

THE
ENGINEERING
AND 47672
MINING JOURNAL.

VOLUME LVII.

JANUARY TO JUNE, 1894.

SCIENTIFIC PUBLISHING COMPANY,
253 BROADWAY,
NEW YORK.



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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.

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1297 WANTED—AN EXPERIENCED mill man, with unquestionable references as to character and ability, willing to go to Mexico. Must have had at least five years' experience with refractory ores. Address with references and salary expected MILLMAN, ENGINEERING AND MINING JOURNAL.

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1299 WANTED—A MINING ENGINEER of practical experience for a gold and silver mine in Central America. Address CENTRAL AMERICA, ENGINEERING AND MINING JOURNAL.

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

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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.

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POSITION WANTED AS FOREMAN BY AN expert mechanic; well posted in all electric light apparatus, electrical instruments, dynamos, motors, etc. Has held same position; 15 years' experience; first-class references. Address F. S., 241 Franklin street, Philadelphia, Pa. No. 15,771, Jan. 6.

WANTED—A SITUATION AS FOREMAN of iron foundry. Best of references. Address ABILITY, ENGINEERING AND MINING JOURNAL. No. 15,745, Jan. 6.

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A FIRST CLASS TOPOGRAPHICAL draughtsman and expert letterer, with long experience, desires a position. Address TOPOGRAPHER, ENGINEERING AND MINING JOURNAL, No. 15,759, Jan. 20.

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. No. 15,760, Jan. 30.

CHEMIST AND ASSAYER WITH WIDE EX-perience in all kinds of chemical analysis desires position. Is a member of American Institute of Mining Engineers, and member of Chicago Academy of Sciences. References from last employer. Address COLUMBUS, ENGINEERING AND MINING JOURNAL. No. 15,724, Jan. 6.

PRACTICAL METALLURGIST, NOW IN Southwest, desires position. Seven years' experience in mining and smelting copper ores. Chemist. Address J. A., ENGINEERING AND MINING JOURNAL. No. 15,751, Jan. 6.

YOUNG MAN OF 24, GRADUATE IN MIN-ing, with three years' experience in railroad and general engineering work, at present county surveyor, desires position as assistant mining engineer. Address GEO. B. GILL, Searcy, Ark. No. 15,748, Jan. 13.

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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. No. 15,767, Jan. 27.

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. SHERROD, Decatur, Mich. No. 15,754, Jan. 20.

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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. H. M. DYSART, Mayor.

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PROPOSAL FOR LIGHTING THE STREETS and Parks of the City of Schenectady for three years, beginning October 1st, 1894, with Electric Arc Lamps of full 1,000 candle power and of full 1,200 candle power, and also of full 1,500 candle power, and furnish everything needed therefor, is requested by the Common Council of the City of Schenectady. A bond in the penalty of \$4,000, with approved sureties, that the bidder will enter into a contract with said city, in accordance with his bid, and for the faithful performance of said contract when made, must accompany each bid. The Common Council reserves the right to refuse to consider any bid not accompanied by such a bond, and to reject any or all bids made. All bids must be addressed as follows: "Lamp Committee of the Common Council of the City of Schenectady, N. Y. Bids for Lighting," and be in a sealed envelope. They will be received and opened by the Council at a meeting to be held January 9th, 1894, at 7:30 p. m. Communications not including bids may be addressed to the members of the Committee by name. PETER B. HARBISON, ALBERT SHEAR, WALTER HAMILTON, Committee on Lamps.

BRIDGE.—BUDAPEST, AUSTRO-HUN-gary.—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 \$6,050 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 Mansourah to Menzaleh 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 accepting 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.

SEWER CONSTRUCTION.—Sealed bids for building a storm water sewer on 12th, 13th, Dale and 17th streets will be received by the City Clerk of Sioux City, Ia., until January 16th, 1894. There will be about 1,200 ft. of 3-ft. 4-in., 300 ft. of 4-ft. 6-in. and 3,300 ft. of 6-ft. brick sewer, and about 500 ft. of 12, 15 and 18-in. pipe sewer, about 50 brick inlets and 15 manholes. Plans can be seen and specifications and bidding blanks can be obtained at the office of the City Engineer. Two bids are asked; one conditional upon payment on monthly estimates in cash and one on payments on monthly estimates in "sewer bonds" running two, three, four and five years, bearing interest at the rate of 6 per cent. KNUDE SUNDE, Chairman Sewer Committee.

MINERAL OIL—JEFFERSONVILLE, IND.—Sealed proposals in triplicate will be received here until the 17th day of January, 1894, for furnishing at the Q. M. Depot here 100,000 gallons mineral oil of 135 degrees flash test, in cases of two five-gallon cans each. Government reserves the right to reject any or all proposals, and to accept the whole quantity, or any portion of the mineral oil bid for. All information furnished on application here. Envelopes containing proposals should be marked "Proposals for Mineral Oil," and addressed to Colonel HENRY C. HODGES, Assistant Quartermaster General, U. S. Army, Depot Quartermaster.

