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RICHARD P. ROTHWELL, C. E., M. E., Editor. ROSSITER W. RAYMOND, Ph. D., M. E., Special Contributor. SOPHIA BRAEUNLICH, Business Manager. THE SCIENTIFIC PUBLISHING CO., Publishers.

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* Illustrated.

Table listing mining news and foreign news with page numbers: MINING NEWS: Alaska, California, Colorado, Georgia, Idaho, Michigan, Minnesota, Missouri, Montana, Nevada, New Mexico, Ohio, Oregon, Pennsylvania, South Dakota, Tennessee, Utah, Washington, Wyoming. FOREIGN: Bolivia, Brazil, Br. Guiana, Chile, France, New Brunswick, Nova Scotia, Ontario, South Africa. COAL: New York, Boston, Buffalo, Chicago, Pittsburg. IRON: New York, Buffalo. CHICAGO: Philadelphia, Pittsburg. MARKETS: METALS, CHEMICALS AND MINERALS, MINING STOCK, MARKETS: New York, Colo. Springs, Boston, San Francisco, London. ASSESSMENTS: METALS, MINING STOCK, TABLES: New York.

THE Legislature of Colorado is evidently composed of men more sensible than its extraordinary Governor. Assembled in extra session this week, at the Governor's call, it refused to pay attention to his message advising legislation for State coinage of silver and various other measures which he advocates in his own peculiar fashion, and will, the dispatches say, probably adjourn in a few days without any action.

THE January reports of the American blast furnaces show practically no change from December. At the opening of the year 130 furnaces are reported in blast, with a weekly capacity of 101,000 tons. As we have before remarked, furnaces are not likely to be blown in under present conditions, unless there is a certainty of disposing of their output, and the revival in demand is not yet sufficiently marked to increase the demand for pig. We believe, however, that the February report will show some improvement, though not, perhaps, a large increase.

FOR two or three years past Japan, with an annual output of about 8 1/2 million tons, has had more coal than is needed for home consumption, and with characteristic enterprise the Japanese have been looking for foreign markets. Their exports now amount to fully 1 1/2 million tons a year. There was some talk of shipping coal to California, which has not yet, however, been done to any extent; but several cargoes have been sent to Bombay and there found a market. Some of it has been tried as railroad fuel and found to be of as good quality as Indian and much cheaper than English coal.

MR. ANDREW CARNEGIE, the shrewd and far-seeing iron manufacturer who practically controls the steel trade of the United States to-day, and who is an ardent Republican, wants to see the tariff reduced and the WILSON bill, with some desirable amendments made to it, passed by the present Congress. He wisely says that it is better for the protected industries to submit gracefully to a moderate reduction in the tariff as the WILSON bill proposes, and to have it passed by the Democratic party, than to maintain a high tariff that will be a constant source of criticism and contention, unsettling business until it is revised. No doubt this is sound advice from a business standpoint.

THE production of pig iron in 1893 by the German furnaces, with December estimated, is given at 4,750,000 metric tons, this statement including the Luxemburg furnaces. The output was almost the same as in 1892, showing a decrease of about 7,000 tons only. Although consumption was well up to production, prices have declined and the trade is said to be in poor condition, chiefly owing to the great decline in the market for finished iron and steel. The latter is said to be entirely demoralized by excessive competition. All attempts to renew the Rolling Mills Convention, or union of iron makers, have failed, although the Westphalian companies have succeeded in forming a new local union for their district.

WE have from time to time stated that a fight is looming up between the owners of the MACARTHUR-FORREST cyanide patents and certain gold mining companies in South Africa which have set up cyanide plants on their own account, without consulting the African Gold Recovery Company. This action on the part of these companies is occasioned by their knowledge that the MACARTHUR-FORREST patents are invalid owing to previous use of the process, and they are courting the settlement of the subject in the courts. The latest news on this point is that the African Gold Recovery Company is not going to pay any dividend this half-year, in order that it may have plenty of money on hand wherewith to pay for impending litigation. That the struggle is near at hand is evident from the fact that a barrister well known in the patent law courts has just sailed from London for South Africa to look after the company's interests.

IT may be noted that in the death of Sir GEORGE ELLIOTT, who proposed the creation of an English Coal Trust, England has lost an interesting personality. Beginning work as pit-boy in a mine at the age of nine years, he was a miner, foreman, inspector and agent, and while still a young man rose to be a colliery owner and manager himself. He had full opportunity to study the labor question from both sides, for at one time he was leader of the largest trades-union in England, while at a later date he had at work in the collieries which he owned, or managed for others, nearly 10,000 men. He never forgot his early experience, and to him was largely due the passage of the present Mines Regulation Act, which worked a great improvement in the conditions of mining labor. By nature and training an active man, he was prominent in many public movements and interested in many enterprises. It is a little curious, considering his disposition and experience, that while in Parliament he was a firm adherent of the Conservative party.

THE Reading election resulted in the defeat of Mr. ISAAC L. RICE and the New York party by a majority of nearly three to one on the stock. Mr. HARRIS and his friends voting about three-quarters of the stock. The

report is, as usual, a somewhat unsatisfactory document, giving only brief and bare statements of earnings, expenses and charges, without the particulars needed for a proper understanding of details. The receivers have made some comments on the accounting methods of the McLEOD management, and have made some significant changes in the figures given for 1892 a year ago, deducting \$2,166,361 from the profit then reported for the Railroad Company, and changing the apparent profit of \$24,339 then reported for the Coal and Iron Company to a real deficit of \$813,163. For 1893 the Railroad shows earnings \$606,694 less than its expenses and charges, and the Coal and Iron Company a deficit of \$195,649, making a loss of \$802,343 on the joint operations. The report requires more extended comment and analysis, which we hope to give it later.

THE ENGLISH IRON TRADE IN 1893.

The English iron trade seems to be suffering from depression, not perhaps as great as our own, but still sufficient to make the ironmasters anything but cheerful. In the early part of the year the pig iron trade was fair, and up to June 30th production was larger than in 1892. The coal strike and other troubles brought the output down to the lowest point about November 1st, but a reaction followed, and on December 31st there was an increase noted. The promise of the earlier months was not fulfilled, and the conditions of the later months of the year were so unfavorable that the total production is estimated at 6,800,000 long tons, an increase of only 183,000 tons over 1892, and a decrease of 423,500 tons from 1891; while as compared with 1889, the year of greatest production, there is shown a falling off amounting to 1,445,300 tons.

The decrease in production is not the only unfavorable feature of the trade. Owing largely to the coal strike, but in some degree to other causes, such as higher charges for ores and labor, the cost of production increased, but the current demand did not permit a corresponding increase in prices. Complaints are made that profits have been very small, and in many cases have disappeared entirely, while the fact that lower rates could not be made on pig, and consequently on finished iron, caused the loss of some important export orders, chiefly to Belgian competitors.

The range of prices during the year was not very great. Quotations of Scotch pig varied from \$9.60 to \$10.60 per ton, closing about \$10; Cleveland pig ranged from \$8.10 to \$8.80, and Cumberland hematite from \$10 to \$11.10 per ton. The fall in prices of finished iron and steel was apparently greater than in pig, and in September sales of steel rails were made at \$17.50 per ton, the lowest price ever reported; later, however, the price went up slightly and was about \$18.50 at the close of the year. Other prices were almost as low, and the present outlook is not favorable.

THE MINERAL PRODUCTION OF IDAHO IN 1893.

A statement showing the mineral production of Idaho in 1893 has been prepared for the Wells-Fargo Company by Mr. ALFRED EOFF, cashier of the Boise City National Bank, and this estimate gives the following figures, in comparison with those for 1892:

	1892.		1893.	
	Quantity.	Value.	Quantity.	Value.
Gold.....		\$1,790,000		\$1,645,000
Silver, oz.....	2,798,000	2,798,000	2,145,714	1,502,000
Lead, lbs.....	61,875,000	2,475,000	22,142,857	775,000
Total value.....		\$7,063,000		\$3,922,000

In the estimate for 1892 silver was valued at \$1 per ounce and lead at 4 cents per pound; in the 1893 estimate silver is taken at 70 cents and lead at 3½ cents.

It was to be expected that Idaho would suffer more from the depression than Colorado, since the variety of her resources is less, and the output of the great silver-lead mines of the Cœur d'Alene district consists of the metals most largely affected. Had the price of lead been maintained there would have been some compensation for the fall in silver, as we have heretofore pointed out; but with both metals depressed there has been no alternative left to many of the mine-owners except to shut down, unless, indeed, a large reduction in working expenses could be made, and this would have required a scaling down of wages, which the miners were not willing to submit to.

In Idaho, as elsewhere, the fall in silver has turned the attention of miners to gold, and there has been an unusual amount of prospecting for the yellow metal, while the older placers and mines have been worked with great energy. The season was well advanced, however, before the movement in this direction began, and the country is too far north to permit prospecting and placer work in the winter, so that the full effect will not be apparent until spring sets in. Preparations have been made for placer working on a large scale on the bars along Snake River, and at other points; while the work of prospecting will be prosecuted more extensively than for a number of years past. Some of the older mines have continued to do well, and the work of development and improvement has continued. This has been notably the case at the De Lamar mine, where, in addition to the ordinary work, a considerable sum has been expended

to secure economy in the future by the application of water-power to the mills and other machinery. Last year, it will be seen, the production of gold shows an actual decrease, though much less in proportion than that in silver.

The future of silver mining in Idaho must depend largely upon the degree to which good management and economy can reduce the cost of production. Here, as in other States, a fall in mining wages to a point near the rate ruling in other occupations is inevitable, and will doubtless follow before long.

While no considerable increase in the price of silver is to be expected, it is probable that a rise in the lead market may offset to some extent the depreciation in the white metal. To how great an extent the gold output can be increased is still uncertain.

TARIFF DISCUSSION.

The debate on the WILSON tariff bill was fairly begun in the House of Representatives this week, and the bill has been made the standing order, to the exclusion of other business. The Committee on Rules has asked the House to close debate and order a vote taken on January 29th. If this be done, the bill will go to the Senate early in February; but the well-known deliberate methods, of that body make it entirely uncertain how long it will take to act on the measure. If the opposition decide to fight the bill by delay, it is impossible to predict the date of its passage or the shape which it will finally take. It is to be hoped that no such course will be resorted to, for the injury to the country from continued delay and uncertainty will far outweigh any temporary advantage, industrial or political, which may be secured in the contest.

What the country needs now above all is certainty as to the future and rest from political calamity-bowlers. When manufacturers are in a position to look forward to the future with some degree of security as to the conditions under which they will have to work, a prompt revival may be looked for; but until then very little improvement can be expected. Full and fair discussion of so important a measure as the tariff bill is to be desired, but unfortunately very little of the current discussion is fair. Even from quarters where something better might be expected, statements and arguments on both sides are distorted by motives of partisan or personal interest. The most extravagant and unfounded statements are repeated and as they probably find credit to a considerable extent, the effect is necessarily bad.

What we need above all, we repeat, is rest and certainty; time and the energy and enterprise of our people will do what else is needed to restore prosperity. If our contemporaries of the press will stop their wild and stupid predictions of disaster if their advice is not taken, and if Congress will give us a tariff bill in a reasonable time, we need not fear the result; but delay is poison to the business system of the country.

NEW PUBLICATIONS.

BOOKKEEPING AT A GLANCE. By John T. Brierley. New York; the Excelsior Publishing House. Pages 142; price 75 cents.

Practice is needed to make a good bookkeeper, just as experience is necessary to perfect a man in any art or trade. Good preliminary instruction is necessary also, and the most expert of accountants will find it convenient sometimes to have a book to refer to. The system set forth in this book seems to be an excellent one, and it contains also many useful hints, with forms, tables, etc., which are very convenient for reference. The book is of a size which can be carried in the pocket, and so kept always ready for use. It will be found serviceable both for beginners and for old hands.

ILLUSTRATED CATALOGUE OF RAILWAY AND MACHINISTS' SUPPLIES. New York; Manning, Maxwell & Moore. Pages 1,072; illustrated.

Under the modest title given above, Manning, Maxwell & Moore have issued what might almost be called an "Encyclopedia of Modern Machine Tools," for it includes in its pages almost every description of tool and implement which the metal or wood worker can use. Its extent may be judged from the fact that the index alone takes 10½ pages. From this catalogue one could select the entire equipment of a machine shop, including the iron and brass foundry; of a wood-working shop; of a railroad, with the sole exception of the locomotives and cars; or of a quarry and a large part of that needed for a mine. Engines and boilers are included as well as tools, and there is an almost endless list of the numerous small supplies needed in the shop and on the road. The catalogue is carefully arranged and classified, and, with the aid of a full index, anything desired can easily be found with its appropriate brief description and notes as to capacity, weight, special uses and other particulars important to the intending purchaser, who will find also, in many cases, a selection from different types of machines open to him.

The mechanical execution of the book deserves a word of commendation. It is well printed and bound and the almost innumerable illustrations are woodcuts, as a rule well drawn and engraved. It may be considered, as we have said above, as a book of reference as well as a catalogue, and no experienced mechanic can look through its pages without finding some tool or device new to him, and getting some new ideas. Taken altogether it is the most remarkable catalogue of the kind we have ever seen, and shows better than any statements could the extent and variety of the business done by the firm which issues it.

STATISTISCHE ZUSAMMENSTELLUNGEN UBER BLEI, KUPFER, ZINK UND ZINN, VON DER METALLGESELLSCHAFT, FRANKFURT-AM-MAIN, IN DEN JA HREN 1890-1892. Pages 36. 1893.

The name of the well known metal house which has issued this excellent statistical compilation would in itself be a guarantee of its value. With its associate houses, the American Metal Company, in New York, and Henry R. Merton & Co., in London, it has for some years past published promptly the statistics of production of zinc, tin, and copper, in London. The field has now been enlarged and the result is an extremely useful compilation.

As its title indicates this pamphlet contains statistics of lead, copper, tin and zinc, in 1890, 1891 and 1892. Under the heading Lead is given a statement of the production of that metal by countries in the years 1883 to 1892, both inclusive, and the imports, exports and consumption of lead in the most important countries in the years 1890, 1891 and 1892; the production of lead ore and lead (together with the imports and exports of the same), in Germany from 1881 to 1892, and a table of the annual price of English lead for many years. The other metals are treated in a similar manner, the statistics of Henry R. Merton & Co., of London, being used for the production of copper and zinc. The other statistics in the pamphlet are compiled from official sources; the "Engineering and Mining Journal's" figures being used for the United States. There are many statistics given, which we have not seen elsewhere, those for the consumption of the metals in all the principal countries being especially interesting and valuable. The table showing the production of lead in the world is also worthy of note, no other that we know of being so complete and so nearly correct. According to this the output of lead in the world was 621,200 metric tons in 1892, 603,700 in 1891, and 546,700 in 1890. We commend this pamphlet to the trade as an extremely interesting and useful compilation.

TRAITE DE TOPOGRAPHIE. By André Pelletan, Ingénieur en Chef des Mines, Professor à l'École Nationale Supérieure des mines. Paris, France; Baudry & Cie. Pages 330; 235 figures. Price, 15 francs.

To the American who wishes to familiarize himself with the European methods of surveying this work will be of great service, and to the French student indispensable. We believe it is the best book on the subject at present in the French language. The reviewer remembers that while studying at the Liege University, not so very long ago, he wished to supplement the lectures on this subject, and was obliged to have recourse to German treatises. French books on surveying are usually devoted too much to theoretical and general principles; and while this one does not totally discard analytical discussions, it is at the same time of a very practical nature.

The book is divided into five parts. In the first, Mr. Pelletan gives some of the principles of physics which are made use of in surveying. He studies in particular the lenses and the compass, which are of such importance in surveying instruments. He also recalls a few geodetic principles, such as the determination of the co-ordinates of the polar star, etc., the correction of different errors due to the curvature of the earth and to refraction.

In the second part, covering 112 pages, the author first describes in a general manner all the instruments, and then indicates the modifications necessary in the special cases of surface or underground surveying. The methods for underground or surface surveying are based on the same general principles; though in practice they differ a good deal. The author therefore rightly studies them separately. The third part of the book is devoted to surface, and the fourth to underground surveying. We should here like to say that the examples worked out to show how the operations are systematically carried on are all that could be desired.

Lastly, the fifth part is devoted to the theory of errors, which is now generally applied by many surveyors to the discussion and correction of results obtained. At the end of the work there are two tables; the first for the conversion of degrees into grades, and of grades into degrees, operations which frequently occur, as both systems are still in general use; the second table for the reduction of angles to mean time. The drawings and the general text are good, as is the mechanical execution of the book generally.

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 in another page of the Journal.

Principles of Coal Mining. Second Edition, Revised. By J. H. Collins. London and Glasgow; William Collins, Sons & Co., Limited. Pages 152; illustrated.

Abnormal Man: Essays on Education and Crime and Related Subjects. (Bureau of Education, Circular No. 4.) By Arthur MacDonald. Washington; Government Printing Office. Pages 448.

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 Basin Elkhorn Mine.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: Nearly two years ago a company was formed in London, England, known as the Basin Elkhorn Mining Company, Limited, with offices at 138 Leadenhall street, in that city, to acquire and work certain mining property situated in Jefferson county, Montana. It is thought the company has expended about \$20,000 during the present year in developing the said property, but a short time ago it discontinued

operations. The company was extensively advertised and well recommended at the time it was launched before the public, both in England and Scotland, and the writer would be pleased to know what are the prospects of the mine; what results the development of the mine has produced, and what are the prospects and general standing of the company. Any information on these points will be appreciated.

GLASGOW.

Photography and Mining Reports.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: The art of underground photography has of late made such progress as to deserve the special attention of mining engineers. By its aid they may now illustrate their reports with pictures plainly showing the exact appearance of ledges, ore-bodies and other features of importance. And if the practice of employing such illustrations once becomes general, the value of mining reports will be considerably enhanced. Indeed, I doubt not that in the near future no mining report will be considered satisfactory if it be not fully illustrated by means of photography.

As an example of the excellent results now obtainable, I send you a copy of a report I have just made upon the Mayflower and South Mayflower mines, on the great "Mother Lode," in Amador County, California. This report is illustrated by some exceptionally fine photographs of points underground; and I trust you will permit me to add that in the event of any of your readers being desirous of having a copy, I shall be very happy to supply the same free of charge, as I think that by so doing I shall be aiding mining engineers in general.

SAN FRANCISCO, Dec. 15, 1893.

STEPHEN H. EMMENS.

Theories of the Origin of Coal.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: If A. de Gaul had not given up his "old text-books" so soon, he would have made the interesting discovery that the carboniferous period, in the strata of which most of the coal is deposited, is far from the bottom of the pile which the geological periods make; he would not, then, in all probability, have made the strange statement that he believed the coal was formed by the solidification of a fluid; for if the coal was formed by such a process it would not have been deposited in such comparatively late strata as the carboniferous, but would have been found in the joint strata we know of, the Laurentian, or deeper yet, and we would only have learned of its existence through volcanic agency; for such a fluid as A. de Gaul talks of would have been one of the first formations of a cooling globe—when all the carbon was in the form of carbonic acid. How to account for the fact that this fluid was not formed until the carboniferous age is a very weak point in A. de Gaul's theory, while it is a very strong one in favor of the vegetable origin of coal, as no great amount of vegetation existed until that time.

A. de Gaul makes reference to the limestone of the carboniferous as an evidence that free carbonic acid must have been present in large quantities in order to combine with the lime to form the limestone. There is no evidence whatever that the limestone of the carboniferous or any other limestones we have any knowledge of was formed by the direct combining of lime and carbonic acid. All the limestone we know shows, on microscopic examination, that it is composed of the minute shells of foraminifera, and in some cases of longer shells of the bivalve variety. That free carbonic acid was no more abundant in the waters of the carboniferous than it is in our present waters is shown by the great horde of aquatic animals that are known to have lived in those waters. That it did not exist in the air as carbon dioxide in great quantities is shown by the many land animals of that period, especially insects, which require quite pure air and are now known to have been plentiful at that period. When A. de Gaul says that the theory of the vegetable origin of coal rests on nothing but the fact that a lot of roots and little plants are found in the coal seams, he shows most deplorable ignorance of the theory. A man who would bring forward a new theory should be better posted on the old one he is trying to displace, than A. de Gaul appears to be. If he will notice carefully he will see that some of these very roots and plants he is talking about are changed to coal. If he will carefully prepare microscopic sections of soft coal and also of the hardest and most structureless looking anthracite, he can see its vegetable structure. Even if he will examine the ashes of any coal, he can find remains of vegetable cells with characteristic markings, and these cells will be of many varieties, showing that the coal is composed of the remains of many different kinds of plants. Again after more experience in the coal fields he will find that he can trace a perfect gradation from wood or peat through brown coal, lignite and bituminous coal to anthracite and graphite. I think I have so punched A. de Gaul's armor by this time that he had better take it up and sell it for old iron.

OLD THEORY.

Coal Exports of the United States.—The coal exports reported by the Bureau of Statistics, Treasury Department, for the 11 months ending November 30th, were 3,372,665 tons, against 2,349,468 tons for the corresponding period in 1892; an increase of 1,023,197 tons, or 43.5%. The increase was entirely in the exports to British North America, which were 2,619,150 tons this year, the gain being 1,033,221 tons, or 65.1% over last year.

Rolling Aluminum.—In the 23-in. mill of the Carnegie Steel Company's works, at Homestead, Pa., the experiment of rolling 6-in. beams from aluminum for government vessels is being tried. The first beam was rolled January 8th, but was not altogether satisfactory. The aluminum was heated just hot enough to char a pine board, and then submitted to the rolls. In the second pass it collared on the rolls and broke two boxes. Consequently the experiment was postponed. The experiment will be tried again this week. This is the first experiment of the kind ever tried in the works.

THE MISSOURI MINERAL EXHIBIT AT THE COLUMBIAN EXPOSITION.

Written for the Engineering and Mining Journal by E. O. Hovey, Ph. D., Superintendent of the Exhibit.

Missouri produces about as much zinc ore as all the rest of the United States put together; stands second in the Union in the production of lead; mines very large quantities of coal and considerable iron ore; and has valuable deposits of clay and quarries of various building stones and marbles, besides other sources of mineral wealth. In recognition of her prominence as a mining State and on account of her extensive and intelligent preparations for making a creditable display, she was assigned a position of honor in the middle of the Mining Building, at the southeast corner formed by the intersection of the two main central aisles. The exterior installation was itself in the nature of an exhibit. It consisted of a colonnade in Italian Renaissance style of handsome light brown terra cotta pilasters, furnished by the Winkle Terra Cotta Company, of St. Louis, resting on a low screen wall of Roman brick from the yards of Evens & Howard, St. Louis, and surmounted by a wooden cornice. The base of the whole structure was of fine red granite from the quarries of the Syenite Granite Company, at Graniteville. The main entrance to the exhibit was at the central corner, and its sides were ornamented with panels of onyx from Stone and Texas counties.

On account of the pre-eminence of the State in zinc and lead ores special emphasis was laid on them in the collection and arrangement of the exhibit. The zinc region of the State is concentrated in Jasper, Newton and Lawrence counties, more than 97% of the ore mined in the State coming from the three, and 79 per cent. from Jasper county alone. Seven other counties produce zinc ore in commercial quantities. The production of the State by counties for 1892 is given in the following table: Dade, 103 tons (of 2,000 lbs.); Barry, 192; Green, 899; Jefferson, 2,075; Newton, 8,343; Lawrence, 13,861; Jasper, 106,014; total, 131,487 tons. In past years zinc ore has been mined in Washington, Wright, Christian, Howell, Webster and Morgan counties also, and is known to occur in small quantities in many other parts of the State.

The chief ore is the sulphide, or sphalerite, locally known among the miners as "jack," and called rosin jack, black jack or steel jack, according to its color. The other Missouri zinc ores are calamine, the hydrous ortho-silicate, and smithsonite, the carbonate, which are indiscriminately called "silicate" by the miners. Sphalerite is the principal ore of the Joplin district, and is the most valuable of the three, containing 67% of zinc. Aurora and Granby produce most of the calamine and smithsonite. These ores contain 54% and 52% metallic zinc respectively. Smithsonite is relatively of less importance in the State than calamine. A large part of the calamine from Aurora is used in the manufacture of zinc white at Waukegan, Ill. Most of the ore is smelted outside the State, only about 28,750,000 lbs. of spelter being produced in Missouri in 1892.

Zinc occurs in most of the paleozoic geologic formations of Missouri, but the great deposits are confined to the Lower Carboniferous, or Mississippian strata, and are there found "sometimes in thin sheets in crevices in the massive limestone; sometimes in great chambers; sometimes buried in clay and a mass of loose material which can be excavated by pick; sometimes disseminated through solid, brecciated rock which has to be blasted down; sometimes lining cavities with drusy crystals." (Winslow.) Statistics of the production in past years are very hard to get and are not always accurate, but those obtainable show a fairly steady increase of output from 1870, when zinc mining began in Jasper county, and the output was 4,000 tons to 1889. Since the latter date the increase has been very rapid and there is no reason to believe that the maximum rate of production has yet been reached. Crude and wasteful methods of mining and concentrating have been the rule rather than the exception in southwest Missouri, and there is still room for great improvement, though modern machinery and methods have been introduced by many of the larger companies in the last two or three years. Few of the miners really know what their ore has cost them as it lies in the bin, but one of the companies that keeps books scientifically has given the following figures as to the average cost of mining and concentrating at one of its mines in 1892: Mining (including culling and all dead work), 75 cts. per ton hoisted; hoisting, 23 cts.; pumping, 26 cts.; haulage of ore to mill, 11 cts. per ton taken to mill; general expense and fixed charges, 26 cts.; concentration, 50 cts. Regarding these figures it should be said that the water is unusually heavy at this mine, and that the company did more prospecting in 1892 than usual, and therefore did not run the mill to its full capacity all the time.

The principal feature of the exhibit of zinc ore was the finely crystallized specimens from Carterville, chief among these being those from the North Star Mine on the Perry land. Resting on a table at one side of the main entrance was a mass of almost pure "rosin jack" from this mine, weighing 1,650 lbs. Many other specimens from this and other mines in the district were notable for their perfection or complexity of crystalline form. The variety in sphalerite was astonishing to those not familiar with the mineral. An interesting feature of some of the North Star specimens was the numerous tetrahedra of chalcopyrite on the surfaces of some of the crystals of sphalerite. The tetrahedra were small, not exceeding 2 mm. in an edge, and all those on a given surface were in parallel position. Specimens from the Victor mine show a similar phenomenon, but the tetrahedra are much larger, measuring 8 to 10 mm. on an edge. Occupying the place of honor on a pedestal of zinc on a table in the center of the space was a magnificent specimen of black sphalerite, weighing 790 lbs., from the Eagle mines of the Empire Zinc Company, at Joplin. This was made up of huge aggregate crystals 4 to 6 in. (10 to 15 cm.) in diameter which were dotted over with small doubly terminated scalenohedra

* The statistics of production were collected and furnished the exhibit by the State Geological Survey, Arthur Winslow, State Geologist.

of calcite as if with rice, while here and there a small octahedron of galenite could be seen.

A very instructive feature of the sphalerite exhibit was a display of the work done by the Empire Zinc Company, in concentrating the ore from its Kohinor mine. Twenty-one jars neatly arranged in a handsome open case showed the work of one day. The books of the company indicate that the day did not happen to be a good one for ideal results. The jars were arranged so as to show the rock as it came from the crusher, and as it was fed to each of four sizes of jig and to each of the two sizes slime tables, and the "heads" or concentrates and "tailings" or refuse from each. The percentage of zinc in the concentrate was given in each case; for the slime table this was about 54%, and for the jigs was from 63% to 65%. The amount of zinc in the "general sample" was about 64%, while that in the tailings therefrom was about 2%, and that in the rock crushed was about 18½%. This company also furnished the spelter used in building a column containing 200 slabs, and weighing 9,600 lbs., which represented the amount of metal in the zinc ore mined in the State every 15 minutes of working time in 1892.

Lead is mined in Missouri as the sulphide, galenite (87% Pb), and as the carbonate, cerussite (78% Pb) incorrectly called "drybone" by the miners. The latter is the direct product of the decomposition of the former, and is found near the surface. Galenite is the more valuable and also the more common ore. Lead is known to occur widely throughout the State and has been mined in 26 counties. In 1892 the production of pig lead by counties was, in tons of 2,000 lbs.: Perry, 4; St. Francois, 15,430; Washington, 1,166; Miller, 16; Greene, 264; Lawrence, 3,719; Newton, 812; Madison, 2,865; Jefferson, 268; Franklin, 98; Cole, 23; Barry, 55; Dade, 64; Jasper, 7,476; total production pig lead in 1892, 32,260 tons.

Lead was the first metal mined in the State, mention of its production being made as early as 1700. The Mine La Motte diggings, in Madison county, were opened in 1723, and have been worked intermittently ever since. Lead mining in the southwestern district dates from about 1850. The lead ores of the southwestern counties are very closely associated with the zinc ores and therefore occur in the Mississippian formation. They are in a more or less concentrated state and are readily cleaned by hand picking or jigging. Large isolated crystals and groups of crystals are not uncommon. The finest specimens of crystals of galenite in the exhibit were from the land of the Oswego Mining Company, Joplin. Of these, the largest group measured more than 2 ft. in length, and contained many almost perfect cubes, some of which were fully 3 in. on the edge. The galenite of the southeastern region, on the other hand, is disseminated in small crystals or crystalline masses through solid limestone (of Cambrian age) and is so intimately mixed with the rock that an elaborate plant is needed for its proper concentration. Such a plant was illustrated in the exhibit by a beautiful model (1-32 actual size) of the ore dressing works at Bonne Terre, St. Francois county, owned and operated by the St. Joseph Lead Company. This mill handles from 900 to 1,000 tons of rock every 24 hours. Each crusher feeds its own set of roughing jigs, sand jigs and percussion slime tables, so that in case of a breakdown it is not necessary to stop the whole mill, but only that series in which the accident occurs. All the crushers, jigs and slime tables are on the main floor of the mill, while the rolls, screens, classifiers, settling vats and rotary pumps for the elevation of material for the jigs and slime tables are on the floor beneath, and everything is arranged to work as automatically and with as little manual labor as possible. In addition to this model, the exhibit of this company consisted of a series of specimens and samples, showing very fully the country rock and the occurrence of the ore in it, the milling products and the various stages of furnace work to commercial lead. Besides these is a set of large photographs of the mills, furnaces, etc., belonging to the company. This company's mines at Bonne Terre are the largest lead mines in North and South America, and the third largest in the world. Their annual product is upward of 14,000 tons of pig lead. A pile of 70 pigs, or 5,600 lbs., of lead furnished by the same company represented the amount of lead in the ore raised in the whole State every 15 minutes of working time in 1892.

The Picher Lead Company, of Joplin, made a unique display of a comparatively new industry, the manufacture of strictly amorphous lead sulphate for paint. This is made directly from galenite by the Lewis-Bartlett process as a by-product in the smelting of pig lead. The process consists in catching in tow bags the volatilized lead sulphide given off by the open Scottish hearth furnaces; burning the sublimed sulphide in the open air; completing the oxidation to sulphate in a furnace, and purifying the sublimed product. The exhibit consisted of crude ore and slag and grades "A" and "AA" of "sublimed white lead," which contain small percentages of PbO, and "sublimed lead sulphate," which is more than 99% pure PbSO₄. The firm marketed more than 5,000 tons of these products in 1892.

Nearly in the center of the exhibition space stood a pyramid 10 ft. high made up of huge masses of lead and zinc ores aggregating 28,000 lbs., representing the output of concentrated ore of the whole State for 14 minutes of working time in 1892. The most striking specimens in the pile were a mass of pure galenite from Belleville, Jasper county, weighing 6,500 lbs., another from Webb City, weighing 2,400 lbs., and one of rich disseminated galenite in limestone from Bonne Terre weighing more than 5,000 lbs. The largest masses of zinc ore in the pyramid weighed from 500 to 700 lbs.

(To be Continued.)

A Buried Gallo-Roman City.—Excavations in Oisseau le Petit, department of the Sarthe, France, have revealed a Gallo-Roman city, which appears to have been destroyed by an earthquake. The city probably contained some 30,000 inhabitants, but its name is not known in French history. The ruins include a great temple, part of which is still standing, also a theatre and monuments.

SOME GEOLOGICAL FEATURES OF THE MINES OF VELARDENA, MEXICO.

Written for the Engineering and Mining Journal by Carl S. Fogh.

At the beginning of 1893 the writer was engaged as engineer of the Velardena Mining Company, at Velardena, Mex., a mining camp on the Mexican International Railroad, about 60 miles west of Torreon, the point of intersection of the Mexican International and the Mexican Central railroads. One of the duties of the position was to make a complete survey of the underground workings as operated at the time and to prepare a map to serve as a guide for future work; this was done with the assistance of Mr. S. C. Sherman.

The recent workings were connected with the surface by two vertical shafts, No. 1 and the Mejora, and two inclined shafts, one at about 60°, called No. 2, and one at 45°, called San Nicolas. The accompanying sketches of the outcroppings of the porphyry dykes (Fig. 1) and of the drifts in the 200-ft. level (Fig. 2) give an idea of their relative position. The three first-named shafts were driven down to the 300-ft. level, which was at the time the lowest one; the San Nicolas incline alone only reached to the 200-ft. level. These two levels were the only ones in which any prospecting and developing were carried on. Two continuous drifts in both levels connected

were driven on contact for 600 ft., when suddenly both drifts run into limestone, the top of the porphyry dyke not reaching up to the 200-ft. level. The southerly drift (No. 2 west) had been continued in more southerly direction to avoid a cave in the limestone which had been met with in drift No. 1. After a short distance vein matter was again encountered having porphyry on the south; this contact was laid bare for about 100 ft. in southeasterly direction, but mainly followed in northwesterly direction toward the Mejora shaft. The outcropping of the porphyry Dyke 3 was found south of the mouth of the San Nicolas incline; it was traced in northwesterly direction, until it disappeared under a high point, from whence a ridge is seen running in more northerly direction, which is formed by limestone strata standing on edge, a result of a volcanic upheaval. The inclination of the ridge being toward the north, it corresponds to the disappearance of Dyke 3 between No. 1 and No. 2 west San Nicolas. Close by and south of where the outcropping of this dyke ceases another dyke is seen, which can be traced southeasterly past the mouth of the San Nicolas incline and northwesterly beyond the first gulch over the following mill, down past the Mejora shaft and further west to the west side of the gulch in which No. 1 and No. 2 shafts are situated; here the outcroppings cease on top of the hill, showing a distinct line of limestone around its western edge.

