.)

The mining stock market has continued dull throughout the week, the wholesale buying of assessments a week ago and the absence of exciting news from the Comstock tending to discourage active trading. "Jim" Rule, who has been in the city for some days, returned to Virginia City to-day, and the directors of the Consolidated California & Virginia Company having consented to his request that a larger force of men be put to work, some lively news may be looked for. There are yet nearly three months to run before Rule's contract expires, and he is as confident as ever that in the interim he will uncover the ore body for which he is seeking. Meantime the stock continues to range from \$3 to \$4 per share. To-day the ruling rate was \$3.30; Ophir selling for \$2.60, Mexican for \$1.60, Sierra Nevada for \$1.25, and Union Consolidated for 95c.

The middle Comstocks were fairly active this morning, albeit there was no decisive change in the ruling rates. Best & Belcher sold for \$1.80; Chollar for 45c.; Gould & Curry for 80c.; Hale & Norcross for 60c.; Potosi for 95c. and Savage for 45c.

The Gold Hill group of stocks show the most marked decline during the week. Belcher ruled at 80c.; Bullion at 40c.; Challenge at 43c.; Confidence at \$1.60; Crown Point at 55c.; Kentuck at 10c.; Overman at 17c.; Occidental at 15c. and Yellow Jacket at 75c.

In the afternoon session these stocks were sold more freely than heretofore during the week generally at from one to two points in advance of the ruling rate. The general market at the close, was somewhat stronger, the demand, however, being confined almost solely to the leading stocks.

With the money market here becoming more easy, and a considerable amount of interesting and very promising work being carried on in various of the Comstock mines, it is quite probable that more activity will be noted in the stock market in the near future.

London. March 14.

(From our Special Correspondent.)

La Plata shares have been inquired for on the news that a new company is being brought out called "The Lion (Mozambique) Gold Company." The shares in this company are offered only to the shareholders in La Plata. The shareholders have been for some time in treaty for a property in Mozambique, and they have had Mr. Niness inspecting the country for them. The La Plata Company has been a large shareholder in the company called the "Gold Fields of Mozambique," and the latter company helps the La Plata Company in floating the new Lion Company. The La Plata Company reports, with respect to the business in Colorado, that the Leadville mines have been self-supporting during the year 1893, in spite of the declining prices of lead and silver. The mines are to be leased on a new system, with a smaller rent and without any responsibility for outlay, so that for the coming year it is anticipated that some profit will be made.

The troubles of the recently reconstructed Flagstaff Company are by no means at an end. When the reconstruction was decided on a couple of months ago, the shareholders were given to understand that the service of Professor Vincent as director or manager were to be dispersed with, and it was really only on that consideration that the directors and shareholders thought it worth while continuing to work the mine. Since then, however, Professor Vincent and his friends have been working hard to get him re-elected as managing director at the mines. On hearing of this, Mr. C. W. Stidstone, one of the directors, has intimated to the shareholders that he will not allow his name to be on the directorate if Professor Vincent is on it as well, and other directors will probably pursue the same course. Unless very energetic measures are taken by somebody, these gentlemen will resign and their places will be taken by friends of the professor. Thus the state of the company will be as bad as or worse than ever.

DIVIDENDS.

Boston and Colorado Smelting Company, dividend of 2½%, payable April 2nd to stockholders of record March 20th.

Elkhorn Mining Company, Limited, dividend of 18c per share, payable at the office of the company in London on and after March 22nd to stockholders of record March 3rd.

Horn Silver Mining Company, dividend of 12½c. per share, (\$50,000) payable March 31st at the office of the company, No. 56 Broadway, New York City.

Napa Consolidated Quicksilver Mining Company, dividend No. 59 of 10c. per share (\$10,000) payable April 2d at the office of the company, No. 70 Kilby street, Boston, Mass.

MEETINGS.

Colorado Coal and Iron Development Company, at the office of the company in Pueblo, Colo., April 2d, at 12 o'clock noon.

NEW YORK MINING STOCK QUOTATIONS.

Table with columns for 'DIVIDEND-PAYING MINES' and 'NON-DIVIDEND-PAYING MINES'. Each section lists company names and their stock prices for various dates from Mar. 17 to Mar. 23. Includes a 'SALES' column for each.

*Dividend. †Sale in at New York stock ex. ‡Unlisted securities. §Assessment paid. ¶Cash unpaid. D dividend shares sold 2,443. non-dividend shares sold 2,280. Total shares sold, 5,245.

BOSTON MINING STOCK QUOTATIONS.

Table with columns for 'NAME OF COMPANY' and 'SALES'. Lists mining companies and their stock prices for March 16, 17, 19, 20, 21, and 22. Includes a 'SALES' column.

Dividend shares sold, 1,875. Non-dividend shares sold, 2,450. Total shares sold, 4,325.

CURRENT PRICES.

These quotations are for wholesale lots in New York unless otherwise specified. Lists prices for various acids, chemicals, and minerals like Muriate, Ammonia, and Sulphur.