DREDGING—U. S. ENGINEER OFFICE, Galveston, Tex.—Sealed proposals in triplicate for dredging in Trinity River, Tex., will be received at this office until January 20th, 1894, and then publicly opened. Specifications, blank forms and all available information will be furnished on application to this office. A. M. MILLER, Major Corps of Engineers.

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A dividend of five cents per share (\$50,000) has been declared, payable November 15th, 1893, to stockholders of record on November 8th. Transfer books close November 8th, and reopen November 16th, 1893. PERCY HAGERMAN, Sec'y-Treas.

RICO-ASPEN CONSOLIDATED MINING COMPANY.

DENVER, Colo., December 30th, 1893.

A dividend of two and one-half cents per share, twenty-five thousand dollars, has been declared, payable January 15th, 1894, to stockholders of record on January 10th, 1894. Transfer books close January 10th, 1894, and reopen January 16th, 1894. Transfers of stock to be made at the general office of the company, Denver, Colo., or at the offices of W. M. Tuttle, 22 William Street, New York, or Elliott, Johnson & Co., Philadelphia. A. B. ROEDER, Secretary.

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Entered at the Post-Office of New York, N. Y., as Second-Class Mail Matter.

Vol. LVII. JANUARY 6. No. 1.

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.

SUBSCRIPTIONS TO THE ENGINEERING AND MINING JOURNAL are PAYABLE IN ADVANCE. Price: For the United States, Mexico and Canada, \$5 per annum; \$2.50 for six months; all other countries in the Postal Union, \$7.

The address slip on the paper will show date of expiration of subscription. Subscribers wishing their address changed will please give the name of the old post-office as well as the new one.

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ADVERTISING RATES furnished on application. REMITTANCES should always be made by Bank Drafts, Post-Office Orders or Express Money Orders on New York, payable to THE SCIENTIFIC PUBLISHING CO.

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OFFICERS: R. P. ROTHWELL, Pres. & Gen'l Mang. | P. O. BOX 1833. | 27 Park Place, New York.
SOPHIA BRAEUNLICH, Sec'y & Treas.
Cable Address: "Rothwell, New York." Use A B C Code, Fourth Edition.

LONDON OFFICE:

20 Bucklersbury (Room 366), London, E. C., England.
Edward Walker, Manager.

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The distress among the iron miners of the Lake Superior regions is pressing, and the steps taken for its relief do not come too soon. A large number of men were thrown out of work at the beginning of the winter: their wages had not been large enough to leave any surplus, and even if they had the means to go elsewhere they were not likely to find work. The region is entirely dependent on the iron mines, and other industries exist there only to a very limited extent. The distress appears to be greatest in the towns and villages on the Gogebic range, where there has been a more complete shut-down of the mines than elsewhere. In Detroit and other Michigan cities a large sum has been raised to alleviate the immediate wants, and with the new season it is hoped that the opening of the mines will give permanent relief to many. But the Far West still offers a better field for miners than do the overstocked Eastern districts. Those who can do so will probably seek new homes in the Western mining States.

The collapse in the silver market, which so many claimed had enormously reduced the production of the white metal in this country, has apparently been far less injurious than was supposed by these nervous people. When, in September, we stated that the production of silver during the year had probably exceeded that in the corresponding months of 1892, many doubted it. Now that the reports are coming in, it is safe to say that there has not been any large falling off in silver production in 1893, and what reduction has taken place came in the last quarter of the year. In 1892 the United States produced 65,000,000 ounces of fine silver; in 1893 it is probable that the output exceeded 60,000,000 ounces, though it will not be possible to give the exact figures for a few weeks yet. When we have received the full returns we are now getting for THE MINERAL INDUSTRY volume, which is now in preparation, the figures will be published in the ENGINEERING AND MINING JOURNAL, as will also be the preliminary reports of the production of the other metals. The output of gold was much greater in 1893 than in 1892.

PIG IRON PRODUCTION IN 1893.

The pig iron market has generally, and with justice, been considered a fair indicator of the general condition of business. Iron is the most important material of construction, and enters in some form or other into every trade, and the pig iron output is at the base of the iron manufacture itself. It is of importance, therefore, to review at the earliest possible time the condition of the trade during the year just closed and to study as far as possible its prospects for the new year.

Taking the exact figures of the American Iron and Steel Association for 1892 and the first half of 1893—and it is worthy to note that our figures a year ago differed but a very few thousand tons from these—and estimating those for the last half of 1893 as closely as it is possible to do in a period of such fluctuating production as the half-year has been, we find that the pig iron output for the two years compares as follows, in gross tons:

	1892.	1893.	Decrease in 1893.
First half.....	4,769,683	4,562,918	206,765
Second half.....	4,887,317	2,633,440	1,753,877
Year.....	9,157,000	7,196,358	1,960,642

The decrease thus shown was 4.3 per cent. for the first half year; 39.9 per cent. for the second half, and 21.4 per cent. for the full year. For ten years the total production, as given in the MINERAL INDUSTRY (adding our estimate for 1893), has been:

	Tons.	Change.	Tons.	Change.
1884.....	4,097,869		1889.....	7,603,640
1885.....	4,044,524	D. 53,345	1890.....	9,202,702
1886.....	5,683,626	I. 1,639,102	1891.....	8,279,870
1887.....	6,417,156	I. 733,530	1892.....	9,157,000
1888.....	6,489,738	I. 72,582	1893.....	7,196,358

The great gains made in 1889 and 1890 were thus nearly neutralized last year, and the output fell over 400,000 tons below that of 1889, being the smallest recorded in any year since 1888.