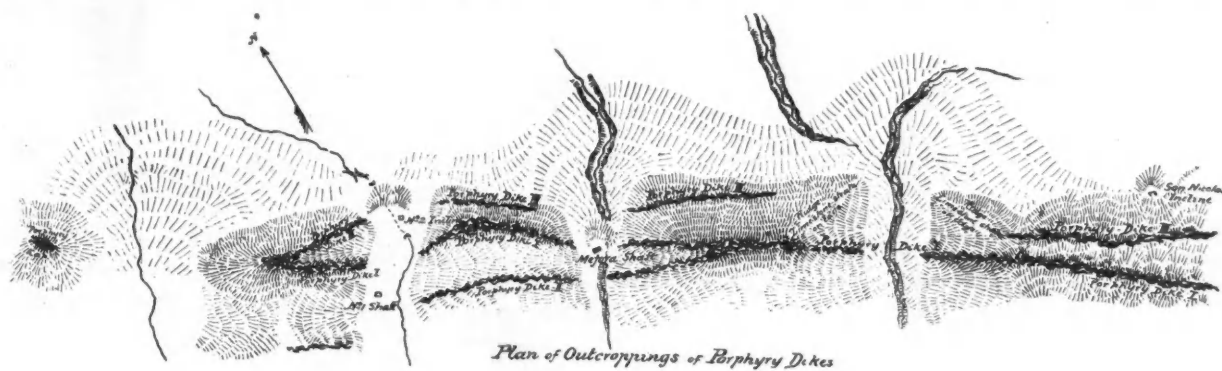


FIG. 1.

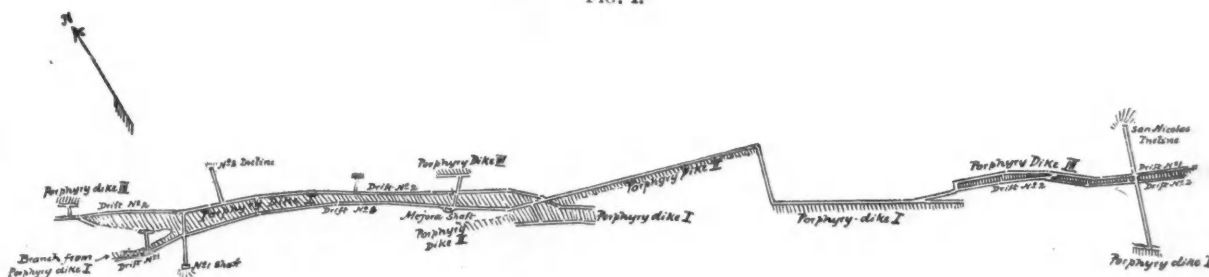


FIG. 2.

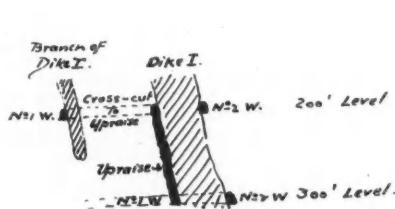


FIG. 3.

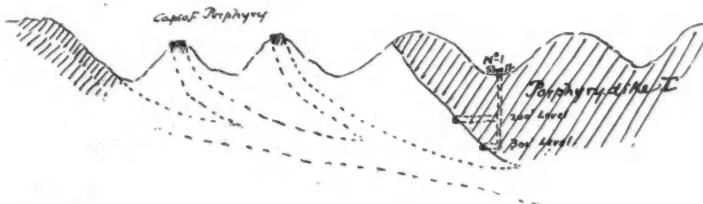


FIG. 4.

GEOLOGY OF THE VELARDENA MINES, MEXICO.

No. 1, No. 2 and the Mejora shafts. When the survey was started no connection had yet been made between the San Nicolas incline and the Mejora shaft; but drifts were driven for that purpose toward each other from both shafts on the 200-ft. level. The general direction of the drifts was found to be N. 60° W.

The general conclusion arrived at by examining the drifts was that they were as a rule driven in vein matter between two practically vertical walls of porphyry and limestone. As mentioned above, two drifts connected No. 1 shaft and the Mejora in the 200-ft. and 300-ft. levels, the cross-cuts showing the veins to be on each side of a porphyry dyke (called Dyke 1, on the sketch) of an average thickness of 35 ft. Several cross-cuts north had encountered another dyke (called Dyke 3) of but 10 ft. thickness; but no continuous drifts were driven on its contacts between No. 1 shaft and the Mejora. A cross-cut from the bottom of the San Nicolas incline driven through limestone encountered at first a porphyry dyke (Dyke 3) laying bare two veins, in which drifts were driven southeast and northwest; northwest to connect with drifts coming from the Mejora shaft. A continuation of the cross-cut encountered another dyke (Dyke 4) at 300 ft. from the bottom of the incline, but the contacts were not followed up.

The two first-mentioned drifts (San Nicolas No. 1 and No. 2 west)

This dyke is called Dyke 1 on the sketch, and is the dyke that No. 2 west drift of San Nicolas is following on its north contact.

The Mejora shaft was sunk on the south contact of this Dyke 1. Drift No. 1 east in the 200-ft. level was driven forward to connect with drift coming west from the San Nicolas incline; soon the drift was run completely into porphyry, and a cross-cut south struck lime contact again and the vein was followed for a short distance westerly and easterly but abandoned on account of poor ore. The main drift was driven forward in a more easterly direction; soon lime contact was encountered and followed until the drift ran into limestone, the top of the dyke not reaching up to that level. The surface above this drift showed a ridge of limestone strata on edge with a sharp inclination due east; a feature similar to that found on the other side of the gulch. The indications were that two dykes were intersecting each other just east of the Mejora shaft and that No. 1 east had been following the south contact of Dyke 4 then cut through Dyke 1 to north contact on Dyke 2, which contact could never lead to a connection with No. 2 west San Nicolas. These conditions once understood it was an easy matter to find the north contact of Dyke 1 on which No. 2 west San Nicolas was driving by cross-cutting through Dyke 2 and the intervening limestone east of the intersection of the dykes. No. 1 shaft had been sunk in solid lime-

stone south of Dyke 1; a cross-cut north on the 200-ft. and 300-ft. levels struck two contacts as expected. The veins were followed easterly connecting with the McJora shaft and westerly for some distance. In the No. 1 west 300-ft. level an upraise was made to the 200-ft. level, but no drift was encountered, as was expected; the survey revealed that the top of the upraise was 50 ft. north of No. 1 west toward the 200-ft. level. A cross-cut north from No. 1 west toward the upraise showed that No. 1 west was driven on the south contact of a porphyry dyke, 8 ft. thick, which must be looked at as a branch from Dyke 1. The bottom of this branch was between the 200-ft. and 300-ft. levels, as no indications could be found in the lower level of a dyke corresponding to the above. A cross-section would look as shown in Fig. 3.

By referring to Fig. 2, it will be seen that drift No. 2 west from shaft No. 1 turns an acute angle and runs back in a southeasterly direction toward the upraise. The corresponding drift on the 300-ft. level does the same, and connects with the drift at the bottom of the upraise. Considering these features in connection with the disappearance of the outcropping of Dyke 1 on top of the hill west of No. 1 shaft, the conclusion seems to be warranted that the west end of Dyke 1 had been reached at least between the 300-ft. level and the surface. A longitudinal section would look as shown in Fig. 4. That Dyke 1 has a continuation west deeper than the 300-ft. level might be suggested on account of the porphyry caps on top of the two hills farther west; unless the branch of Dyke 1 mentioned above should continue on and break through to the surface on those hills. It may be hoped that further prospecting may clear up this feature.

Working under the impression that there had been a fault in Dyke 1 at the point where the drift makes an acute angle, a cross-cut was driven near the apex in a northerly direction which encountered a vein on the south side of a porphyry dyke; as the surface shows Dyke 3 to come so close to Dyke 1 on the top of the hill west of shaft No. 1 so as to make it impossible to distinguish them, it seems more natural to consider the dyke encountered in the 200-ft. level the Dyke 3 of the surface, as no faulting can be noticed on the surface.

THE GOLD OF CRIPPLE CREEK.

Written for the Engineering and Mining Journal by Wm. P. Blake.

A recent visit to the Cripple Creek gold mines in Colorado has furnished material for a few notes upon the gold and its form of occurrence. It is a very lively camp, reminding one of the Comstock in the sixties, and of Reese River when Austin was located as a town. The claims are numbered by hundreds, perhaps thousands, and the map of them shows an intricate maze of lines at apparently all angles, though the general direction is north and south, inclining northeasterly and southwesterly, while some locations are made on veins claimed to extend east and west. These locations are chiefly within an area of 25 to 30 square miles.

The rocks are essentially granite, alternating, in places, with "phonolite," a feldspathic rock, but having so much slaty structure with micaceous films as to suggest its mechanical origin and subsequent metamorphism by the immense granite masses of the Pike's Peak range. The granite of the mining district differs from the coarse hard, flesh-red granite of the higher ridges in this respect: that it is so generally mineralized that it has softened and decayed near the surface, and rarely shows in solid outcrops. The whole surface is covered with the soft granular disintegrated debris of its decomposition in place; and when dug into, it is generally found to be soft and rusty. There are no great outcropping reefs or ledges; most of the veins were round by following up "float" masses and by digging, and have the form characteristic of those found in granite.

It is claimed that there are now 85 producing mines or claims. Large shipments of ore are made to the smelters; most attempts at milling the high grade ores having been unsuccessful, and better returns being secured by smelting. Some of the ores near to the surface are comparatively free milling, but it is claimed that the returns rarely reach 75% of the assay value. There are some 13 mills in the camp and vicinity, but the largest and best appointed mill of 50 stamps stands idle.

The value of the yield of the camp for 1892 is estimated at \$700,000 to \$900,000, and it is expected that the total for 1893 will not be less than \$2,500,000.

The ores of Cripple Creek are essentially a telluride of gold, in a quartzose granite gangue, generally associated with a pale purple fluor spar in small cubic crystals. In the upper portions of the veins, where the decomposition has been complete, no bright telluride is seen, and the gold is left free, but in a spongy state, with a peculiar dull dead brown color, and it is not easily recognized as gold except by the experienced eye. At lower levels the telluride appears as a silver white, bright metallic mineral, and it replaces the native gold. This telluride is commonly known in the camp as sylvanite, but an examination of the few samples I have had convinces me that it is richer in gold than sylvanite; that it contains less tellurium and silver, and no lead, antimony or copper. It is nearer to the species calaverite or krenninite than to sylvanite, and it may prove to be different from either. The crystallization is prismatic, and much striated. It is brittle, but soft, and gives a blackish gray powder which soils paper like graphite. Under the blowpipe, it gives, instantly, globules of high grade yellow gold. In one specimen thin crystalline plates upon quartz being detached left behind a thin coating or gilding of native gold of a brown color, which assumed its normal bright yellow color on being burnished.

A specimen of ore from below the water level consists chiefly of flesh-red feldspar, but it is permeated by irregular grains of angular quartz, and has numerous cavities lined with minute quartz

crystals, over which there is a fine druse of pyrites, and here and there a prismatic crystal of the telluride. On decomposing, the telluride crystals appear to leave the gold with the form of the original crystal, but in a light spongy condition, which is unfavorable to amalgamation. The so-called "cube gold" of the camp appears to have received its form from the original telluride, and is not crystallized gold. The association of fluor spar is not only unusual, but, I think, unique. The fluor in some places occurs massive, and is sent to the smelters, who are glad to get it in their mixtures. It has a dark purple color, and some people who have read of the "purple precipitate of Cassius" so regard it.

The gold of the camp is unusually fine, averaging in value over \$20 an oz., and assaying 998 fine, particularly the gold from the placers. Careful experiments are greatly needed to determine the best way to work the medium and low grade ores, which will not bear the cost of transportation.

GOLD PRODUCTION OF CRIPPLE CREEK IN 1893.

Reported for the Engineering and Mining Journal by our Special Correspondent.

The total output of the camp of Cripple Creek for the year 1893, according to a conservative estimate, was \$2,116,100, the product of 67 mines and prospects. The milling ore was in the proportion of 35.43% of the total output. The placers yielded about \$25,000, all of which was obtained by panning and cradling, the water having to be carted for placer mining. The details of the output were as follows:

Name of Hill.	1892.	1893.	Increase.
Gold Hill.....	\$61,000	\$110,000	\$50,000
Battle Mountain.....	20,000	49,000	39,000
Bull Hill.....	14,010	83,500	69,490
Globe Hill.....	124,500	187,000	62,500
Little Bull.....	28,500	267,000	238,500
Tenderfoot and other hills and placers	2,690	3,000	103,010
Total output.....	\$383,000	\$2,116,100	\$1,533,100

The amount of development work in the camp for the years 1892 and 1893 may be summarized as follows:

Name of Hill.	1892.	1893.	Changes.
Gold Hill.....	5,200 ft.	1,750 ft.	Dec. 3,450 ft.
Battle Mountain.....	1,630 "	4,800 "	Inc. 3,170 "
Bull Hill.....	8,730 "	9,425 "	Inc. 695 "
Globe Hill.....	4,530 "	2,700 "	Dec. 1,830 "
Little Bull.....	8,250 "	5,615 "	Dec. 2,635 "
kyholite.....	2,500 "	3,270 "	Inc. 770 "
Wilson Creek.....	950 "	1,200 "	Inc. 250 "
Beacon and other hills.....	13,800 "	10,000 "	Dec. 3,800 "
Total.....	45,600 ft.	38,760 ft.	Dec. 6,840 ft.

In 1892 there were five steam hoists in the camp; at the close of 1893 there are 26 steam hoists.

SINKING SHAFTS THROUGH QUICKSAND.*

The Produits colliery at Fleny, near Mons, Belgium, is founding a new seat of working at Jemappes, by sinking two shafts to the coal, which is 170 m. (558 ft.) deep, overlaid by sterile measures. Over the rock are 15 m. of quicksand which was sunk through by means of the compressed air plant shown in the annexed engraving, consisting of an air-lock, s, a chimney, g, and a floor, P, closing the tubbing at a height of 2.25 m. above the base of the knife, and supporting the chimney with air-lock. At the depth of 15 m. the tubbing rests upon a stratum of hard sand; but between the depth of 3.3 m. and that of 15 m. there is nothing but green shifting sand.

The air-lock, a cylindrical box formed of iron plates 8 mm. (5-16 in.) thick, 1.5 m. (4.9 ft.) in diameter, and 1.9 m. (6.23 ft.) high, is surmounted by a winch, t, inclosed in an airtight casing, and worked by a small engine outside the air-lock, carried by the floor, m, which covers the tubbing and descends with it. The door by which the air-lock is entered is shown by p; the valve opening downward underneath the air-lock by c; and one of the two tubes for receiving the spoil by l. The pipe for introducing compressed air is represented by h, while i is a cock for affording communication between the air-lock and the outer air. The air enters by the orifice, o, at the top of the chimney, but below the valve c.

In working, if the bucket for receiving the spoil is empty in the air-lock, to make it descend the man in the lock throws out of gear the drum of the winch, t, allowing the bucket to descend by its own weight. When the bucket is filled at the bottom, the man in the lock throws the winch drum into gear for drawing up the bucket, the engine on the outside constantly running in the direction for raising. When the bucket comes up it strikes against a lever, which causes the rope to be clamped upon the winch. The bucket is then tipped into one of the tubes; and, when it is full, the top valve is closed, and the lower one opened, allowing the spoil to fall on to a timber floor, m, the same which carries the small motor above mentioned.

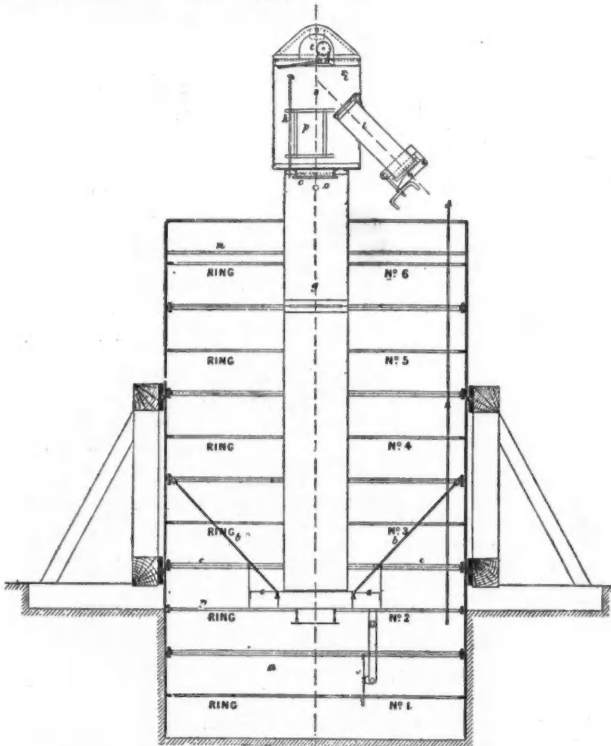
If, while working, it becomes necessary to enter the air-lock, the man therein closes the valve, c, opens the cock at the top of pipe h, and opens the cock, i, for putting the lock into communication with the outer air. As the pressure in the lock is now the same as that outside, the door, p, may be opened. In order to permit of opening the valve, c, and descending by the chimney into the working chamber, the door, p, and the cock, i, must be closed; and then the cock at top of pipe, h, is opened, thus equalizing the pressure on both sides of the valve, c, when the latter may be opened so as to permit the descent of the chimney by ladders riveted to the plates. The working chamber is closed by the strong plate-iron floor, P, resting on the middle flange of tubbing ring No. 2, being made of eight segments connected by cover strips, with bands of india-rubber between for tightness. The floor is strengthened by radial brackets, e, e, while 16 tie-rods, b, b, of

* Abstract from article in the "Colliery Guardian."

40 mm. (1.57 in.) diameter, are bolted to the flanges of rings three and four at their joint. The center of the floor carries a cylindrical drum, which, in turn, supports the chimney and the air-lock. Under the floor is a valve, always open during the sinking, for the following purpose:

As the whole ten rings of the tubbing could not be put up together, on account of the great height, it was necessary to do this in two operations. First, six rings, forming together a height of 9 m., were put up on the surface. When these 9 m. of tubbing were sunk, it was still necessary to mount the four remaining rings on the top of them, while also raising the chimney and air-lock. By removing the latter, however, all means for introducing compressed air under the floor would be taken away, which would be out of the question, because, as the base of the tubbing was in moving sand, if the air pressure were taken off, the sand would flow into and fill the tubbing. To prevent this contingency, a pipe, n, was put up from the floor, the pipe being closed while working. To mount the four tubbing rings, the above-named pipe, n, was connected with that introducing the compressed air; the valve under the floor was closed; and compressed air was still forced into the working chamber.

As the internal surface of the tubbing is 21 sq. m. (226 sq. ft.), there was, at atmospheric pressure, a force of 210 tons tending to raise or sustain the tubbing. To overcome this force, and oblige the tubbing to descend, the latter was filled with water and also loaded with pig iron. The men removed the sand under the knife; and the tubbing descended uniformly, being guided by a strong timber framing 3 m. (9.8 ft.) high, as shown in the drawing, carrying guide pulleys in the middle of each of the four sides.



SHAFT SINKING THROUGH QUICKSAND.

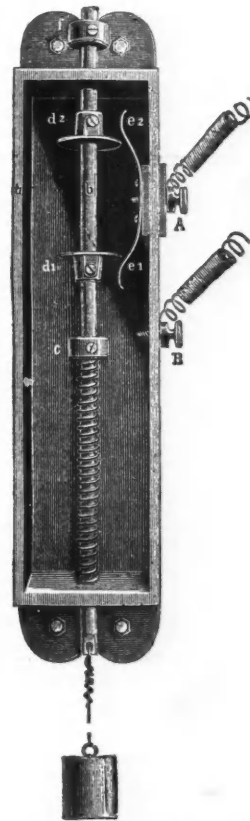
One of the two shafts is now being sunk by means of the Kind & Chaudron method, the central hole having reached the depth of 140 m. (461 ft.). The particulars and drawings were obtained from M. C. Hilgenstock, Directeur des Travaux at the Produits Colliery.

Oil Tank Steamers.—According to the London "Engineer," there are at present 47 oil tank steamers afloat, ranging in size from 666 to 4,134 tons gross, while no less than 17 more are at present being built at European yards. The Dover (England) Harbor Board has closed arrangements with an oil company for the erection on the docks of large oil reservoirs, which are to be constructed by next summer, when oil tank steamers will make Dover a depot for the South of England and run regularly between there and Russian and American ports.

The Diamond Shoal Lighthouse.—In Washington recently the Lighthouse Board awarded contracts for beginning work on the construction of a lighthouse on Diamond Shoal, off Cape Hatteras, N. C., probably the most dangerous point on the Atlantic coast. Borings necessary to find a solid foundation will first be made, and to start them a metal framework will be placed in position. For this the contract has been awarded to the Weimer Machine Works, of Lebanon, Pa., at \$2,700. The contract for pontoons to carry the metal frameworks to Cape Hatteras has been awarded to Sandford & Brooks, of Baltimore, at \$1,175. It will be remembered that two years ago a contract for the construction of this lighthouse was made and the caisson which was to constitute the foundation for the lighthouse was started from Norfolk for Cape Hatteras, but the lighters carrying it foundered, and the caisson was lost. The contractors then surrendered the contract, having sustained a loss of \$75,000. The great difficulty is that the sea off Cape Hatteras is very seldom at rest, and probably only a few days' work can be done in the course of the year.

A NEW SHAFT SIGNAL.*

Opinions are generally agreed as to the advisability, if not the absolute necessity, of establishing simple, trustworthy, and permanent means of communication between men in the moving cage and the engineman on the surface. Herr Otto Winkler, of Dresden, has solved the question in a practical manner, as shown by the annexed engraving of his device. The top and bottom of a cast iron box, a, closed by an airtight cover for protecting it from dust and damp, and attached by four bolts to a timber near the top of the shaft, form the guides of a rod, b, which is capable of sliding freely in them, though its travel is limited by adjustable collars. It is maintained in its position with, however, the necessary amount of elasticity, by a spiral spring, the tension of which may be regulated by the collar, c. The rod is also brought down upon the spring, as on a cushion, by a weight attached to it by a galvanized steel wire reaching the whole depth of the shaft. The two adjustable collars, with plates d¹ and d² come into contact respectively with the ends e¹ and e² of a curved plate, which is in electrical connection at A with a battery (while the box itself is connected at B with an electric bell, completing the circuit), on the rod being pulled up or down. The wire passes through the cage, in such a manner that it may be pressed by the hand, or, better still, through a yielding plate or casing. While the cage is descending, a



WINKLER'S SHAFT SIGNAL.

very slight lateral pressure is sufficient to draw down the rod, slightly compressing the spring, and bringing the plate of collar d¹ into contact with e¹ of the curved plate; and again, when the cage is rising, such slight lateral pressure, owing to the momentum acquired, is sufficient to stretch the spring and bring the plate of collar d² into contact with the end, e², of the curved plate, thus completing the electrical circuit causing the bell to ring in either case. One advantage of this arrangement is that it is not affected by damp, and may be applied to a shaft that has become distorted owing to a movement of the strata. This signal is in successful use by the Koenigliche Berg-Inspektion, Dresden, the Zwickau Colliery Company, the Haenicheuer Bergwerks Direktion, and other mining bodies.

Electric Traction in Japan.—A concession has been secured by an American for the construction of an electric railway between Tokyo and Yokohama, a distance of about 30 miles. Two American engineers are said to be now on their way to Japan in connection with the matter.

Japanese Coal in India.—Japanese coal has recently found its way to Bombay. "Indian Engineering" says a quantity of it was lately delivered alongside in Bombay harbor at prices ranging from 11 to 12 rupees per ton. The Great Indian Peninsular Railway Company is trying some of it.

The New York Water Works Tunnel.—The new tunnel through which the water from Byram River will find its way into the storage reservoir at Kensico, from which part of the water supply of New York is taken, was completed December 29th. The tunnel is 2,600 ft. long, through rock, and has taken about two years to complete.

* Abstract from article in the "Colliery Guardian."

THE CHLORINATION OF GOLD ORES.

Written for the Engineering and Mining Journal by L. D. Godshall Ph.D.

(Concluded from page 7.)

The Rapid City works used bromine almost altogether, instead of chlorine. The writer conducted a series of experiments, both in the assay office and in the mill, to determine the relative merits of bromine and chlorine. The tests in the mill were made in the chlorinating barrels, of which there were two each capable of treating about four tons of ore at a time; the charges were treated alternately with bromine and chlorine. In the assay office the tests were made to cover as many conditions of the ore as it was possible to obtain; following are the results obtained:

Assay office tailings.				Mill tailings.			
Bromine.	Chlorine.	Bromine.	Chlorine.	Bromine.	Chlorine.	Bromine.	Chlorine.
\$2.60	\$2.40	\$1.40	\$3.40	\$5.00	\$3.80	\$3.60	.....
2.61	2.20	2.20	2.00	4.80	4.40	4.40	\$4.80
2.80	2.00	3.00	2.80	4.40	4.80	4.20	.....
4.40	1.80	4.20	3.00	4.60	3.20	4.60	4.80
2.80	3.20	2.80	3.20	4.40	4.20	4.60	3.80
2.60	1.60	2.20	4.80	3.80	3.80	4.00	4.80
3.80	5.20	3.00	2.80	4.20	4.00	4.00	4.80
4.20	4.00	3.40	2.80	4.80	4.20	4.00	3.80
6.20	4.00	2.60	3.20	4.00	3.80	4.40	4.20
5.80	3.00	2.40	2.20	4.20	4.20	4.60	3.80
5.60	4.20	1.40	1.40	4.00	1.60	.....	.....
1.61	1.40	Average.		4.80	3.40	Average.	
7.80	7.80	\$3.48	\$3.10	4.00	3.60	\$4.32	\$4.13

Some of the assay office results were obtained from fine ore while all of the mill results came from coarse ore. It will be noticed that the discrepancy between the bromine and chlorine tailings in the mill is less than that obtained in the assay office. However, it was afterward discovered that one of the "chlorinators" had been purposely trying to give the worst possible conditions to the chlorine tests. But even taking the discrepancy as shown in the assay office results, the difference in favor of chlorine is more than overcome by the difference in cost of the two chemicals, not to mention other advantages in favor of the bromine, such as purer sulphides; less of the obnoxious gas which is very hard on the working men, avoiding altogether the handling of sulphuric acid, an excess of which soon rots all filter cloths unless asbestos be used. The writer has recently been informed that bromine can now be obtained in quantity for as low as 18 cents per pound; ore well roasted should not require more than 1½ lbs. of bromine per ton of ore; in fact, considerably less than this was used at Rapid City at times; whereas with chlorine it takes an exceptionally well roasted ore to bring the cost to 50 cents per ton of ore, taking Western prices of chemicals as a basis.

That it is possible to extract a very high percentage of the gold from the refractory ores of the Black Hills by means of either chlorine or bromine when such ores are crushed to pass only an 8 or 10-mesh screen, is extremely doubtful, but with fine crushing it becomes at once simple and practical. The only difficulty yet remaining is the crushing. To crush a hard ore in the dry state so as to pass through a 30-mesh screen is a difficult thing to accomplish by means of rolls, while pulverizers of all kinds are still more to be dreaded.

The most practical and at the same time the most economical method of fine dry crushing is in the opinion of the writer by stamps. The desirability of using stamps instead of rolls will unquestionably be contrary to the convictions of many engineers. The writer, however, has seen and heard of so many breakdowns and so much trouble in mills where rolls were used, that the conviction has been forced upon him that stamps, notwithstanding their increased initial cost, and power required, are more reliable and more economical. An objection frequently brought against the use of stamps is the fact that a great part of the ore is crushed very fine and apt to produce slimes, but where pressure leaching is used these slimes are of no serious consequence. In fact, with many ores the finer the crushing the higher the extraction and pulverization rather than granulation should be the aim.

The furnace best adapted for roasting such fine ore depends somewhat upon the character of the ore; if very low in sulphur, the Howell-White will answer, although large dust chambers should be provided with this furnace. Much of the fine dust would also have to be roasted a second time. The Bruckner cylinder is better adapted for ores in general than the Howell-White, as the charges can be controlled better in this furnace, while the amount of fine dust produced is comparatively small. The Pearce turret furnace is good for ores moderately low in sulphur. This furnace has the good points of the old-style reverberatory, and is mechanical in every respect, producing also a comparatively small amount of fine dust. For concentrates or such ores as are high in sulphur or where a chloridizing roasting is desired at the end the Pearce turret may answer, but a reverberatory or a mechanical furnace in conjunction with a reverberatory is to be preferred.

In view of the experience and results obtained on the Dakota ores, it is believed by the writer that a modification of the process as now used by the Golden Reward Company would result in increasing materially the percentage of extraction, and at the same time lessen the cost of treatment. The modifications proposed include the crushing of the ore to 30-mesh, instead of 8 or 10, and using a separate pressure leaching vat, instead of leaching direct from the barrels.

The character of the ores found in the Cripple Creek district, in Colorado, varies very much; more or less free gold may be found in a great majority of the ores of the camp, a very small proportion of which might be termed free-milling, although not strictly so. A small percentage of coarse gold is common in many of the surface ores; among the most prominent examples of such may be mentioned

the Pike's Peak, Eclipse, Anaconda and the Wichita. The character of the gold of the district varies considerably; a very small proportion found in the quartz appears bright and has apparently been deposited as native gold. In some ores, however, it is quite dull, very friable and extremely difficult to amalgamate, as in the Raven for example. In such ores the gold was evidently deposited originally as a telluride, the oxidation of the tellurium leaving the gold in the dull and friable state. Another variety is found in the Victor mine, where high-grade ore is frequently found; much, if not all of this gold, occurs in the native state, but cannot be amalgamated to any appreciable extent for the reason that it occurs in infinitely minute particles associated with a hydrated oxide of iron. Judging by the number of stamp mills found in the district, one might be led to suppose that the treatment of the ore was simple, but a closer examination of the actual results obtained cannot fail to lead to a different conclusion. The Cripple Creek district is a typical one for chlorination, although the occasional occurrence of coarse free gold in the oxidized ore necessitates in such cases amalgamation before chlorination; however, as such coarse gold would amalgamate very easily, no serious difficulty would be experienced on account of its presence. The writer has made chlorination tests on ores from over 200 mines from different parts of this country, and without any exception the ores of Cripple Creek gave a higher extraction than any other ores experimented with.

A few results will be given below to show the extraordinary percentage of extraction obtained on these ores by chlorination. Moreover these results were all obtained on raw ore, which make them still more remarkable, although the ore, as a matter of course, was well oxidized.

Name of ore.	Assay value.		Tailings and extraction obtained	
	Oz.	\$	Oz.	%
Morning Glory.....	11'94	220.80	0'09	1.80
Pharmacist.....	11'75	235.00	0'05	1.00
Independence.....	5'00	60.00	0'02	0.40
Deerhorn.....	1'60	32.00	0'01	0.20
Deerhorn (surface dist.)...	0'50	10.00	trace	..
Little May.....	1'00	20.00	0'02	0.40
Anaconda.....	19'60	392.00	0'40	8.00
".....	10'60	212.00	0'20	4.00
".....	0'25	5.00	0'06	1.20
Stamp mill tailings.....	0'32	6.40	0'01	0.20

The above results show how easily the ore yields to this treatment when in proper condition. It must not be supposed that all the ore from the above named mines can be treated successfully in the raw state. The tailings from the stamp mill had been run over concentrating tables where the iron pyrites and other oxidizable minerals had been removed.

Where an ore contains iron pyrites or where the gold is associated with a hydrated oxide as in the Victor, roasting becomes necessary. Below are given the results of a few experiments made, when chlorination of the raw ore would not answer, the results shown the value of the raw and of the roasted ore, the extraction on the raw ore, the loss in roasting and the extraction on the roasted ore.

Name of ore.	Assay value.				Loss in roasting per cent.	Tailings and extraction on raw ore.		Tailings and extraction on roasted ore.	
	Raw.		Roasted.			\$	Per cent.	\$	Per cent.
	Oz.	\$	Oz.	\$					
Morning Glory.....	5'4	108.00	5'5	110.00	0'18	83.00	23'15	3.20	
Victor.....	11'4	228.00	11'4	228.00	.....	124.00	45'61	1.00
".....	3'76	75.20	3'76	75.20	.....	52.00	30'85	0.40
".....	0'70	14.00	0'70	14.00	.....	7.50	50'00	0.20
Pharmacist.....	0'80	16.00	0'70	14.00	12'5(8)	2.00	87'5	trace	
Trail.....	24'50	490.00	24'70	494.00	0'40	158.00	69'78	2.40	
".....	2'60	52.00	2'58	51.61	0'77	7.40	85'77	0.60	
".....	1'30	26.00	1'36	27.20	1'10	6.20	76'15	0.20	
Anaconda.....	2'68	53.60	2'68	53.60	.....	46.00	14'18	0.40

The loss in roasting in some of the above experiments was determined by roasting exactly one assay ton of ore and assaying all of the sample after roasting. In others the loss was determined by roasting a larger quantity of ore, the loss by weight noted, the roasted ore assayed and the loss calculated. In the case of the Pharmacist ore some error evidently crept in as no such losses are sustained in a careful roasting. Scores of experiments with results fully as good as those above given might be recorded here. It is a curious fact that not a single ore was found in the camp that would not yield readily either in the raw or roasted state to the process of chlorination. However, the majority of the ores of the camp contain more or less tellurium combined with the gold, making the roasting a more delicate operation than it would otherwise be.

Various figures have been given as to the actual cost of treating a ton of ore by this process. Some of these figures have been ridiculously low while others have been unnecessarily high. The cost of treatment by this process, or any other depends on a variety of circumstances, such as the price of labor, fuel, freight, capacity of mill, etc.