Lists prices for various metals and ores including Cadmium Iodide, Copper, Iron, Lead, and Zinc. Includes prices for different grades and quantities.

Lists prices for various oils, phosphorus, and other industrial materials. Includes prices for Mineral Wool, Phosphorus, and various oils.

Lists prices for Tin-Crystals and other rare metals. Includes prices for Muriate, Barium, and other specialized materials.

THE RARER METALS.

The prices given below are the prices in Germany, and are per gramme except where otherwise stated. Lists prices for Rarer Metals like Arsenic, Bismuth, Cadmium, and others.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Main table with columns: Name and Location of Company, Capital Stock, Shares, Assessments, Dividends, Name and Location of Company, Capital Stock, Shares, Assessments. Lists various mining companies and their financial details.

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 \$1,320,000 in dividends, and the Cons. Virginia \$12,500,000. § Previous to the consolidation of the Copper Queen with the Atlanta, August, 1885, the Copper Queen had paid \$1,350,000 in dividends. ¶ Previous to this company's acquiring Northern Belle, that mine paid \$2,400,000 in dividends against \$125,000 in assessments.

COAL AND COAL RAILROAD STOCKS.

Table with columns for stock names, dates (March 17-23), and sales. Includes stocks like Am. Coal, Balt. & Ohio, Cambria Iron, etc.

*Good Friday. Total shares sold, 53,141.

INDUSTRIAL AND TRUST STOCKS.

Table with columns for stock names, dates (March 17-23), and sales. Includes stocks like Adams Express, Am. Cotton Oil, Am. Dist. Tel., etc.

*Good Friday. Total shares sold, 312,494.

CALIFORNIA. San Francisco.

Table of closing quotations for San Francisco stocks, including Alpha, Alta, Belcher, etc.

COLORADO. Aspen.

Table of prices for Aspen stocks, including Argentinum-Juniata, Aspen Contact, etc.

Colorado Springs, Mar. 16. Prices and sales for the week ending March 16th, 1894.

Table of prices and sales for Colorado Springs stocks, including Cripple Creek, Alamo, Anaconda, etc.

Denver. Prices and sales for six days ending March 17, 1894.

Table of prices and sales for Denver stocks, including Alamo, Anaconda, Amity, etc.

Table of stock prices for Gold Stone, Golden D., Gold Standard, etc.

MARYLAND. Baltimore.

Table of stock prices for Baltimore stocks, including Atlantic Coal, Balt. & N. C., etc.

MINNESOTA. Duluth.

Table of stock prices for Duluth stocks, including Biwabik M. Iron Co., Cincinnati Iron Co., etc.

UNLISTED STOCKS.

Table of unlisted stock prices, including Adams Iron Co., Ashland Iron Co., Buckeye Iron Co., etc.

MONTANA.

Table of stock prices for Montana, including Bald Butte (Mont.), Benton Group, etc.

PENNSYLVANIA. Philadelphia.

Table of stock prices for Philadelphia, including Cambria, Edison E. Light Co., etc.

Pittsburg.

Table of stock prices for Pittsburg, including Bridgewater Gas, Chartiers Valley Gas, etc.

UTAH. Salt Lake City.

Table of stock prices for Salt Lake City, including Alliance, Anchor, Centennial Eureka, etc.

Table of stock prices for Horn Silver, Mammoth, Meares, etc.

London Quotations.

Table of London quotations for Alaska Treadwell, Alaska Ter, Almada & Tiritio, etc.

Paris.

Table of Paris quotations for Helmez, Spain, Golden River, etc.

New York Mining Stocks.

Table of New York mining stock prices, including Alice, Alta, Best & Belcher, etc.

ASSESSMENTS.

Table of assessment details, including company name, amount, date, and status.

CLASSIFIED LIST OF ADVERTISERS.

Adders and Calculators
Smith, H. C.

Air Compressors and Rock Drills
American Diamond Rock Drilling Co.
Birk, W. C. Mfg. Co.
Burlingame, R. C. Drill Co.
Clifton Air Compressor Works.
Hansen, W.
Ingersoll - Low Rock Drill Co.
Micklerman, S. G. & Co.
New York Air Compressor Works.
Penn Diamond Drill & Mfg. Co.
Rock Drill Co. (See Diamond Drills)

Aluminums
Cowles Electric, S. & A. Co.

Amalgamators
Bucyrus Steam Shovel & Dredge Co.
Gates Iron Works.

Anti-Friction Metals
Hertz, T. & Son.

Architects and Builders
Perry Bridge & Const. Co.
Pittsburg Bridge Co.
Pittsburg Bridge Co.
Scaife, Wm. B. & Sons.

Arms and Ammunition
Hartley & Graham.

Assayers and Chemists' Supplies
Alasworth, Wm.
Baker & Adamson.
Baker & Co.
Berge, J. H.
Brock & Crenshaw.
Denver Fire Clay Co.
Hess, Wm. C.
Hoskins, Wm.
Overbrook Chem. Co.
Penn Salt & Ref. Wks.
Penn Salt & Ref. Wks.
Attorney Corporation
McIndoe, H.