So far as the figures have been received there is reason to believe that the production has pretty closely agreed with consumption. In panic times like those of last summer few producers will carry stock and prices have been so low that there has been no inducement for furnacemen to start up unless they had orders ahead. On June 30th the official statement showed stocks on hand of 549,141 tons, or only 43,025 tons more than on January 1st. We have not as yet the figures for stocks on January 1st, 1894, but we do not hear of any considerable accumulations of iron, and have no reason to believe that such exist or that the unsold stock is greater than it was a year ago; it is more likely to be less. The indications are that the increase of output in November and December was almost entirely in response to a gradually increasing demand for iron.

It will be seen from the table above that, while the tendency to diminish the output had set in before the close of June, the production for the first half of the year was but little below that of the first half of 1892, and was, in fact, four per cent. greater than that of the second half of the same year. From that time on, however, it fell off rapidly. The weekly capacity of the furnaces in blast, which had averaged about 175,500 tons for the first six months, fell to 158,000 tons (in round figures) in July; to 110,000 tons in August; to 84,300 tons in September, and to

76,000 tons in October, being then only 43.4 per cent. of the figure reported for June, which was very near the average. To put it in another form, the output in June was at the rate of 9,126,000 tons yearly; in July it was at the rate of 8,216,000; in August, 5,720,000; in September, 4,383,600, and in October at the rate of 3,952,000 tons per year only. The number of furnaces in blast, which was 253 at the beginning of the year, was 226 on July 1st, but decreased to 170 on August 1st, 128 on September 1st, and on October 1st to 115, the smallest number recorded for many years.

In October, however, the bottom was reached and production took an upward turn. The November report showed 119 furnaces in blast with a weekly capacity of 82,100 tons, and by December 1st this had again risen to 130 furnaces and 98,700 tons. Though still only 56.2 per cent. of the weekly output for the first half of the year, this was a decided gain, and while the full figures for January 1st are not yet at hand, there is no doubt that a further increase was made during December.

The demand for iron ores has, of course, varied with the production of iron, and such figures as are available at this early date show the change. In 1890 the Lake Superior region furnished about 50 per cent. of all the iron ore produced in the United States, and it is probable that this proportion has not greatly varied since that time. The figures for the shipments from the Lake Superior districts at the close of navigation showed total shipments by water for the season of 5,837,000 tons, which the all-rail shipments for the year will increase to about 6,150,000 tons. On this basis the total output of iron ores for the year would be about 12,300,000 tons, which shows a decrease very nearly corresponding to that in the pig iron output.

There is not space in a single article to review the course of prices as well as production; but our weekly reports have shown the downward course very plainly. We can only note here that one sale of Southern grey forge at \$6.55 per ton at furnace is the lowest price on record for pig iron in this country, while the quotation of Bessemer pig at \$10.80 per ton in Pittsburg marks an equally low point for that grade and place; and many others could be cited.

At the present time there is every reason to look forward to a gradual, though probably for some months a slow, improvement in both production and prices. Our industries are recovering from the panic, and the demand for iron will keep pace with that recovery. The general suspension of repairs and renewals on the railroads which has been forced by the hard times cannot continue very long, and the continued increase of the use of iron and steel in place of other materials in construction is a warrant for greater demand. Moreover, the improvements and economies in production which have been and are being made are putting us into position to compete for the markets of the world with manufacturers of iron, and there is every reason to expect in the near future an important export demand—not for pig iron directly, but for the finished products of which it forms the base—which will materially increase the demand upon our great resources.

A RUINED STATE.

From the outcry made by a few Colorado demagogues last summer, and which is still kept up by her extraordinary governor, many sympathetic persons have no doubt been led to picture to themselves the State of Colorado as in a condition of entire collapse; with her once prosperous people suffering and slowly starving among the ruins of their former industries; her towns and cities fast going to decay; her mines and smelters idle, and ruin and destruction everywhere. We and others who are familiar with the real facts, however, have never imagined such a somber picture, and now some figures are at hand which tend to prove the correctness of the view we have taken.

With characteristic enterprise the Denver "Republican" and the Denver "Times" have already published statements showing the mineral production of the State for 1893, and in these we find much encouragement for the future. For the precious metals the figures are based on the returns made by the smelters in Denver, Leadville, Aspen, Durango and elsewhere, and on the receipts from the stamp mills and placers at the Denver Mint; for copper and lead the smelters reports will certainly need some corrections for duplications in these returns which have been made, and also for ores bought and smelted in Colorado from other States, but undoubtedly these statements show the marvelous resources of the State and the irrepressible enterprise of the men who have made it.