Estimate of the cost of treatment per ton by barrel chlorination based on Colorado prices, treating 100 tons of ore per day of 24 hours. The labor required is: 6 men unloading ore and fuel at \$2, \$12; 5 men tramping ore and fuel at \$2, \$10; 2 engineers at \$3.50, \$7; 2 firemen at \$2.50, \$5; 2 millmen at \$3.50, \$7; 1 oiler, \$2; 2 men at Blake crusher, at \$2, \$4; 1 blacksmith, \$3.50; 1 carpenter, \$3; 1 machinist, \$3.50; 1 helper, \$2; 2 men at chlorinating barrels, at \$3, \$6; 2 helpers, at \$2, \$4; 6 roasters at \$3, \$18; 6 wheelers at \$2, \$12; 2 foremen at \$4, \$8; 1 clerk, \$3.50; 1 assayer, \$4; 1 helper, \$1.50; 2 extra men for odd jobs at \$2, \$4; 1 superintendent, \$10. The total cost will be as follows:

	Total	Per ton
Labor.....	\$130	\$1.30
Fuel.....	100	1.00
Repairs and supplies.....	50	.50
Chemicals and assay office supplies.....	75	.75
Or total cost of treatment per day.....	\$355	\$3.55

For a plant to treat 25 tons per day of 24 hours, 26 men would be needed, and the cost would be:

	Total.	Per ton.
Labor.....	\$75	\$3.00
Fuel.....	40	1.60
Chemicals and assay supplies.....	25	1.00
Repairs and mill supplies.....	25	1.00
Total.....	\$165	\$6.60

In both of the above calculations the estimates are high, and should be considerably lowered in actual practice, by having dump cars, for instance, the cost of unloading is practically done away with. If bromine can be used the cost of chemicals will also be much less, and this item should even be considerably less when chlorine is used. The estimated cost for fuel is conservative, while that for repairs and supplies should be lessened in practice. It was thought better to state the costs a little too high than too low. The greatest economy in milling ores by this process, or by any other, lies in running the mill to its utmost capacity. It is impossible, as may be seen by the above figures, to treat ore in a 25-ton mill as cheaply as in one treating 100 tons daily, but it is still far worse to build a 100-ton mill and treat only 25 tons a day in it. Under such circumstances the cost of milling may run up to \$8 or \$10 a ton. With most ores a minimum net extraction of 90% can be obtained by this process, but on low grade ores it is safer to figure on minimum net extraction of 85% of the gold contents of the ore. With the silver market, as it is at present, and with no signs of improvement in the near future, it is almost self-evident that the smelting charges on low-grade siliceous ores will not be lowered, but in all probability be raised. The smelting charges of the last six months have varied from \$12 to \$15 on siliceous gold ores, assaying from \$20 to \$40 per ton, which if added to the freight, usually from \$5 to \$10 per ton, if the mines are near a railroad, will make a very nice margin for a chlorination mill to compete against. In the case of isolated localities the advantages in favor of chlorination are even greater.

ABSTRACTS OF OFFICIAL REPORTS.

DARIEN GOLD MINING COMPANY, LIMITED.

The report of this company for the year ending August 31st, 1893, is far from encouraging. It will be remembered that some five years ago this company was formed in Manchester, England, to work an old Spanish gold mine at Panama. So rosy were the traditions of enormous wealth obtained from the mine in bygone centuries, and so certain were the promoters that plenty of gold remained behind that was easily obtainable by modern methods, that there was a genuine "boom" of the company's shares at the very beginning, and the £1 shares were up to £4 10s. and £5 on prospects only. After purchasing the property for £58,000, and spending a quantity of money on plant and development the real state of the case was found, viz., that there was no trace of old Spanish worked veins, and that there was very little gold in sight to work on. Then the best of the bad bargain was not made, for the mine captain muddled his opportunities away, and did nothing for the shareholders. Two years ago the directors roused themselves and determined that the mine should be fully tested by a competent mining expert, and they accordingly appointed Mr. Ernest R. Woakes, of London, to examine the property and take it thoroughly in hand. Mr. Woakes' last report is given below. The directors' financial statement of course shows a large deficit for the past year, as follows: Expenditure, £7,331; income, £1,537; for the mill was closed down entirely in November, 1892, and the work confined entirely to prospecting. The work in hand is the construction of a long deep adit to unwater and open up the old Spanish Espiritu Santo mine, a work of considerable magnitude. The directors are determined to see the mine thoroughly tried, and what it turns out to be will decide their future operations.

In reporting on the work now in progress at the mines in Cana, in connection with the development of the South mine, Mr. Woakes says: "I arrived at Cana in company with Mr. G. M. Andrews, the mine captain, on July 25th last; and found that during my absence Mr. Harrison had completed the ditch for bringing on the Cana River to the South mine, according to the plans I had left with him. The total cost of this ditch has been £169. It will give a minimum water power of 80 H. P. with a vertical head of 180 ft., which, applied to a Pelton wheel and air compressor, will yield sufficient power for pumping and winding at the South mine for years to come. While working on the ditch, Mr. Harrison discovered various outcrops of lodes, one of which he reported to me in England as yielding ½ oz. gold per ton. On my arrival at Cana, I examined these discoveries. Further researches proved fully the existence of several lodes along the course of the ditch, though in all cases careful assays showed the vein stuff to be too poor in gold to repay the expense of milling. The existence of these lodes, coupled with our other experiences in Cana on somewhat similar formations, shows conclusively that we have yet to find the mother lode or 'Veta Madre' of the Spaniards, from whence in former days the enormous quantities of gold were extracted. This lode, I have every confidence, we shall find at the South or Espiritu Santo mine. On the completion of the ditch Mr. Harrison started work on the tram road and open cutting for the commencement of the new adit tunnel for draining the South mine, and on my arrival at Cana I found this work well in hand. The work is being carried out substantially according to the plan I submitted last March, with the sole difference that it has been found necessary to do more tunneling and less open cutting than I then deemed necessary. The adit is commenced at the lowest point possible—that is to say, at the junction of Espiritu Santo and San Francisco creeks, and about 300 ft. above the spot where the latter joins the Cana River. By means of this adit we shall be enabled to get into the mine at the deepest level possible for natural or gravity drainage, at the same

time using the valley of the Cana as a dump. After having constructed 150 ft. of open cutting, most of which required careful timbering, we started the tunnel or adit proper. The mouth is situated at a distance of 1,070 ft. from the shaft sunk last year with the object of prospecting the South mine, and in the cross-cut from which we struck the old workings and got drowned out. The floor of the adit at its mouth is 93½ ft. below the collar of this shaft; so that, allowing the grade necessary for drainage, we shall tap the mine some 3 ft. below the sump at the bottom of this shaft, thus we shall drain the mine of all water by gravity to this depth. We then propose to sink the same shaft another 100 ft. or so, pumping, of course, only to the level of our new tunnel, which will serve as a deep adit for our future workings at the mine. Two boilers, a steam winch, and pit-head gear are already erected and ready for work at this shaft, and a new Cameron pump is being constructed in New York to go out to Cana this dry season.

"At the beginning of October, when I left the mines, the tunnel had already been completed a distance of 170 ft. On November 8th it had been extended to 338 ft. Under the most favorable conditions the adit may be completed at the earliest by the end of May next, by which time the pump will, I expect, be at Cana, and everything in readiness to commence sinking to prove the mine below the Spanish workings. The adit tunnel is being carried 6½ ft. high by 5 ft. wide in the bottom and 3 ft. in the top, inside the timbers, which are placed 3 ft. apart between centres, the whole being "lagged" or lined with 2-in. plank. A tram road is laid in the center, with the waterway between the rails. The above mentioned drivage of 115 ft. per month, which will probably be exceeded during the succeeding months, is most creditable for hand labor with native workmen, who, strictly speaking, are not miners, and who therefore require constant supervision by the mine captain. At a point midway between the mouth of the adit and the shaft we have started a shaft which will be necessary for ventilation and other purposes. It was not found possible during the wet season to sink this to the required depth without pumps; it will therefore be completed when the place is drained by the funnel getting under it. The open cutting is situated in the bed of the Espiritu Santo Creek, which no doubt was deepened by the Spaniards in former times to drain the mine. We found it necessary to construct a dam to turn out the water of this creek. In the cutting the bedrock rose considerably faster than did our graded cutting, so that at the point where we commenced tunneling we had in the face some 6 ft. of bedrock with 4 or 5 ft. of gravel and boulders on the top, while the banks of the creek rose almost vertically on both sides to a considerable height. This gravel carried a quantity of coarse angular gold and fragments of quartz, which had no doubt come from the mine situated 1,100 ft. higher up the creek. From these indications I consider it only reasonable to believe that gold was being extracted from the mine down to the time of its abandonment by the Spaniards. We have constructed a small overshot water wheel at the mine, and erected it in the San Francisco Creek, where it operates a small fan to ventilate the tunnel until the intermediate shaft is reached. We have done considerable work on the roads, making new bridges and repairing old ones, and have constructed new houses at the Parca and Ipeliza stations. The stamp mill and other buildings at the mine are kept in good order. We cleared the Cupe River of snags, etc., from its mouth to El Tigre, so that during the wet season all goods are brought up by canoe from El Real to the latter station, where I have placed an agent, who is within 12 hours' ride of Cana. Thus we avoid the worst half of the road transport. The above works are being carried on at a cost at the mines of less than £200 per month, inclusive of Panama and El Real expenses."

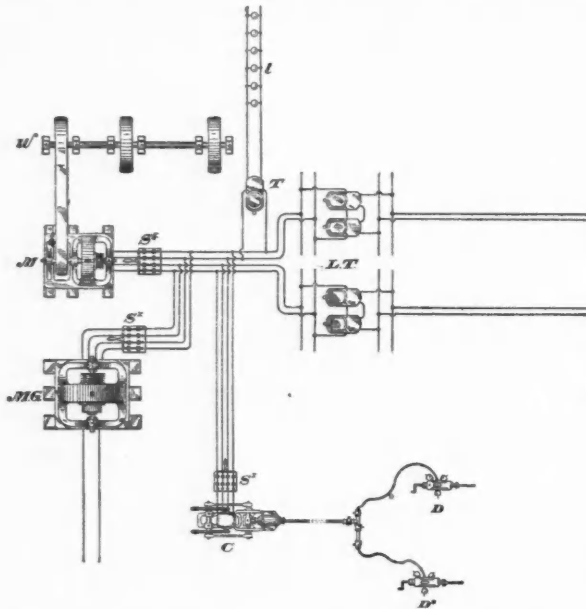
THE WESTINGHOUSE ELECTRIC MINING PLANT.

A book on the electric transmission of power has recently been issued by the Westinghouse Electric and Manufacturing Company, in which its motors and the various apparatus employed for that purpose are fully described and handsomely illustrated. We take from this work the accompanying description of the Tesla polyphase motor, which is especially adapted for this work. The motor shown is operated synchronously; that is, its speed depends solely upon that of the generator, and no variation in the speed of one can take place without a change in that of the other. The only element requiring attention, therefore, in the matter of speed is the prime mover. The electrical apparatus is perfect as regards speed regulation, the speed of the motor being as dependent on the speed of the generator as if their respective armatures were rigidly coupled to the same shaft. In an electrical system transferring the energy of falling water to mechanical energy available at the shaft of a motor there are three links in the chain of transfer in which variation in speed may appear: First, between the water and the turbine shaft; second, between the turbine shaft and the generator; and third, between the generator and the motor. Excessive variation in the first must be guarded against by proper construction of the hydraulic apparatus and by the use of effective governors. Where the turbine shaft is connected with the generator by a belt, variation or stretching of the second link can result only from slipping of the belt, and this can be practically eliminated without difficulty. Where direct connection of turbine and generator by means of a clutch is adopted, there can, of course, be no difference in speed. Unless the synchronous method of operation is employed there is necessarily more or less stretching of the third link; that is to say, the speed of the motor is not exactly equal to that of the generator, and the difference in speed will increase or decrease by a greater or less amount as the load upon the motor is varied. In the Westinghouse two-wire synchronous alternating current system and in the multiphase system where motors of the synchronous type are employed, this link of the chain is inflexible.

In the two-wire synchronous system, motors are necessarily operated

in synchronism with the generators. In the Tesla polyphase system synchronous operation is preferable wherever the nature of the service will permit. For the ordinary work of mills and factories, and for all purposes where constant speed is desirable, while it is not impracticable to bring the motors up to speed without load, motors of this type should be used.

In the accompanying engravings the special application of the Tesla polyphase system to a mining plant is shown. Fig. 1 is a diagram showing the general arrangement. The generator G delivers its currents to step-up or raising transformers RT, through the switch S. At the distant end of the line where the power is to be utilized, the step-down or reducing transformers, LT, are located, and from their secondary circuits the various lamps and motors are supplied. Incandescent lamps, I, are connected to the secondary circuits of the transformer, T, it being assumed that in this instance the potential



delivered by the step-down transformers is too high for incandescent lamps. The switch S' is used to connect the motor generator or rotary transformer, MG, and the local distributing circuits. This machine, receiving alternating current, delivers from its commutator direct current suitable for the operation of tramways, for electrolytic purposes, etc. The switch, S'', connects to the distributing circuits the motor, M, driving the line shaft W. A third switch is used in connection with the air compressor C, which is driven by a motor mounted upon the same bedplate. The motor is of special construction adapted to use in connection with the compressor. As shown in the diagram it is of the multiphase type, but direct current motors are sometimes employed. The drills, shown at D, D', are standard pneumatic drills. As is well known the limitations of pneumatic drilling lie in the fact that the cooling of the air compressor and pipes involves a loss of energy, which when the distance between compressor and drills is excessive, implies low efficiency. Where it is practicable to locate the

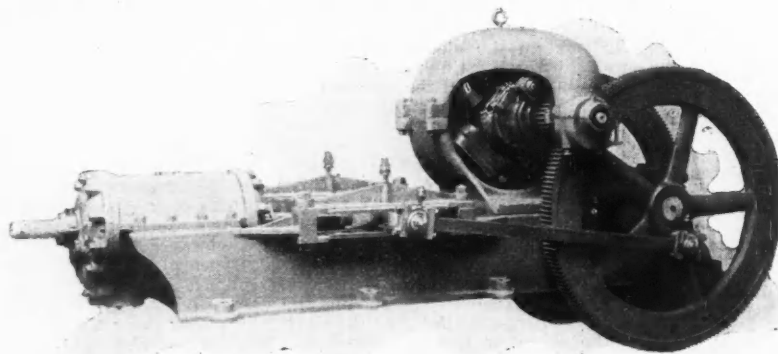


FIG. 2.—AIR COMPRESSOR WITH WESTINGHOUSE MOTOR.

compressor within a moderate distance of the drills a high efficiency is secured. It will be noted that in the arrangement shown in the diagram the compressor, C, may be moved without changing the location of the source of power, it being only necessary to extend the electrical circuit.

This system, while it calls upon mining operators to throw away neither experience nor investment in pneumatic machinery, will, in many cases, enable them to materially increase the efficiency of their pneumatic apparatus. At the same time the introduction of the electrical apparatus provides for other work necessary in mining operations—hauling, pumping, etc.—by a system at once flexible and efficient.

Fig. 2 illustrates the method of mounting the motor upon a standard

compressor originally intended to be operated by steam. The steam cylinder is removed, and the flywheel ordinarily employed is replaced by large gear wheels. Fig. 3 shows a type of motor especially adapted to mining operations. This is the Westinghouse ironclad motor, in which, as will be noted, the armature, commutator, brushes and field coils are thoroughly protected against dust and moisture.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

United States Circuit Court, District of Nevada.

Validity of a Subsequent Location of a Lode.

It is not necessary for the locator of a mining claim to first discover a vein or lode, in order to make a valid location. It is sufficient if it be clearly shown that the locator knew at the time of making his location that there had been a discovery of a vein or lode within the limits of his location.—Book vs. Justice Mining Company, 58 Fed. Rep. 109.

Work on Different Claims Owned by Same Person.

The running of a tunnel for the purpose of prospecting, developing of two separate and distinct mining claims owned by the same person is to be credited to both of said claims, and, if the necessary amount of work is done, it is deemed a sufficient compliance with

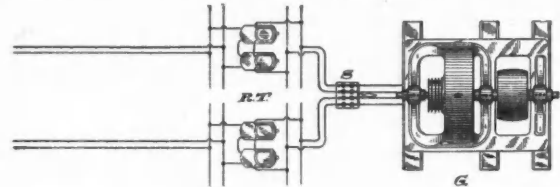


FIG. 1.—ARRANGEMENT OF ELECTRICAL MINING PLANT.

the law; and the owner is not, in such a case, required to also perform work on the surface of the locations, in order to hold the same.—Book vs. Justice Mining Company, 58 Fed. Rep. 109.

Annual Labor and Improvements Required on Location.

The mining laws of the United States require that not less than \$100 worth of labor shall be performed or improvements made during each year upon each unpatented location. Labor and improvements, within the meaning of the statute, are deemed to be done upon the location when the labor is performed or the improvements made for the express purpose of working, prospecting, or developing the ground embraced in the location. Work done outside the limits of a mining claim, for the purpose of prospecting or developing it, is as available for holding the claim, as if done within the boundaries of the location of the claim.—Book vs. Justice Mining Company, 58 Fed. Rep. 109.

Failure To Have Work Recorded Does Not Amount to Forfeiture of Claim.

In construing the act requiring owners of mining claims to make affidavits as to the amount of work done, and to have the same recorded, the object of the act was to prescribe a definite way in which the proof of the performance of the work might be obtained, and the act was not intended to prevent the owner from making the proof in any other way, but it simply makes the record immediate evidence of the facts therein stated, and a failure to comply with the terms of the

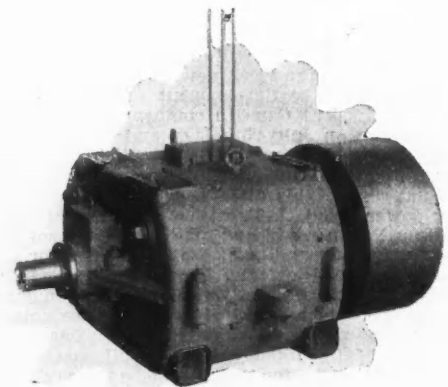


FIG. 3.—"IRONCLAD" MOTOR

act does not work a forfeiture, and a forfeiture of a mining claim can only be established by clear and convincing proof of the failure of the owner to comply with the provisions of the law as to the amount of work required to be done.—Book vs. Justice Mining Company, 58 Fed. Rep. 109.

What Constitute Discovery of Vein or Lode.

Any discovery of quartz or other rock in place, bearing gold, silver, or any of the precious metals or valuable deposits specified in the first clause of section 2320, Rev. St. U. S., constitutes a discovery of a vein or lode, within the meaning of those words as used in the last clause of said section, which declares that no location of a mining claim shall be made until the discovery of a vein or lode within the

limits of the claim located. The statute was intended to apply to any kind of a vein or lode of quartz or other rock in place, bearing any of the precious metals named therein in sufficient quantity to induce them to expend their time and money in prospecting and developing the ground located. When the locator finds the rock in place, containing mineral, he has made a discovery, within the meaning of the statute, whether the rock or earth is rich or poor, whether it assays high or low. It is the finding of the mineral, in the rock in place, as distinguished from float rock, that constitutes the discovery and warrants a location of a mining claim to be made.—Book vs. Justice Mining Company. 58 Fed. Rep.

Nicaragua Canal Company.—It is stated by the preliminary committee that the answers received from stockholders show a dissatisfaction with the Bartlett plan. The committee in opposition to the Bartlett plan thinks there is little need for the reorganization of the Nicaragua Canal Construction Company. Its affairs simply want investigation and adjustment, and there is nothing in its condition which makes it necessary for the stockholders to sacrifice nine-tenths of their stock.

The Franklin Institute Medals.—The Committee on Science and the Arts of the Franklin Institute desires to call attention to the medals which are awarded yearly by the Institute directly, or (in the case of the Scott medal) by the city of Philadelphia on recommendation of the Institute. There are three of these, as follows: The "Elliott Cresson Medal," founded in 1848, by the gift of the late Elliott Cresson. This medal is of gold, and by the terms of the deed of trust may be granted for some discovery in the arts and sciences, or for the invention or improvement of some useful machine, or for some new process, or combination of materials in manufactures, or for ingenuity, skill or perfection in workmanship.

The "John Scott Legacy Premium and Medal," awarded by the city of Philadelphia. This medal was founded in 1816 by John Scott, a merchant of Edinburgh, Scotland, who bequeathed to the city of Philadelphia a considerable sum of money, the interest of which should be devoted to rewarding ingenious men and women who make useful inventions. The premium is not to exceed \$20, and the medal is to be of copper.

The "Edward Longstreth Medal of Merit," founded in 1889, by Edward Longstreth, machinist, and late member of the Baldwin Locomotive Works. This medal is of silver, and may be awarded for useful invention, important discovery, and meritorious work in, or contributions to, science or the industrial arts.

Full directions as to the manner and form in which applications for the investigation of inventions and discoveries should properly be made will be sent to interested parties on application to William H. Wahl, Secretary of the Franklin Institute, Philadelphia, Pa., U. S. A.

Discovery of Coal in Cheshire, England.—At the December meeting of the Manchester Geological Society an interesting communication was read by Mr. De Rance, of the Geological Survey, with respect to a recent important discovery of coal in Cheshire, in which he gave some details as to the results of the borings which for some time past have been carried on by the Manchester Freeholders' Company near Hazel Grove station on the London & Northwestern Railway, on the boundary of their Bramhall estate, and that of Lord Newton, which had been undertaken to prove the possible presence of coal, under the two estates, at the joint expense of the two owners. They have been the first to establish that the vertical displacement of the Red Rock Fault was not, as had been held, sufficient to throw the Cheshire coalfield to unworkable depths on the down-throw side. The site of the boring was the first of three alternative positions suggested by Mr. De Rance, and on December 6th a 4 ft. coal of good quality was penetrated. It had been anticipated that the Permians overlying the coal measures would be 850 ft.; they had turned out to be 913 ft., or 63 ft. thicker than expected, consisting of two beds of sandstone resembling the Collyhurst sandstone of Manchester, separated by more than 100 ft. of marls. The following was an abstract of the measures passed through: Drift, 80 ft.; pebble bed of the Bunter, 30 ft.; Permian sandstone and marl, 913 ft.; coal measures, red and variegated, 471 ft. 7 in.; coal and shale, 2 ft.; shales, 11 ft. 5 in.; coal, 2 ft. 2 in.; measures, 110 ft. 10 in.; coal, 4 ft. The coals were believed to be higher in the middle coal measures than any previously known in Cheshire. The dip of the coal measures varied from 7 ft. to 11 ft. The boring had been carried out by Mr. Thom, Canal Works, Patricroft. The slack rope process had been used in the red rocks, and the diamond process in the productive coal measures, subsequently the boring was still in progress. The depth at which the 4 ft. seam has been proved is 1,629 ft. from the surface, and is stated to be a soft, bright coal, of good quality, suitable for house-fire purposes. It has not yet been possible to determine the exact position of this seam in the coal measures, but further boring operations are being carried on which it is hoped may establish this point.

Lead Mining in Afghanistan.—At a recent meeting of the North of England Institute of Mining Engineers, Mr. A. L. Collins communicated a paper descriptive of the Ghorband lead mines, Afghanistan. These, the most considerable lead mines in Afghanistan, are situated at Frinjal, about 50 miles northwest from Kabul. The country around is bare and desolate, the valley itself being 7,000 ft. above the sea level; while both to the north and south the mountains of the Hindu Kush and the Paghman range reach more than double that height. Judging from the extent of the old workings known—a series of large empty chambers and narrow irregular tunnels which can be followed underground for quite half a mile into the mountain—they must certainly have been worked in spasmodic Afghan fashion for hundreds of years. They seem to have been last abandoned during the unsettled times of the latest British occupation of Kabul, and were only re-opened by the present Ameer some six years ago. The paper describes the geological features of the district, methods of working, etc., and summa-

rizes the total cost of a ton of smelted lead from these mines as follows: Mining, crushing and washing, 2½ tons of ore, \$22.40; smelting, labor, \$14.04; smelting, fuel (wood), \$10.62; superintendence, etc., \$2.44; total, \$50.40. The total output is about 14 tons of smelted lead per month. The methods are very primitive, but the introduction of European methods of mining would be impossible for political reasons. At present the Hazara miners consider the mines to be their own property, where they can work how they please, being bound only to extract a certain amount of ore at a fixed price, and any interference with the system would be resented. The output could be vastly increased, but these and other mines already produce enough for the needs of the country, almost confined to the making of bullets, and there is a disinclination to export metal. In the smelting the greatest economies could be effected. By increasing the size of the hearths and using a water power blast the present expenses of labor and fuel could be lessened; and with flues to condense the fume, and a slag hearth to resmelt the slags, a fairer percentage of metal might be saved. Brushwood is fairly cheap and abundant. The unsettled political condition of the country has as much to do with the backward condition of mining as the ignorance of the people. There is evidence that things were not always so bad as they are now; thus, small amounts of fused slags, poor in lead, found at the surface, show that smelting was at one time better understood. But no ruler latterly has been sure enough of his position to give much attention to mines, and a class of professional miners would fare badly in time of war. It is only as the country becomes more settled politically that the mining will be likely to improve.

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 DECEMBER 30TH, 1893.

- 2,616 of 1893. Chilling Armor Plates. T. J. Tresidder, Sheffield.
- 2,832 of 1893. Coal Mining Machine. F. Scott, Sheffield.
- 2,903 of 1893. Miners' Safety Lamp. J. V. Wilson, London.
- 3,210 of 1893. Electric Miners' Lamp. S. W. Maquay, London.
- 4,029 of 1893. Metallic Mine Props and Roofing. E. A. Cresson, Paris.
- 8,015 of 1893. Jigging Machines. A. Hegener, Cologne.
- 13,723 and 13,542 of 1893. Electrolytic Soda and Bleach. Dr. C. Kellner, Vienna.

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, JANUARY 2D, 1894.

- 511,761. Tool for Turning Lock-Seams upon Metal Sheets. Charles E. Eckel, Syracuse, N. Y.
- 511,774. Method of Removing Tin from Tin-Plate Scrap. Henry H. Hollis, Chicago, Ill.
- 511,792. Blasting Cartridge. Gershom M. Peters, Cincinnati, O.
- 511,794. Drill Jar. William H. Phillips, Philadelphia, Pa., Assignor to the Breull-Phillips Company, Limited, same place.
- 511,800. Method of and the Apparatus for the Treatment of Ores. George M. Rice, 2d, Worcester, Mass.
- 511,810. Composition of Matter for Plating Metallic Surfaces with Silver. Joseph W. Skinner, La Crosse, Wis.
- 511,816. Process of Removing Tin from Tin-Scrap, etc. Thomas G. Hunter, Philadelphia, Pa.
- 511,851. Furnace Chill. Alexander Loughlin, Sewickley, and Joseph Reuleaux, Pittsburg, Pa., Said Reuleaux Assignor to said Loughlin.
- 511,869. Mining Drill. Ernest P. Warner, Chicago, Ill., Assignor to the Western Electric Company, same place.
- 511,871. Ore Pulverizer, Gold Saver and Mineral Concentrator. Basil J. Atterbury, Brixton, England.
- 511,898. Naphthal Trisulfonic-Acid Monamid. Hans Kuzel, Höchst-on-the-Main, Germany, Assignor to the Farbwerke, vormals Meister, Lucius & Bruning, same place.
- 511,890. Apparatus for Drawing Metal Tubes. Howard Lane, Birmingham, England.
- 511,901. Tetranitro-Anthrachryson. Heinrich Laubmann, Höchst-on-the-Main, Germany, Assignor to the Farbwerke, vormals Meister, Lucius & Bruning, same place.
- 511,919. Converter. Alexander Tropenas, Paris, France.
- 511,924. Artesian Well Apparatus. Josiah Barrett, Allegheny, Pa.
- 511,938. Manufacture of Cement. Seigmund Dentler, New York, N. Y., Assignor of one third to Herman Loewenthal, same place.
- 511,950. Process of and Apparatus for Carburetting Air. Samuel Hibes, York, Pa.
- 511,965. Saw for Cutting Stone. Orlando W. Norcross, Worcester, Mass.
- 511,974. Coke Oven. Archibald R. Strachan, Pineville, Ky.
- 511,998. Stone Crusher. Morton G. Bunnell, Chicago, Ill., Assignor to Frederick C. Austin, same place.
- 512,005. Ingot-Casting Mold. Charles W. Cantz, Philadelphia, Pa., Assignor to Henry Dixon & Sons, Incorporated, same place.
- 512,010. Pumping Engine. Ezra E. Clark, Northampton, Mass.
- 512,016. Rock Drill Tripod. Samuel W. Dauglass and Abraham J. Sypher, Chicago, Ill., Assignor to Milan C. Bullock, same place.
- 512,019. Wrapper-Holder. Robert E. Glasgow, Richmond, Va.
- 512,133. Driving Mechanism for Centrifugal Separators. Johann L. Jonsson, Stockholm, Sweden, Assignor to the Aktiebolaget Separator, same place.
- 512,046. Precipitating Precious Metals out of their Solutions. Carl Moldenhauer, Frankfurt-on-the-Main, Germany.
- 512,053. Blast Furnace. John W. Nesmith, Denver, Colo., Assignor to the Colorado Iron Works, same place.
- 512,083. Pont for Dredges. Edward Woods, Sault Ste. Marie, Mich.
- 512,106. Brick-Kiln. Carrel Forrester and Augustus H. Dancken, Omaha, Neb., Assignor of one-third to John H. Thissen, same place.
- 512,127. Steam Boiler Furnace. Charles E. Southard, St. Louis, Mo.
- 512,128. Concrete Block with Expanded Metal Reinforce Core. August C. Storck, St. Louis, Mo., Assignor of one-half to August C. Erfort, same place.
- 512,143. Apparatus for Manufacturing Pipes, Covering Wire, etc. Alexander Wylie, Johnstone, near Glasgow, Scotland.
- 512,154. Rock Drill. Arthur E. Buzzo and Henry H. Thompson, Ishpeming, Mich.
- 512,160. Articles Coated with Metallic Alloys. Sherard O. Cowper-Coles, London, England, Assignor to the London Metallurgical Company, Limited, same place.
- 512,170. Apparatus for Atomizing Petroleum Oil for Vapor Fuel. Evan A. Edwards and Jason De Neal Toledo, O., said De Neal Assignor of one-fourth to William Henry Laird, Toronto, Can.
- 512,173. Ore Car. Michael C. Ensminger and John W. Smitham, Denver, Colo.
- 512,183. Smoke Abating Furnace. Thomas W. Gallagher, St. Louis, Mo., Assignor of one-half to Charles D. Stevens, same place.
- 512,208. Mill. Thomas C. McCleery, Exeter, Neb.
- 512,213. Water Tube Boiler. Harry S. Peil, Akron, O.
- 512,235. Process of and Apparatus for Roasting Ores. Charles W. Stickney, Keichum, Idaho.
- 512,245. Hydrocarbon Burner. Daniel W. Coie, Ottawa, Kan., Assignor to William W. De Wolf, same place.
- 512,258. Hoisting Machine. George C. Murray, Seattle, Wash.

PERSONALS.

Mr. S. H. Davis, of the Beatrice mine, Sudbury, Ont., has gone to the Pacific coast, to try and interest capitalists in the development of the mine.

Governor Pattison, of Pennsylvania, has appointed Mr. Eckley B. Cox, of Drifton, Luzerne County, a member of the Geological Survey Commission to succeed A. Pardee, resigned.

Mr. W. E. Knox has been appointed superintendent of the Alabama Mineral Division of the Louisville & Nashville Railroad, with headquarters at Anniston, Ala., in place of Mr. T. K. Scott, resigned.

Dr. E. O. Hovey, who was superintendent of the Missouri exhibit in the Mines and Mining Building, at Chicago, has been appointed assistant to Prof. R. P. Whitfield, at the Museum of Natural History, in New York.

Mr. F. Merricks, a mining expert, of London, has arrived in British Columbia from New Zealand on his way to England. He is going to Alberni to inspect the Golden Eagle claim recently acquired by the Duke of Montrose and other English capitalists.

Mr. W. G. Godfrey has resigned his position as superintendent of the Hileta Gold and Silver Mining Company, of Velardena, Mex., and is now engaged in examining some gold properties in the interest of Chicago capitalists. His headquarters are in the City of Mexico.

Mr. J. B. Tyrrell, geologist, and J. W. Tyrrell, Dominion Government land surveyor, have just returned to Toronto from a visit to the far North. They went as far as Chesterfield Inlet, on the west side of Hudson Bay, traversing 850 miles of entirely new country which a white man had never before crossed.

Mr. F. C. Beardsley has been engaged by the Turkey Knob Coal Company, as engineer in charge of the development of the extensive coal lands which they have leased. Mr. Beardsley was formerly assistant and locating engineer on the Chesapeake & Ohio. His headquarters will be at Mount Hope, Fayette County, W. Va.

Mr. J. H. Weddle has been appointed manager of the Arkansas Valley smelting works of the Kansas City Smelting and Refining Company, at Leadville, Colo., in place of Mr. John Williams, resigned. Mr. Henry W. Allen, who was formerly agent of the company in Mexico, is now assistant treasurer, with office in Leadville.

The firm of Moss, Heikes & Co. has just been established with offices in the Monadnock Building, Chicago, to do a general mining business, the examination of mines being a specialty. Mr. Moss was formerly president of the Colorado State School of Mines. Mr. Heikes was lately chief of the Colorado mineral exhibits at the World's Fair.

Messrs. Cary & Moore, analytical and consulting chemists, of Chicago, have moved from the Unity Building to handsome quarters in the Monadnock Building. Mr. Cary was chemist and assayer of the Department of Mines and Mining, chemist of the National Jury of Awards at the World's Columbian Exposition, and in that capacity won high honors. Mr. Moore was formerly connected with the firm of Rattle, Nye & Hollis, chemists.

Messrs. H. L. Hollis and F. A. Emmerton have formed a partnership under the firm name of Hollis & Emmerton, to continue the business of analytical chemists, metallurgical and mining engineers, formerly carried on by H. L. Hollis & Co., with offices and laboratories in Cleveland, O., and Chicago. Mr. Emmerton will take immediate charge of the Cleveland office and laboratory, and give his personal attention to the ore sampling at Lake Erie ports and at furnaces.

OBITUARY.

Samuel Lockwood, Ph. D., died at his home in Freehold, N. J., on January 8th. For many years he was president of the New Jersey Microscopical Society.

Edmund W. Converse died at Newton, Mass., on January 6th, aged 67 years. He was born in Weathersfield, Vt., and went to Boston when 17 years old. At the time of his death he was a director of the Aetna mills and the National City Bank, of Boston; of the National Tube Works, of McKeesport, Pa., and the Pueblo Smelting and Refining Company.

Pierre J. Van Beneden died on January 8th at Louvain, Belgium. He was born in 1809, and devoted his life to research in the physical sciences. Besides publishing several large works, he edited nearly 300 memoirs in the transactions of scientific societies. He was Doctor of Medicine, Sciences and Laws, was a member of almost every academy of science in Europe, and had received decorations from five or six sovereigns.

Paul Wilhelm Forchhammer, the German archaeologist, died in Kiel, Germany, on January 9th. Herr Forchhammer was born at Husum, Prussia, in 1803. After traveling in Italy and Greece, he

visited Asia Minor in 1838, to ascertain the site of Troy, being assisted by the British Admiralty. His chart of Troy appeared in the publications of the Royal Geological Society. Among his treatises is the "Topography of Athens," published in 1841.