Babbitt's Metal
Knappl, Carjeter & Co.
Pittsburg Bridge Co.

Bakers and Brokers
Bandler, E.
Bieher & Sohne.
Blidings, Root & Co.
Grubb, S. B.
Hendy & Harman.
Hicks & Sprague.
Hyal, Wm. A. & Co.
Mason, E. C. & Co.
Metzger & Sons.
H. J. & J. J. Mfg. Co.
New York Belting & Packing Co., Ltd.
Shultz Belting Co.

Blasting Caps and Fuse
Lau, J. H. & Co.
M. South, James & Co.
Metallic Cap Mfg. Co.
Potts Mfg. Co. | Sturtevant, B. F. Co.

Boiler Compound
American Fluoride Co.

Boilers
Babcock & Wilcox Co. | Stillwell-Bierce &
Pollock, Wm. B. & Sons. | Smith-Valle Co.
Scaife, Wm. B. & Sons. | T. J. & J. J. Mfg. Co.

Brass Castings
Epping, Carpenter & Co.

Brass and Iron Machinery
Pittsburg Bridge Co.

Brick Machinery
Fletcher, S. K.
Fresso, A. M. & Co.

Bridges
Pittsburg Bridge Co. | Stillwell-Bierce &
Pittsburg Br. & Const. Co. | Scaife, Wm. B. & Sons.

Buckets
Scaife, Wm. B. & Sons. (See Machinery.)

Cable Railing
Pittsburg Bridge Co.

Calculators
Smith, H. C.

Carbides
Bischoff, Victor & Co.
Lebow, Theodore.

Car Wheels
Whitney, A. & Co.

Chain and Link Belting (See Belting.)

Chemicals
Baker & Adamson.
Bullock & Crenshaw.
Henry Hill Chem. Co.
Overbrook Chem. Co.
Clutches, Friction
Pittsburg Bridge Co.

Coal
Burward-White Coal
Mfg. Co.
Castner & Curran
Consolidation Coal Co.
Coxe Bros. & Co.
Coal Cutters
Ingersoll-Sergeant Drill Co.
Jewrey Mfg. Co. (See Machinery.)

Concentrators, Crushers, Pulverizers, Separators, Etc.
Albion Mfg. Co.
American Mining & Milling Machinery Co.
American Wire Machinery Co.
Beckett Foundry & Machine Co.
Baker, Theo.
Boston Ore Machinery Co.
Crawford, J. S.
Fraser & Chalmers.
Fresno Vanner Concentrator.
Gates Iron Works.
Hendrick & Goldthorpe Mfg. Co.
Krom, S. B.
Mechanical Gold Extractor Co.
Pierce & Miller Engineering Co.
Seymour Concentrator Co.
Stedman Foundry & Mach. Co.
Wabura-Swenson Mfg. Co. (See Machinery.)

Copper Dealers and Producers
Abbot, Wheelock & Co.
American Mining Co.
Atlantic Mining Co.
Babcock & Wilcox Co.
Baltimore Cop' Wks.
Boston & Mont Mfg. Co.
Canadian Copper Co.
Central Mining Co.
Copper Queen Mfg. Co.
Detroit Copper Mfg. Co.

Copper Rolling Machinery
Pittsburg Bridge Co.

Crosscutters and Miners' Supplies
Bucyrus Steam Shovel and Dredge Co.
Scaife, Wm. B. & Sons.
Frat & Whitney Co. (See Machinery.)

Forged Iron
Pittsburg Bridge Co. | Scaife, Wm. B. & Sons.

Crucibles, Granite, Etc.
Denver Fire Clay Co.

Obermayer Co.
Stedman's Foundry & Machine Works.

Cupola
Obermayer Co.

Diamond Drills
Grotzinger & Sons.
Hibon, Victor & Co.
Davis, F. W.
Diamond Drills
A. J. & J. J. Mfg. Co.
Bostelman, L. F.
Hoskins, Wm. C. M.C.
Hansen, W.

Dredges
Bucyrus Steam Shovel & Dredge Co.

Drawing Materials
Alexander, Theo. & Son.
Queen & Co.

Dredging Machines
Pittsburg Bridge Co.

Dump Cars
Hunt Co., C. W. | Trux Mfg. Co.
Tucker & Son Co.

Educational Institutions
Columbian University.
Correspondence School of Mines.
Harvard University.
Mass Inst. of Technology.
Michigan Mining School.
Pennsylvania Military College.
Woodward Institute.

Electric Machinery and Supplies
General Electric Co.
Jeffrey Mfg. Co.
Okonite Co., Limited.
Thomson-Houston International Co.

Elevators, Conveyors and Hoisting Machinery
Brown Hoisting and Convey. Mach. Co.
California Wire Works.
Cooper, Hewitt & Co.
Hunt, C. W., Co.
Jeffrey Manufacturing Co.
Scaife, Wm. B. & Sons.
Union Wire Rope Tramway Co.
Vulcan Iron Works.
See Wire Rope Tramway and Machinery.)