The following table shows the gold and silver output of the State for the year, with that of the copper and lead produced by the smelters:

COLORADO METAL PRODUCTION.			
	1891.	1892.	1893.
Gold, ounces.....	217,652	228,234	315,305
Silver, ounces.....	23,102,355	26,542,135	26,806,327
Lead, tons.....	63,128	61,572	46,817
Copper, pounds.....	5,537,001	4,666,450	5,519,483
Total value.....	\$33,548,934	\$32,342,571	\$31,102,303

The production of gold and silver is shown in detail in the following table, the deposits at the Denver Mint, which were 69,256 oz. gold and 20,315 oz. silver, being given in dollars and cents:

Smelters:	Ounces Silver.	Ounces Gold.
Boston & Colorado.....	2,494,017	45,605
Omaha & Grant.....	7,591,425	82,405
Globe.....	3,766,045	24,004
Bi-Metallic, Leadville.....	1,093,791	1,150
Elgin, ".....	212,321	2,493
American, ".....	1,244,412	13,149
Harrison, ".....	636,087	2,096
Holden, ".....	708,750	7,850
San Juan, Durango.....	1,260,560	16,190
Standard, ".....	467,597	2,172
Holden, Aspen.....	224,819	78
Eastern smelter (confidential).....	38,838	369
National, Chicago.....	3,094	314
Zinc-Lead, Canon City.....	95,000	370
St. Louis Mint.....	34	424
San Francisco Mint.....	200	345
Other smelters, including Pueblo.....	8,312,174	50,078
Total ounces.....	28,149,114	249,092
Deduct duplications.....	1,363,112	3,143
Corrected totals.....	26,786,002	245,949
Total value.....	\$20,625,222	\$5,083,766
Denver mint receipts.....	15,640	1,431,522
Grand total.....	\$20,640,862	\$6,515,288

These figures do not indicate a collapse of the mining industry; on the contrary, they show the actual increase of 262,194 oz. in quantity of silver, and the large gain of 86,971 oz. in gold production which very nearly compensated in the total values for the decrease in the value of the white metal.

The gain in gold shows how much the attention of the miners has been turned in that direction; the discovery of new and the working of old placers, the increased activity of the older mines and the additions made from new ones—notably from Cripple Creek and the adjoining districts—have begun to make a prominent appearance in the returns, and there is every prospect of a continued increase. The decrease in lead was 14,755 tons, but there was a gain of 853,033 lbs. in copper. The precious metals, with copper and lead, moreover, are not the only mineral products of the State. Coal and iron form an important part of her resources, and the following statement by the Colorado Fuel and Iron Company, to which is added the State's output of coal, shows a wonderful increase in output, and this in the face of an enormous decline in the iron industry everywhere else in the country:

	Tons of 2,000 lbs.		Increase.
	1892.	1893.	
Coal.....	3,771,234	4,200,000	428,766
Iron ore, tons.....	51,243	84,487	33,244
Pig iron, ".....	34,979	48,143	13,164
Spiegel, ".....	1,139	2,808	1,669
Castings and pipe, tons.....	4,167	4,888	421
Merchant iron, ".....	5,438	6,642	1,204
Spikes, ".....	441	304	137
Steel rails, ".....	27,311	44,884	17,573
Steel angle bars, ".....		59	59

There is no doubt that the fall in the price of silver has considerably affected Colorado miners. It has diminished the profits of the larger mines and caused the closing of some of the smaller and less profitable ones, and caused a disorganization of the industry, which could only be overcome by time and good management, and which will certainly result in a permanent lowering of wages to more nearly the rates paid in other States.

The great State of Colorado has prospered probably as no other State in the Union, notwithstanding the stoppage of silver purchases by the government, and the decline in the price of the white metal. It seems probable that Colorado will admit, even sooner than we had expected, that the silver scare was not an unmitigated evil, but that by directing greater attention to its other resources it is bringing a greater and more enduring prosperity to the State. Colorado has fully demonstrated her marvelous resources and the vitality of her industries, though in making this very remarkable record she has flatly contradicted her "calamity howlers" in Congress and at home. At the same time she has justified the statements so frequently and justly made in the columns of the "Engineering and Mining Journal" that her resources and enterprise could not be paralyzed by the repeal of the Silver Purchase bill, nor her prosperity be seriously retarded by any decline in the value of the white metal. Well done, Colorado!

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.

Metallurgia del Plomo. Per D. Manuel Sanchez-y-Massia. Madrid, Spain Enrique Teodoro. Pages 376; with atlas of plates.

Helical Gears: A Practical Treatise. By a Foreman Pattern Maker. New York; Macmillan & Co. Pages 128; illustrated. Price, \$2.

The Iron Founder Supplement: An Exposition of the Art of Casting in Iron. By Simpson Bolland. New York, John Wiley & Sons. Pages 392; illustrated. Price, \$2.50.

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 Origin of Coal.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: Since Amadis de Gaul has hung up his armor as a target for such spears as may be cast, I will throw my weapon in the hope that he may be induced to come from his retreat and see how much damage has been wrought. I do not expect to hit anything, but will enjoy the sport as much as any one. Durre in his latest book "Die Neueren Cokes Ofen," in giving very briefly some of the opinions held as to the genesis of coal, says truly we have not yet enough data for reliable theories. Kleinschmidt has lately revived an older theory, that of Hirshing, as to the origin of coal, and curiously enough it bears a certain relation to the theory of the formation of some deposits of limonite, or brown iron ore. According to these observers coal may have arisen through the decomposition of carbonite of lime, a cubic mile of which would furnish \$4,000,000 tons of coal. Taking the weight of a cubic foot of limestone as 168 lbs., we have 11.9 cu. ft. in each ton of 2,000 lbs., and in order to get our \$4,000,000 tons of coal we would have to use 1,237,046,320 tons of limestone, setting free 148,445,558 tons of carbon, 593,782,233 tons of oxygen, and 494,818,529 tons of calcium.