Henry S. Eckert died in Reading, Pa., on January 10th, aged 63 years. He was a son of the late Isaac Eckert, a millionaire iron manufacturer, and was widely known among the bankers and financiers, having been president of the Farmers' Bank for 21 years. He was the senior member of the firm of Eckert & Brother, owners of the Henry Clay furnace. He was president of the Eastern Pig Iron Association for a number of years; one of the board of directors of the Union Trust Company and Penn Mutual Life Insurance Company, of Philadelphia; president of the Topton Furnace Company, and a director in a number of the branch lines of the Reading Railroad. He also had large interests in Alabama, and at one time in connection with his brother was the owner and operator of the Wheatfield iron ore mines.

SOCIETIES AND TECHNICAL SCHOOLS.

Michigan Mining School.—Work is to be begun at once on the new building for the State Geological Survey on the grounds of this school, at Houghton. The building will contain, besides offices, the maps and documents of the survey and its mineral collections, which will be accessible to the students.

Western Society of Engineers.—At the annual meeting in Chicago, January 4th, the following officers were elected: President, H. B. Herr; vice-presidents, D. W. Mead and H. C. Draper; secretary, Thomas Appleton; treasurer, David L. Barnes. The meeting was followed by the annual dinner at the Sherman House.

Scranton Engineers' Club.—A preliminary meeting for the organization of a society, to be known as the Scranton Engineers' Club, was held December 21st, 1893, at the Coal Exchange, Scranton, Pa. A good number were present, and committees on by-laws, membership and rooms were appointed, and a meeting for permanent organization fixed for January 11th, 1894. The membership is intended to include all branches of the profession, and the object of the society will be the reading and discussing of papers on engineering topics.

California Academy of Sciences.—At the annual meeting in San Francisco last week the following officers were elected: President, H. W. Harkness; vice-presidents, H. H. Behr and J. G. Cooper; corresponding secretary, George A. Moore; recording secretary, Charles G. Yale; treasurer, L. H. Foote; librarian, Charles Trayer; director of the museum, J. Z. Davis; trustees, W. C. Burnett, Charles F. Coker, D. E. Hayes, E. J. Moera, George C. Perkins, Adolph Sutro and John Taylor. At the meeting the treasurer reported the year's receipts as \$28,921 and the disbursements as \$18,451.

American Society of Civil Engineers.—At the regular meeting in New York, December 20th, a paper by Peter C. Hains, Lieutenant-Colonel Corps of Engineers, U. S. A., on the "Reclamation of the Potomac Flats, at Washington, D. C.," was read by the secretary. A written discussion on the paper by Robert A. Cummings was read and it was discussed orally by Messrs. Crowell, J. D. Van Buren, H. W. Brinckerhoff, Gosling, Washburn, R. S. Buck, R. L. Harris and Charles B. Brush. At the regular meeting, January 3d, a paper on "Train Loading for Bridges," by Mr. Theodore Cooper, was read and a brief discussion followed.

Columbia College, New York.—At the January meeting of the board Herman H. Cammann and William Gerard Lathrop, Jr., '62, were elected trustees to fill vacancies caused by the deaths of Hamilton Fish and Samuel Blatchford. The following officers were re-elected: Chairman, William C. Schermerhorn; clerk, John B. Pine; treasurer, John McLean Nash. McKim, Mead & White have been employed as architects of the buildings on the new site at Bloomingdale. President Low presented a collection of scientific apparatus, photographs of engineering works, and a set of 18 volumes, each 4 ft. square, of photographs and original detailed plans of all the German universities. They were prepared at great expense for the German Government, and were exhibited at Chicago.

Engineers' Club of St. Louis.—At the regular meeting, January 3d, Mr. Winthrop Bartlett addressed the club on "Street Railways." The total mileage in St. Louis in 1893 was 147, and the number of people carried was 47,000,000. At the close of 1893 the mileage had increased to 279, and the passengers to 92,000,000. In the discussion Mr. Richard McCulloch stated that the horse power to drive cable roads in this city averaged 11 per train, of which seven was required to move the empty cable. For electrical roads, the horse power was 13½ per train. These figures were much more favorable to electrical road than was commonly believed to be the case. The consumption of coal was still more favorable to electricity, being slightly less than the cable. This discrepancy, however, may be slightly due to a better steam plant. Mr. McCulloch also stated that data collected by him indicated that roads operating less

than 30 cars would find electricity preferable to the cable, while the reverse would be true for a traffic requiring more cars, providing the conditions as to curves and grades were favorable to the cable. The discussion was very full, and was participated in by Messrs. Ayer, Johnson, Oishausen, Russell, Flad, Crosby and Bruner.

Engineers' Club of Philadelphia.—At the regular meeting, December 16th, Mr. John Birkinbine exhibited a hemisphere of metallic ore highly polished with a ⅜-in. hole drilled slantingly through its upper part, and stated that, while traveling in Mexico, a companion, having promised to get him a meteorite, upon reaching Pueblo had presented him with this specimen. It was extremely hard, being capable of scratching glass, and to get some particles for analysis, it had taken three-quarters of an hour to drill a very shallow hole in it. Mr. E. K. Landis, who had analyzed these borings, had found that the specimen was iron pyrites with about 43% each of sulphur and iron, with the other ingredients still to be analyzed. Mr. A. Falkenau described some interesting features that he had studied in the Department of Mechanical Engineering at the World's Fair. The main points to which attention was called were the methods of construction in the 40-in. Yerkes telescope, and details regarding air compressors, exhibited by the Rand Drill Company. Mr. S. M. Vauclain exhibited a fine suite of specimens alluded to in his discussion on "Riveting Pressures," at the last meeting. These had been planed through the bolts to show how they filled the holes, and then treated to an acid bath, which showed the direction in which the iron had flowed.

INDUSTRIAL NOTES.

The Southern Steel Works, Chattanooga, Tenn., have decided to increase their plants by the addition of a train of rolls.

The Chattanooga Clay Works have been awarded the contract to furnish all the sewer pipe for the New Orleans sewerage system.

The bloom mill, rolling mill and steel plant of the Phoenix Iron Works, at Phoenixville, Pa., started up on January 8th, after being idle several days.

Oliver & Roberts, South Side Wire and Rod Mills, at Pittsburg, Pa., resumed operations on January 8th, in all departments. Both mills will run double.

Three departments of the Wheeling (W. Va.) Iron and Steel Company's top mill resumed in full on January 9th, employing 500 men. The mills have been idle three months.

The new wage scale at the Bessemer Steel Works, at Pueblo, Colo., has been practically accepted by the men. It is thought that the rail mill will be started by January 15th.

The large machine and wire works of W. H. H. Sisum at Belleville, N. J., started up on January 8th after having been closed several months. The Eastwood chemical and wire cloth works have already started up.

The puddling department of Zug & Co.'s mill, at Pittsburg, Pa., has been put on a system of four turns, with three heats to a turn. Until there is an improvement this plan will be followed to give some work to all the men. The 8 and 10-in. bar mills started on January 9th.

The Wright Steam Engine Works, Newburg, N. Y., has been placed in the hands of a receiver, and Mr. William Wright has made a personal assignment. The indebtedness is about \$123,000, of which \$40,000 is secured by a mortgage on the buildings. The failure is due to loss of business and bad debts.

At the annual meeting of the Sheet Iron Manufacturers' Association, in Pittsburg, January 9th, the following were elected officers: President, J. G. Battelle, Piqua, O.; vice-president, W. T. Graham, Bridgeport, O.; secretary, John Jarrett, Pittsburg; directors: W. T. Graham and B. M. Caldwell, of Bridgeport; N. E. Whittaker, Wheeling; B. F. Jennings and W. C. Cronemyer, Pittsburg.

The Anniston Pipe and Foundry Company has been organized at Anniston, with F. C. Miller, of Newport, Ky., president; J. K. Dimmick, of Anniston, vice-president and general manager; H. B. Cooper, of Anniston, secretary, and H. C. Peters, of New York, treasurer. This company has been organized to operate the old Anniston Pipe Works, one of the largest plants of that kind in the South, with a capacity for turning out 200 tons of the finished product daily. The new company will put the pipe works, which have been idle several months, in operation at an early date.

The Clayton Air Compressor Works, New York, state that while shipments during 1893 did not equal those of the previous year, which was the best in their history, the trade was uniformly good and they are now working full time and full capacity. In addition to the usual trade among the mining, tunneling and railway interests, the increasing use of this kind of machinery in transmitting natural gas through pipes, for refrigerating and ventilating purposes, supplying divers in submarine operations, working pneumatic riveters, cranes, hoists and tools of all descriptions, vul-

canizing wood, removing rubber hose from mandrels, operating transmission tubes, charging pneumatic tires, compressing carbonic acid gas, charging automatic sprinklers, elevating acids and other liquids, agitating molasses and solutions of every kind, operating oil fires and lights, testing tinware, pipe and hose, experimental purposes, etc., has tended to swell the volume of orders. The number of requests for catalogues and estimates on compressors promises an early increase in business.

MACHINERY AND SUPPLIES WANTED.

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

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

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

GENERAL MINING NEWS.

ALASKA.

Alaska-Treadwell Gold Mining Company.—The report for December is as follows: Shipment of bullion, \$69,948; tons of ore milled, 19,412; tons of sulphurets treated, 350; of bullion there came from sulphurets, \$20,333. The estimated gross expenses for period have been \$26,652, leaving a profit of \$43,296 for the month. The net profits available for dividends for the first seven months of the present financial year are therefore about \$325,000, without including profits from store, which are, perhaps, \$5,000.

(From our Special Correspondent.)

W. W. Murray is now en route to Juneau. He is the mining expert who promoted the celebrated Bear's Nest scheme some years ago, by which German and English capitalists were misled to the extent of about \$300,000. Mr. Murray has gone north to prosecute a claim of \$25,000 against T. S. Nowell, an Alaskan mineowner, in the courts of the territory.

CALIFORNIA.

The California Debris Commission has granted Joseph Davis, Manuel Mateo and Frank Barbero permits to work three small mines on Howard Creek, near Sierra City. Permits were granted for dams to be built at the Red Hill, the Badger and the Walker mines, all near Ono, Shasta County; the Tannery Ravine, near Brownville, Yuba County; the North Star and the Green Mountain mines, at Mokejume Hill. The Fifty-four Flat mine was directed to submit plans of the dam for which it petitions.

(From our Special Correspondent.)

The receipts of quicksilver at San Francisco during the 12 months ending November 30th, 1893, aggregated 25,421 flasks, valued at \$1,042,261, an increase of \$182,541 over the total for the preceding year. The heaviest receipts were in May, 2,790 flasks; the lightest in September, 1,281 flasks. The shipments by both sea and rail during 1893 were as follows: By sea, 14,740 flasks, value, \$588,616; by rail, 10,380 flasks, value, \$415,200; total, 25,120 flasks, value, \$1,003,816.

Butte County.

According to the Oroville "Register" the mining outlook in Butte County is better than at any time in the past. From 1849 to 1860 there were many profitable placer mines and some good quartz mines worked in Butte. Then came a period of retrogression which kept up for nearly 25 years. Then came a change, for the old quartz mines that had been abandoned began to be opened and those ores thrown aside as useless on account of the sulphurets became sought after. Then came new discoveries of mines, the working of gravel mines under the lava, the opening up of the famous blue lead at Bangor and a general revival of mining of all kinds.

Mono County.

Standard Consolidated Mining Company.—This company reports its electric transmission plant (which was described and illustrated in the "Journal" for May 13th, 1893), as working finely. The mill is running steadily by this power. The distance transmitted is 12½ miles. The system is the Westinghouse "A. C." synchronous, single-phase at 3,000 volts potential. There is a 120-KW. generator and 120-H. P. motor.

Placer County.

(Reported for the "Engineering and Mining Journal.")

Hidden Treasure Mining Company.—This corporation was organized in 1892 and acquired by purchase two locations in the Auburn mining district, about 1½ miles north of the town of Newcastle. The Central Pacific Railroad runs through the property. The course of the vein is east and west bearing south about 5°, and varies from 4 to 6 ft. in width. There is a well-defined body of quartz between the granite and slate formation with a soft gouge about 8 in. wide between the hanging wall and vein. The general appearance

of the vein is seamy, with galena sulphurets and pyrites showing prominently, the same being well distributed through the rock outside the seams. Considerable work has been done about the property, such as building roads, etc., and the vein has been prospected by two tunnels driven on the ledge, one from each side of the ravine; that on the west side about 200 ft. and on the east about 100 ft. The mountains on the east side rise very steep and abrupt. Also a shaft has been commenced (now down about 25 ft.) on another ledge (2 ft. wide), about 100 ft. south of the tunnel and bearing toward the main ledge. While doing this prospecting various small quantities (from 10 to 20 tons) have been worked as tests at custom mills, returning about \$17. Mill tests made by assayers have gone from \$17 up to \$200 per ton. Concentrating tests average a little less than 1% sulphurets, which, unlike most in this county, are not rebellious; average assay value gold, \$1,306; silver, \$481 per ton. Facilities for running a mine as to location, wood, water, etc., are good.

COLORADO.

The United States Surveyor-General has approved the following mineral surveys for Colorado for the week ending December 30th, 1893:

8669 (Pueblo)—Summit.
8611 (Montrose)—Shining Gold.
8563 (Durango)—Senator, Cabezon and Sparticus lodes.
8666 (Garfield)—Ladd & Crockett and Ladd & Crockett No. 2 lodes.
7530 (Pueblo)—Queen Bess.

Boulder County.

Copper Rock District.—Bowman, Burleson & Co. have let a contract to drive a tunnel 300 ft. into Cedar Mountain to cut the Empire vein, several hundred feet deep. In the upper workings on this claim, there is exposed a well-defined vein nearly 3 ft. wide, with mineral scattered through it. In close vicinity to the Empire is the Windy group and others that pan gold at the surface. The Starbank, owned by Munson & Co., has one of the best showings in the camp. The main work is being done in the tunnel, which is now in 85 ft. In the breast and back is exposed a large body of mineral, through which is scattered copper, iron, etc. The ore is chiefly free milling.

Pine Forest.—J. N. McElvaine and John H. Francis, of Peoria, Ill., and A. E. Bowen and Bert Langridge, of Boulder, have purchased the Pine Forest mine for \$5,000. The property is located near the Smuggler, at Balarat. The new owners will at once erect three Griffin mills of 125 tons capacity per day, a 125-H. P. engine, a 180-ton Gates crusher, nine tables, electric plates and a 50-H. P. double hoister with engine. In addition to this machinery a 6-in. pipe line will be constructed from the St. Vrain to the mill, a distance of three-quarters of a mile. These improvements altogether involve an outlay of \$40,000 in addition to the purchase price of the property.

Chaffee County.

Nellie Bly.—Reports from Buena Vista state that at a depth of 18 ft. in the Nellie Bly lode a 4-ft. vein of free-milling gold ore in a well-defined streak has been encountered. The newly discovered ore is made up of black hematite iron and honeycomb quartz, the cavities in the quartz being filled with oxide of iron. Five tons of Nellie Bly ore are now in the bins, and a carload shipment will be made to the Pawnee mill at St. Elmo.

Salida Copper Company.—The mines of this company have thus far produced a total of 2,791,000 lbs. of copper.

El Paso County.

The first strike of real importance on the north side of Blue Hill was made last week in a 70-ft. shaft on a claim situated north of the Kalamazoo and west of the Hart group. It is said to consist of 8 in. of ore that averages 40 oz. by assay. Rich float has been found all over this sidehill, and there are dozens of shafts which have been sunk in search of the source, but thus far this is the only strike of ore yet made in the place. The wash in this hill is unusually deep, and in some places over 100 ft. has been sunk without finding solid foundation.

Isabella Mining Company.—This company has proved that it has the Victor vein in the Smuggler claim by making connections with the Victor workings. The vein where opened has a small streak of high-grade ore.

The following items of Cripple Creek mining news are taken from the local papers:

Anaconda Mining Company.—This company is using an Ingersoll-Sargeant compressed air drill in its cross-cut tunnel with success. The Superior and Great View are both furnishing weekly about 40 tons of ore.

Gold Dollar.—The entire 16-ft. vein on this property will mill upward of \$10, with 18 in. on each side of the rich streak which will smelt \$100. Eight men are working in the mine at present, but the number will be soon increased.

Pharmacist Mining Company.—The Pharmacist shaft is the deepest in the camp, being 354 ft. below the surface, with fine levels of a combined length of about 1,600 ft.

Princess Mining Company.—The Mattie D. of this company is now sacking ore for shipment which

is expected to run \$100 to the ton. It carries considerable free gold.

Strong.—The lessees of this mine are working 43 men stoping, extending the levels and sinking the 170-ft. shaft as rapidly as possible.

Victor Gold Mining Company.—The development of the Victor consists of two shafts of 337 and 80 ft. respectively, together with levels of 400, 908, 760, 550 and 60 ft., a total length of 2,678 ft.

Lake County.

(From our Special Correspondent.)

The properties of Rock Hill, all of which, excepting the La Plata, are under the control of the Iron-Silver Mining Company, have been under lease during the year and have made a very good showing.

The presence of gold in the Iowa Gulch ores has encouraged those operating in that section. The Doris heads the list of shippers. Then there are the Standard group and the Edison group.

Although the Morning and Evening Star properties show a decrease of output from 1892, they have made an output of over 33,000 tons of iron ore. There are some 13 odd shafts on these properties, all of which are under lease and looking fine.

Breece Hill.—The coming summer promises to see much work performed in this district on the gold properties, which already number a lot of producing mines, among which are the Valley, Midnight, New York, Little Ella, Little Johnnie, Uncle Sam, Legal Tender, Little Winnie, Fanny Rawlings, St. Louis, Eliza, Black Prince, Hamburg, Highland, Chief Consolidation, Great Hope, Antioch, Printer Boy, Florence & Nellie S., Alta and North Star.

Curran.—Parties are negotiating for a lease on this old shaft. Good indications have been found in these workings.

Leadville Smelters.—The word has been definitely given out that the Arkansas Valley plant here, belonging to the Kansas City Smelting and Refining Company, is to blow in as soon as possible; this will be by January 15th at the latest. During the months of idleness the plant has been placed in thorough repair and there are from 10,000 to 12,000 tons of ore on hand. The new wage scale is from 10 to 15% lower than the former scale and has been generally signed by the workmen.

It is rumored that Leadville parties have secured a lease on the St. Louis Smelting and Refining Company's plant at this point, but nothing definite has yet been made public.

The Holden Smelting and Refining Company's plant, which was closed by attachments some months ago, is to be sold by the sheriff this week. The Bi-Metallic smelter and also the Elgin are running with a good force of men and are treating considerable ore. The Bi-Metallic is handling quite a quantity of Creede ore in addition to the Leadville output.

Lillian.—This mine is the only one on Printer Boy Hill now working. It produces a silicious smelting ore which averages 1¼ oz. gold and from 4 to 5 oz. silver.

Little Winnie.—The shaft has gotten into a rich body of silicious ore and the further sinking has revealed a body of lead ore.

Mike & Starr.—This mine, which has been shipping 100 tons daily, has closed down; the ore was too low-grade to mine at present.

Small Hopes.—These people make the following division of their output for 1893: Sulphide, 325 tons; iron, 15,220 tons; lead, 151 tons; dry ore, 2,390 tons.

Wolcott.—This property has added \$100,000 to the output of the camp for 1893. The Morning and Evening Star output was \$97,500.

Pitkin County.

Mineral Farm.—Leasers are going to work on the Mineral Farm, Aspen, and probably 300 men will find employment there within a short time.

Mollie Gibson Consolidated Mining and Milling Company.—Mr. J. J. Hagerman, president of this company, has issued the following notice to the stockholders: At a meeting of the board of directors of this company, held at Colorado Springs, on January 4th, it was decided to suspend dividends for the present. While the company has about \$200,000 surplus in its treasury, the directors do not deem it prudent to either encroach on it or to exhaust the ore remaining above the seventh level until the eighth, ninth and tenth levels are developed and put in condition for safe and profitable working. When the drop in silver came, about July 1st, the company had in its treasury \$323,000 in cash, and about \$180,000 due from the smelter. Very little ore was shipped during the three months following. Since, and including July, we have paid \$330,000 in dividends, and have expended \$60,000 in new pumps, and other machinery made necessary to provide for deeper mining and more water. More than a year ago the upper edge of a fault in the formation was encountered, between the fifth and sixth levels, throwing out of line the heretofore regular trend of the rich ore chutes in their downward course. This faulted, or broken ground has been found to be about 100 ft. deep vertically, and about 130 ft. on the dip of the contact. Through this broken mass rich ore has been found, of the same char-

acter as that in the regular formation above, but so mixed with the crushed rock that its mining has not been profitable. It proves, however, the continuity of the ore chute to the ground below the fault, which ground is regular from the eighth level down to the tenth, and presumably below it. The shaft cuts the contact on its dip at the tenth level, disclosing the same geological conditions as exist in the fourth and fifth levels, where the richest ore was found. Early in the year it was expected this lower ground could be developed and be producing ore several months ago, and to that end the No. 2 shaft was sunk and reached the tenth level in May last, and preparations were made to place there the largest pump in the State. Unfortunately, while this work was in progress and incomplete, in July a new flow of water was struck, which quickly filled the shaft to the eighth level. The preparations to remove this water took a good deal of time, and has been very expensive, but it was successfully accomplished in December last. The new pump at the tenth level will be in place and ready to work about January 25th, when development of the lower levels will begin. The pumping capacity at the tenth level will be three times the present flow of water. But for the flooding of the shaft in July, which has caused the delay stated, it would probably not be necessary to now interrupt dividends. Nearly all the ore heretofore mined from the Gibson has been taken from ground not deeper than 350 ft. from the surface. The tenth level is 770 ft. from the surface. The contact in which rich ore chutes are always found in this part of the Aspen district, extends through the property of this company a distance of 2,500 ft. Of this only about 500 ft. have been thoroughly prospected. It is the purpose of the company to begin the development of the remaining 2,000 ft. of contact in the near future. According to all experience in this district ore chutes other than those we are now working will be found. As an indication of faith in the property by those who know most about it, it may be proper to state that the control of the stock is still in the hands of those who held it when the company paid its first dividend.

Saguache County.

The management of the New York Chance and the Last Chance, two of the largest shipping mines in Creede, is having some difficulty in making arrangements for the smelting of its ore, says the Denver "Republican." The proposition made, as the result of the meeting of a number of smelting men in Pueblo last week, was not satisfactory. The meeting decided to raise the charges for the Creede ore. The owners of the two large mines received offers from the Elgin smelter and the Harrison smelter, at Leadville, and from a plant at Trinidad, which is using the Austin process. In speaking of the proposals Mr. S. Z. Dickson, one of the owners of the mines, stated that no agreement had been arrived at as yet. The prices asked by the smelters were not satisfactory and their stipulations that they should decide the amount of ore to be mined were less so. Negotiations are still in progress.

Creede is now shipping 150 tons a day, of which 90 is from the Last Chance and York and 40 from the Amethyst.

GEORGIA.

Cherokee County.

Creighton Mining and Milling Company.—The Mecklenburg Iron Works, Charlotte, N. C., are now shipping to this company a 10-stamp mill and a chlorination plant complete with furnaces, to take the place of a cyanide plant that has not been successful with the concentrates at the mine.

IDAHO.

The following statement of the mineral production of the State for 1893 has been prepared by Mr. Alfred Eoff, of the Boise City National Bank, for the Wells-Fargo Company, and is published in the Boise City "Statesman":

Counties:	Gold.	Silver.	Lead.
Ada.....	\$10,000	\$2,000	.....
Alturas.....	50,000	300,000	\$150,000
Bingham.....	15,000	.....	.....
Boise.....	300,000	103,000	.....
Cassia.....	25,000	.....	.....
Custer.....	50,000	75,000	25,000
Elmore.....	50,000	10,000	.....
Idaho.....	85,000	10,000	.....
Lemhi.....	175,000	10,000	.....
Logan.....	30,000	20,000	.....
Owyhee.....	665,000	335,000	.....
Shoshone.....	175,000	600,000	600,000
Washington.....	15,000	40,000	.....
Totals.....	\$1,615,000	\$1,502,000	\$775,000

In the statement for 1892 silver was taken at \$1 per ounce and lead at 4 cents per pound; in 1893 silver is rated at 70 cents and lead at 35 cents. The total values of the estimates for the two years compare as follows:

	1892.	1893.	Decrease.
Gold.....	\$1,791,000	\$1,645,000	\$146,000
Silver.....	2,792,000	1,502,000	1,290,000
Lead.....	2,475,000	775,000	1,700,000
Totals.....	\$7,063,000	\$3,922,000	\$3,141,000

The decrease was largely in the Coeur d'Alene district, where the estimated production decreased in value \$2,053,500, the total value given for 1893 being \$1,375,000 only.

The firm of Winters, Parson & Boomer, Butte, Mont., has received the contract for grading the Idaho State road from Salmon City to Stanley Flats, 100 miles; the contract price is \$40,000. The State of Idaho has recently let contracts for grading roads which will call for an expenditure of about \$125,000 in all. These roads will be of much importance to the mines of the State.

Coeur d'Alenes.

Gem Mine.—This mine laid off 50 men last week, and has now only 25 at work, who will be employed on development work.

Idaho County.

Brownsville Mine.—This mine has been sold by Mr. L. P. Brown to a California company, represented by J. P. Ewing, says the Grangeville "Free Press." The price is said to be \$25,000, and the new company intends at once to sink the shaft, which is now down 48 ft., to 100 ft., and to put up a 10-stamp mill.

MICHIGAN.

Copper.

Wolverine Mining Company.—The product for the month of December was 75 tons, 1,500 lbs. copper.

Iron—Menominee Range.

Appleton & Loretto.—According to the Norway "Current," the Loretto output is much in excess of what it was some weeks ago, the opening work at the same mine having so far given good results. The shaft is down to the second level, the station cut, and cross-cutting to the ore begins in a day or two. At the Appleton the new ore lens to the south is very promising and everything points to the development of a large body of ore, the grade of which is exceptionally fine. The long cross-cut which struck the ore and passed through it will be continued south to the limestone.

Dunn.—The leasehold of the Dunn mine was sold under execution last week. The execution was levied at the instance of the Chicago & Northwest Railway Company. The leasehold was bid in by Attorney F. H. Abbott, acting for the railway company. The bid was \$28. The arrearage freight charges and royalties will, however, bring the price of the leasehold up to an amount worthy of consideration. There is due at the present time about \$22,000 in royalties and the "Diamond Drill" is informed that the freight charges attaching to the leasehold, approximate \$10,000.

Ingersoll.—The work of exploration and development has been resumed and about 20 men will be employed.

MINNESOTA.

Iron—Mesaba Range.

(From our Special Correspondent.)

Biwabik Iron Mine.—The stripping contractors closed down here, because of some complications between other contractors and the company which forbade the further use of certain tracks, etc. About 300 men are idle in consequence. The shutdown is only temporary. This leaves but one mine—the Canton—at work on the Mesaba.

Iron King.—W. O. Winston has the contract for stripping as well as for 1½ miles of main track for the Duluth & Iron Range Railroad.

Mountain Iron.—It is stated on good authority that at the time of the shutdown a week ago, ordered by the Consolidated company, earth was being moved at about 30 cents a yard. Work will probably resume soon enough to allow the stripping to be kept in advance of the miners.

Redwood County.

(From our Special Correspondent.)

Redwood Falls Coal Mine.—The coal deposit which was opened last fall, and from which more or less lignite coal has been taken, was optioned last week to William McKinley, of Duluth. He proposes to explore by drills and to mine in the usual way. It is the opinion of many that the quality of coal will improve as depth increases. At present the coal taken out is suitable only for immediate use.

St. Louis County.

(From our Special Correspondent.)

The county commissioners and the Jobbers' Union, of Duluth, will build a road to the newly discovered gold deposits on Rainy Lake, distant from the end of the railroad about 50 miles. Loggers are going into the country and even if gold is not found the road will be of use. These are not by any means the first gold finds made in the same general locality, but nothing has ever come of the preceding ones.

MISSOURI.

Jackson County.

Oak Tree Mining Company.—This company has been incorporated by F. Howard, S. Smith, C. W. Gilbert and T. A. F. Jones, to mine coal. The office is in Kansas City.

Jasper County.

(From our Special Correspondent.)

Joplin, Jan. 8.

The first week of the new year closed with a dull market for both lead and zinc ore, and the ore buyers were not after everything in sight even at reduced prices. The price of zinc ore dropped to \$15 per ton in some camps; the average in Joplin

was \$16 per ton, while a few sales of choice lots of ore were made at \$18. Lead ore opened at \$17.50 per thousand and on Saturday closed at \$17. There is a large stock of ore on hand in the bins which will be held for better prices.

Following are the sales of ore from the different camps: Joplin, 1,246,690 lbs. of zinc ore and 394,410 lead, value \$16,535; Webb City, 410,549 lbs. of zinc ore and 44,330 lead, value \$7,732; Carterville, 1,253,750 lbs. of zinc ore and 205,830 lead, value \$14,408; Zincite, 142,710 lbs. of zinc ore and 12,880 lead, value \$1,324; Oronogo, 65,800 lbs. of lead ore, value \$1,021; Lehigh, 33,060 lbs. of zinc ore and 18,520 lead, value \$281; Galena, Kan., 630,000 lbs. of zinc ore and 128,000 lead, value \$6,710; district's total value, \$48,071; Granby, 243,960 lbs. of zinc ore and 44,910 lead, value \$2,547; Mount Vernon, 94,550 lbs. of zinc ore, value \$709; Aurora, 724,000 lbs. of zinc ore and 135,000 lead, value \$7,187; lead and zinc belt's total value, \$58,514.

Margerum Mining Company.—This company, which is operating a 160-acre track of land along the Center Creek bottom, south of Oronogo, is this week putting in position the largest walking-beam lift pump ever erected in the district; the main spur wheel is 12 ft. in diameter, 14-in. face, and weighs 11,000 lbs. This will operate two 13-in. pumps at the plant and make rope connections to other pump shafts at different points on the land. This entire plant is manufactured and put in position by Shellenbach Brothers, of Joplin, Mo.

MONTANA.

Cascade County.

Sand Coulee Coal Company.—This company's mines are now producing about 2,000 tons of coal per day. There are 31 Harrison mining machines at work, and the Rand drills are used. The usual work is 25 tons for a 10-hour run of each machine, but 30 tons are frequently done. There are 600 men employed and work has been carried on pretty steadily, the average being over 250 days a year.

Deer Lodge County.

Bi-Metallic Mining Company.—This company is advertising for bids for driving and timbering a drain tunnel about 6,170 ft. long from the west face of the 1,000-ft. level of the Blaine shaft to Boca, on Douglass Creek. The first, or cross-country tunnel is to be 2,075 ft. long and the second tunnel on the ledge 4,106 ft. long, each to be 4 ft. wide and 8 ft. in the clear. No bonds will be required from the contractors, but the company will hold back a percentage of the estimates. Cessation of work five days will be deemed abandonment, and the company reserves the right, on 20 days' notice, to terminate the contract by purchasing the supplies the contractors may have on hand. All ores extracted in the work shall be the property of the company. It is required that three crews of miners be employed to drive the cross-country tunnel. The company will furnish free of charge, hoisting engine and boilers, air compressors, all pumps, cars, rails and ties, timbers framed and drain boxes ready to put in, at the Parnell and Bi-Metallic extension shafts. At Boca the company will furnish, free of charge, boiler, air compressor, machines, cars, rails, cross-ties, timbers framed and drain boxes ready to put in. The company will also furnish supplies needed at cost.

Jefferson County.

American Developing and Mining Company.—This company, operating the Golden-Sunlight mines, will commence driving next week an 800-ft. tunnel, which will strike the vein at a depth of about 700 ft. and undercut the body of rich copper ore recently encountered in the upper workings. A few days ago a carload of silicious ore from the 100-ft. level was shipped to the Parrot smelter, Butte; it assayed gold, \$43.41; silver, 28 oz. to the ton.

Madison County.

Golden Star Gold Mining Company.—Work was resumed on one of the two mines belonging to this company early last month. On the Orphan Boy a level was drifted and so far over 30 ft. of the vein has been exposed. A 15-in. vein has been encountered. It is the intention of the company to sink to a considerable depth at once and also to put on a mill without delay.

Silver Bow County.

Butte & Basin Gold Mining Company.—This company has been organized with a capital of 350,000 shares of \$1 each, to develop three promising claims in the Basin district. The company is composed of John E. Lloyd, D. J. Charles, Charles Schatzlein, J. H. Lynch, Fayette Harrington, Frank Beck, O. P. Blaine, Lee Mantle, Charles S. Warren, A. H. Hedley and Chris. Johnson. Mr. Lloyd is president; Mr. Schatzlein, secretary; Mr. Harrington, treasurer and Chris. Johnson, an experienced miner, says the Butte "Inter-Mountain," will superintend the work at the mine. The properties owned are the D'mon, Forest Hill and Fairview. Attention will be paid at present to the D'mon. The shaft, now 60 ft. deep, will be developed 100 ft. more, or until water is reached.

Montana Mining Company.—According to the Butte "Inter-Mountain," the news of a rich strike in the Drumlummon mine is confirmed. The strike was made on the 200-ft. level.

NEVADA.

(From our Special Correspondent.)

Jim Crow & Monitor Mines, Helena.—Samuel T. Gothe, manager of the Kingston mine, on the proposed extension of the Nevada Southern Railroad, has sold to Denver capitalists these properties. The purchase price was \$450,000. They are located in the Ferguson district, one of 10 camps to be opened by the extension of the Nevada Southern from Blake, Cal., to meet the extension of the Rio Grande Western in southern Utah.

Eureka County.

(From our Special Correspondent.)

Eureka & Palisade Railroad Company, Eureka.—During the month of December, 1893, this company received in transit to Salt Lake and Vallejo Junction, Cal., 1,504 tons of ore, as follows: Eureka district, from the Diamond mine, 873 tons; Eureka Consolidated mine, 143 tons; Jackson mine, 106 tons; Hamburg mine, 70 tons; Richmond mine, 57 tons; Dunderberg mine, 44 tons; Bullwhacker mine, 23 tons; and sundry mines, 26 tons; total Eureka district, 1,342 tons. From White Pine County, 152 tons; from H. A. Cohen, Morey, Nye County, 10 tons.

Nye County.

(From our Special Correspondent.)

Hot Creek District, Morey.—H. A. Cohen shipped during December, 1893, 10 tons of very rich silver ore.

Storey County—Comstock Lode.