Elevator, Grain, Machinery
Pittsburg Bridge Co.

Emeralds
New York Belting & Packing Co., Ltd.

Employment Bureaus
Engineering Employment Bureau.

Engineers, Chemists, Metallurgists
Adams, W. H.
Anthony, Wm. A.
Assaw & Russell.
Baker & Co.
Blandy, John F.
Blauvelt, Harrington.
Boggs, W. R., Jr.
Boss, Clarence M.
Boss, M. P.
Brode, Walter M.
Burford, J. H.
Burlingame, E. E.
Butters, Charles.
Campbell-Johnson Mfg. Co.
Carnahan, F. W.
Carpenter, Franklin R.
Case, Wm. H.
Cazin, Franz.
Chandler, W. H.
Channing, J. Parke.
Clark, Ellis.
Clement, Victor M.
Collins, J. H. & Sons.
Courtis, Wm. H.
Cram, R. Stuart W.
Crawford, J. S.
Darling, L. B.
Davis, Floyd J.
De la douglie, Geo.
Dewey, Frederic P.
Dickerman, Alton L.
Dicke, H. P.
Donald, J.
Dryden, Dr. W. A.
E. de Burwell.
Emmons, Stephen H.
Engelhardt, E. C.
Eppinger, W. W.
Farish, Wm. A.
Fearn, Percy L.
Fisk, W. W.
Forsberg, George.
Fresson, Francis T.
Froehling, Dr. Henry.
Furlong, W. H.
Gooding, F. W.
Goussier, James H.
Hahn, O. H.
Halse, E.
Hammond, John Hays
Hampson, W. Stanley
Hartman, John H.
Hastings, John B.
Hoffman, Ottokar.
Hollibaugh, J. R.
Hooker & Lawrence.
Hunt & Robertson
Engineers' Instruments
Alteeder, J. & Son.
Brandt's Sons.
Bullock & Crenshaw
Everhardt, J. M.
Armstrong Brothers.
Bucyrus Steam Shovel & Dredge Co.
Cole, Wm. E.
Fertilizer Machinery
Pittsburg Bridge Co.
Fire-Brick and Clay
Chas. A. T.
Denver Fire Clay Co.
Flour Mill Machinery
Pittsburg Bridge Co. & Son Co.
Flint & Co.
Obermayer Co.
Fly Wheels
Pittsburg Bridge Co. & Son Co.
Foot Mfg. Co.
Founders
Pittsburg Bridge Co. & Son Co.
Fountain Frames
Obermayer Co.
Foundry Supplies
Obermayer Co.

Friction Clutches
Pittsburg Bridge Co.

Furaces
Hoskins, Wm. C. | Moore, S. L. & Son Co.
Pollock, W. B. & Co.
(See Machinery.)

Gas Works
Pollock, Wm. B. & Co. | Wood, R. D. & C.
Lenses, Recording, Etc.
Everhardt, J. M.

General Mfg. Co.

Gearing
Pittsburg Bridge Co.

Grain Elevators
Pittsburg Bridge Co.

Grease, Turpentine, Etc.
Hoskins, Wm. C. & Co.

Hangers
Pittsburg Bridge Co.

Heavy Machinery
Pittsburg Bridge Co.

Hopper Cocks
Hoskins, Wm. C.

Hoses, Rubber, Etc.
Allen, Chas. A.
New York Belting & Packing Co., Ltd.

Inspection and Tests
Hunt, The Robert W. Co.

Insulated Wires and Cables
Okonite Co., Ltd.

Insurance Companies
Hartford Steam Boiler Inspection and Ins. Co.
Mutual Life Insurance Co.

Iron Castings
Pittsburg Bridge Co.

Ladders
Obermayer Co.

Lenses, Miners'
Everhardt, J. M.

Lenses
Seneca Falls Mfg. Co.

Lead, White, Machinery
Pittsburg Bridge Co.

Locomotives
General Electric Co.
Hoskins, Wm. C. & Co.
Pittsburg Bridge Co.
Thomson-Houston International Co.

Lubricants
Pittsburg Bridge Co.

Machinery
Pittsburg Bridge Co.

Dealers in Mining, Milling, and Other Machinery
Albion Mfg. Co.
Amer. Mining & Milling Machinery Co.
Armstrong Brothers.
Baker & Co.
Burlingame, R. C. & Co.
Boston Ore Machinery Co.
Buckeye Engine Co.
Cass, W. C. Mfg. Co.
Crescent Steel Works.
Euxine Mach'ry Co.
Fraser & Chalmers.
Griffith & Wedg. Co.
Hendrick & Goldthorpe Mfg. Co.
Hoskins, Wm. C. & Co.
McKenna, S. G. & Co.
McKenna, S. G. & Co.
McKenna, S. G. & Co.
McKenna, S. G. & Co.
Moore, S. L. & Son Co.
Metal Dealers
Abbott, Wheelock & Co.
American Metal Co.
Am. Zinc-Lead Co.
Baker & Co.
Cowan, E. C. S. & Co.
Eureka Co.
James & Shakspeare.