We are not told what would be the density of the carbon thus set free, but in order to get the \$4,000,000 tons of coal it is obvious that some violent assumption must be made, no more violent, however, than would be the upheaval of the earth in the vicinity of the said cubic mile of limestone, when it was decomposed! No one doubts the existence of carbon in limestone, but it would require the vivid imagination of Jules Verne or Rider Haggard to picture the means whereby it was separated as carbonic acid and re-deposited as solid carbon.

But it is true that immense beds of limestone have been decomposed, and that the residual siliceous matter has been left as chert, or compressed into trap-like masses, while the ferruginous matter has assumed the form of brown ore. It has been supposed that the carbonic acid of the air and of atmospheric water removed the lime, but what became of the carbonic acid resulting from the decomposition of the limestone? Was it absorbed by vegetation, or was it by some unknown natural process deprived of its oxygen and deposited as carbon? Or was it enabled to lay hold of hydrogen, and become an oxidized hydrocarbon, such as coal?

Mr. Page's opinion that coal may have been transported from some other locality to its present home is in a measure fortified by Grisley's assertion ("Iron," XXX., p. 36) that the coal-forming plants did not necessarily grow where the coal seams are now found. It is a good sign when practical coal miners, such as Mr. Page, turn their attention to the theories of coal formation, and although he will find, it seems to me, greater difficulties in his own theory than in those he discards, I, for one, heartily applaud his efforts to elucidate a dark subject.

As to Amadis de Gaul—his theory of the fluidity of the coal-forming mass is too much for me. I grant that coal may be plastic, but I cannot accept the fluidity theory. If you treat peat with superheated steam in a partial vacuum, you get a substance by distillation that resembles paraffin. It may have, according to Durin, a composition $C_{17}H_{47}O_2$, or $C_{47}H_{94}O_2$. But the difference between this and coal is certainly very great. We must draw the line somewhere, and I draw it at fluid coal. I trust that Amadis has not been tempted by the general fluidity of the Christmas season to apply to coal the principles that govern the manufacture of egg-nog—hot but not too hot, fluid but not too fluid, of the proper strength and plenty of it.

FOISSART.

The Use of Plain English in the Discussion of Geological Questions.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: I have been reading with much interest in the "Journal" the criticisms offered by Professor Posepny and Dr. Raymond on the subject of my letter dealing with the use of plain English in matters pertaining to mining and geology. Yes, if the American Institute of Mining Engineers were an academy of sciences, then Professor Posepny would be warranted in complaining that I failed to sufficiently recognize the fact that "The Genesis of Ore Deposits" was addressed to the scientific world, and not intended for those whom he refers to as "miners or foremen." May I be permitted, however, to point out that the body to whom he presented his invaluable treatise is not purely scientific but contains a large percentage of those who are captains of the mining industry, men who are not necessarily classical scholars, men to whom his observations and deductions are of the greatest importance and assistance, the very men who can best apply them in a practical way to the elucidation of the problems which arise every day underground.

However beautiful the Greek language may seem to me as a student I confess that I do not recognize that beauty in the hideously anglicized combinations which are daily being introduced, and as one of a large army of mining men desirous of utilizing the work of geologists and physicists, I do regret very much that their views on subjects of vital interest to me and to my fellow workers cannot be expressed in the one language which we all know.

In the hurry and competition of modern life, the acquirement of a knowledge of the classic languages is very greatly omitted from the education of a professional man. Neither at the Columbia School of Mines, in New York, nor at the Royal School of Mines, in London, is the study of Greek or Latin required. The "Transactions" of the American Institute of Mining Engineers exercise a notable educational influence on the mining engineers of English speaking coun-

tries, and I fear that many to whom the transactions might be of much service have their desire to read them killed when confronted with a nomenclature and terminology which are repulsive in form and in sound, and which can be fully intelligible only to those who have a knowledge of the classics. It was the cause of these, many of them the brightest and most successful of our mining men, that I was pleading when I attacked the growing use of "long Greek and Latin words."

It would be impertinent for me to try to find English equivalents for "idiogenous," "xenogenous," etc., when so capable a translator as Dr. Raymond confesses his inability to do so. In mentioning "original," "secondary," "foreign," etc., as words which could be used I did not mean that they were synonyms; I merely desired to suggest that by a judicious use of them, and of other adjectives, the author's ideas might have been expressed without falling back on the Greek. In the matter of "muddy thinking" Dr. Raymond was a little bit unnecessarily caustic, but I quite appreciate that there was nothing but friendly intention behind the vigorous criticism. He will pardon me, however, if I state my intention of persisting in preferring to use familiar English words, and if the result be "muddy" I shall believe that it is a fault due to the writer, and which with care he may learn to conquer, but that it certainly cannot be charged to the "plain English" which may be employed as the vehicle of his ideas.