During the year 1893 the sworn statements of superintendents show that only two ore-producing mines along the Comstock lode paid a bullion tax on the net proceeds, says the San Francisco "Report." These were the Potosi and Consolidated California & Virginia. The total tax paid during last year on the net bullion proceeds of the mines was \$4,514. Of that amount the Consolidated California and Virginia paid \$4,427 and the Potosi \$87.

The Virginia "Enterprise" publishes the following statement giving the number of men employed by the Comstock mining companies: Chollar & Potosi, 60; Ward Combination Shaft, 12; Alpha & Exchange, 12; New York, 2; Bullion, 10; Sierra Nevada, 8; Union Consolidated shaft, 20; Crown Point, Yellow Jacket, Segregated Belcher, Belcher Kentucky, Justice, Overman and Silver Hill, 95; Savage, 44; Hale & Norcross, 22; Andes, 8; Consolidated California & Virginia, including the West Consolidated California & Virginia, 170; Mexican and Ophir, 30; Utah, 1; Gould & Curry and Best & Belcher, 30; Occidental, 10. As a majority of these men receive \$4 a day for their labor, the aggregate shows a monthly payroll of nearly \$100,000, says the "Enterprise." The population of Storey County is now estimated at 5,000 and the combined product of labor is equal to \$20 per month for every inhabitant of the county.

Crown Point Mining Company.—The latest weekly official letter says: We are now opening out on the quartz encountered in the raise from the 300-ft. level south drift. It is about 4 ft. wide and assays from \$17 to \$20 per ton, as per sample. It runs half gold. The raise from No. 2 cross-cut, 700-ft. level, is now up six floors, following the footwall. The ground is hard, and progress is somewhat slow in consequence. Repairs to the main shaft are still under way.

Segregated Belcher & Midas Mining Company.—The latest official weekly letter says: The north drift from the south raise above the 1,100 level is now out 47 ft. The face presents no change; have stopped this drift for the present. The raise from No. 1 south drift, 1,100 level, is up 17 ft., and the top shows a width of from 18 to 20 in. of quartz, running from \$28 to \$25 per ton as per face samples, which is saved for pay. In the south drift from the 1,200 level raise we have encountered a streak of quartz yielding assays of from \$20 to \$28 per ton, extending for about 15 ft. in the drift, and on which we have started to raise. The streak is about 2 ft. in width. We are engaged in repairing the chute in this raise and opening another compartment to it.

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

Chollar Mining Company.—We extracted and sent to the mill the past week 111 tons and 250 lbs. of ore from the 100 level. Milled during the week 170 tons. On hand at mill 56 tons 1,250 lbs. Average battery assays, \$24.72; average car sample assays, \$28.29.

Consolidated California & Virginia Mining Company.—1,650 Level.—In working upward from the drift run north from the foot of the upraise on the sill floor of this level—at a point 200 ft. from the mouth—some ore has been extracted, assaying \$37 per ton. The drift running north from the cross-cut run east from the drift run north from the winze (52 ft. down) has been extended to a total length of 75 ft.; face in porphyry, clay and quartz. From the vicinity of the winze (20 ft. down) and from the north drift from the foot of the upraise on the sill floor of this level we have extracted during the week 28 carloads of ore—about 26 tons—the average assay value of which was \$35.50 per ton. The southwest drift (the Rule drift) from the 1,000-ft. station of the Consolidated Virginia shaft has been advanced during the week 63 ft.; total length, 205 ft.; face in soft porphyry and clay, carrying streaks of quartz.

Hale & Norcross Mining Company.—On the 1,300 level we continued stoping ore from the winze below this level and extracted during the week 22 cars of ore, assaying \$38.88 per ton per car sample, and eight cars of ore; average assay per car sample \$14.85 per ton. The mine was closed two days during the week.

Occidental Consolidated Mining Company.—From the west ledge above the 400 level we continue to extract about 10 tons of ore per week, of the average assay value of \$49 per ton. The west cross-cut from No. 2 upraise, started at a point 75 ft. below the 300 level, is now in 179 ft. and continues in porphyry, with seams of quartz.

(From our Special Correspondent.)

The following is the weekly tabulated statement of ore extracted from Comstock mines and milled, with the average car and battery assays, bullion product, etc.:

Mines.	Ore H'nd'd	Car S'mple Assay.	Ore Mil'd.	Av. Bat'ry Assay.	Bullion for Week.	Total.
Con. Cal. & Va....	28 ¹	35.50	.....	.....	.....	.....
Chollar....	.....	.....	.....	.....	.....	.....
Hale & Norcross	22 ²	38.88	.....	.....	.....	.....
	8 ³	14.85	.....	.....	.....	.....
Savage...	200 ⁴	30.37	279	23.01	\$3,914.95	.....

¹ 23⁴ Cars.

Consolidated California & Virginia Mining Company.—The Rule drift has been carried 260 ft., the face being in quartz carrying some pay ore. Mr. Rule remains confident that he will strike the ore body when the drift has been carried the proper length. The formation passed through has been almost identical with that passed through in the upraise from the 1,200 level some years ago.

Justice Mining Company.—The Blaine tunnel has been extended 345 ft., the face being in porphyry and seams of quartz. At a point 200 ft. back from the tunnel's face work has been commenced in stoping ore.

Segregated Belcher & Midas Mining Company.—The raise from No. 1 South drift 1,100 level is up 17 ft., the top showing a width of from 18 to 20 in. of quartz. The assays run from \$28 to \$35 per face samples, which is being saved for pay. A streak of quartz has been encountered in the south drift, from the 1,200 level raise. The assays have been running from \$20 to \$28 per ton.

White Pine County.

(From our Special Correspondent.)

White Pine District, Hamilton.—During the month of December, 1893, the following ore shipments were made via Eureka, in transit to Salt Lake and Vallejo Junction, Cal.: From C. A. Mathewson, 62 tons; Ed. McEllin, 53 tons; A. Muir, 26 tons, and F. Paul, 11 tons; total White Pine district, 152 tons.

NEW MEXICO.

A press dispatch from Albuquerque says that the preliminary figures in reference to the precious metal output of the territory for 1893 are \$1,000,000 gold and \$300,000 silver. This is a small increase in gold over any previous year, but a marked decrease in silver output. Mr. Walter C. Hadley gathered the statistics.

OHIO.

Columbiana County.

Pittsburg, Marion & Chicago Railway Company.—The annual election of officers of this company was held at Beaver on January 8th. An important matter to the company was the transferring of the option on leases on 2,000 acres of canal and bituminous coal land near Negley, on the line of this railroad, known as the Billingsly, Dyke & Rogers tracts, to a New York syndicate of capitalists by Hon. I. F. Mansfield and C. H. Smith. The former has been for years interested in the canal coal mines, at Cannelton. The company purchasing the options on the leases will begin extensive operations at once.

OREGON.

Baker County.

Beckwith.—This mine, says the Baker City "Democrat," is being operated under the superintendency of Mr. E. A. Pennington, who has a force of 30 employees at work in the mine and mill. The Bryan mill is crushing about 20 tons of ore per day and with satisfactory results. Last week two carloads of concentrates were shipped to the reduction works in Denver.

Gold Bug District.—This new district is about seven miles west of Baker City. A number of claims have been taken up and many men are at work. It is a gold district and several promising veins are being developed.

Snowstorm Mining Company.—The property of this company near Sanger has been attached on a suit to recover claims amounting to \$3,000.

Union County.

Oregon Gold Mining Company.—The receiver appointed on suit of the bondholders is now in full possession of the mine. The foreclosure proceedings are to be pressed.

PENNSYLVANIA.

Anthracite Coal.

During the past several months No. 1 Silver Brook Breaker, at Hazleton, had been working nine hours per day. On the first of the year the officials decided to curtail the breaker hands another hour, giving them but eight hours' pay. The amount of work to be done, however, it was found, required more than eight hours, and as a consequence the men struck. The officials conceded the demands of the men, and they will hereafter be paid for each hour and fraction worked. The colliery resumed operations on January 9th.

Anthracite Coal and Improvement Company.—At the annual meeting of this company, held on January 8th, the following officers were elected: President, W. A. Lathrop; directors, E. P. Wilbur, Charles Hartshorne, Israel W. Morris, F. Herbert Janvier, Charles Weston, William A. Lathrop, William Uhler; D. G. Baird, secretary and treasurer.

Buck Mountain.—Preparations are being made at Jeansville for the driving of a rock tunnel to reach the Buck Mountain vein, which was proved there some years ago, says the Hazleton "Plain Speaker." The tunnel will start 130 ft. east of the bottom of No. 10 and will be driven north a distance of 250 ft., when it is expected to strike the vein. As soon as the vein is reached a gangway will be driven west until a point can be reached, and a slope driven to surface. Where the vein will be first reached, it will crop out on land of E. B. Cox & Co., and in order to reach a point where it will crop on the Jeansville tract it will be necessary to drive the gangway west from the tunnel. After the slope is completed so far as the surface it will be driven to the basin. It is thought that the vein will cover the same area as the Mammoth and Wharton veins do now. A new Allison pump will be placed in the No. 10 slope and the tunnel will be driven by machines.

Philadelphia & Reading Coal and Iron Company.—At the annual meeting in Philadelphia, January 8th, the following officers were elected: President, Joseph S. Harris; secretary, F. P. Kaecher; treasurer, W. A. Church; assistant secretary, H. C. Russell; directors, S. P. Wolverton, Charlemagne Towers, Jr., R. G. Cook, H. A. Dupont, Arthur Brock and Thomas Cochran. On the same day the following officers were elected by the Philadelphia & Reading Railroad Company: President, Joseph S. Harris; treasurer, William A. Church, secretary, William R. Taylor; managers, A. J. Antelo, James Boyd, Joseph F. Sinnott, Thomas McKean, John Lowber Welsh and George F. Baer. The only change in the board of managers is the retirement of E. P. Wilbur, who was succeeded by George F. Baer. Isaac L. Rice, as the opposition candidate for president, received 117,112 votes. President Harris' majority was 265,191 shares.

Westwood Coal Company.—At the annual meeting held January 8th the following officers were elected: President, E. P. Wilbur; directors, E. P. Wilbur, Charles Hartshorne, Robert H. Sayre, John B. Garrett, Israel W. Morris; secretary and treasurer, D. G. Baird.

Bituminous Coal.

Advices from Pittsburg state that the miners at Henry Florsheim's pits on the Wheeling division of the Baltimore & Ohio Railroad, returned to work on January 9th at the old rate, 60 cents. They struck for 65 cents per ton. Their action gives a black eye to the project of making a uniform rate of 65 cents.

Blossburg.—After being out on a strike for 10 days, and losing \$35,000 in wages, the coal miners at Arnot, Fallbrook and Morris Run, in the Blossburg coal region, went to work again on January 8th, accepting a 10% reduction in wages.

East Broad Top Railroad and Coal Company.—At the annual meeting of this company held January 8th, the following officers were elected: President, William A. Ingham; directors, William A. Ingham, Edward Roberts, Jr., Percival Roberts, Edward R. Wood, G. Theodore Roberts, John Markie, Calvin Pardee, Herbert M. Howe, M. D.

Westmoreland Coal Company.—A dispatch from Greensburg says that the miners employed by this company, 500 in number, who struck the other day, have decided to accept the reduction of 10 cents per ton made by the operators. The men employed by the Penn Gas Coal Company, upon hearing this, agreed to work for the same wages, and all went in at the price on January 8th.

SOUTH DAKOTA.

Lawrence County.

Caledonia Mining Company.—It is said that 20 stamps of the Caledonia mill will be placed in operation shortly, says the Deadwood "Pioneer," to dispose of the ore which has accumulated in the new workings of the mine behind the prospectors who are searching for new ore bodies.

Deadwood & Delaware Smelting Company.—Although the smelter has blown out its stacks, steam is still kept up in the boilers. Professor Carpenter said last week that he did not think the plant would remain idle long. At the Oro Fino mine operations have been entirely suspended. The big Cornish pump is, however, kept in constant operation freeing the workings of water. The resumption of operations at this property depends on

the sale now pending for the smelter company's interests to an Eastern syndicate, of which we recently published an account.

Geyser Group.—This group, situated in Carbonate district, adjoining the Spanish R. on the north, consists of three full claims owned by William Johnson and others, who recently opened up a seam of ore assaying 60% lead and 70 oz. silver per ton, says the Deadwood "Times." The streak averages 3 in. in width inclosed in a 3-ft. vein of lead carbonate ore between porphyry and lime walls. The strike was made in the 100-ft. tunnel run some time ago on the claim. A shaft 20 ft. deep has been sunk on this seam, showing it to be continuous and vertical.

Gotham Group.—Development work on this property, consisting of 10 claims, situated about a mile above Pennington, Whitewood Gulch, is being steadily prosecuted by the owner, C. L. Price, of Lead City. The workings show a large body of free milling gold ore, ranging in value from \$3 to \$20 per ton, says the Deadwood "Times." A small vein was recently uncovered which shows considerable free gold. In the early days a large amount of work was done on the property, and considerable ore crushed at a stamp mill in the vicinity, but the grade was too low to pay the cost then charged. With present facilities this class of ore can be treated profitably on a large scale.

TENNESSEE.

Blount County.

(From our Special Correspondent at Chattanooga.)

Tennessee Slate Company.—Some 20 years ago Prof. J. M. Safford, State Geologist, called attention to the deposits of roofing slate in the extreme eastern part of Tennessee at the base of the Unaka Mountains, but these deposits, being in an almost inaccessible region, remained untouched until about a year and a half ago, when this company was organized and purchased 2,500 acres of land bordering on the Little Tennessee River, 150 miles above Chattanooga. Upon its property the company has opened quarries of several kinds of slate, roofing and slab being the principal ones, having the latter in beds varying from 6 in. to 36 in. in thickness. Besides deposits of the well known slate color, it has one deposit of a decidedly greenish appearance, but more brittle and more difficult to work than those of the usual color. A stream of water on the property gives all the power that the company requires for its mills and machinery. The product is shipped down the river and placed on the market at Chattanooga. Heretofore the company has been simply developing and testing its property; now, however, it intends to work it actively.

Scott County.

(From our Special Correspondent at Chattanooga.)

Glen Mary Coal and Coke Company.—This company was organized in the latter '70's. Like many other corporations, its vicissitudes in its younger days were many and varied, but owing to the fact that it had a good property and to good management finally it is now in good condition. The mines are on the Cincinnati Southern Railroad, 112 miles north of Chattanooga, near the Kentucky State line. The coal seam that is worked at present is from 3 ft. to 5 ft. thick and lies in the upper coal measures. These measures, in this region, are known to contain many seams of coal, but how many are to be found on this company's land is not known, as but this one seam has been opened. The daily output is about 600 tons, mostly used for domestic and steam purposes at present. The coal goes northward into Kentucky and southward into Georgia. About 2½ years ago the company adopted coal mining machines, and nine of these machines are now at work. An analysis of the coal shows volatile matter 36.73%; fixed carbon, 61.03%; ash, 1.64%; sulphur, 0.29%. An analysis of the coke made from this coal gives: Carbon, 89.70%; ash, 10.30%; sulphur, 0.60%. The coke is spongy and crushes under a furnace load. The company, however, has found by experiment that by grinding and then converting, the coal into coke they obtain a product that is fitted for the blast furnace. The results of experiment have decided the company to put in the necessary grinding machinery at once and as soon thereafter as possible to put their 70 coke ovens into operation. A new tippie will also be erected and a slack elevator and rotary screen, etc., will be added to the present plant.

UTAH.

Beaver County.

Copper Mountain Mining and Milling Company.—This company has filed articles of incorporation. The incorporators are Chas. H. Smith, C. S. Graham, Mary E. Smith, Elizabeth Graham and C. E. Allen, all of Salt Lake. The company is capitalized at \$30,000, divided into 30,000 shares at the par value of \$1. Salt Lake City is the principal place of business and the object of the corporation is to carry on the business of mining, reducing and buying and selling precious and other metals and minerals and carry on a general mining and milling business. The assets are represented by an undivided one-half interest in the following mining claims: Miners' Ghost lode, Wildcat, Rainstorm, Pilot Hill, Gambrianus and Abwilda. C. S. Graham is president; Charles H. Smith, vice-president; and C. E. Allen, secretary and treasurer.

Juab County.

Bullion-Beck & Champion Mining Company.—The secretary of this company has prepared his annual report of the condition of the property. The total ore shipments from the Bullion-Beck mines aggregate 26,781,195 lbs., or nearly 14,000 tons. The mine has only been operated 10 months this year. The company's mines at Eureka closed down for the holidays, but operations were resumed on December 26th.

Salt Lake County.

The shipments of ore and bullion from Salt Lake City for the week ending December 30th were as follows: Bullion, 904,781 lbs.; copper matte, 49,820 lbs.; silver and lead ores, 2,009,470 lbs. The receipts of ore and bullion at Salt Lake City for the week ending January 3d were to the aggregate value of \$212,043, of which \$145,349 was in bullion and \$66,694 was in ore. The receipts of Mingo bullion amounted to \$26,696; Hanauer bullion, \$32,150; base bullion, \$30,700; Daly bullion, \$7,821; Pennsylvania bullion, \$3,477; bullion, \$1,700; Daly sulphides, \$30,805; gold bars, \$12,000. Ore receipts were: \$22,044 by Wells, Fargo & Co.; \$25,350 by McCormick & Co.; and \$19,300 by T. R. Jones & Co.

WASHINGTON.

Kititas County.

The interest in the gold placer propositions above and below Leavenworth increases, says the Spokane "Review." About a dozen claims have recently been sold to Seattle parties on the report of an expert.

Leavenworth Coal Company.—A good quality of coal has been struck within three miles of Leavenworth, up the Chumpstich and Frendt creeks, and the vein is 4 ft. wide, says the Spokane "Review." The Leavenworth Coal Company, composed of F. A. Losekamp and J. W. Arthur, of Leavenworth, and J. R. Allen, of Spokane, bonded the property of Mr. Frendt, the owner, and is now putting in a 100-ft. tunnel, which is now in 45 ft. F. D. Estes, of Leavenworth, has also made a coal find within four miles of that town.

Okanogan County.

Rush.—Two shifts are now at work on this mine, says the Spokane "Review," and development on the property will be vigorously prosecuted. A drift has been started on the 75-ft. level and good ore has been encountered.

WYOMING.

Carbon County.

Union Pacific Coal Company.—This company is about to begin several improvements at the mines at Carbon, among which is a tunnel about 1,200 ft. in length in mine No. 2. The tunnel will cost \$8,500 and reach coal enough to last 10 years longer.

FOREIGN MINING NEWS.

BOLIVIA.

Huanchaca Silver Mining Company.—The production of the mines for the 10 months ending October 31st was 217,000 kg. of silver, or nearly 25% greater than for the corresponding period in 1892.

BRAZIL.

Ouro Preto Gold Mining Company.—This company reports that the ore worked in 1893 will reach 39,700 tons, with a production of 11,500 oz. gold; in 1892 the production was 11,543 oz. from 39,766 tons. A new 20-stamp mill has been bought and will soon be in use.

BRITISH GUIANA.

The total gold output reported for the 11 months ending November 30th is 126,388 oz., valued at \$2,260,797. The Conowrook district has been the leading producer, with Curuni, Barma and Potaro following in order. Steps are being taken to explore and work some of the quartz veins which are known to exist, and machinery for this purpose has been ordered.

CHILE.

Government Nitrate Properties.—The following are the more important of the first group of oficinas in Northern Tarapaca, intended to be put up to auction in the course of 1894; the total valuation amounts to \$3,409,000 for the 18 officially surveyed by Messrs. J. T. Humberstone (former manager of the Primitiva Company), G. Julian and C. Barriga:

Name.	Nitrate-bearing ground.	Average nitrate.	Iodine.
Victoria.....	269,500 sq. m.	46%	0.14%
California.....	425,900 "	42%	0.04%
Germania.....	1,433,275 "	36%	0.05%
Valparaiso.....	1,116,813 "	49%	0.079%
Incurables.....	801,660 "	45%	0.027%
Trinidad.....	313,672 "	43%	0.025%

With one single exception Caleta Buena and Junin are named as the natural outlets for the foregoing and other properties, the nitrate produced in which will be shipped at those ports unless the Nitrate Railways Company reduces its rate in order to secure the traffic. Of 16,562,000 quintals manufactured under the combination in

the 10 months ending October 31st, 1893, 6,195,000 quintals, or 38%, were made by oficinas (including the Rosario Company) which do not at present use the Nitrate Railways Company's lines. The production of the better known English companies for the 10 months to October 31st was 6,241,000 quintals, against 6,308,000 quintals for the full year 1892.

FRANCE.

Compagnie des Fonderies et Laminiers de Biache.—This company has received a contract to supply the Greek Government with 37,000 kg. of nickel at a price of 3'88 francs per kilogramme. The metal is to be used for coinage.

NEW BRUNSWICK.

Bocabec Granite Quarry.—The firm of Gibson, Stuart & Hanson has been formed to work this quarry, where a very fine quality of black granite is found.

NOVA SCOTIA.

Cape Breton.

Coal Shipments.—The coal shipments in round numbers for the Cape Breton mines during 1893 are as follows: Sydney mines, 200,000; Victoria, 100,000; Bridgeport International Gardner, 185,000; Reserve, 132,000; Little Glace Bay, 114,000; Caledonia, 152,000; Gowrie, 120,000; total, 1,003,000 tons.

ONTARIO.

Algoma Nickel Mines.

(From an Occasional Correspondent.)

The Sudbury "Journal" in its last issue predicts a boom in nickel here. It says: With the opening of the new year comes the welcome prospect of renewed activity and interest in mining in this district before the approaching season is over. For the past three years there has unfortunately been very little progress made in the development of our nickel mines, and for several well known reasons. Since the nickel deposits of this district were discovered, however, and the superior qualities of nickel-steel have been demonstrated by practical tests, there has been a change. Investors from present appearances are satisfied that the time is near at hand when large quantities of nickel will be used in the general industries. All that is now required, in order to give confidence to mining capitalists, is for the Ontario Government to abolish all restrictions on mining, and give us at the coming session a simple, just, well-defined and permanent mining law. The government should also offer a bonus for the discovery of a new and cheaper process for the treatment of nickel ores.

All the companies which have smelting plants here have more or less trouble with their water supply, and especially in winter, their works being located in every case on small streams, though the district is dotted all over with lakes and traversed by several large rivers. A pipe line had to be laid recently from the Murray mine to a lake 1½ miles from the mine.

Chicago Nickel Company.—This company has commenced operations again, after being closed down for nearly a year, with a force of 30 men. It is said that the company has sold all the stock of matte and has orders for all the output for the next six months.

Copper Cliff Mine.—A new vertical shaft, from the third to the seventh level, is to be started soon in this mine, as the present inclined shaft runs away from the ore beds. Messrs. Mickle & Evans, mining engineers, of Sudbury, are making the necessary survey of the mine and preparing the plans for the new shafts.

Evans Mine.—Fifty men were laid off at this mine two weeks ago, owing to the cold weather freezing the ore in the rock house, and to enable the main shaft to be cleaned out for the purpose of putting in a diamond drill to test the ore below the fifth level.

Tam O'Shanter.—Some English capitalists are negotiating for the purchase of this property, discovered last season in the township of Snider, only three miles from the Copper-Cliff mine, and six from Sudbury. The surface ore runs from 3½ to 4% of nickel and there is apparently any quantity of it.

Worthington Mine.—This mine is being worked on a larger scale than ever this winter. About 100 hands are now employed and large bodies of exceedingly rich ore have been found in it. Mr. Jan Cameron, the local manager for the company, left this week for the Old Country on a business trip.

SOUTH AFRICA.

Diamonds.

De Beers Consolidated Mines (Limited).—The London board has received information by cable from Kimberley to the effect that a dividend of 12½% (12s. 6d. per share) for the six months ending December 30th, 1893, has been declared. The revenue for the half-year ending December 30th, including the diamonds on hand, is £1,611,000 and the expenditure £716,000, leaving a gross profit of £885,000, and after providing for interest and sinking fund on debentures and all other obligations there remains a net profit of £603,000. These figures are exclusive of the amount carried forward in the balance-sheet of June 30th, 1893, and of the increase of about half a million loads in the stock of blue ground on the floors which brings the total stock to more than 3,000,000 loads.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Jan. 12.

Statement of shipments of anthracite coal (approximated) for week ending January 6th, 1894, compared with the corresponding period last year:

	1894.	1893.	Difference.
	Tons.	Tons.	
Wyoming region.....	292,816	300,824	Dec. 8,008
Lehigh region.....	90,787	77,034	Inc. 13,753
Schuylkill region.....	159,143	129,828	Inc. 29,315
Totals.....	542,746	507,686	Inc. 35,060

PRODUCTION OF BITUMINOUS COAL, in tons of 2,240 lbs., for week ending January 6th and year from January 1st:

	1894.		1893.
	Week.	Year.	
Shipped East and North:			
Phila. & Erie R. R.....	704	704	1,562
Cumberland, Md.....	50,817	50,817	53,649
Barclay, Pa.....	430	430	1,101
Broad Top, Pa.....	6,767	6,767	13,857
Clearfield, Pa.....	60,855	60,855	63,897
Allegheny, Pa.....	21,518	21,518	19,142
Beech Creek, Pa.....	38,725	38,725	35,812
Pocahontas Flat Top.....	46,721	46,721	40,842
Kanawha, W. Va.....	56,829	56,829	65,763
Totals.....	286,396	286,396	297,615

	1894.		1893.
	Week.	Year.	
Shipped West:			
Pittsburg, Pa.....	28,415	28,415	22,636
Westmoreland, Pa.....	23,496	23,496	38,875
Monongahela, Pa.....	5,571	5,571	13,533
Totals.....	57,512	57,512	75,003
Grand totals.....	343,908	343,908	372,618

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending January 6th, 1894, and year from January 1st, in tons of 2,000 lbs.: Week, 57,375 tons; year, 57,365 tons; to corresponding date in 1892, 114,368 tons.

Anthracite.

The condition of the anthracite coal trade remains exactly as reported in these columns last week. The market is exceedingly dull and quiet. The demand is almost nil. What little business is doing is so small and of so insignificant a character that it is no exaggeration to say that no business has been done during the past week.

As it is to-day the market is decidedly uninteresting in every respect save one, which is that the future of the trade depends to a considerable extent upon the actions of producers during the next few weeks. Just now, the market is altogether a "weather market," and no demand need be expected until we have a "cold snap" which will last for a few weeks at least. In the mean time, and until the mercury drops to freezing point and stays there, the most serious question which confronts producers is that of restriction of output. So dull and quiet is the market that operators have come to realize that a cut in prices would not bring about much of an improvement in the demand and therefore the companies are adhering to the circular prices. The salvation of the trade seems to lie in an enforced curtailment of production. If this is carried out by all the producers, individual operators as well as companies, when the much-longed-for cold snap arrives, it will find the trade in a good statistical condition. Strict measures are being taken to keep the production for January within the 2,500,000 tons recommended by the salesagents at their last meeting. Most of the collieries are working either on two-thirds or on half time. Shipments for the week ending last Saturday were 542,746 tons; if this curtailment is maintained through the month the producers will have, for once, kept their output within the limits dictated by common sense as well as by the salesagents.

The Anthracite Coal Operators' Association held a meeting and took luncheon at the Fifth Avenue Hotel, in this city, on Wednesday. No "formal" business was transacted, but it is understood that the independent operators are more disposed to-day to restrict their own output proportionately to the curtailment ordered by the companies than ever before; in other words, the individual operator will be this year less of a disturbing factor than he has heretofore been.

The Reading official circular rates, subject to the usual commissions, are as follows, f. o. b. at its New York harbor shipping ports:

	Broken.	Egg.	Stove.	Chestnut.
Hard white ash.....	\$1.00	\$1.25	\$1.60	\$4.60
Free white ash.....	3.90	4.15	4.60	4.60
Shamokin.....	4.50	4.80	4.60	4.60
Schuylkill red ash.....	4.50	4.95	4.75	4.75
Lykens Valley.....	5.15	5.80	6.25	5.50
Pea, \$2.75@3; No. 1 Buckwheat, \$2@2.25; No. 2 Buckwheat, \$1.75@2.				

The Reading Railroad reports that its coal shipment (estimated) for last week, ending January 6th, was 155,000 tons, of which 20,000 tons were sent to Port Richmond and 16,000 tons were sent to New York waters.

The annual report of the Reading Railroad and Coal and Iron companies is discussed in our editorial columns.

NOTES OF THE WEEK.

The Government is in the market for 2,700 tons of coal to go to Rio Janeiro. Bids will be opened at noon on January 13th. The coal is to be delivered over the side of the steamer and vessel with cargo aboard to be ready to leave the United States within 10 days of the date of the order. The freight to Rio is about \$6.50.

We learn from a trustworthy source that the Philadelphia & Reading Coal and Iron Company is making special efforts to capture all the trade in Phoenixville, Pa., and vicinity. An agent of the company has recently been there, asking the coal dealers there to sign a contract binding them to take from that company all the anthracite that they sell. We are unable to learn whether any concessions as to prices have been made.

A meeting was held at Philadelphia on January 10th between the representatives of the Pennsylvania Railroad Company, the Pennsylvania Company, Baltimore & Ohio, Lake Shore and Philadelphia, New York & Ohio Railroad companies, to consider the advisability of making a change in the rate on coke from the Connellsville region. The session was a lengthy one and the situation was carefully gone over. At first there was a disposition to make a change in the existing rates, but after considerable discussion it was agreed to let the rate of coke remain as it is.

Bituminous.

The bituminous coal trade seems to be going from bad to worse. Very nearly all the shippers have either curtailed their output to a great extent, or are shut down. There have been a few transient orders in the market during the past week, but they were of little consequence to the trade at large. The few regular orders coming into the hands of producers have kept the mines open, and that is about all. There is a grain of comfort in the knowledge that this is perhaps as good a time as any for the dullness in the trade, as it permits the taking of inventories for 1893 at the mines without much trouble. The tonnages for 1893 will exceed those for 1892, but they will not be so great as the tonnage for 1891. Last year's large shipments were brought about by the uninterrupted transportation extended to the trade by all roads and by coastwise vessels after the ice blockade of the early part of 1893. It was thought in the spring that the traffic to and from Chicago on account of the World's Fair would interfere with the transportation of coal on the main line roads, but this fear was not justified, as that traffic did not appear to have any effect worth mentioning. The labor disturbances during the year were not of much importance and affected the trade only slightly, if at all.

Transportation over the railroads is very good; the railroad companies desire and could give facilities to more trade. The car supply is in the same condition and is greater than the demand. The shipping ports are to a certain extent blocked up with coal for shipment standing on cars, but the railroads are not permitting producers to send forward coal unless they have the vessels or the orders to take the coal at the ports. All-rail trade is fair.

Vessels are sufficient for all demands, but rates are stationary in accordance with the schedule of the Vesselowners' and Captains' National Association, as follows: From Baltimore and Georgetown to St. George and Hoboken, 80c.; to New York, 85c.; to ports west of Cape Cod, \$1; to ports east of Cape Cod, \$1.10; to Portsmouth, \$1.15. From Hampton Road 10c. less. From Philadelphia to ports west of Cape Cod, 90c.; ports east of Cape Cod, \$1; Portsmouth, \$1.05. From Hoboken, Port Liberty and Weehauken to ports east of the Cape, 70c.; Portsmouth, 75c. From Port Johnston, Elizabethport, Perth and South Amboy, 5c. higher.

Boston. Jan. 11.

(From our Special Correspondent.)

The market is so quiet that a cut in prices by the companies would not be at all surprising any day. The companies have already shown signs of weakness. Only a few days ago the local agent of one of the largest coal companies in the country heard that a competitor was cutting the circular rates and immediately he dropped his prices. The following day he learnt the rumor was simply a hoax and thereupon restored prices. Business is so extremely quiet that a repetition of such proceedings would not be at all surprising. Just now circular prices are well maintained. Companies' prices f. o. b. New York net are: Stove, \$4.45; egg, \$4; free broken, \$3.75; and chestnut, \$4.45. Individuals' white ash coals can be had as follows: Stove, \$4.15@4.25; egg, \$3.80@3.85; free broken, \$3.75; chestnut, \$4.25. Lykens Valley (at Philadelphia): Broken, \$4.90; egg, \$5.55; stove, \$6; and chestnut, \$5.25.

There is practically nothing new transpiring in bituminous coal. Cumberland on cars is worth \$3.80; New River and Pocahontas, \$3.80; and Clearfield, \$3.50.

Freight rates continue very steady. From New York they are 70@75c.; from Philadelphia and Hampton Roads, \$1; from Baltimore, \$1.10; to Sound points, 10c. less than the foregoing.

The retail trade is very quiet and prices continue quite steady. We quote: Stove, \$6.25; nut, \$6.25; egg, \$6; furnace, \$5.75; Franklin, \$7.75; Lehigh egg, \$6.25; Lehigh furnace, \$6; soft coal, \$4.25.

Buffalo. Jan. 11.

(From our Special Correspondent.)

Trade in anthracite coal is quiet; the continued mild weather is not conducive to dealers' interests. Prices are unchanged. Bituminous coal is dull;

many manufacturing establishments are doing little comparatively, and several large concerns are shut down completely. Prices are easy; to save demurrage railroad charges concessions are made to the published figures. Mr. Robert R. Hefford, the well known coal producer, dealer and shipper, was yesterday elected president of the Buffalo Merchants' Exchange. It was a case of Coal versus Flour (his opponent being a miller), and coal came out ahead.

Mr. A. R. Atkins having resigned his position as general Western agent of the Philadelphia & Reading Coal and Iron Company, Mr. J. H. M. Claggett has been appointed acting salesagent in charge of the business of this company at Buffalo, including the shipping docks and the territory tributary thereto, with office at Buffalo, N. Y.

The Grand Trunk Railway, of Canada, advertised yesterday for tenders for the supply of locomotive coal required between April 1st, 1894, and March 31st, 1895. Full particulars with form of tender can be obtained of Mr. John Taylor, storekeeper, Grand Trunk Railway, at Montreal. The last day for receiving tenders is February 7th, 1894.

Our merchants are liberally donating to the poor of our city hard and soft coal and coke. Yesterday the Lehigh Valley Coal Company contributed 20 tons of anthracite to the Courier Relief Supply Committee.

Chicago. Jan. 10.

(From our Special Correspondent.)

The coal market in Chicago has not been in such a condition for years. The demand for both hard and soft coal has almost ceased and there is no immediate prospect for the better. We have been having for the past three weeks spring weather and that, coupled with the business depression, has placed the coal trade in a deplorable state. What few sales are made are those of the hand-to-mouth variety and this holds good both in wholesale and retail trade. Prices are weaker and a considerable cutting is noted. All are looking eagerly forward to a change for the better, but this present season is not likely to see it.