Metalurgical Works and Ore Processors' Processes
American Zinc Lead Co.
Baker & Co.
Babcock Smelting & Refining Co.
Baltimore Copper Works.
Canadian Copper Co.
Cowan, E. C. S. & Co.
Edwards, C. F. & Ref. Co.
Leduc & Co.
Mechanical Gold Extractor Co.
Orford Copper Co.
Pennyroyal Salt Mfg. Co.
Ricketts & Banks.
Russell Process Co.
St. Louis Sampling & Testing Works.
State Ore Sampling Co.
Wabura-Swenson Mfg. Co.

Mining and Land Companies
Atlantic Mfg. Co.
Boston & Mont. Mfg. Co.
Central Mfg. Co.
Copper Queen Mfg. Co.
Detroit Copper Mfg. Co.
Eureka Co.
G. J. & J. J. Mfg. Co.
Nickel
Canadian Copper Co.
N. Y. Lock
Young Lock Nut Co.

Ore Testing Works
Hunt & Robertson.
Leduc & Co.
Packing and Pipe Coverings
Hunt, Randolph.
Jenkins Bros.
Resany, Robt.
Patterson, J. L.
Perforated Metals
Harrison & King Perforating Co.
Hendrick Mfg. Co.
Mundt & Sons.
Periodicals
Arms and Explosives.
Austral. Mfg. Stand'd
El Minerio Mexicano.
Electrical Plant & Electrical Industry.
Phosphates
Pennyroyal Paul Co.
Phosphor-Bronze
Pennyroyal Paul Co.
Picks, Miners'
Chas. A. T.
Pile Drivers
Bucyrus Steam Shovel and Dredge Co.
Pipes
Pittsburg Bridge Co. | Wyckoff & Sons, A.
Planed Gearing
Pittsburg Bridge Co. & Son Co.
Plumbers
Baker & Co.
Johnson Matthey & Co.

Plumbago-East India
Obermayer Co.

Power
Albion Powder Co.
Lafayette Hand Powder Co.
Law, J. H. & Co.
Pulleys
Pittsburg Bridge Co.

Pumps
Pittsburg Bridge Co. | Knowles Steam Pump
Works.
McCowan, John H. &
Cameron, A. S., Steam
Pump Works.
Epping, Carpenter &
Co.
Grotzinger, A., & Sons
-Savannah Iron Works.
Worthington, Henry

Publications
Financial Times
Mining Journal

Quarrying Machines
American Diamond Rock Drilling Co.
Ingersoll-Sergeant Drill Co.
Rock Drill Co.
Sullivan Machinery Co.
Union Wire Rope Tramway Co.

Quicksilver
Eureka Co.

Railroad Supplies and Equipment
Hoskins, Wm. C. & Co.
Porter, H. K. & Co. | Young Lock Nut Co.
(See Machinery.)

Regulators, Damper, Heat, Etc.
Mason Regulator Co.

Rock Drills
Pittsburg Bridge Co.

Rolling Mill Machinery
Pittsburg Bridge Co.

Roofing
Pittsburg Bridge Co.

Rope Wheels
Pittsburg Bridge Co.

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

Screens
Exeter Machine Works Co.
Harrison & King Perforating Co.
Mundt & Sons.
Tyler, W. S. Wire Works Co. (See Machinery.)

Screen Plates
Harrison & King Perforating Co.

Separators
Harrison Safety Boiler Works.

Shafting
Pittsburg Bridge Co.

Shoes and Laces
Crescent Steel Co.

Shovels (Steam)
Bucyrus Steam Shovel & Dredge Co.

Smelting and Refining Works
Babcock & Wilcox Co. | Penn Lead Co.
Baltimore Cop' Wks. | Penna. Salt Mfg. Co.
Bos. & Colo. Smelt. Co. | Penn Smelting and
Cowan Smelt & Ref. Co. | Refining Works
Kansas City & Ref. Co. | P. B. & S. Bronze
Mathison Smelting Co. | Smelt. Co.
Orford Copper Co.

Steel Rails, Castings, Rolls, Drill Steel
Abbott, Wheelock & Co. | Moore, S. L. & Son Co.
Robertson, A. & P., & Co. | Robinson & Orr.
Chester Steel Cast. Co. | Robinson & Orr.
Crescent Steel Works. | Whitney, A. & Sons.
Crescent Steel Co. (See Metal Dealers)

Steel Plates
Pittsburg Bridge Co.

Stamps
Pittsburg Bridge Co.

Steam Engines
Pittsburg Bridge Co.

Stoves
Pittsburg Bridge Co.

Telegraph Wires and Cables
Pittsburg Bridge Co.

Tin Plate Rolling Machinery
Pittsburg Bridge Co.

Tools
Frat & Whitney Co.

Tubes
Pittsburg Bridge Co. & Co.
Williams Bros.

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

Turbines
James & Shakspeare & Co., The.
Pittsburg Bridge Co. & Son Co.
Stillwell-Bierce & Smith-Valle Co.