May I confess that I have a great faith in the resources of the English language? This faith is based, not on my own blundering use of so exquisite a vehicle of thought, but upon a familiarity with the writings of that master of clean Anglo-Saxon—John Ruskin. Scattered through his works, notably in "Deucalion" and in Vol. IV. of "Modern Painters," there are many chapters of geological discussion. You will find whole pages which describe with affectionate care the geological features of mountain crest and dark ravine, without the use of a single word of direct classic origin. The Anglo-Saxon tongue can be made a weapon trenchant as a Damascus blade if we would but sharpen it with use instead of allowing it to become blunted by the gathering rust of classical importations.

In the mean time, if my slight protest may prevent those who do not understand Greek and Latin from an unthinking use of high sounding words, and may induce those who are classical scholars to be chary of the employment of terms which might be unintelligible to their less lettered brethren, then I shall feel, as Dr. Raymond puts it, that I have been "barking in a good cause."

DENVER, Col. Dec. 15, 1893.

T. A. RICKARD.

THE ANNUAL MEETING OF THE GEOLOGICAL SOCIETY OF AMERICA.

Reported for the Engineering and Mining Journal by E. O. Hovey.

The list of papers presented at the sixth annual meeting of the Geological Society of America has already been published in this "Journal." The convention was held in the rooms of the Boston Society of Natural History, December 27th, 28th and 29th, and was the largest annual meeting which the society has held. About 75 Fellows, besides many visitors, attended the sessions, and the papers read were interesting and valuable. In all 59 papers were on the printed programme, of which 45 were read in whole or in part, the remainder, for various reasons, being given only by title. It would be out of the question to give anything like a full report of all that was said and done in the eight sessions of nearly three hours each, and a mere list of titles would have but little value now.

The address of welcome by Prof. W. H. Niles, president of the Boston Society of Natural History, was a brief resume of the career of that association, which is one of the very oldest in the country, and spoke of the change in the popular attitude toward geology, from the antagonism of 50 or 60 years ago to the general favor which the science now enjoys. Professor Niles dwelt at some length upon the value to geologists of occasionally meeting and discussing freely phenomena and theories. In his reply to this address the president of the visiting society, Sir J. William Dawson, of Montreal, said that the papers to be presented at this meeting covered the whole continent and all of geologic time. The quality of the work done by the youthful Geological Society of America compares very favorably with what has been done abroad by much older societies.

The reports of the secretary and the treasurer showed the excellent condition of the society. The last printed list contained the names of 233 living fellows. Since that was issued nine men have been received into the society, and eight have been dropped from the rolls. Fourteen applications for membership are under consideration by the council of administration. No fellows have been lost by death during the past year. Four complete volumes of the "Bulletin"—the official publication of the society—have been issued, containing 172 papers, which may be classified as follows: Biographic and historical, 11; physical and structural geology, 27; glacial geology, 21. Stratigraphic geology, 60, divided as follows: Archaean (pre-paleozoic), 8; paleozoic, 19; mesozoic, 11; tertiary, 10; pleistocene, 12. Paleontologic geology, 20, as below: Paleozoology, 15; paleobotany, 5. Lithologic and mineralogic geology, 18; physiographic geology, 4; cartographic geology, 2; archeologic geology, 1; economic geology, 8. This is a total number of 172 papers. The receipts of the treasury were \$3,859, and the disbursements \$3,226. The committee on photographs reported that 39 views of caverns had been received during the past year. There have been received in all 755 photographs, and they formed a very interesting exhibit in the library of the Boston society during the convention.

Sir J. W. Dawson's presidential address was a masterly effort, and was of especial interest as showing the attitude toward modern methods and theories maintained by a geologist of the older school who has kept abreast of the times. The subject of his address was "Some Recent Discussions in Geology," and treated particularly those

relating to mountain building and continent making. The principal theories promulgated to account for the uplifting of mountains and continents are known as the contraction theory, the expansion theory, and the isostatic or flotation theory. These are not really antagonistic, and forces acting in accord with all of them may have produced some phenomena. The laws of nature have been uniform from the beginning, but they have acted upon continents in different stages of development with varying distribution of land and water, and have, therefore, produced different results in successive eras. The culmination of slowly acting causes may be a catastrophe, and this is truly a part of the uniformity of nature. The slow crumbling of the face of a cliff is very gradual, but it leads to the sudden fall of vast masses of rock, exposing new surfaces to infinitely slow decay. The comparatively short time which is now supposed by the best authorities to have elapsed since the close of the great glacial epoch makes it evident that vast movements of the earth's crust have taken place in periods geologically recent. Among geologists the opinion is gaining ground that there has been a great diluvial catastrophe since the appearance of man on the earth. One argument in favor of this is that the continent of Europe has included Great Britain as an integral part of it within the human period. Throughout his address the distinguished impressed upon his audience the thought that geology is a science in which is especially true that the goals of to-day are but the starting points of the researches of to-morrow.