Prices on anthracite coal are: Lehigh lump, \$6.25; large egg, \$5.85; small egg, range or chestnut, \$6.10. Retail prices remain the same: Large egg, \$6.50; small egg, range or chestnut, \$6.50@ \$7.

Bituminous Coal.—But little is to be said of the bituminous trade here during the week just past. It is extremely dull. The mineowners are feeling the effect of the depression much more than others and many of them in Illinois and Indiana are closing down entirely or else running on quarter time. Quotations on bituminous coal per ton of 2,000 lbs. f. o. b. Chicago, are: Youghiogheny, \$3.40; Pittsburg, \$3.35; Hocking Valley, \$3.10; Brazil block, \$2.70; Illinois and Indiana lump, \$2.

Coke.—Is in moderate demand, sales being mostly small quantities. Connellsville coke is quoted at \$3.90 for furnace and \$4.20 for crushed; New River foundry, \$4.15; Walston furnace, \$3.85; foundry, \$4.

Pittsburg. Jan. 11.

(From our Special Correspondent.)

Coal.—A rise in our rivers has enabled shippers to forward to the lower markets about 3,000,000 bushels of coal; owing to the low price prevailing in Cincinnati and Louisville the bulk of the shipments will be forwarded South. The warm weather in Cincinnati caused a decline of 50c. per ton in Pittsburg coal. The Kanawha coal men refused to make any decline in prices, which showed good sense.

At Middlesboro, Ky., January 9th, C. M. Woodward was appointed receiver of the Mingo Mining Company, one of the largest coal and coke companies in the South. The camp has failed to meet rents due to the American Association. The assets are about \$200,000; liabilities unknown.

A test has just been made at Cleveland, O., at the waterworks pumping station, the result of which shows Pittsburg coal to be superior to the Ohio article in all respects. The New York & Cleveland Gas Coal Company, at Turtle Creek, has advanced the miners' wages to 60c., or 15c. per 100 bushels; the men are very happy. The situation in the Monongahela is unchanged. Railroad shipments very light.

Connellsville Coke.—There will be little change in the condition of affairs in the coke business until after February 1st. To sum up the situation in a few words, the output shows a slight increase, while the number of ovens in blast show a decrease. There are 85 coke works in the Connellsville region, and of this number 37 are idle and 48 are in operation in part or in whole. The output of the region for the week amounted to 77,616 tons, a falling off from the preceding week of 8,414 tons. During the past month the large competing companies have been hustling lively for orders, and it now seems they have about gobbled up all the best contracts. They have been so industrious in this that the new year found most of the small dealers without orders. W. J. Rainey, the third largest operator in the region, and who owns 1,422 ovens in blast, has given orders to blow out 521 of these. Shipments for the week amount to 4,220 cars, distributed as follows: To Pittsburg, 1,180 cars; to points east, 1,475 cars; to points west, 1,565 cars; total, 4,220. Prices are still being slaughtered, and it seems impossible to

get the actual selling price, as parties differ in their statement of values. Furnace coke is quoted at \$1, but it is known that sales have been made at 95c., and rumor says that these figures have been shaded. Foundry coke, \$1.15; crushed, \$1.45 f. o. b. at ovens; freights to Pittsburg, 70c. per ton of 2,000 lbs.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Jan. 12, 1894.

Pig Iron Production and Furnaces in Blast.

Fuel used.	Week ending				From	
	Jan. 13, 1893.		Jan. 12, 1894.		Jan., '93.	Jan., '94.
	F'ces.	Tons.	F'ces.	Tons.	Tons.	Tons.
Anthracite.	70	31,969	29	14,192	63,938	28,384
Coke.	139	133,610	81	82,967	267,220	165,934
Charcoal.	39	8,955	20	3,884	17,510	7,763
Totals.	248	174,534	130	101,013	349,065	202,086

Pig Iron.—The market this week offers no new features, being characterized by the same conditions which have prevailed for some time past. Consumers continue their policy of a hand-to-mouth buying and the result is that the production and stocks are practically as they were a month ago. The production shows, in fact, a small decrease and stocks a slight increase, indicating a slight decrease in the consumption. All these changes have been so moderate that there is no cause for greater alarm at this time than on December 1st last.

An event of importance to the trade here has been the announcement made by the Lowmoor Iron Company of a reduction in the price of its iron to \$13 for No. 1 Foundry and \$12.50 for No. 2. This company has always managed to dispose of its product at prices ranging from \$1 to \$2 above the other standard grades, on account of its excellent quality, and hence the present reduction is a surprise to the trade. The Lowmoor Company is not a large producer, but its action will probably tend to depress prices of pig iron. Other well known furnaces have not yet followed the example of the Lowmoor Company, and prices are still nominally as quoted last week: 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, \$12@12.50; No. 1 soft F., \$12@13; gray forge, \$11@12—all at tidewater. Scotch irons are quoted: Colness, \$11.50@12.25; Eglington, \$10.50@12; Summerlee, \$11.50@12.1.

Billets and Rods.—This market continues exceedingly dull with prices low. Quotations are nominally as follows: Domestic billets, \$19@20; foreign billets, \$28@29, tidewater. Wire rods, domestic, \$23@24; foreign, \$33@34, tidewater.

Manufacture of Iron and Steel.—Very little has been done in manufactured iron and steel during the past week. There are rumors of some orders to be placed in the near future, but nothing definite is learned. Prices are unsettled and any quotations named must be regarded as merely nominal, for owing to the recent philanthropy of certain well-known Pittsburg mill-owners, by which orders have been accepted at what they claim to be a loss to them, in order to give employment to the workmen, it is difficult to say at how low a price contracts could be closed. We quote nominally: Angles, 1.60@1.75c.; axles, scrap, 1.70@2c., delivered; steel, 1.70@2c.; bars, common, 1.35@1.50c.; refined, 1.45@2c. on dock; beams, up to 15 in., 1.65@1.75c.; 20 in., 1.85@2c.; car truck channels, 1.95@2c.; channels, 1.65@2c. on dock; steel hoops, 1.75@1.9c., delivered; links and pins, 1.70@1.80c.; plates, flange, 1.90@2.10c.; firebox, 2.3@2.4c.; flange, 2.10@2.25c.; marine, 2.30@2.75c.; sheared, 1.8c.; shell, 1.63@1.90c.; tank, 1.50@1.65c.; universal mill, 1.50@1.75c.; tees, 1.75@2c., all on dock.

Merchant Steel.—There is nothing of interest to report of this market. It continues quiet with prices unchanged. We quote: Tool steel, \$6.75@6.50; tire steel, \$1.90@2; toe calk, \$2.10@2.20; Bessemer machinery, \$2@2.10; open hearth machinery, \$2.10@2.20; open hearth carriage spring, \$2@2.10; crucible spring, \$2@2.10.

Old Material.—Nominal quotations are as follows: Old iron rails, \$12@13; No. 1 wrought scrap at \$9.50@10, both delivered to vessels at this port. Other quotations are as follows: Old steel rails, \$8@10; old wrought tubes and pipe, \$7.50@8.50; wrought turnings at \$9@9.25 delivered at mill.

Rail Fastenings.—This market continues lifeless. Quotations are nominally: Fish and angle plates, 1.30@1.50c. at mill; spikes, 1.75@1.90c.; bolts and square nuts, 2.15@2.40c.; hexagonal nuts, 2.30@2.50c., delivered.

Spiegeleisen and Ferromanganese.—We do not hear of any business in either spiegel or ferro during the week. Prices are nominally: Spiegeleisen, 10@12, \$2@2.25; 20%, \$2.50@2.75. Ferromanganese, \$5@5.50.

Steel Rails.—No sales of standard sections are reported this week, but it is understood that one or two fair sized orders are or will soon be in the market. Some business in light sections has been done. The quotation for standard sections remains \$24.80 tidewater.

NOTES OF THE WEEK.

Imports of iron and steel at the port of New York as reported by the New York Metal Exchange for the week ending December 27th:

From Sweden	Nail rods	100 tons
Glasgow	"	150 "
Antwerp	Iron rods	25 "
"	Steel billets	250 "
"	" rods	58 "
Liverpool	"	27 "
"	Steel wire rods	52 "
Holland	"	35 "
Sweden	"	50 "
Antwerp	Steel wire	24 "
Liverpool	"	42 "
Sweden	Scrap iron	15 "

Buffalo, Jan. 11.

(Special Report of Rogers, Brown & Co.)

There is still very little life in the pig iron market. The amount of iron moving is small and orders are entirely for current use except in very rare instances where some buyer considers it an opportune time to cover expected wants for six months or more at present prices. In the competition for orders furnaces have been willing to take such long-drawn-out contracts in order to get the benefit of present deliveries, although their better judgment dictates that this may be against their interest. We quote below on the cash basis f. o. b. cars Buffalo: No. 1 X foundry strong coke iron, Lake Superior ore, \$13.25; No. 2 X foundry strong coke iron, Lake Superior ore, \$12.75; Ohio strong softener No. 1, \$13.25; Ohio strong softener No. 2, \$12.75; Jackson County silvery No. 1, \$16.80@17.30; Jackson County silvery No. 2, \$16.30@16.80; Lake Superior charcoal, \$15.75; Tennessee charcoal, \$15.75; Southern soft No. 1, \$12.75; Alabama car wheel, \$16.50@17.50; Hanging Rock charcoal, \$18.50@20.

Chicago, Jan. 10.

(From our Special Correspondent.)

The new year has not produced any material change in the pig iron market. Sales continue limited and are mostly for small lots. The indications are that consumers are not going to contract ahead, notwithstanding the exceedingly low prices now ruling. They prefer taking their chances on such changes as may come with the year. The outlook is one of doubt, but it may be conceded that any change which may occur must be in the nature of an improvement and a passing away of the depression which will long be remembered.

Pig Iron.—Trade continues about as usual, Northern and Southern coke irons meeting with a very limited but proportionate demand. A larger number of inquiries is noted. There is a good deal of figuring in various ways and a considerable business may be the outcome by the end of the month. Prices are a shade lower. The Iroquois furnace at South Chicago may soon start up. Quotations per gross ton f. o. b. Chicago are: Southern coke, foundry, No. 1, \$13.00; No. 2, \$12.00; No. 3, \$11.00. Southern coke, foundry, soft, No. 1, \$12.40; No. 2, \$11.65; Lake Superior charcoal, \$15.50@16.50. Lake Superior coke No. 1, \$13.50; No. 2, \$12.25@12.50; No. 3, \$12.00@12.25. Lake Superior Bessemer, \$14; Lake Superior Scotch, \$13.75@14.25; American Scotch, \$15.50@16. Ohio silvers No. 1, \$16.50; No. 2, \$16. Ohio strong softeners No. 1, \$16.25; No. 2, \$15.75; Tennessee charcoal No. 1, \$16.50; No. 2, \$16. Standard Southern car wheel, \$18.25@18.75.

Structural Iron and Steel.—The only work of importance in sight is that of a large warehouse in the south side, Chicago. This will take 600 tons. The competition for so small a contract is unusually large. Quotations are as follows: Chicago delivery: Angles, 1.70@1.80c.; tees, 1.95@2.00c.; universal plates, 1.70@1.80c.; sheared plates, 1.70@1.80c.; beams and channels, 1.75@1.85c.

Plates.—The market remains inactive. Sales from stock show a slight increase over previous week. Prices are: Flange steel, 2.30@2.50c.; best firebox steel, 4.00@4.50c.; tank steel, 1.70@1.80c.; shell steel, 2.15@2.35c.; iron or steel sheets from No. 10 to 14, 2.10@2.25c.

Merchant Steel.—Some increased activity is noted during the week, presumably from the fact that buyers are modestly beginning to stock up, but such sales are small. There is no encouragement in the outlook whatsoever. Prices are: Smooth finished machinery steel, 2.10@2.30c.; open hearth tire steel, 1.90@2.10c.; ordinary Bessemer bars, 1.55@1.65c.; toe calks, 2.20@2.30c.; ordinary tool steel, 6.50@7.00c.; special brand tool steel, 12@20c.; crucible spring, 3.50@3.75c.

Galvanized Sheet Iron.—Dullness continued in the history of this market; never has sheet iron been so inactive and never has the outlook been worse. The quotation on Juniata is 70, 10 and 5% off for mill shipments. Jobbing quantities are selling at 75% discount.

Black Sheet Iron.—Business is very quiet and very little inquiry is noted. Prices for small lots from stock are, f. o. b. Chicago: No. 24, 2.50c.; No. 26, 2.60c.; No. 27, 2.70c. Same gauges and steel sheets are 3.10@3.20c. less 10c. per 100 lbs. for large lots.

Bar Iron.—The hand-to-mouth policy continues to prevail, but there are a few indications that some of the larger manufacturers will branch out to more liberal purchases. Certain persons are now feeling the market for blocks ranging from 300 to 500 tons. Prices are still low and without any tendency to immediate firmness. Small lots from stock prices are 1.60@1.70c. for bar iron and 1.65@1.75c. for soft steel bars. Mill prices are f. o. b. Chicago, 1.35@1.40c. on bar iron, and 1.45@1.55c. on soft steel bars.

Billets.—Inquiries are more numerous than for months past and a better feeling is observed. Still

the market remains very dull. The Joliet mill of the Illinois Steel Company which closed down last week will reopen again in February. Quotations are \$19@19.50 Joliet. Rods remain inactive.

Steel Rails.—Conditions remain same as last report and indications of early improvement are not discernible. Prices are \$25@27.

Nails.—Some slight improvement is noted in sales from stock, otherwise the market is very dull. Jobbing quotations are, per keg: Cut nails, \$1.25@1.30. Wire nails, \$1.25@1.30.

Scrap.—No material change from last week. Small lots continue to rule. Prices are: Railroad, \$10.75; No. 1 forge, \$10; cast borings, \$4.50; wrought turnings, \$6.50; axle turnings, \$3; leaf steel, \$14.50; mixed steel, \$7; tires, \$12.50; iron axles, \$14.50@15.50.

Old Rails and Wheels.—The demand for old rails and wheels has been extremely limited. The reason assigned is that the prices asked are too high for intending purchasers. Quotations are: Old steel rails, \$7.50@10; old iron rails, \$12.50. Old car wheels are quiet at \$9.50@10.50, according to quantity.

Philadelphia, Jan. 12.

(From our Special Correspondent.)

Pig Iron.—Buyers of all excepting a few of the very finest brands of No. 1 foundry iron have been led by recent movements to believe that there will be a general cut in prices, amounting to perhaps 25c. per ton. Offers were made to day at 50c. below asking prices in view of this probability. No sales have been made. Negotiations are pending for a good deal of foundry iron. No. 2 is very dull, and unless a drop should be made in it, is not likely to move to any extent. The mill men are not stirring yet, even though standard forge iron has been offered as low as \$11.50, with some makes at \$11. Southern iron quotations are shaky, and buyers are waiting to see what effect this Southern competition will have on Pennsylvania iron quotations. The point of the whole matter is that lower quotations are generally looked for.

Steel Billets.—In the absence of demand it is probable that a big order could be placed among unwilling buyers at about \$18, though the delivery price is \$18.50.

Merchant Iron.—Capacity is generally idle, and will probably remain so for some time. The position in the bar iron trade is very disappointing, indeed, and some manufacturers are taking a gloomy view of the future on account of the growing conviction that, as against steel, the days of bar iron are numbered, and that the future will only be a weary contest, without beneficial results. Refined bars are offered at 1.40; common iron, at mill, 1.30 to 1.25.

Nails.—The nail trade is in a broken-up condition, although some makers think there will be a better demand before long. New York quotations are \$1.20.

Sheet Iron.—While business just at present is very light, the indications on the surface are that there will be a good demand for sheet iron later on in the season, and manufacturers are getting ready for it. Only small retail lots are selling. Manufacturers are canvassing the entire market in order to start up with a full supply of orders.

Merchant Steel.—Eastern makers are canvassing very earnestly, and securing a fair amount of business, though at prices which forbid profit.

Plate and Tank.—The work of canvassing for business seems to be going on in all branches. Brokers are corresponding with a good many probable buyers. Just at present there is very little business secured, but prospects are better than they have been for perhaps six weeks. There is a great deal of apprehension as to the outcome on business in sight, lest it may go to Western competitors. Steel tank is offered at 1.45; shell, 1.60; flange, 1.90. Plates are 1.50.

Structural Material.—Representatives of big Eastern concerns are looking after several large possible contracts, and have encouragement that about 2,000 tons of material will be ordered within four or five weeks, if plans do not fall through. One large establishment is likely to reduce its force unless orders are soon secured. There is nothing definite yet, but speaking generally, the makers of structural iron think there will be a moderate improvement in demand in a short time, though the prospects for steady work are by no means encouraging.

Steel Rails.—Quotations continue at \$24. As for information concerning the future of the trade there is none to be had. Rail makers will only state that there is inquiry for small lots.

Pittsburg, Jan. 11.

(From our Special Correspondent.)

Raw Iron and Steel.—The new year so far has developed no improvement in values, but rather the reverse, with sales of steel billets, Bessemer and gray forge iron at the lowest figures yet. There is no disposition on the part of consumers to contract for material in advance of current requirements. There is the same activity in the competition for business, which has been a marked feature of the trade for months past and a continued irregularity in prices for both crude and manufactured products. Mills at certain points indicate a determination to secure whatever business there is to be had, irrespective of price, and the cutting of rates indulged in by these works tends to keep the

market in a demoralized condition. So severe has been the depression in the iron trade the past year, and so thoroughly has it affected even the strongest concerns, that many months must elapse before a number of them will recover from the trying period through which they have passed. It is believed that the worst is over, and that a recovery from the prices now in force, which are the lowest ever before known in the history of the trade, and below a point at which many of the best located works can meet and continue in operation, is inevitable. How soon this improvement will occur and whether a further shading of prices will take place before the tide turns it is impossible to foretell. Manufacturers in general believe that with the settlement of the tariff question and the readjustment of the conditions of manufacture, rendered necessary by any new measure, more active business will be induced. Most of the mills that closed during the holidays have resumed, at least those that have orders, and will continue in operation as long as the orders last. In good times the mills continued to run steadily even when they had no orders; the products were piled up to meet orders when they arrived. The situation at present is altogether different; when orders on hand are completed the mills close and wait for fresh orders, when the works are again started. Steel further declined, with sales at \$16.00, January-February delivery; price of Bessemer and gray forge maintained.

Coke Smelted Lake and Native Ore.		1,000 Billets, Jan., Feb., at mill	16.45
Tons.	Cash.	500 Billets, Jan., Feb., at mill.	16.00
1,500 Bessemer, Jan., Feb.	10.80	250 Billets, Jan., Feb., at mill.	16.00
1,000 Bessemer, Jan., Feb.	10.85	<i>Ferro-Manganese.</i>	
1,000 Bessemer, Jan., Feb.	10.80	250 80% delivered.	52.50
1,000 Bessemer, Jan., Feb.	10.75	<i>Muck Bar.</i>	
500 Bessemer, Jan., Feb.	10.85	350 Neutral, delivered.	20.50
500 Bessemer City Furnace, prompt.	11.00	<i>Skelp Steel.</i>	
1,000 Gray Forge, City Furnace, Jan., Feb.	10.00	400 Wide gr'vd., 1'07 1/4 m.	
500 Gray Forge, Jan., Feb.	10.00	365 f. o. b at works.	\$21.80
500 Gray Forge, Jan., Feb.	10.00	<i>Iron Skelp.</i>	
350 Gray Forge, Jan., Feb.	9.85	440 Wide grooved, 1'30 4 m.	
250 No. 1 Foundry, Jan., Feb.	12.00	360 Narr'w gr'vd., 1'30 4 m.	
100 No. 1 Silvery, extra.	15.00	300 Sheared.	145 4 m.
75 No. 2 Silvery.	13.50	<i>Old Rails.</i>	
50 No. 1 Foundry.	12.25	1,000 Iron Valley, delivered.	14.50
50 No. 2 Foundry.	11.25	<i>Steel Wire Rods.</i>	
<i>Charcoal.</i>		700 5 gauge American at mill.	23.50
100 Cold Blast Extra.	29.00	<i>Blooms, Billets, Bar Ends.</i>	
100 Cold Blast.	26.00	600 Billets and Bloom Ends.	11.25
50 Warm Blast.	18.00	<i>Scrap Material.</i>	
50 No. 2 Foundry.	17.50	250 No. 1 R. R. W. Scrap.	10.00
25 Cold Blast.	25.00	250 No. 1 R. R. W. Scrap.	10.00
<i>Blooms, Billets and Stabs.</i>		100 Cast Scrap, Gross.	8.75
4,000 Billets, Jan., Feb., March, at mill.	16.50	100 Cast Borings, Gross.	5.50
1,500 Billets, Jan., Feb., at mill.	16.40		

METAL MARKET.

NEW YORK, Friday Evening, Jan. 12, 1894.
Prices of Silver per Ounce Troy.

Jan.	St. Ex.	London	N.Y. Cts.	Value of sil. in \$.	Jan.	St. Ex.	London	N.Y. Cts.	Value of sil. in \$.
6	1'35	31 3/4	68 3/4	'532	10	4'85 3/4	31 3/4	69	'534
8	1'85	31 3/4	68 3/4	'533	11	4'86 1/4	31 3/4	68 3/4	'533
9	1'85 3/4	31 3/4	68 3/4	'533	12	4'86 3/4	31 3/4	68 3/4	'533

Silver has been remarkably steady the past week; shipments have been on a liberal scale and the demand, chiefly for India, has absorbed the offerings. Great uncertainty still prevails as regards the import tax, the reply of the Government to all questions on this point being, that they have decided not to let their future action be trammelled by commitment on the subject. It does seem, however, as if, the very large importations of the uncoined metal continuing, the Government will be confronted with the necessity of going back to the coinage of rupees or of shutting out the bullion.

The United States Assay Office at New York reports the total receipts of silver for the week to be 103,000 oz.

Gold and Silver Exports and Imports at New York, Week Ending January 6th, 1894, and for Years from January 1st, 1894 and 1893.

Week	Gold.		Silver.		Excess of Ex. or Imp.
	Exports.	Imports.	Exports.	Imports.	
1891...	\$5,200	\$115,156	\$925,410	\$71,944 E	\$743,510
1892...	5,200	115,156	925,410	71,944 E	743,510
1893...	2,055,740	14,300	5,400	1,754 E	2,039,686

The gold exported for the week went to the West Indies; the silver nearly all to London. Both the gold and silver imported came from the West Indies and Central America.

During the five days ending January 11th the exports and imports of gold and silver at New York have been as follows: Exports, gold, \$23,647; silver, \$539,180; imports, gold, \$25,578; silver, \$2,243. Of the gold exported \$147 was in Spanish coin, and went to the West Indies; \$23,500 was in American

coin and bullion, of which \$500 went to London and the remainder to the West Indies. All the silver exported went to London, \$9,700 being in Mexican dollars and the rest in American coin and bullion.

NOTES OF THE WEEK.

No material alteration in business can be noted. Its volume continues small, though there are some signs of gradual improvement in the way of opening mills and factories. Not much can be expected, however, while the disturbing element of tariff discussion continues to affect trade.

The statement of the New York banks for the week ending Saturday, 6th, shows increases of \$2,891,500 in surplus; \$1,200,700 in loans; \$4,757,000 in specie; \$1,246,200 in legal tenders; \$12,086,800 in deposits; a decrease of \$67,500 in circulation. The total surplus was \$213,426,500, or \$83,796,650 in excess of the legal requirements.

The large increase in deposits was to be expected after the January interest payments. The increase in loans is again small, and it is evident that accumulation of money continues, and is likely to continue for the present. The demand for time loans is still light, and there is almost as much conservatism about borrowing as about loaning.

Gold exports are still considered possible, as the demand for money in Germany continues, and interest rates are high enough to make a transfer of the unemployed surplus an operation with a margin of profit. No exports are noted, however.

It is understood that the United States Government has notified the different governments which took part in the International Monetary Conference at Brussels that it is not prepared at present to ask for the reassembling of the Conference.

The statement of the United States Treasury on Thursday, January 11th, showed total balances in excess of outstanding certificates, amounting to \$88,521,698, of which there was in gold \$74,163,369; silver, \$7,748,270; legal tenders, \$4,516,268; treasury notes, etc., \$2,093,791. This is a decrease during the week of \$3,630,181 in the total balance and of \$5,766,246 in gold. This shows the effect of heavy January payments for interest and pensions.

The receipts and expenditures of the United States Treasury for the five months of the fiscal year from July 1st to November 30th were:

	1892.	1893.
Customs	\$84,267,391	\$60,673,054
Internal revenue	69,769,261	61,903,183
Miscellaneous	7,146,322	6,822,171

Total receipts.....\$161,184,077 \$129,403,418
Disbursements.....156,990,767 159,321,513

Last year the receipts exceeded payments by \$4,193,310; this year the disbursements were \$29,918,095 greater than the receipts.

Secretary Carlisle has been in consultation with members of the finance committees of both Houses of Congress as to measures for the relief of the Treasury. He is said to favor the bill introduced in the House by Mr. O'Neill, of Massachusetts, providing for the immediate issue of \$100,000,000 in 3% loan certificates, payable at the option of the government after one year.

An arrangement has been made between the leading New York banks and the New York Sub-Treasury, by which \$4,500,000 or \$5,000,000 due by the Treasury to the banks for redemption of mutilated currency turned in, will be allowed to run along as a loan by the banks to the Treasury until such time as the latter is able to pay without embarrassment. The loan thus made will bear no interest.

The coinage executed at the mints of the United States during the month of December, 1893, is reported as below:

Denominations.	Pieces.	Value.
Double eagles.....	442,972	\$8,859,440.00
Eagles.....	91,346	913,460.00
Half eagles.....	7,022	35,110.00
Quarter eagles.....	43	107.50
Total gold.....	544,383	\$9,838,117.50
Standard dollars.....	227	\$227.00
Half dollars.....	390,227	195,113.50
Quarter dollars.....	1,148,327	287,056.75
Dimes.....	591,277	59,127.70
Total silver.....	2,128,908	\$441,419.95
Five cents.....	1,270,630	\$63,531.50
One cent.....	4,770,930	47,709.30
Total minor.....	6,041,560	\$111,240.80
Total coinage.....	8,714,551	\$10,490,775.25

According to a recent statement, the amount of silver certificates outstanding November 30th was \$34,138,504. The denominations were as follows: \$1,000 notes, \$646,000; \$500 notes, \$599,500; \$100 notes, \$22,409,000; \$50 notes, \$14,304,300; \$20 notes, \$61,468,220; \$10 notes, \$107,049,791; \$5 notes, \$91,420,130; \$2 notes, \$15,406,042; \$1 notes, \$20,834,622.

The policy of the Treasury has been to put out the smaller denominations of the silver certificates and

to retire the smaller legal tender notes as far as possible. The amount of the latter now in circulation is much less than generally supposed, as is shown by the following statement giving the amount out on November 30th: \$10 notes, \$91,973,950; \$5 notes, \$61,538,415; \$2 notes, \$2,875,940; \$1 notes, \$3,530,587.

The Bank of England on Thursday, 11th, reported its specie holdings at \$25,813,920, an increase of \$1,075,358 as compared with the corresponding date in 1893.

The Bank of France on Thursday, 11th, reported its specie holdings, in sterling, at \$38,075,923 gold and \$50,648,628 silver, an increase of \$26,133 gold and of \$350,067 silver, as compared with the corresponding date in 1893.

The Imperial Bank of Germany, on January 4th, held gold and silver to the amount, in sterling, of \$39,424,800, a decrease of \$3,485,200 from the corresponding date last year.

In the closing week in December India Council bills to the amount of 50 lacs of rupees were offered in London at the fixed price of 15 1/2 d. per rupee, but only 12 lacs were taken. The commercial exchange rate is now 14 1/2 d. per rupee. From April 1st to the close of the year the Council bills sold in London realized \$3,491,985, against \$11,686,242 in the corresponding months of 1892. Last week 50 lacs were again offered, but only six lacs were taken.

Bombay has been the center of a very active speculation in silver, and heavy purchases have been made for future accounts, the metal for the time being taking the place of opium, stocks and other speculative commodities. Late dispatches indicate a collapse in the market, but are not explicit in details.

It is still reported that the Indian Government intends to levy an import duty on silver, and rumor has placed the rate at from 15 to 25%. No official statement is forthcoming, however, except that the question is under consideration, and no decision has been reached.

The London "Statist," in an interesting article on silver, says: Six months have now elapsed since the closing of the Indian mints, and the course of the silver market during that time strikingly illustrates the influence which opinion has in regulating value. India, from time immemorial, has absorbed silver in immense quantities; indeed, the absorbent power of India was almost beyond calculation. For a whole generation, as already observed, she has taken and kept nearly seven millions sterling worth every year. Bearing all this in mind, one would have supposed that the closing of the Indian mints would have caused something like a catastrophe; that there would have been not merely a panic fall, but that the price would have gone so low that the value of silver would have been determined almost entirely by the use of the metal in the arts. As a matter of fact, the fall has been quite trifling. Just before the mints were closed the price of silver was somewhat over 38d. per oz. It fell immediately after the mints were closed to 30d. per oz., bounded upwards again to about 35d., has been slowly declining once more, and now, six months after the decision to close the mints was taken, the price is about 32d. per oz., roughly, that is to say, there has been a fall of 6d. per ounce in the course of six months after the mints have been closed, and America has ceased absolutely either to buy or to coin silver. But 6d. per ounce is not 16%. The fall is so trifling in comparison with the falling off in what is called the demand, that it appears strikingly to confirm the view put forward in recent articles in this journal, that value is a function of opinion. There has been no very great closing of mines.

No one who has closely watched events will maintain for a moment that the falling off in the supply has been at all commensurate with the falling off in the demand. And yet, as has just been pointed out, the fall in price is barely 16%. When it is borne in mind that the United States Government alone was buying very nearly half the total production of the world, it will be seen how trifling is the falling off in the supply compared with that in the demand. Furthermore, it seems to follow that the price of silver is not likely to go very much lower; that, indeed, a rise is more probable than a material fall just now. Of course, the Indian Government may impose a heavy duty upon silver, and may succeed in preventing smuggling. That it can succeed is doubtful; but it is possible, at all events, that it may do so. And if it imposes a very heavy duty, and succeeds in preventing smuggling, it may cut off so much of the Indian demand, will cause a further fall. But assuming, for the purposes of argument, that the Government does not impose a heavy duty, or that it cannot prevent smuggling upon a large scale, then it seems to follow that much further fall in silver is not likely. But if that be the case the Indian Government in closing the mints made even a greater mistake than has generally been supposed. Hitherto it was thought that when the Sherman Act was repealed silver would depreciate more and more until it would become a mere common metal, would cease altogether, that is to say, to be what is called a precious metal. But now it looks as if the depreciation of silver had gone very nearly as far as it is likely to go. If that be the truth, then the Indian Government put off acting until all the in-

jury had been done to its own finances which the depreciation of silver was capable of doing, and it took action just at the moment when, if it had kept quiet, natural causes were about to arrest the downward movement, and even, it would seem, were about to lead to some recovery. The artificial causes which kept the market in a flutter were being removed, and free play was about to be allowed to natural causes.

The Vienna correspondent of the London "Economist" writes under date of December 30th: After the withdrawal of the Austrian florin notes, which the Reichsrath will be asked to vote shortly, the next thing to be withdrawn will not be the 50-florin notes, as everybody hoped, but the 5-florin notes, which will compel the public to receive a large quantity of silver florins and crowns. Later on the public will be somewhat compensated by the 10-crown gold pieces, which will be given out to as large an amount as will be possible; but as this will not be sufficient for the general traffic, one-half (equal to 80,000,000 florins) of the 5-florin notes will be left in circulation, and only 70,000,000 florins of these notes will be withdrawn. Both Finance Ministers are agreed that the public's aversion to having much silver in its pockets need not be much considered. In the meantime gold is still being purchased in large quantities.

In the Argentine Republic the year closed with gold at 229 premium; that is, the gold dollar was worth \$3.29 in paper, or conversely the paper dollar was worth 30 4 cents in gold. This is a slight decline, the highest point reached in 1893 having been 260 premium in September. Our Argentine neighbors are testing fully the blessings of "cheap money," but hardly seem to enjoy them.

The Greek Government has decided to issue 1,500,000 drachmas in subsidiary coinage of nickel. Some 37,000 kg. of the metal will be required, and a contract has been made for the supply with a French company at 3/8 fr. per kg., or about 33 8 cents per pound. The profit or seigniorage on this issue of coins will be about 1,350,000 drachmas, or \$260,000. The Greek treasury is in a very bad state just now.

Domestic and Foreign Coins.

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

Table with 3 columns: Coin, Bid, Asked. Includes Mexican dollars, Peruvian soles, Victoria sovereigns, etc.

Other Metals.

Copper.—The stagnation which predominates in commercial circles in general is also reflected in the copper market. Unfortunately the support which the market received from a good demand from the other side is weakening, the latter dwindling away, and, with no prospect of an improvement in the near future, either here or abroad, it is generally feared that values will experience a further decline before a reaction can set in. The large exports which were made within the closing months of last year have not allowed an accumulation of supplies, but there now appears to be a surplus growing from day to day, which, in an attempt to realize, must necessarily depress prices, in view of the disinclination of manufacturers to buy, except from hand to mouth.

The demand for lake copper is as yet very limited indeed, and while producers have not shown any willingness up to now to accept such prices as are being quoted by second-hand holders, there is not that strong feeling which was noticeable some time ago. They are still asking 10 1/2 @ 10 3/4, but manufacturers meet with no difficulty to get what little they require at from 10 1/2 @ 10 3/4. Electrolytic copper is quoted at 9 3/4 @ 9 1/2; casting copper, 9 1/4 @ 9 3/8; while Arizona pig, guaranteed 96%, 8 3/4 @ 8 1/2.

The decline in the foreign market, which was somewhat sudden when we last went to press, has been checked, there being a slight recovery. G. M. B.'s advancing to £12 7. 6d. for spot and £12 17s. 6d. for three months, although these quotations were not maintained. The market closes to-day at £12 spot and £12 10s. for three months. Other descriptions have not been in the least affected by the changes in the G. M. B.'s, or rather the speculative market, and the quotations remain unchanged from those of last week.

The exports of copper from the port of New York during the week ending January 12th, as reported by the New York Metal Exchange, was as follows:

Table with 3 columns: Destination, Quantity, Unit. Includes Rotterdam-Loch Lomond, Liverpool-Nomadie, etc.