Turkey Water-Wheels
Pittsburg Bridge Co.

Valves
Eddy Valve Co. | Mason Regulator
Jenkins Bros. | Sturtevant & Co., B.F.

Ventilators
Hoskins, Wm. C. & Co.

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

Washers
Hoskins, Wm. C. & Co.

Water Pressure Reducers
Mueler Mfg. Co.

Water Pressure Regulators
Mueler Mfg. Co.

Water Wheels
Pittsburg Bridge Co.

Well Drilling Machinery
American Diamond Rock Drilling Co.
Penn Diamond Drill & Mfg. Co.
Sullivan Machinery Co.
Willis & Sons

White Lead Machinery
Pittsburg Bridge Co.

Wire Ropes and Wire
Hoskins, Wm. C. & Co.
Robinson & Orr.
R. P. Co.
California Wire Wks
Cooper, Hewitt & Co.
Hunt, C. W., Co.
Wabura-Swenson Mfg. Co.

Wire Rope Tramway
Hoskins, Wm. C. & Co.
California Wire Works.
Colorado Iron Works.
Cooper, Hewitt & Co.
Hunt, C. W., Co.
Robinson, J. A., Sons & Co.
Trenton Iron Co.
Vulcan Iron Works.

FREE ADVERTISING.

Inquiries from employers in want of Superintendents, Engineers, 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.

Positions Vacant.

1317 WANTED—A GENERAL MANAGER for a railroad in South America; must speak Spanish and be well recommended. A thorough knowledge of the operation and organization of a railroad absolutely necessary. Apply by letter to RAILROAD, ENGINEERING AND MINING JOURNAL.

1318 WANTED—A THOROUGHLY COMPETENT MASTER MECHANIC, to take charge of railway shops in South America. A knowledge of Spanish absolutely necessary. Apply to COLUMBIA, ENGINEERING AND MINING JOURNAL.

1320 WANTED—AN EXPERT PLACER miner to superintend the installation and operation of hydraulic plant in South America. Address COMPETENT, ENGINEERING AND MINING JOURNAL.

1321 WANTED—AN EXPERIENCED ASSAYER and chemist for silver-lead smelter in Mexico. Salary fair. Address MEX., ENGINEERING AND MINING JOURNAL.

1322 WANTED—AN ENGINEER WHO is familiar with subsoil and spring drainage to report on draining a property near New York City. Address, giving experience and references, SUBSOIL, ENGINEERING AND MINING JOURNAL.

Situations Wanted.

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

A FIRST-CLASS MACHINIST OF GOOD habits wishes position to erect or take charge of machinery, or as engineer. C. F. ALVERSON, Salem, Ohio. No. 16,191, March 31.

EXPERIENCED ENGINEER, SPECIALTY aerial wire-rope tramways, cableways, rope transmissions and haulage, incline cable roads, wants position. Address WIRE ROPE, ENGINEERING AND MINING JOURNAL. No. 16,181, March 31.

A PRACTICAL MACHINIST AND ENGINEER wants situation as master mechanic or chief engineer of large mining plant or erecting engineer for manufacturer. Is well versed in steam, air, modern engines, rock drills, diamond drill, pump, etc.; 36 years of age, married, can furnish first-class references. Address PRACTICAL, ENGINEERING AND MINING JOURNAL. No. 16,176, March 31.

POSITION WANTED, AS STATIONARY ENGINEER Have had 15 years' practical experience with boilers, high speed and Corliss engines. Have indicator and planimeter. Am a member of the N. A. S. E. Can give good reference. Address STATIONARY ENGINEER, ENGINEERING AND MINING JOURNAL. No. 16,139, March 31.

A PRACTICAL MILLMAN, WITH 12 years' experience in managing and working both wet and dry gold and silver chloridizing and amalgamating mills, wishes a position as foreman. Good assayer; has some experience with cyanide process; would be willing to go to Mexico. Unquestionable reference as to character and ability. Address MILLMAN, ENGINEERING AND MINING JOURNAL. No. 16,159, March 31.

A YOUNG, TECHNICALLY EDUCATED Mining Engineer and Geologist desires an engagement in South America. Address "DIABASE," ENGINEERING AND MINING JOURNAL. No. 16,151, March 31.

CHEMIST WANTS POSITION AT BLAST furnace or iron ore mines. Best references. Address L. P. N., ENGINEERING AND MINING JOURNAL. No. 16,189, April 7.

POSITION WANTED.—A THOROUGH THEORETICAL and practical engineer and manager is open to engagement; six years' practical experience in construction and management of electric railways. A. C. H., ENGINEERING AND MINING JOURNAL. No. 16,178, April 14.

ARENSELAER GRADUATE, THREE years' experience, desires a position. Has had experience in preliminary, location, construction and maintenance of way; also on masonry dam. Address T. X., ENGINEERING AND MINING JOURNAL. No. 16,190, May 5.