The most interesting of the theoretic papers was a very elaborate one by Prof. A. C. Lane, of Houghton, Mich., on "The Geological Activity of the Earth's Originally Absorbed Gases." The line of argument followed was: In its early stages the earth absorbed various gases which it has been and is now giving off in the process of cooling. These gases are an original and essential factor in every igneous magma and their presence is essential and characteristic in the crystalline development of plutonic and dike rocks: their sudden loss is necessary to the development of volcanic rocks. Whenever cracks extend far enough down into the earth these gases escape and carry with them the lava, and thus become the moving cause of volcanic eruptions. The earth, after getting below the various surface formations, increases in basicity and heat toward a core which is probably largely metallic iron. Thus the lavas furnished from a crack will be at first a mixture of the rock magma at different levels. Their chemical composition will vary according to the depth of the crack and other factors, but will be of medium basicity as regards the material which can be furnished from that crack. Any already individualized minerals of pronounced acid or basic character, e. g., quartz or olivine, are liable to corrosion. The absorbed gases being slowly given off from plutonic rocks produce in adjacent rocks the characteristic contact zone, while in volcanic rocks the gases escape from the vent and the contact zone is absent or different. In the crystallization of plutonic masses into pegmatitic dikes these gases are concentrated, so that there is a continuous series from pegmatites, to segregation veins and true fissures filled by ascent, and a justification for classing the pegmatites with either veins or igneous rocks. (It is understood that the gases pass into the state of hot mineralized water, whenever temperature and pressure permit.) The gradual specification of certain older rocks and the metamorphism of crystalline schists may in part be due to the slow percolation through the strata of the waters from these gases. An important feature of Professor Lane's paper was a table which condenses much information into a small space and well repays study.

Prof. H. S. Williams, of New Haven, Conn., spoke on the necessity of using a "Dual Nomenclature in Geologic Classification." The time scale and formation scale do not and cannot make use of exactly synonymous terms; the Devonian era was represented by a very different series of strata in the Genesee Valley, from those deposited in that era at Cayuga Lake, in Delaware County, along the Hudson or in Maine. From the rocks of some country must be formed a prime standard time scale, and each continent must have a standard corresponding to this as closely as may be. There may, however, be as many formation scales as there are localities examined.

The morning and afternoon sessions of Thursday were held in the university museum at Cambridge, and the day was largely devoted to petrographic papers and stratigraphic geology. In his address of welcome to the University Prof. N. S. Shaler said that the first step in scientific work in this country had been taken by Harvard when John Winthrop was appointed professor of natural philosophy in the college. Professor Winthrop may be said to have founded one of the branches of geology, seismology, here by his published observations on the great earthquake of 1755.

Dr. C. Willard Hayes, of Washington, D. C., described the geology of the Coosa Valley in Georgia and Alabama, which is a portion of the great iron region of those States, and showed by means of a map how two or more separate sets of faults intersect the region and affect the mines. These faults were due to two or more periods of epeirogenic activity in which the forces acted in different directions and which were probably separated by long periods of denudation.

Prof. George H. Williams, of Baltimore, has been making extended observations on the "Ancient Volcanic Rocks of Eastern North America" and collecting and correlating the literature of the subject and he gave a brief summary of the results of his work. The evidence thus far collected shows that in pre-tertiary times there were two roughly parallel belts of volcanoes in the eastern part of the continent. One belt has been observed in eastern Newfoundland, Cape Breton Island, along the Maine coast at Eastport, Vinalhaven and Machiasport, near Boston, and in Rhode Island; the other belt begins at Gaspe Bay and extends through the Eastern Provinces to northern Vermont, then from Harrisburg, Pa., 150 miles southward to Peach Mountain, Va., and appears again at Roan Mountain, Ga. A belt 12 miles wide extends across North Carolina near Raleigh, and stretches into South Carolina.

The "Sandstone Dikes in Granite," described by Mr. Whitman Cross, of Washington, occur in a region 10 miles long by one mile wide, beginning about five miles north of Pike's Peak, Colo., and have some of the characteristics of intrusive dikes of igneous rock. They are 50 or 60 in number and vary in width from less than 1 in. to many feet. Two are more than 600 ft. wide, and are a mile long. They are composed of nearly pure quartz sand with well rounded grains which has been consolidated into quartzite. The material is very homogeneous and no bedding appears. The dikes have been left standing above the surface by the more rapid decomposition and erosion of the granite. Mr. Cross offered no theory to account for the phenomena, but he thinks that the dikes must be connected in some way with the sedimentary beds not far away.

Some problems of economic geology were touched upon by Prof. W. O. Crosby, of Boston, in his paper on "A Classification of Economic Geological Deposits, Based Upon Origin and Original Structure." His scheme was condensed into the following table: A. Deposits of igneous origin; I. Subterranean in origin (plutonic); II. Superficial in origin (volcanic).

B. Deposits of aqueo-igneous origin. Pegmatites.

C. Deposits of aqueous origin (sedimentary and vein rocks); I. Subterranean in origin (vein rocks, etc.); 1. Veins of deposit in pre-existing cavities; 2. Impregnations; 3. Substitution deposits. II. Superficial in origin (sedimentaries); 1. Mechanical deposits; 2. Chemical deposits; 3. Organic deposits; 4. Residual deposits.