Table with 3 columns: Location, Quantity, Unit. Includes Genoa-K. Wilhelm II., Antwerp-Herrmann, etc.

The exports of copper from Baltimore for the week ending January 10th, as reported by our special correspondents, were as follows:

Table with 3 columns: Date, Location, Quantity, Unit. Includes Jan. 5. Liverpool-Rossmore, Jan. 9. Havre-Govino, etc.

Other metals exported were: 47 bbls. zinc skimmings, 35,800 lbs., to Liverpool, per "Rossmore."

Tin.—The downward course has made further progress, notwithstanding that prices for silver have advanced, and that values for tin are usually governed by those of the latter. The burden of taking care of the production in the Straits seems to have become a little too heavy for the foreigners alone, and as there is still a general lack of consumption here, and, as stocks resulting from importations prior to the time when duty was levied, are still about 1,000 tons, and at present rate of consumption, sufficient for almost two months, an improvement in values is not likely to occur, unless speculation should bring it about, but that factor not only fails to appear in tin, but in all other commodities as well. The metal has to be quoted at 20/20c. for spot and January, and 20/30c. for February and March.

In London prices have gradually declined to £71 15s. for spot and £72 10s. for three months, and only within the last two days has there been a slight improvement, the market closing to-day at £72 12s. for spot and £72 15s. for three months.

Lead.—There has been no change, prices remaining at 3/20, with the official at 3/10. The foreign market is again somewhat easier, quotation for Spanish lead being £9 6s. 3d. @ £9 8s. 9d., and for English £9 8s. 9d. @ £9 10s.

St. Louis Lead Market.—The John Wahl Commission Company telegraph us as follows: Lead very quiet and trading only of a retail character. Prices have been 3c. a pound for about a week, and from present indications do not believe there will be much change one way or the other for some time to come.

Spelter.—Prices continue unchanged and the market flat. It is not likely to improve any further, unless speculation should drive prices higher. But this will hardly be accomplished, as the quantities to be absorbed appear somewhat too heavy. The foreign market remains unchanged at £16 7s. 6d. for ordinaries, and £16 10s. for specials.

Antimony.—We quote Cookson's at 10 @ 10 1/2; L. X. at 9 3/4 @ 9 1/2, and Hall's at 9 @ 9 1/2.

Quicksilver.—This market continues quiet. Quotations are: New York, \$32.50; London, £6 s. 6d. @ £6 5s.

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

Aluminum.—The prices, as at present fixed by the manufacturers, are: 65c. per lb. for 96% pure, and 75c. per lb. for 98% pure metal.

Magnesium.—The Aluminum und Magnesium Fabrik, Hemelingen, Germany, quotes prices as follows: Ingots and cubes, \$6 45 per kilogram; bars, \$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.

Sodium.—Prices, as quoted by the manufacturers, in Germany are 90c. @ \$1 per lb.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, Jan. 12.

Heavy Chemicals.—Owing to the resumption of work at many of the glass works, there has been an improved demand for heavy chemicals. Stocks in consumers' hands are light and any improvement in their business makes itself felt at once in this market.

Alkali has been in better demand and some sales are reported. Supplies of all the articles in the list are light on the spot. Prices are practically unchanged and we quote nominally as follows: Caustic soda, 60%, 3 05 @ 3 20c.; 70%, 2 80 @ 3c.; 74%, 2 82 1/2 @ 3 05c.; 76%, 3 @ 3 10c. Carbonated soda ash, 48%, 1 15 @ 1 25c.; 58%, 1 10 @ 1 20c. Alkali, 48%, \$1.10 @ \$1.20; 58%, \$1.05 @ \$1.15, according to package. Sal soda, English, 1 @ 1 05c.; American, 90 @ 92 1/2c. Bleaching powder, 2 25 @ 2 50c.

Acids.—A better business is reported in the acid market and several fair-sized sales are reported. Contracts, however, have not been as plentiful as they were a year ago at this time. Prices are without change. We quote this week: Acids, per 100 lbs. in New York and vicinity, in lots of 50 carboys or more: Acetic, in barrels, \$1.62 1/2 @ \$1.75; muriatic, 18°, 80c. @ \$1; 20°, 90c. @ \$1.10; 22°, \$1 @ \$1.25; nitric, 40°, \$1; 42°, \$4.50 @ \$4.75; sulphuric, 75c. @ \$1. Mixed acids according to mixture, oxalic, \$6.30 @ \$7. Blue vitriol is quoted all the way from \$3.37 1/2 to \$3.75; glycerine for nitro-glycerine, 11 1/2 @ 12 1/2c., according to quality and quantity.

Brimstone.—The market for Sicilian brimstone continues quiet. There are no stocks to speak of

on the spot. Quotations for arrivals are \$18.50 @ \$20 for best unmixed seconds, according to the time of arrival. Shipments are held at \$17.75 @ \$18 for seconds. Seconds are 75c. @ \$1 less.

Fertilizing Chemicals.—There is very little new or of interest to report of this market. It continues very quiet. Stocks are not appreciably accumulating and prices are unchanged. Manufacturers are just now buying from hand to mouth. Our quotations this week are as follows: Sulphate of ammonia, gas liquor, \$3.45 @ \$3.50; bone, \$3.30 @ \$3.35; dried blood, \$2.55 @ \$2.60 per unit for high grade and \$2.30 @ \$2.40 for low grade. Azotine, \$2.50 @ \$2.60. Concentrated phosphate (30% available phosphoric acid), 75c. per unit. Acid phosphate, 13% to 15%, av. P. O. 60c. per unit at seller's works in bulk. Dissolved bone-black, 17% to 18% P. O., 92 1/2c. 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, \$25.50 @ \$26.50; low grade, \$22 @ \$22.50. Bone tankage, \$2 @ \$2.4; bone meal, \$2 @ \$2.50.

In lots of 50 tons on contracts closed prior to January 31st, we quote: Double manure salts, 48-53% (basis 48%); New York and Boston, \$1.10; Philadelphia, \$1.12 1/2; Charleston, Savannah, Wilmington, N. C., and New Orleans, \$1.15. High grade manure salts, 90-95% and 96-99% (basis 90%) respectively: New York and Boston, \$2.05 and \$2.09; Philadelphia, \$2.07 1/2 and \$2.11 1/2; Charleston, Savannah, Wilmington, N. C., and New Orleans, \$2.10 and \$2.14.

Phosphates.—Quotations are as follows: Land rock, 60% bone phosphate of lime, \$5 f. o. b. vessel Charleston; 62%, \$5.25; river rock, 58%, \$6; all kiln-dried.

Muriate of Potash.—In lots of 50 tons, prices on contracts closed prior to January 31st are as follows for muriate of potash, 80-85% and minimum 95% (basis 80%), respectively: New York and Boston, \$1.75 and \$1.78; Philadelphia, \$1.77 1/2 and \$1.80; Charleston, Savannah, Wilmington, N. C., and New Orleans, \$1.80 and \$1.83.

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, \$8.75 and \$9; Charleston, Savannah, Wilmington, N. C., and New Orleans, \$9.50 and \$9.75. For sylvinit, 27-35%, prices are as follows per cent. per gross ton, invoice weights: New York, Boston and Philadelphia, 30 1/2c.; Charleston, Savannah, Wilmington, N. C., and New Orleans, 40c. Actual weights, 1c. more per cent.

Nitrate of Soda.—We must report a greater firmness in the prices of nitrate this week. Owing to the small supply available on the spot there has been an advance and we quote nitrate ex-store at \$1.92 1/2 @ \$1.95.

Liverpool. Jan. 3.

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

During the past fortnight there has been quite a holiday feeling here, and business has hardly properly resumed even yet. Since our last report several alterations have been made in quotations in different lines, as noted below.

Soda ash is in small compass and for Leblanc makes quotations vary according to make, quantity, market, etc., the nominal spot range being about as follows:

Caustic ash, 48%, £3 15s. @ £4 5s. per ton; 57-58%, £4 10s. @ £5 per ton net cash. Carb. ash, 48%, £3 15s. @ £4 5s. per ton; 58%, £4 10s. @ £5 per ton net cash. Ammonia ash, 58%, is firmly held at from £4 to £4 5s. per ton net cash for casks, and 5s. per ton less for bags. These quotations are for both prompt and forward delivery. Soda crystals receive little attention, and are flat at £3 per ton, less 5%. Caustic soda is rather quiet, but prices have been rearranged and vary considerably, according to export market, the nearest range for either prompt or January-June delivery being as follows: 60%, £7 15s. @ £8 10s. per ton; 70%, £8 15s. @ £9 10s. per ton; 74%, £9 15s. @ £10 10s. per ton; 76%, £10 15s. @ £11 10s. per ton net cash. For January-December delivery, contracts can be made at a reduction of from 5s. to 10s. per ton on these figures. For parcels under 10 tons, 5s. per ton extra is charged.

Bleaching powder is very slow of sale, and prices show a considerable decline. The nominal spot quotations range from £7 15s. to £8 per ton net cash for softwood casks, and £8 @ £8 5s. per ton for hardwood casks. For contracts over all 1894 a reduction of 5s. per ton would be made. Bicarb. soda continues firm at £6 15s. per ton, less 2 1/2% for 1 cwt. kegs with usual allowances for larger packages. Chlorate of potash, although dull on the spot, is receiving a considerable amount of attention as regards forward delivery. The manufacturers have to-day advanced prices 1/4d. per lb. all round, and now quote as follows: January-March, 8d. per lb.; January-June 7 1/4d.; January-December, 7 1/2d., less 5%. For prompt or January deliveries, 7 1/2d. are about nearest values, but there is next to nothing going on for near positions.

Sulphate of ammonia has declined and is now quoted at £13 12s. 6l. @ £13 15s. per ton, less 2 1/2% for good gray 24-25% in double bags, f. o. b. here.

Nitrate of soda is dull, but at the same time is steady at about £9 10s. per ton, less 2 1/2% for double f. o. b. here. Carb. ammonia—Lump, 3 1/4d. per lb. Powdered, 3 3/4d. per lb., less 2 1/2%.

MINING STOCKS.

NEW YORK, Friday Evening, Jan. 12.

[For complete quotations of shares listed in New York, Boston, San Francisco, Aspen, Colo.; Baltimore, Pittsburg, St. Louis, London and Paris, see pages 46 and 48.]

The mining stock market continues in the exceedingly dull condition which has characterized it during the past few months. More stocks were traded in than during the preceding week, but for all that it is a fact that speculation in mining shares is dead in this city and nearly so in the other cities which once made a specialty of such business.

The Comstocks closed a little higher than last week. Consolidated California & Virginia opened at \$3.75, advanced to \$4.40, declined on Wednesday to \$3.65 and closed at \$4.10. Other sales were as follows: 100 shares Gould & Curry at \$1.15; 100 shares of Hale & Norcross at 85c.; 300 shares of Ophir at \$1.85@2.00; 400 shares of Yellow Jacket at 90c.@1.10; 100 shares of Best & Belcher at \$2.45; 2,100 shares of Comstock Tunnel at 8c.; 100 shares of Union Consolidated at 95c., and 300 shares of Consolidated Imperial at 11c.

The following companies report having had balances on hand December 30th, 1893, with the expenses of that month unpaid: Andes, \$3,512; Alta, \$1,312, with all outstanding debts save the December expenses paid; Best & Belcher, \$19,206; Belcher, \$13,200; Bullion, \$5,145; Consolidated California & Virginia, \$31,657; Consolidated Imperial, \$1,033; Challenge Consolidated, \$1,701; Caledonia, \$7,336; Confidence, \$995; Crown Point, \$635; Gould & Curry, \$5,113; Hale & Norcross, \$18,515; Justice, \$4,200; Kentuck, \$27; Lady Washington, \$1,361; Overman, \$2,089; Occidental Consolidated, \$22, with \$4,000 payable on the company's note; Ophir, \$3,185; Savage, \$1,628; Sierra Nevada, \$6,993; Segregated Belcher, \$3,066; Scorpion, \$232; Union Consolidated, \$17,536; Utah Consolidated, \$2,464.

Of the California stocks Bode Consolidated shows sales of 200 shares at 25c.@30c.

Of the Colorado shares Chrysolite was stationary at 20c., with sales of 300 shares. Of Leadville Consolidated 800 shares were sold at 12c.@13c. Robinson, which had not been traded in for some time past, this week shows transactions of 300 shares at 32c. Sales of Lacrosse amounted to 700 shares at 4c. Of Ontario 150 shares changed hands at \$7. Home-sake was traded in during the week for the first time in months; 100 shares were sold at \$12.50.

NOTES OF THE WEEK.

A Milwaukee dispatch, January 12th, says that receivers have been appointed for the Penokee & Gogebic Consolidated mines as a result of proceedings begun by the Farmers' Loan and Trust Company to foreclose a mortgage for \$1,000,000. Howard Morris, of Milwaukee, and C. F. Rand, of New York, are the receivers.

Boston.

Jan. 11.

(From our Special Correspondent.)

The Montana stocks have led the market this week in point of activity at a decline of 50c. to \$1 per share. The Lake stocks have held very firm with the exception of Osceola, which has shown a weakening tendency and sold off \$1 per share. There is no evidence of a movement of a speculative character at present although there was an effort made to advance Centennial on the report that the company were about to resume work at the mine, but it was of short duration and died in the effort.

Calumet & Hecla sold in a small way at \$300, but there is no rush of investors for it at this price. Tamarack declined to \$158, but recovered and sold at \$160, mostly in small lots.

Quincy declined from \$126 to \$122, with later sales at \$125, at which price it is wanted.

Osceola declined from \$27 to \$25½, and rallied again to \$26 for a few shares only.

Franklin came out quite freely at \$10, the last sale being for 20 shares at \$9½. Atlantic declined to \$11, at which price it was freely offered.

Kearsarge sold at 7¼@7½, against \$8 the last sale, December 21st.

Centennial, on the report before stated, advanced from \$3½ to \$3, and declined to \$1 on later sales; about 5,000 shares were traded in.

Tamarack, Jr., sold at 19 and Wolverine at \$2. For a small lot \$2½ was paid.

Boston & Montana declined from \$27 to \$25½, with recovery to \$26½ on sales of 2,800 shares. Butte & Boston declined from \$9 to \$8½, with later sales at \$9. It is stated that work is being pushed vigorously at the mine, the company having more men at work now than at any period in its history.

3 p. m.—Boston & Montana declined this afternoon to \$25 and Kearsarge to \$6½, the last sale being at \$7. A small lot of Centennial sold at \$4½. For Calumet & Hecla \$302 was bid, \$305 asked, with no sales.

Colorado Springs.

Jan. 8.

(From our Special Correspondent.)

Sales for the week of five working days were 1,013,000 shares, a daily average of 203,000. This large trading is chiefly made up of the cheaper Cripple Creek stocks, and goes to show increasing confidence in the more modest properties, and the belief in the eventual success of the great gold camp.

The reported discovery in the Camilla gives promise for the Rose Maud lode of the Anaconda company being only 75 ft. from the south end line. The Alamo company has given a bond and lease on the Happy Day lode; figure, \$5,000. Cripple Creek

as a mining camp is improving right along. In the town large sales of real estate are made daily.

The merchants are doing well. The event of the week was the passing of Mollie Gibson's January dividend (noted in another column).

San Francisco.

Jan. 5.

(From our Special Correspondent.)

The new year has opened with some slight improvement in prices, but trading has continued to be very limited as is usual during the holiday season. At several points on the Comstock lode ore has been struck and the work being done is of such a nature that prices in the stock market can be advanced when desired. The calls for money at the beginning of the year are, however, of such a mandatory kind that men generally have neither time nor inclination to dabble in stocks. A month hence, however, there is a strong probability that an upward movement in stocks will inaugurate a season of active trading.

In the Consolidated California & Virginia mine the running of the Rule drift is keeping interest alive; all the more as it is more confidently asserted than before that the ore body is just about where it was anticipated it would be. This, of course, is largely conjectural, and the opinion is based on the indications so far. Meantime the stock has sold during the week at \$3.69, advanced to \$3.80 to-day and closed firm. Of the other north enders Ophir sold to-day for \$1.70; Mexican for \$1; Sierra Nevada for \$1.05 and Union Consolidated for 90c.

In the middle group of Comstocks Best & Belcher has been most active, selling to-day for \$2; Chollar has ruled at 55c.; Gould & Curry at 95c.; Hale & Norcross at 85c.; Potosi at 80c.; and Savage at 85c.

Some of the leading Gold Hill stocks have moved rather freely, but prices have not, with the exception, perhaps, of Jacket, shown any signs of strengthening. Alta sold to-day for 15c.; Belcher for 80c.; Confidence for \$1.10; Crown Point for 45c.; Justice for 24c.; Overman for 33c.; and Yellow Jacket for \$1.05.

At these rates the market closed firm to-day with trading advances in the leaders.

The following nominations have been made at the San Francisco Stock Exchange for the election of officers: W. Edwards, president; A. B. Ruggles, vice-president; O. V. Walker, chairman; F. W. Hadley, secretary, and George T. Marye, treasurer.

San Francisco, Jan. 12 (By telegraph).—The opening quotations to-day are as follows: Best & Belcher, \$2.15; Bode, 20c.; Bulwer, 50c.; Chollar, 55c.; Consolidated California & Virginia, \$3.95; Gould & Curry, 85c.; Hale & Norcross, 70c.; Mexican, 85c.; Mono, 10c.; Ophir, \$1.70; Savage, 75c.; Sierra Nevada, 95c.; Union Consolidated, 80c.; Yellow Jacket, 85c.

London.

Jan. 2.

(From our Special Correspondent.)

During the past fortnight the Christmas and New Year holidays have interfered with the ordinary course of business, for there were only seven working days out of the 14. There has nevertheless been a considerable amount of business done, though, of course, on a small scale, and some stocks have been fairly active. The most stirring news of the week has been the declaration on the part of the African Gold Recovery Company, referred to in another column, that they intend taking almost immediately proceedings against those South African gold mining companies which have adopted the cyanide process without their permission.

The recent advance in good American mines has been fully sustained. De Lamars have further risen 1s., chiefly because there appears to be no more selling of vendors' shares, but also on the publication of Mr. Muir's report on the mine. Mr. Muir is the chairman of the company and has recently visited the mine, as is his custom, once a year, but his report is not very specific and only deals in hopeful prospects for future dividends.

Harqua Halas have also maintained their advance, and the fears of an indefinite postponement of dividend-paying work has been dissipated by the news that the new shaft was down 140 ft. on December 21st. Montanas have been dealt in pretty freely again and they have maintained their advance; the reports from the mine are still encouraging about the recent discovery. The last report says that the cross-cut has been driven from the old workings in the 400-ft. level and has encountered the continuation of the New Castletown vein recently discovered in No. 3 level. They have advanced 8 ft. in the ore and the width of the vein is not yet ascertained.

Holcomb Valley shares have fallen 1½d., although a letter has been received from the manager stating that from December 17th the plant was running from four to six hours a day regularly.

Mr. Davis, the manager of the Springdale Gold Company, of Denver, writes to say that shaft No. 2 is 75 ft. deep and everything is looking favorable. It is now decided to commence drifting and stopping out ore. After sinking 10 ft. farther for a sump, a platform will be put in and a level begun running on the vein toward shaft No. 1, where at an equal depth two levels will be started, one toward shaft No. 2, the other in opposite direc-

tion—both on the vein. The object is to get out ore for a dividend early in February, which the directors hope to be able to repeat quarterly thereafter.

The annual meeting of the Arizona Trust and Mortgage Company was held at Edinburgh, December 29th, when a 10% dividend was declared. The chairman announced that the erection of the leaching plant was being proceeded with at Clifton and that by its means the copper company would save from £6,000 to £10,000 a year. Hitherto nothing had been done on anything but first class ores, but with the present price of copper and with the dull times and rivalry, it was necessary to pursue different tactics. With these alterations and improvements the directors have every confidence in the future of the company.

The Harqua Hala company announce that their profit for the month of November was \$29,500. It may be interesting to give the chairman, Mr. Muir's, account of the reason of the dangerous condition of the old shaft, which has been referred to in another column before. He says that a mine foreman worked the mine Mexican fashion, with no good will to American or English mining ways, and not expecting to be long in the company's service. At the outset, as he had occupied the same post under the old company, it was considered good policy to retain his services for a time, at least, under the new administration. Allen (the company's manager) could only give a small portion of it to the mine itself. He was then far from satisfied with the foreman, or his methods, but as a comparative stranger to the mine, he delayed taking strong measures until September, when he was able fully to realize whether things were teuding. He thereupon determined that a change was absolutely necessary, and decided to part with the old foreman, having promise in the meantime of the services of Mr. Oxnam, from De Lamar, in his place. Mr. Oxnam entered upon his duties on October 1st, and under his able and systematic methods, things are rapidly assuming different shape. Mr. Muir adds that Mr. Bratner, who accompanied him, is of opinion that inside of two months improvements will have so far advanced as to permit of mill work being resumed.

The Silver King Mining Company had a stormy meeting on December 20th. The accounts showed a loss due to depreciation of silver and the subject of directors' fees was the cause of a good deal of acrimonious discussion. Eventually, the report was rejected and three new directors appointed. The manager at the mines, in his annual report, regrets that he has not been supplied with more working capital to enable him to carry out the development of the property in the manner he had anticipated, and to make the desired improvements in the plant and methods of working, which would, of course, have entailed a large outlay. Respecting the work done at the mines, the average grade of the ore worked has been 972 oz. per ton; the cost of production has been 3648d. per ounce; and the amount realized for the bullion was 3888d. per ounce, thus leaving a small profit. Upon examination of the books, etc., at the mines, the auditors report that the average cost of production, management, etc., for the years 1891-2 was \$1.10 per ounce. For the eight months to December 31st, 1892, it was \$0.70 per ounce, and for the four months ending April 30th, 1892, the average cost per ounce was reduced to \$0.56.

Three judgments have been given in the suits in the Circuit Court for the district of California, between the Waterloo Company and Mr. Doe, the vendor. That relating to the Mammoth mine is chiefly in favor of the Waterloo Company, and they have accordingly brought suit against this company, claiming damages to the extent of about £20,000 for the value of ore extracted by the company. That relating to the Red Cloud and Oriental No. 2 mines is in favor of Mr. Doe. The judgment in the suit relating to the "Oregon No. 3" mine was, that neither party had a right to it as a mineral claim. Immediately after this decision Mr. Edwards, the manager, secured the claim as a mill site; the Waterloo Company attempted to do the same a few hours later, but found they had been forestalled, and, as the mouth of the tunnel through which the Waterloo Company brought all their ore from the King mine is on this claim, they will be unable to work their mine again, unless the decision is reversed on appeal. Notices of appeal to the United States Supreme Court have been given by both parties against the judgments adverse to each respectively.

MEETINGS.

Black Diamond Coal Mining Company, at the office of the company, No. 224 California street, San Francisco, Cal., January 15th, at 10 a. m.

Lone Star Quartz and Gravel Mining Company, at the office of the company, No. 2814 Sacramento street, San Francisco, Cal., January 20th, at 12 o'clock noon.

Nevada Salt and Borax Company, at the office of the company, No. 310 Pine street, San Francisco, Cal., January 16th, at 10 a. m.

Pacific Oil Company, at the office of the company, No. 13 Pine street, San Francisco, Cal., January 16th, at 12 o'clock noon.

Sierra Nevada Silver Mining Company, at the office of the company, No. 309 Montgomery street, San Francisco, Cal., January 17th, at 11 a. m.

NEW YORK MINING STOCK QUOTATIONS.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Table with columns for Name and Location of Company, Jan. 6-12, and Sales. Dividend-paying mines include Belcher, Nevada; Belle Isle, Nevada; Bolivia Cons., Cal.; Bunker, Cal.; Crystallite, Colo.; Comstock T. bonds, Nev. scrip; Cons. Cal. & Va. Nev.; Crown Point, Nev.; Deadwood, Dak.; Eureka Cons., Nev.; Father de Smet, Dak.; Gould & Curry, Nev.; Hale & Norcross, Nev.; Homestake, Dak.; Horn Silver, Utah; Kentucky, Nev.; Leadville Cons., Colo.; Little Chief, Colo.; Mono, Cal.; Mt. Diablo, Nev.; Navajo, Nev.; N. Belle Isle, Nev.; Ontario, Utah; Ophir, Nev.; P. mouth, Cal.; Quicksilver, Pref., Cal. Com.; Robinson, Colo.; Sierra Nevada, Nev.; Silver King, Ariz.; Standard Cons., Cal.; Yellow Jacket, Nev. Non-dividend-paying mines include Alpha, Nev.; Alta, Nev.; Andes, Cal.; Barcelona, Nev.; Belmont, Cal.; Best & Belcher, Nev.; Brunswick, Cal.; Bullion, Nev.; Chollar, Nev.; Comstock T. Nev.; Con. Imperial, Nev.; El Cristo, Rep. of Col.; Exchequer, Nev.; Independence, Nev.; Julia, Nev.; Justice, Nev.; King & Pembroke, Nev.; Lacrosse, Colo.; Mexican, Nev.; Middle Bar, Cal.; Minnesota Iron; Nevada Queen, Nev.; N. Standard, Cal.; N. Commonwealth, Nev.; Overman, Nev.; Oriental & Miller, Nev.; Phoenix of Ariz.; Potosi, Nev.; Scorpion, Nev.; Seg. Belcher, Nev.; Union Cons., Nev.; Utah, Nev.

*Ex-dividend. †Dealt in at New York Stock Ex. Unlisted securities. ‡Assessment paid. †A 468400 unpaid. D dividend shares sold, 3,163. non-dividend shares sold, 3,300. Total shares sold, 6,463.

BOSTON MINING STOCK QUOTATIONS.

Table with columns for Name of Company, Jan. 5-12, and Sales. Dividend-paying mines include Atlantic, Mich.; Brecc, Colo.; B. & Mont. Mont.; Bonanza Development; Ca. met & Mees, Mich.; Central, Mich.; C. ur d'Alene, Id.; Franklin, Mich.; Honorine, Utah; Horn Silver, Utah; Keams, Mich.; Lake Superior, Iron; Minnesota Iron; Ontario, Utah; Osceola, Mich.; Quincy, Mich.; Rige, Mich.; Silver King, Ariz.; Tamarack, Mich.; Tecumseh, Mich. Non-dividend-paying mines include Alton, Mich.; Arnold, Mich.; Atze, Mich.; Brunswick, Cal.; Butte & Boston, Mont.; Centennial, Mich.; Colchis, N. Mex.; Copper Falls, Mich.; Hancock, Mich.; Humboldt, Mich.; Huron, Mich.; Mesnard, Mich.; National, Mich.; Native, Mich.; Oriental & Miller, Nev.; Phoenix, Ariz.; Pontiac, Mich.; Tamarack, Jr., Mich.; Washington, Mich.; Wolverine, Mich.

Dividend shares sold, 4,228. Non-dividend shares sold, 6,930. Total shares sold, 11,158.

CURRENT PRICES.

These quotations are for wholesale lots New York unless otherwise specified. Acetic, chem. pure... 17.19. Commercial, in bbls. and cys... 0.13@0.12. Carbonic, liquefied... 18.25. Chromic, chem. pure... 1.00. for batteries... 40. Hyarobromic dilute, U. S. P... 45.00. Hydrocyanic, U. S. P... 45.00. Hydrofluoric... 2.00. Iodine-95%... 22.30@22.40. Absolute... 33.80. Ammoniated... 32.80. Alum-Lump... 1.75@1.85. Copperas-Cwm... 1.85@1.90. Powdered... 0.44@0.05. Lump... 0.45. Aluminium Chloride-Pure... 1.25. Amalgamating solution... 60. Sulphate... 1.30@1.32. Ammonia-Sal. in bbl. lots... 0.71@0.08. Carbonate... 0.71@0.08. Muriate, white, in bbls... 0.81@0.04. Aqua Ammonia... 0.94@0.05. Antimony-Oxymur... 0.42@0.06. Regulus... 1.02@1.14. Argon... 0.15. Arsenic-White, powdered... 0.82@0.03. Red... 0.65@0.07. Yellow... 0.62@0.09. White at Plymouth... 1.12@2.0. Asbestos-Canadian... 3.50@3.00. Italian... 1.18@1.50. Ashes-Pot, 1st sort... 4.75@5. Pearl... 0.54@0.064. Asphaltum... Prime Cuban... 0.42@0.05. Hard Cuban... 3.25@3.00. Trinidad, refined... 33.00@35.00. Egyptian and Syrian... 0.52@0.74. Californian, at mine... 12.00@26.00. at San Francisco... 15.00@29.00. Barium-Carbonate, pure... 45. Carbonate, commercial... 0.06@0.15. Chlorate, crystal... 75. Chloride, commercial... 0.05@0.10. pure... 16. Iodide... 40. Nitrate... 0.05@0.07. Sulph. Am. prime white... 1.50@1.19. Sulph. foreign, floated... 2.21@2.24. Sulph. off color... 1.15. Carb. lump, f. o. b. L'pool... 28. No. 1, Casks, Runcorn... 24.10. No. 2, bags, Runcorn... 13.0. Bauxite... 10.00. Bichromate of Potash-Scotch... 11.12. American... 11.12. Bichromate of Soda... 0.91@1.10. Borax-Refined... 0.82@0.09. San Francisco... 0.82@0.09. Concentrated, in car lots... 0.71@0.08. Refined, Liverpool... 25. Bromine... 25. Cadmium (minion)-lb... 32.00.

Cadmium Iodide... 55.50. Chalk... 1.50@2.23. Precipitated... 0.42@0.06. China Clay-English... 13.00@18.00. Domestic... 19.00@11. Chlorine Water... 10. Chrome Yellow... 10.25. Chrome Iron Ore... 10.00. Chromalium-Pure... 35.00. Commercial... 0.24. Cobalt-Oxide... 1.60@1.70. Copper-Sulph. English Wks... 22.00@21. Vitriol (blue), ordinary... 0.31@0.034. extra... 0.41. Nitrate... 40. Copperas-Comm'n... 85.95. Best, 100 lbs... 1.35@1.50. Liverpool... 22.00@22.10. Corundum-Powderea... 0.44@0.09. Flour... 0.03. Cryolite-Pow... 0.12. Emery-Grain... 0.14@0.05. Flour... 0.02@0.04. Epsom Salt... 0.12@0.14. Feldspar-Ground... 6.00@10.00. Crude... 2.00@3.00. Fluorspar-Powdrd, No. 1... 22.00@33.00. Lump, at mine... 26.00@33.00. French Chalk... Fuller's Earth-Lump... 1.00@2.00. Glauber's Salt-in bbls... 0.12@0.14. Glass-Ground... 0.09. Gold-Chloride, pure crystals... 12.00. pure, 15 gr., c. v., doz... 35.40. liquid, 15 gr., c. v... 55.50. Chloride and sodium... 36.00. 15 gr., c. v., doz... 32.75. Oxide... 27.25. Gypsum-Calcined... 1.25@1.50. Land Plaster... 30.00@33.00. Iodine-Resublimed... 30.00@33.00. Iridium-Oxide... 80. Iron-Nitrate... 0.12@0.14. Kaolin-See China Clay... 1.00@1.10. Kieserite... 0.62@0.07. Lead-Red, American... 0.62@0.07. White, American, in oil... 0.62@0.07. White, English, in oil... 0.62@0.07. Acetate, or sugar of, white... 0.06@0.064. Granulated... 0.09@0.12. Lime Acetate-Am. Brown... 30.00@35.00. Powdered... 1.87@1.90. Litharge-Powdered... 0.05@0.07. English flake... 0.06@0.09. Magnesite-Crude... 1.01. kilos... 14.75. Calcined, ton of 2,240 lbs... 22.00. Brick, ton of 2,240 lbs... 47.50. Manganese-Ore, per unit... 23.25. Oxide, ground... 0.21@0.064. Mercuric Chloride-Corrosive... 33.00@34.00. Powdered... 1.26@1.50. Marble Dust... 1.26@1.50. Metallic Paint-Brown... 2.00@2.25. Red... 2.00@2.25. Mica-In sheets according to size... 1st quality... 2.00.

Mineral Wool-Ordinary slag... 0.14. Ordinary rock... 0.24. Ground... 0.04. Naphtha-Black... 10.00. Nitre Cake... 10.00. Ochre-Rochelle... 0.14@0.194. Washed Nat Oxfrd. Lump... 0.06@0.064. Washed Nat Oxfrd. Powder... 0.07@0.074. Golden... 0.05@0.05. Domestic... 12.00@20. Oils, Mineral-Cylinder, light filtered... 14.16. Dark filtered... 10.13. Extra cold test... 26.24. Dark steam refined... 0.71@0.12. Phosphorus... 5.50@5.95. Precip., red... 80.85. white... 85.90. Plumbic Chloride-Dry... 0.07. Plumbago-Ceylon... 0.04@0.06. American... 0.05@0.07. Potassium-Cyanide... 0.52. 674... 28.31. mining... 28.32. Bromide, domestic... 18.184. Chlorate, English... 18.184. Chlorate, powdered, English... 18.14@19. Carbonate... 0.04@0.05. Caustic, lb, pure slick... 0.05@0.06. Iodide... 32.58@32.80. Nitrate, refined... 0.06@0.08. Bichromate... 10.114. Yellow Prussiate... 21.64@22. Red Prussiate... 39.44. Pumice Stone-Select lumps... 0.034@0.15. Original cks... 0.11@0.094. Powdered, pure... 0.11@0.094. Pyrites-Non-cuprous, p. units... 10@11. Quartz-Ground... 86.00@100.00. Rotten Stone, Powdered... 0.034@0.034. Lump... 0.06@0.07. Original cks... 0.04@0.054. Rubbing stone... 0.034@0.04. Sal Ammoniac-lump, in bbls... 70.00. Salt-Liverpool, ground... 8.00. Domestic, fine... 37@37.5. Common, fine... 34.50@35. Turk's Island... 26.28. Salt Cake... 10.00@15.00. Saltpeter-Crude... 0.034@0.04. Soapstone-Ground... 30.00. Block and slab according to size. Sodium-Fluoride... 22@24. Phosphate... 0.42@0.05. Stannate... 0.06@0.12. Tungstate... 30@35. Hyposulphite... 1.70@1.80. Strontium-Nitrate... 0.08@0.09. Sulphur-Roll... 0.14@0.024. Flour... 0.134@0.02. Syvinit, 27@35, S.O.P., per unit... 3.75. Talc-Ground French... 0.14@0.014. American No. 1... 0.14@0.014. American No. 2... 0.06. Terra Alba-French... 65@60. English... 65@60. American, No. 1... 80@80. American, No. 2... 40@60.