WANTED—SITUATION AS CHEMIST AND metallurgist; have had several years' experience with all classes of furnace supplies and products; technical education. Good reasons given for leaving present situation. Address A. M. H., ENGINEERING AND MINING JOURNAL. No. 16,164, May 19.

WANTED—SITUATION IN SMELTING OR concentrating works; technical education; several years' experience in treating low grade ores. References given. Address SMELTING AND CONCENTRATING, ENGINEERING AND MINING JOURNAL. No. 16,166, June 9.

MINING ENGINEER, GRADUATE, OPEN for engagement May 15. Twelve years' practical experience in the development and management of metalliferous mines. Can give present employers' and other references. Address COLORADO, ENGINEERING AND MINING JOURNAL. No. 16,177, etc.

A MINING SUPERINTENDENT, GRADUATE Civil Engineer, with successful experience in difficult and dangerous mines, will engage to manage mines, or to examine and report upon mining properties, and furnish mining plans for safe and successful extraction of ores; satisfactory references. Address C. E., ENGINEERING AND MINING JOURNAL. No. 16,150, etc.

METALLURGIST, WITH EXTENSIVE EXPERIENCE, and one of the best records as superintendent for several years of one of the largest smelting works of this country, wishes a change and position with a solid concern who appreciates good, practical and cheap running of their works. Address EXPERIENCED METALLURGIST, ENGINEERING AND MINING JOURNAL. No. 16,188, etc., etc.

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DRILLING ARTESIAN WELLS.—DEPARTMENT of the Interior, Office of Indian Affairs, Washington, D. C. Sealed proposals indorsed "Proposals for Drilling Artesian Wells," and addressed to the Commissioner of Indian Affairs, Washington, D. C., will be received until April 10, 1894, for furnishing the necessary materials and labor required in drilling one artesian well each on the Pine Ridge, Rosebud and Standing Rock Indian Reservations in South Dakota. Bidders to furnish their own specifications for doing the work, and if possible state the length of time proposed to be consumed in drilling each of the wells. A separate bid for each well is required. Location of the proposed wells, means of transportation, with cost per cwt., and such knowledge of the local conditions of each reservation as is had by the U. S. Indian Agents in charge of the reservations named, will be furnished upon application to said agents, whose postoffice addresses are respectively: Pine Ridge Agency, S. D.; Rosebud Agency, S. D., and Standing Rock Agency, N. D. Proposals will be made to do the work at stated rates per foot, and not for a lump sum. The right is reserved to reject any or all bids or any part of any bid if deemed for the best interests of the service. D. H. BROWNING, Commissioner.

PORTLAND CEMENT.—U. S. Engineer Office, Montgomery, Ala.—Sealed proposals, in triplicate, for furnishing and delivering, at Wetumpka, Ala., 10,000 barrels, more or less, of Portland Cement will be received at this office until April 12, 1894, and then publicly opened. Specifications, blank forms, and all available information will be furnished on application to this office. F. A. MAHAN, Capt. Corps of Engineers, U. S. A.

PUMP-HOUSE.—Office Constructing Quarter-master, Burlington, Vermont.—Sealed proposals in triplicate will be received at this office until April 9th, 1894, and opened immediately thereafter, for the construction at Fort Ethan Allen, Vermont, of a pump-house, complete, and pumping plant, complete, in accordance with the plans and specifications to be seen at this office, where general instructions and circular to bidders and blank forms of proposals will be furnished. The United States reserves the right to reject any or all bids. Address Captain GUY HOWARD, Assistant Quartermaster U. S. Army.

STEAM HEATING APPARATUS.—Treasury Department, Office Supervising Architect, Washington, D. C.—Sealed proposals will be received at this office until the 12th day of April, 1894, and opened immediately thereafter for all the labor and materials and fixing in place complete the low pressure, return circulation steam heating and ventilating apparatus required for the U. S. Post Office Building at Martinsburg, W. Va., in accordance with the drawings and specification, copies of which may be had at this office, or the office of superintendent at Martinsburg, W. Va. Each bid must be accompanied by a certified check for a sum not less than 2 per cent. of the amount of the proposal. The right is reserved to reject any or 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 inclosed in envelopes, sealed and marked "Proposal for Heating and Ventilating Apparatus for the U. S. Post Office Building at Martinsburg, W. Va.," and addressed to JEREMIAH O'ROURKE, Supervising Architect.

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DREDGING.—U. S. Engineer Office, 537 Congress street, Portland, Me.—Sealed proposals for dredging in Portland Harbor, Maine, will be received at this office until April 21, 1894, and then publicly opened. Specifications, blank forms and all available information will be furnished on application to this office. PETER C. HAINS, Lieut.-Col. of Engineers.

PUMPING PLANT.—The City of Concordia, Kansas, wants a 60-horse power boiler, feedwater heater with all attachments, compound duplex pump 1,000-000 gal. capacity and ten tubular wells 6 in. diam. with connections. Bids close April 9th, 1894. Plans and specifications can be seen at the office of W. Kiersted, room 38, Waterworks Building, Kansas City, Mo., or with the undersigned, J. H. TYNER, City Clerk.