Tin-Crystals, in kegs or bbls... 14.16. Double or strong, 54° B... 10.12. Oxymur, or nitro... 19. Vermilion-Imp. English... 8. Am. quicksilver, bulk... 57@59. Am. quicksilver, bags... 58@60. Chinese... 85@100. Trieste... 90@95. American... 114@119. Zinc White-Am. Dry... 0.44@0.08. Antwerp, Red Seal... 0.61@0.07. Paris, Red Seal... 0.75@0.08. Muriate solution... 0.06. Sulphate crystals, in bbls... 0.03@0.034.

THE RARER METALS.

The prices given below are the prices in Germany, and are per gramme except where otherwise stated: Arsenic (metallic), per kilo... 20.25. Barium (ex amalgam)... 2.12. (per electrol)... 7.75. Bismuth (metallic), per kilo... 6.25. Cadmium (metallic)... 2.75. Calcium (per electrol)... 5.25. Cerium (pulv)... 2.25. (fusum in globulis)... 5.50. Chromium (fus)... 40. (cryst)... 75. Cobalt (metallic), per kilo... 10.00. (pure), per kilo... 40.00. Didymium (pulv)... 5.50. Erbium-Vitrium (oxydat)... 10.00. Gallium (cryst)... 100.00. Germanium (fus)... 37.50. (pulv)... 35.00. Glucinum (pulv)... 7.00. (cryst)... 10.75. Indium... 5.00. Iridium (fusum)... 1.25. Lanthanum (pulv)... 6.00. (per electrol)... 11.00. Lithium (in glob)... 5.00. (wire)... 6.25. Manganese (fusum)... 25. Molybdenum (pulv)... 124. Niobium (pulv)... 4.25. Osmium... 1.00. Palladium (wire)... 1.06. (pulv)... 1.00. Potassium (metal), per kilo... 27.50. Rhodium... 1.63. Ruthenium... 2.50. Rubidium... 6.25. Selenium (cryst)... 54. (precipitates)... 624. Strontium (per electrol)... 7.25. (ex amalgam)... 3.25. Tantalum... 4.75. Tellurium (fusum)... 50. (precipitates)... 224. Thallium... 0.694. Titanium... 1.13. Tungsten (furo)... 0.06. Uranium... 1.10. Vanadium... 4.00.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Main table with columns: Name and Location of Company, Capital Stock, Shares, Par, Assessments, Dividends, Date and amount of last, Total paid, Name and Location of Company, Capital Stock, Shares, Par, Assessments, Date and am't of last. 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 \$31,320,000 in dividends, and the Cons. Virginia \$12,390,000. § 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 \$425,000 in assessments.

COAL AND COAL RAILROAD STOCKS.

Table with columns for company names, dates (Jan. 6-12), and sales. Includes companies like Am. Coal, Balt. & Ohio, and various railroad stocks.

Total shares sold, 60,973.

INDUSTRIAL AND TRUST STOCKS.

Table with columns for company names, dates (Jan. 6-12), and sales. Includes companies like Adams Express, Am. Cotton Oil, and various industrial stocks.

Total shares sold, 375,618.

CALIFORNIA. San Francisco.

Table with columns for company names and closing quotations for various stocks in San Francisco.

COLORADO. Aspen.

Table with columns for company names and prices for various stocks in Aspen, Colorado.

Colorado Springs, Jan. 6. (Specially reported by W. H. McIntyre).

Table with columns for company names and prices for various stocks in Colorado Springs.

Total reported sales for the week ending Jan. 6, 1,250,000 shares.

Denver.

Table with columns for company names and prices for various stocks in Denver.

Total shares sold, 421,86.

MARYLAND. Baltimore.

Table with columns for company names and prices for various stocks in Baltimore, Maryland.

MINNESOTA. Duluth.

Table with columns for company names and prices for various stocks in Duluth, Minnesota.

UNLISTED STOCKS.

Table with columns for company names and prices for various unlisted stocks.

MONTANA. Helena.

Table with columns for company names and prices for various stocks in Helena, Montana.

PENNSYLVANIA. Philadelphia.

Table with columns for company names and prices for various stocks in Philadelphia, Pennsylvania.

MISSOURI. St. Louis.

Table with columns for company names and prices for various stocks in St. Louis, Missouri.

London Quotations.

Table with columns for company names and prices for various London quotations.

Paris.

Table with columns for company names and prices for various Paris quotations.

New York Mining Stocks.

Table with columns for company names and prices for various New York mining stocks.

ASSESSMENTS.

Table with columns for company names, dates, and assessment amounts.

CLASSIFIED LIST OF ADVERTISERS.

Adders and Calculators
Smith, R. C.

Air Compressors and Rock Drills
American Diamond Rock Boring Co.
Bullock, M. C., Mfg. Co.
Burlingame Rock Drill Co.
Clayton Air Compressor Works.
Hassensahl, W.
Ingersoll-Sergeant Rock Drill Co.
Morris County Machine & Iron Co.
Norwalk Iron Works Co.
Pana Diamond Drill & Mfg. Co.
Rand Drill Co. (See Diamond Drills.)

Aluminum
Cowles Electric, S. & A., Co.

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

Architects and Builders
Berlin Iron Bridge Co.
Fenocoy Bridge & Const. Co.
Pittsburg Bridge Co.
Pollock, Wm. B. & Sons.
Scaife, Wm. B. & Sons.

Assayers' and Chemists' Supplies
Almsworth, Wm. Richards & Co.
Baker & Adamson. Roe-sier & Hasselacher
Baker & Co. Chemical Co.
Berge, J. & H. Snellson, W. H., Assay.
Bullock & Crenshaw. & Engineering Co.
Henry Hill Chem. Co. Solvay Process Co.
Hoskins, Wm. Taylor, J. Wm., & Co.
Overbrook Chem. Co. Troemner Henry
Penn Sm. & Ref. Wks. Victory Chemical Co.
Penna Salt Mfg. Co. Voland & Van Zelm.
Queen & Co.

Babbitt's Metal
Epping, Carpenter & Co.

Bankers and Brokers
Bandell, E. H. Pacific Mining Agency
Sieber & Sohne. & Frust Co.
Billings, Root & Co. Peabody & Koltf.
Grant, E. K. Pullman, J. W.
H. andy & Harman. Robertson, E. C.
Hyde, Geo. A. Saow & Ficus.
Hattes, E. C. & Co. Smith, C. H.
Trenhou, Paul C.

Belting
Groetzinger & Sons.
Harris & Putnam Mfg. Co.
Jeffery Mfg. Co.
New York Belting & Packing Co., Ltd.

Blasting Caps and Fuse
Lau, J. H., & Co.
M. Coeth, James, & Co.
Metallic Cap Mfg. Co.

Blowers
Foss Mfg. Co.
Stur & Co. B. F. Co

Boiler Compound
American Fluoride Co.

Boilers
Babcock & Wilcox Co. Star Boiler & Sheet
Belne Safety Boiler Co. Iron Works.
Orr & Sombower, Inc. Stillwell-Bierce &
Pollock, Wm. B. & Sons. Smith-Valle Co.
Scaife, Wm. B. & Sons. Strung Co.
(See Machinery.)

Brass Castings
Epping, Carpenter & Co.

Brick Machinery
Freese, S. M., & Co.

Bridges
Berlin Iron Bridge Co. Pittsburg Bridge Co.
Fenocoy B. & Const. Co. Scaife, W. B., & Sons.

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

Calculators
Smith, R. C.

Calipers
Smith, E. C.

Carbons
Bishop, Victor, & Co.

Car Wheels
Whitney, A. & Co.

Chain and Link Belting
(See Belting.)

Chemicals
Baker & Adamson. Penn. Salt Mfg. Co.
Bullock & Crenshaw. Roe-sier & Hasselacher
Henry Hill Chem. Co. Chemical Co.
Overbrook Chem. Co. Solvay Process Co.
Vanderbergh Lab'tory

Coal
Berwind-White Coal Maryland Coal Co.
Mfg. Co. Fotta, F. A., & Co.
Cassner & Curran. Stickney, Conyngham
Consolidation Coal Co. & Co.
Coxe Bros. & Co. Ward & Olyphant.
Haddock, Shonk & Co.

Coal Cutters
Ingersoll-Sergeant Drill Co.
Jeffery Mfg. Co. (See Machinery.)

Concentrators, Crushers, Pulverizers, Separators, Etc.
Illis, Ed. P. & Co. (See Machinery.)
American Mining & Milling Machinery Co.
American Ore Machinery Co.
Beckets Foundry & Machine Co.
Blake, Theo. A.
Colorado Iron Works.
Copeland & Bacon.
Fraser & Chalmers.
Frue Vanner Concentrator.
Gates Iron Works.
Hendrie & Boltnoff Mfg. Co.
Krom, S. E.
Mechanical Gold Extractor Co.
Pierce & Miller Engineering Co.
Seymour Concentrator Co.
Sturtevant Mill Co.
Walburn-Swenson Mfg. Co.
(See Machinery.)

Copper Dealers and Producers
Abbott, Wheelock & Co. James & Shakspeare.
American Metal Co. Lewisohn Bros.
Atlantic Mining Co. Orford Copper Co.
Balbach S. & Ref. Co. Osceola Con. Mfg. Co.
Baltimore Cop. Wks. Penn. Salt Co.
Boston & Mont. M Co. Quebeca R. R. L. &
Canadian Copper Co. C. Co.
Central Mining Co. Tamarack Mfg. Co.
Copper Queen Mfg. Co.
Detroit Copper Mfg. Co.

Contractors and Miners' Supplies
Bucyrus Steam Shovel and Dredge Co.
Pollock, Wm. B. & Sons.
Frost & Whitney Co. (See Machinery.)

Corrugated Iron
Berlin Iron Bridge Co. | Scaife, W. B. & Sons.

Dermagintine
Groetzinger & Sons.

Diamonds
Bishop, Victor, & Co.

Diamond Drills
American Diamond Rock Boring Co.
Bishop, Victor, & Co.
Bullock Mfg. Co., M. C.
Hassensahl, W.
Penn. Diamond Drill & Mfg. Co.
Stearns Bros.
Sullivan Machinery Co.
(See Air Compressors and Rock Drills.)

Drawing Materials
Heller, Chas. S.
Alteneder, Theo. & Son. | Queen & Co.

Dredges
Bucyrus Steam Shovel & Dredge Co.
Souther & Co.

Dump Cars
Hunt Co., C. W.
Thacher Car & Con. Co.

Educational Institutions
Mass. Inst. of Technology.
Michigan Mining school.
Pennsylvania Military College.
Woodside Seminary.

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

Elevators, Conveyors and Hoisting Machines
Brown Hoisting and Convey. Mach. Co.
California Wire Works.
Cooper, Hewitt & Co.
Davis, F. M., Iron Works.
Hunt, C. W., Co.
Jeffery Manufacturing Co.
Orr & Sombower, Inc.
Scaife, Wm. B. & Sons.
Union Wire Rope Tramway Co.
Vulcan Iron Wks.
(See Wire Rope Tramway and Machinery.)

Emery Wheels
New York Belting & Packing Co., Ltd.

Emery Mill Stones
Sturtevant Mill Co.

Employment Bureaus
Engineering Employment Bureau

Engineers, Chemists, Metallurgists
Adams, W. H. Kerr, Mark B.
Anthony, Wm. A. Keyes, W. B.
Amsw & Russell. Kirby, E. B.
Baker & Co. Lammer, T. L.
Blanch, John F. Languth, Werner.
Blauvelt, Harrington. Lavagnino, G.
Boggs, W. R., Jr. Leggett, Thomas H.
Boas, Clarence M. Loring, Frank C.
Bos, M. P. Mariner & Hoskins.
Brodie, Walter M. Maynard, George W.
Burlingame, E. E. Medermott & Luford.
Butters, Charles. Merwin & Richardson.
Carnahan, F. W. Moore, Gideon.
Cary, & Moore. Newberry, W. E.
Case, Wm. H. Nicholson, Frank
Casin, Franz. O'Brien, Frank
Chandler, W. H. Brock, Eben A.
Channing, J. Parke. Osgood, J. O.
Clark, C. H. Page, Wm. Byrd.
Clark, Ellis. Penrose & Barringer.
Clement, Victor M. Peters, Edward J.
Collins, J. I. & Sons. Poole, Robt., & Son Co.
Darling, L. B. Porter, J. A.
De la Bouglise, Geo. Potter, William B.
Dewey, Frederic F. Price, Thomas & Son.
Dickerman, Alton L. Randolph, John G. F.
Dickinson, H. P. Raymond, Rossier W.
Donald, J. T. Raymond, R. M.
Drysdale, Dr. W. A. Rickard, T. A.
Ed & Burwell. Sissons & Banks.
Emmons, Stephen H. Robinson, G. H.
Everette, Dr. W. S. Rothwell, John E.
Farish, Wm. A. Rothwell, Richard P.
Fearn, Percy L. Saunders, W. L.
Flak, W. W. Schmitz, E. J.
Fraser & Chalmers. Schwara, Theodore S.
Freohling, Dr. Henry. Snapeleigh, W.
Furlonge, W. H. Snow, Thomas.
Genth, F. A., Jr. Skowes, Edward.
Gooding, F. W. Smith, H. O.
Goudie, James H. Squire, Jos.
Hahn, O. H. Stein, Wm. M.
Halise, E. Stoiber, & G.
Hammond, John Hays Taylor & Branton.
Hampton, W. Huntley. Tates, A. W.
Hardman, John E. Trent, L. C.
Hastings, John B. vanderbergh Lab'tory
Hofman, Ottokar. Van Slooten, Wm.
Hollbaugh, J. R. Wassemaker, J. F.
Hooker & Lawrence. Wardrop, D. Lee.
Hunt & Robertson. Wills, J. Linton
Inne, F. W. Wilson, J. Howard.
Jennings, E. P. Wyatt & Saarbach.
Jones & Jones. Yates, H. N.
Kennedy, Julian. Young & Park.
Kent, William.

Engineers' Instruments
Alteneder, T. & Son. | Gurley, W. & L. E.
Brandt's Sons. Heller, Chas. S.
Bullock & Crenshaw. Queen & Co.
Everhardt, J. M.

Engines
Bucyrus Engine Co. Orr & Sombower, Inc.
Bullock, M. C., Mfg. Co. Union Iron Works.
Morris Co. Mach. & Stillwell-Bierce &
Iron Works. Smith-Valle Co.
(See Machinery.)

Excavators
Bucyrus Steam Shovel & Dredge Co.
Souther & Co.

Fire-Brick and Clay
Char. A. T.

Forges
Foss Mfg. Co.

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

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

Gauges, Recording, Etc.
Bristol Mfg. Co. | Zverhardt, J. M.

Grass, Graphite, Etc.
Dixon, Jos., Crucible Co.

Hose, Rubber
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 Inspect'n and Ins. Co.
Mutual Life Insurance Co.

Lamps, Miners'
Everhardt, J. M.

Locomotives
General Electric Co.
Hunt, C. W., Co.
Potter, H. K., & Co.
Thomson Houston International Co.

Lubricants
Dixon, Jos., Crucible Co.

Manganese Steel
Taylor Iron & Steel Co.

Mats, Rubber
New York Belting and Packing Co., Ltd.

Machinery.
Dealers in Mining, Milling, and Other Machinery
Allis, Edw. & Co. American Mining & Milling Machinery Co.
Hesselt & Co. Dry & Machine Co.
Buckeye Engine Co.
Bull, C. W., Mfg. Co.
Colorado Iron Works.
Copeland & Bacon.
Davis, F. M., Iron Works Co.
Exeter Machine Works Co.
Fraser & Chalmers.
Harris & Putnam Mfg. Co.
Hendrie & Boltnoff Mfg. Co.
Jeffery Mfg. Co.
Mechanical Gold Extractor Co.
Mechlenburg Iron Works.
Moore, Samuel L., & Son.
Morris County Mach. & I. Co.
Orr & Sombower, Incorp.
Penn Diamond Drill & Mfg. Co.
Pierce & Miller Engineering Co.
Pollock, Wm. B. & Sons.
Poole, Robt., Son & Co.
Scaife, W. B., & Sons.
Seymour Concentrator Co.
Sullivan Machinery Co.
Thomson-Houston International Co.
Trenton Iron Co.
Union Iron Works.
Vulcan Iron Works.
Walburn-Swenson Mfg. Co.

Metal Dealers
Abbott, Wheelock & Co. Johnson, Matthay & Co.
American Metal Co. Lewison's Bros.
Am. Zinc-Lead Co. Mathison Sm'ling Co.
Baker & Co. Orford Copper Co.
Baker & Co. Phelps, Dodge & Co.
Covies Elec. S. & Picher Lead Co.
Aluminum Co. Pullman, J. W.
Eureka Co. State Ore Sampling Co.
James & Shakspeare. Victor Chemical Co.

Metallurgical Works and Ore Pur-chasers' Processes
American Zinc Lead Co.
Baker & Co. Haddock Smelting & Refining Co.
Baltimore Copper Works.
Canadian Copper Co.
Covies Elec. Smelt. & Alumina Co.
Kansas City S. & Ref. Co.
Ludoux & Co.
Mechanical Gold Extractor Co.
Orford Copper Co.
Pennsylvania Salt Mfg. Co.
Ricketts & Banks.
Russell Process Co.
St. Louis Sampling & Testing Works.
State Ore Sampling Co.
Walburn-Swenson Mfg. Co.

Mining and Land Companies
Atlantic Mfg. Co. | Moite Gibson Con. Mfg.
Boston & Mont. Mfg. Co. & M. Co.
Central Mfg. Co. Osceola Con. Mfg. Co.
Copper Queen Mfg. Co. Quebrada R. R. L. &
Detroit Copper Mfg. Co. C. Co.
Eureka Co. Tamarack Mfg. Co.
Niagara Copper Co.

Nuts, Lock
Young Lock Nut Co.

Ore Cars
Star Boiler & Sheet Iron Works.

Ore Testing Works
Hunt & Robertson. | Ricketts & Banks.
Ledoux & Co. State Ore Sampling Co.
Snelson, W. H., Assaying & engineering Co.

Packing and Pipe Coverings
Brandt, Randolph. | New York Belting &
Jenkins Bros. Packing Co., Ltd.
Kenney, Robt. | Wyckoff & Son, A.

Patents
Atkins, J. L.

Perforated Metals
Harrington & King Perforating Co.
Mundt & Sons.

Periodicals
Arms and Explosives. | Financial Times.
El Minero Mexicano. Iron & Coal Trades
Electrical Plant & Review.
Electrical Industry. | Mining Journal.

Phosphates
Trenoum, Paul C.

Phosphor-Bronze
Phosphor-Bronze Smelting Co.

Picks, Miners'
Harris & Putnam Mfg. Co.

Pile Drivers
Bucyrus Steam Shovel and Dredge Co.

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

Platinum
Baker & Co.
Johnson Matthey & Co.

Powder
Atlas Powder Co. | Lafin & Rand Pow-
der Co.

Pumps
Blair, Geo. F., Mfg. Co. McGowan, John H. &
Cameron, A. S., Steam Co. Morris Co. Mach. &
Epping, Carpenter & Co. Pump Works.
Groetzinger, A., & Sons. Pumpsometer Steam
Jeanesville Iron Wks. Stillwell-Bierce &
Knowles Steam Pump Works. Worthington, Henry.

Publications
Allison Coupon Co. Iron & Coal Trades Rev
Arms & Explosives. Mining Journal.
Electrical Plant & Money of the U. S.
Electrical Industry. Open Court Pub. Co.
Financial Times. Stechert Gustave.

Pyrites
Adams W. H.

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

Quicksilver
Eureka Co.

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

Regulators, Damper, Heat, Etc.
Eddy Valve Co. | Mason Regulator Co.
Lunkenheimer Co.

Rock Drills. (See Air Compressor.)

Roofing
Berlin Iron Bridge Co. | Phelps, Dodge & Co.
Fenocoy Bridge and Pittsburg Bridge Co.
Const. Co. Scaife, Wm. B., & Sons.

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

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

Screen Plates
Harrington & King Perforating Co.

Separators
Harrison Safety Boiler Works.

Shoes and Dies
Bucyrus Steam Shovel & Dredge Co.
Crescent Steel Co. | Reliance Steel Co.
Southern & Co.

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

Smelting and Refining Works
Balbach S. & Ref. Co. Penn Lead Co.
Baltimore Cop'r Wks. Penna. Salt Mfg. Co.
Bos. & Colo. Smelt. Co. Penn Smelting and
Covies Smelt & Ref. Co. Refining Works.
Kansas City S. & Ref. Co. Phospor-Bronze
Mathison Smelting Co. Smelt Co.
Orford Copper Co.

Steel Rails, Castings, Rolls, Drill Steel
Abbott, Wheelock & Co. Moore, S. L., & Sons Co.
Bethlehem Iron Co. Reliance Steel Co.
Chester Steel Cast. Co. Roberts, A. & P., & Co.
Crescent Steel Works. Robinson & Orr.
Exeter Machine Wks. Whitney, A., & Sons.
(See Metal Dealers.)

Tanks
Pollock, Wm. B. & Co.
Scaife, Wm. B. & Sons.
Star Boiler & Sheet Iron Works.
Williams Mfg. Co.

Telegraph Wires and Cables
Okonite Co., The, Ltd.

Tools
Frost & Whitney Co.

Tubes
Pollock, Wm. B. & Co.
Williams Bros.

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

Turbines
James Lefell & Co. The.
Poole, Robt., & Son Co.
Stillwell-Bierce & Smith-Valle Co.

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

Ventilators
Bullock, M. C., Mfg. Co.

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

Washers
Milton Mfg. Co.

Well Drilling Machinery
American Diamond Rock Boring Co.
Penn Diamond Drill & Mfg. Co.
Sullivan Machinery Co.
Williams Bros.

Wire Cloth
Harrington & King Perforating Co.
Mundt & Sons.
Tyler W. S., Wire Works.

Wire Rope and Wire
Berlin Iron Bridge Co. | California Wire Works.
Cooper, Hewitt & Co. Colorado Iron Works.
Hunt, C. W., Co. Ropeways syndicate, Ltd.
Ironton Iron Co. Trenton Iron Co.
Washburn & Moen Mfg. Co.

Wire Rope Tramway
Brown Hoist. & Convey. Machine Co.
California Wire Works.
Colorado Iron Works.
Cooper, Hewitt & Co.
Hunt, C. W., Co.
Roebling, 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.

1300 WANTED—A COMPETENT CHEMIST for general analytical work, particularly analyses of clays, limestones and cements and mineral waters. Also an instructor in mathematics, preferably with some knowledge of mining or geology. Address STATE SCHOOL, ENGINEERING AND MINING JOURNAL.

1301 WANTED—FIRST-CLASS DRAUGHTSMAN (letterer): good salary paid. Send samples of work with application to DRAUGHTSMAN, ENGINEERING AND MINING JOURNAL.

1302 WANTED—A SKILLED ASSAYER of silver, lead and gold, one who has some knowledge of bookkeeping, for a silver mine in Montana. State qualifications and salary expected. MONTANA, ENGINEERING AND MINING JOURNAL.

1304 WANTED—A THOROUGH, PRACTICAL and energetic young man to take charge of the tap and die department. Must come well recommended. BLOWER, ENGINEERING AND MINING JOURNAL.

1305 WANTED—PATTERNMAKER familiar with locomotive cylinder work. TAUNTON, ENGINEERING AND MINING JOURNAL.

1307 WANTED—AN UNDERGROUND surveyor of experience and accuracy for a Central American gold and silver mine. Only competent men need apply. Address SAN JUANCITO, ENGINEERING AND MINING JOURNAL.

1308 WANTED—A STORE MANAGER TO take charge of a company store at a coal mine. None but those of experience in such work and with first-class recommendations need apply. Address STOREKEEPER, ENGINEERING AND MINING JOURNAL.

1309 WANTED—A YOUNG MAN AS ASSAYER and to assist in the lixiviation department (silver): one who is technically educated and who is willing to come for a small salary and board for the first year (about \$60 Mexican). Address MEXICAN, ENGINEERING AND MINING JOURNAL.

1310 WANTED AT ONCE—A FIRST-CLASS, experienced mechanical engineer and draughtsman, capable of designing high grade compound condensing engines, air compressors, heavy hoisting and mining machinery. Good salary and engagement for one year. None but experienced, sober men need apply. Address, giving qualifications, experience, age, references and salary expected, COLLIS, ENGINEERING AND MINING JOURNAL.

1311 WANTED—A FIRST CLASS PLACER miner, who has had experience in charge of placers, and who understands, practically, ditching, the setting up and operation of hydraulic works, piping, etc., and the construction and operation of sluice boxes. One speaking Spanish preferred. Address with references, "PLACERS," ENGINEERING AND MINING JOURNAL.

1312 WANTED.—MAN TO SUPPLY PLAN and take charge of erecting and starting a reverberatory furnace of about one ton capacity, for the reduction of solder and tin dross. Address, giving references, and stating experience, salary required, etc., REVERBERATORY, ENGINEERING AND MINING JOURNAL.

1313 WANTED.—TRAVELING SALESMAN—Manufacturers of a first-class line of hot air furnaces desire to engage an experienced man, well acquainted with and commanding an established trade, to represent them for the coming year; must be thoroughly capable in every respect; we are able to offer to the right party a steady position, good salary, and an excellent future. Address, with references and experience, FOUNDRY CO., ENGINEERING AND MINING JOURNAL.

1314 WANTED.—A SKILLED AND PRACTICAL superintendent for copper and silver smelter in Mexico. Must be well rooted in the treatment of ores. Address, giving qualifications, experience, references, and salary expected for term of years, SONORA, ENGINEERING AND MINING JOURNAL.

Situations Wanted.

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

MINING ENGINEER, NINE YEARS' EXPERIENCE in coal mining, building complete colliery plants, coke ovens, etc., desires position as superintendent, engineer or foreman. First-class references. Address MINER, ENGINEERING AND MINING JOURNAL.

TOOLMAKER AND MACHINIST, 13 YEARS' EXPERIENCE, latest improved machinery and tools, repairs gear and rack cutting, pinchers for boiler and electric work, desires position. Best references. Address STEADY, ENGINEERING AND MINING JOURNAL.

WANTED—POSITION AS ENGINEER BY a young man with three years' experience. Have had charge of a 160 horse power engine; can furnish good references. Address JOHN BARLOW, Ledger Side Ave., West Side Hill, Waterbury, Conn.

A SWEDISH CIVIL ENGINEER OF LARGE experience, especially in water-works, canals, drainage, sewerage and such, able to measure and calculate water power; also familiar with power transmissions, shop work and structure work, wishes a position. Age 44. Salary of second consideration. References. Address B. H. C., ENGINEERING AND MINING JOURNAL.

CHEMIST.—A YOUNG MAN FAMILIAR with the analysis or assay of all kinds of ores and minerals desires position. First class references. A. P. BJERREGAARD, 47 N. Willow St., Montclair, N. J.

CHEMIST AND MINE ENGINEER, THREE years with a Lake Superior iron company, wants situation as assayer, chemist or mine surveyor. Unmarried. Good recommendations. Will go anywhere. V. B. SHERRON, Decatur, Mich.

A FIRST CLASS TOPOGRAPHICAL draughtsman and expert letterer, with long experience, desires a position. Address TOPOGRAPHER, ENGINEERING AND MINING JOURNAL.

WHERE MY BUSINESS EXPERIENCE OF several years in steel and iron and railroad supplies can be utilized to mutual advantage. Address "MAN," ENGINEERING AND MINING JOURNAL.

GRADUATED CHEMIST WITH PRACTICAL experience wants position. General analytical work and assaying. Address M. S. R., ENGINEERING AND MINING JOURNAL.

RENSSELAER GRADUATE, THREE years' experience, desires a position. Has had experience in preliminary, location, construction and maintenance of way; also on masonry dams. Address M. E. F., ENGINEERING AND MINING JOURNAL.

MECHANICAL ENGINEER—AMERICAN, ten years' practical experience, university graduate, speaks French and German, expert in special machinery, slide-valve engines, steam and ammonia boilers, etc., estimating, contracting and testing of steam plants, is open for a permanent engagement with some reputable and thoroughly established concern. Address MODERN PRACTICE, ENGINEERING AND MINING JOURNAL.

AN ANALYTICAL CHEMIST, A YOUNG man who has had charge of a general analytical laboratory for the last four years, desires a change; present relations not satisfactory. An expert on phosphate work and thoroughly familiar with the manufacture of sulphuric acid from brimstone and pyrites. State location and salary. S. F. C., ENGINEERING AND MINING JOURNAL.

ASSAYER AND CHEMIST, GRADUATE, with experience in the assay and analysis of gold, silver and copper ores and mill products, would like a position. References former employers. Address ASSISTANT SUPERINTENDENT, ENGINEERING AND MINING JOURNAL.

WANTED—POSITION AS SUPERINTENDENT or foreman of a gravel or quartz mine. Twenty years' practical experience. Address MONTANA, ENGINEERING AND MINING JOURNAL.

WANTED—BY AN EXPERIENCED Mining Engineer, a position as Superintendent; is competent to open up, lay out and manage everything in connection with a first-class coal mine. Address L., ENGINEERING AND MINING JOURNAL.

A GENTLEMAN, LATE PARTNER IN ONE of the largest iron foundries in England, is desirous of corresponding with a firm of iron founders. He has a thorough practical experience in the manufacture of special light and annealed castings; is also a thorough business man and well connected. Address FOUNDRY, ENGINEERING AND MINING JOURNAL.

METALLURGIST DESIRES POSITION with smelting company. Have had several years' experience with refractory ores in the West. Good references. Address M. W., ENGINEERING AND MINING JOURNAL.

CHEMIST AND ASSAYER, AT PRESENT engaged in the West, desires position with milling or smelting company. Best references. Address G., ENGINEERING AND MINING JOURNAL.

AN ACTIVE AND ENERGETIC MINE Superintendent, graduated Mining Engineer, with an extensive practice in Europe and the United States, desires to change his present position. Specialties: Mining, Milling and Chlorination of Gold Ores. Will accept a position as Superintendent or Manager of a mining company with good standing. Highest references. Address ENERGETIC, ENGINEERING AND MINING JOURNAL.

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The undersigned has completed drawings and plans of the latest improvements in Barrel Chlorination, and is open to engagement for the testing of ores, the erection and operation of plants of any capacity. The most successful works in this country were managed by the undersigned.

Correspondence solicited.

JOHN E. ROTHWELL,
ENGINEERING AND MINING JOURNAL, New York.

FURNACE FIREBRICK LAYER—A YOUNG man wishes a position. Steady and experienced in building and repairing all kinds of furnaces; ten years' experience in having charge of plants. Will guarantee good working furnaces. Address FURNACE, ENGINEERING AND MINING JOURNAL.

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An Engineer, Chemist or Draughtsman,
NOTIFY

The Engineering Employment Bureau,
512 THE BASTABLE, SYRACUSE, N. Y.
PROMPT. HONEST. EXPERIENCED.
We will have men write you.

Contracts Open.

WATER-WORKS.—Sealed bids will be received by the City of Bolivar, Missouri, for constructing a complete system of water-works, until February 1st, 1894. Specifications may be obtained on application to the clerk of said city. R. M. DYSART, Mayor.

BRIDGE.—BUDAPEST, AUSTRO-HUNGARY.—A bridge of a total length of 312 meters and another of 332 meters will be executed on the Danube at Budapest. An international competition for plans and projects is opened for these two bridges. Without regarding to which bridge it refers, a prize of \$6,080 will be awarded to the best project, and a prize of \$4,050 to the second best project. If the best project solved the question of connecting the two banks at the Eskuter with one opening, so that it answers the stipulations contained in the conditions, this project will receive a special premium of \$2,030, besides the allotted first prize. The Hungarian minister of commerce reserves the right of buying any of the not rewarded projects for \$1,015. If one of the winners should be commissioned to execute the work upon the basis of his tender the prize allotted will not be paid. The projects provided with device and sealed letter containing the device are to be presented to the manager of the bureaux of the Hungarian royal ministry of commerce (Budapest, Lanchid, ulca) latest the 31 January, 1894, toward receipt. The terms to which the surroundings of the bridges and the plans and longitudinal section of every bridge are subjoined can be obtained at every consulate-general of Austria-Hungary.

MINISTRY OF PUBLIC WORKS, Cairo, Egypt.—The Egyptian Government puts up to adjudication the construction and working of a tramway line of narrow gauge from Menourah to Menzah and Matarieh, with its branch lines, on the conditions of the act of concession and the specification, copies of which will be forwarded to those who apply for them by letter addressed to the Minister of Public Works, Cairo, Egypt. Offers will be received at this Ministry up to February 1st, 1894. Persons tendering should indicate the width of the line, and all other dispositions relative to the type of permanent way and rolling stock, and the term for which they require the concession. This term may not exceed forty years. The Egyptian Government reserves to itself the right of selecting and accepting whichever offer it prefers, or of rejecting any offer, however advantageous it may appear to be.

CREMATORY.—Sealed bids will be received until January 25th, 1894, at the office of the City Secretary of the City of Dallas, Tex., for the building of a crematory of seventy-five (75) cubic yards capacity, guaranteed to thoroughly cremate night soil and all kinds of garbage. Plans and specifications to accompany the bids for building the same. The city reserves the right to reject any or all bids. Address G. W. CRUTCHER, City Secretary, Dallas, Tex.

WATER-WORKS.—Sealed proposals will be received by the city of Bolivar, Missouri, for constructing a complete system of water-works, until February 1st, 1894. Specifications may be obtained on application to the clerk of said city. R. M. DYSART, Mayor; C. H. SKENE, City Clerk; CHAS. F. SUTTEVANT, C. E., Consulting Engineer, St. Louis.

WATER-WORKS.—Sealed proposals will be received by the city of Pana, Ill., until February 12th, 1894, and opened at that time, for furnishing the materials and constructing a system of water-works for said city. There will be required about 754 tons of cast iron pipe, 13 tons of special castings, 75 fire hydrants, brick pumping station, two (2) pumps, having a combined capacity of one and one-half million gallons per day, steel stand-pipe 20 ft. x 100 ft., the necessary valves, valve boxes, etc. Bids will be received for furnishing materials above or for constructing the works complete. Proposals must be addressed to the Mayor, indorsed "Proposal" on outside of envelope, and must contain a certified check or its equivalent, made payable to the City Treasurer of Pana, Ill., in an amount equal to two (2) per cent. of the amount of the bid. Plans may be seen and specifications and blank form of proposal procured at the office of the Mayor, Pana, Ill., or at the office of the engineers, Voorhees & Wilmer, Rooms 65 and 66 Chapin block, Buffalo, N. Y. W. E. HAYWARD, Mayor. A. B. MCMLLEN, City Clerk.

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