WATER WORKS.—Sealed proposals will be received for the construction of a complete system of water works for the City of Poplar Bluff, Mo., until April 16th, 1894. Plans and specifications may be seen at the clerk's office in Poplar Bluff, Mo. Bids will be received for the whole or a part of the system. Right to reject any or all bids reserved by council. A certified check for \$500 must accompany all bids. J. B. REYNOLDS, Clerk of Poplar Bluff; ISAAC A. SMITH, Consulting Engineer, St. Louis.

U. S. ENGINEER OFFICE, 537 CONGRESS Street, Portland, Maine.—Sealed proposals for dredging in Portland Harbor, Me., will be received at this office until April 21, 1894, and then publicly opened. Specifications, blank forms and all available information will be furnished on application to this office. PETER C. HAINS, Lieut.-Colonel of Engineers.

U. S. ENGINEER OFFICE, 537 CONGRESS Street, Portland, Maine.—Sealed proposals for dredging in Penobscot River, Maine, will be received at this office until April 21, 1894, and then publicly opened. Specifications, blank forms and all available information will be furnished on application to this office. PETER C. HAINS, Lieut.-Colonel of Engineers.

U. S. ENGINEER OFFICE, 2258 WABASH Avenue, Chicago, Ill.—Sealed proposals for the design, manufacture and erection of the superstructures of one metal single track railway swing bridge and one metal highway swing bridge at Milan, Ill., will be received at this office until 12 M., central time, Tuesday, May 1, 1894, and then publicly opened. Specifications, blank forms and all available information will be furnished on application to this office. W. L. MARSHALL, Capt. Corps of Engineers.

PUMPING ENGINE AND BOILERS.—Office of the Commissioners D. C., Washington, D. C.—Sealed proposals will be received at this office until April 14th, 1894, for furnishing a pumping engine and boilers. Specifications and blank forms of proposals may be obtained at this office. J. W. ROSS, GEO. TRUESDELL, CHAS. F. POWEL, Commissioners D. C.

GRADING, ETC.—The undersigned will receive tenders up to April 10 for the grading and other works connected with the building of 50 miles (in sections of 2 to 10 miles) of the Tring-Meganric branch of the above-mentioned railway. Plans, profiles and specifications may be seen at the office of the contractor, where forms of tenders and all other information may be obtained. HOLT & LUKES, Sherbrooke, P. Q., Canada.

IRRIGATION WORKS.—Sealed bids will be received at the office of the Rio Grande Dam and Irrigation Co., El Paso, Texas, until April 15th, 1894, for the construction of dams and canals. Apply to the secretary for full information. EDWIN C. ROBERTS, President; E. V. BERKLEN, Secretary, El Paso, Texas.

SEWER.—Sealed bids will be received at the office of the Commissioner of Public Works of Peoria, Ill., until April 6th, 1894, for the construction of sewers in the Walnut St. Sewer District, consisting approximately of the following quantities of work: Brick sewer as follows: 193 ft. 3 in. x 4 ft. 6 in.; 351 ft., 2 ft. 10 in. x 4 ft. 3 in.; 165 ft., 2 ft. 4 in. x 3 ft. 6 in.; 412 ft., 2 ft. 3 in. x 3 ft. 4 in.; 456 ft., 2 ft. 1 in. x 3 ft.; 1 1/2 in.; 196 ft., 2 in. x 3 ft. Pipe sewer as follows: 287 ft., 18 in.; 1,341 ft., 14 in.; 3,261 ft., 12 in.; 2,264 ft., 10 in.; 16,62 ft., 8 in.; 1,650 ft., 6 in.; 57 manholes, 35 flush tanks, 17 storm water inlets, 12 independent lamp holes, 28 cu. yds. outfall stone abutment. Bids must be accompanied by a certified check for \$2,000. For information, form of contract, specifications, etc., apply to the City Engineer, ISAAC TAYLOR, Commissioner of Public Works, JACOB A. HARMAN, City Engineer.

WATER-WORKS.—Sealed proposals will be received at the office of L. G. Hollis, clerk, Winchester, Va., until April 3d, 1894, for furnishing all material and performing all labor necessary for the construction of a system of water-works for that city. The work to be done includes the supply and construction of a Service Reservoir, two Compound Duplex Pumping Engines of a capacity of 750,000 gallons each, two 50-H. P. Boilers, a Pumping Station, 625 tons of 4-in., 6-in., 8-in. and 10-in. cast iron pipe, 6 tons of special castings, 33 fire hydrants, 36 stop valves, 6 in. and 8 in. of six inches of main. Each proposal must be accompanied by a certified check for \$250 payable to the city of Winchester, Va. Plans can be seen and specifications and forms of contract secured on and after Monday, March 19th, by applying to L. G. Hollis, clerk, or at the offices of the engineer, 137 Broadway, New York, and 7-9 Lewis Block, Pittsburgh, Pa. C. E. HOUVER, Chairman Water-works Committee, ALEXANDER POTTER, Engineer.

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