Many other valuable and interesting papers were read but the limits of this report do not permit the mention of more. All will be published in the "Bulletin" of the society and elsewhere during the present year. The officers elected for the ensuing year are, president, T. C. Chamberlin, Chicago; first vice-president, N. S. Shaler, Cambridge; second vice-president, G. H. Williams, Baltimore. The secretary, H. L. Fairchild, Rochester, N. Y.; treasurer, I. C. White, Morgantown, and the editor, J. Stanley Brown, Washington, were re-elected.

Pig Iron in Germany.—For last October the German output of all kinds of pig iron, including Bessemer and Thomas steel, amounted to 425,709 tons, as against 416,073 tons in October, 1892. The number of furnaces in blast was somewhat smaller, being 130 as against 137 in 1892. There was, however, an improvement upon September in this respect, when the number in blast was only 126.

Lake Freight Rates on Iron Ore.—The computation of average freight rates on the lakes the past season, as made by the "Marine Review," shows that the average wild rate on ore from the head of Lake Superior was 77c. a ton to Lake Erie ports, as against \$1.15 in 1892; from Marquette, 71c., against 98c.; from Escanaba, 56c. against 74c. Contract rates averaged \$1, \$1 and 85c. respectively, from the ports named, as compared with \$1.25, \$1.15 and \$1 respectively in the season of 1892. An important fact is to be noted, in connection with these rates, however, The wild rate is the average of daily charters through the season, and is secured by taking the sum of the established rates, day by day, and dividing the total by the number of days. The average freight paid on the tonnage actually moved is a different thing. The "Marine Review" finds, on collecting the data from shippers, that the average freight paid on ore, contract and wild, moved from the head of Lake Superior was 94-1c., or 17c. more than the average wild rate.

New Railroad Construction.—Statistics compiled by the "Railway Age" show that in the year just closed 2,629 miles of railroad were constructed in this country. This new mileage is less by about 2,000 miles than that of either of the two preceding years, and is much smaller than that of any year since 1878, when the total was only 2,679 miles. But in the four years from 1874 to 1877, inclusive, the additions were still less, going as low as to 1,111 in 1875. The lowest point reached since 1878 was in 1885, when only 3,131 miles were built, but in the following year the new mileage leaped to 8,128 miles, and in 1887 it reached the extraordinary total of about 13,000 miles. Notwithstanding the great falling off in activity in the last four or five years, the past ten years have seen an addition of 56,398 miles, or an average of about 5,640 miles a year, while in the 20 years since 1873 no less than 107,585 miles were built, the average increase being 5,379 miles per year. The present railroad mileage of the United States is 177,853 miles. It will require only an average increase of 3,164 miles for the next seven years to bring the total at the beginning of the year 1900 to 200,000 miles. The increase in 1893 was chiefly in short lines.

French Iron Ore Supply.—The total consumption of iron ores in France for a number of years past varied from 4,000,000 to 4,500,000 tons yearly, of which some 3,000,000 have been produced in the country, and about 1,500,000 tons have been imported. The French iron-ore trade has not much developed of late years. According to the statistics given in a paper read by Professor Jordan, of the "Ecole des Mines," before the British Iron and Steel Institute, the consumption in 1877 amounted to 2,750,000 tons, and in 1887 it was only 3,000,000 tons, so that there was little increase to speak of. This is chiefly due to the fact that the ores are generally found a long way from a coalfield. Thus, Creusot, which is the largest iron-making establishment in France, is on a very excellent coalfield, but is so remote from sources of ore supply that the greater part of the consumption is imported from Spain and Algeria, and has to submit to a railway transport of something over 200 miles. On the other hand, there are very extensive supplies of iron ore in the neighborhood of Nancy, but they again are a long way from suitable coal supplies, and hence the French iron trade in that particular locality has to import large quantities of coke from Germany and Belgium.

A LARGE HYDRAULIC TESTING MACHINE.

The testing machine illustrated herewith is the property of the Phoenix Iron Company, Pheoenixville, Pa. It was designed and built for the purpose of pulling full size eye-bars, making tension and compression tests of bridge members, columns, etc.—in short, for testing all sorts of material. To give an adequate conception of the capacity of the machine a description of its component parts is necessary. The double-acting cylinder is of cast steel 7 ft. 10 in. long, 64 1/2 in. diameter and weighs 10 tons. The cylinder heads weigh four tons each, and are secured by 80 studs, 2 1/2 in. diameter. The piston is of cast steel and has a stroke of 6 ft. 6 in.; it is fitted with brass glands, insuring absolute tightness. Four steel piston rods 8 1/2 in. diameter fitted with brass glands for packing, and bolted to piston, pass through the front cylinder-head to the crosshead. The crosshead of cast steel weighs four tons; it works on two steel guides 6 in. diameter, fitted with phosphor-bronze bushings, and kept in true line with the cylinder. The slot in which bars are pinned in testing is 4 1/2 in. wide, capable of receiving a head 15 in. radius from the center of the pin hole. The pin holes are 10 in. diameter and can be reduced to any desired size by bushings. On the inside of the crosshead, on the nearer cylinder head, are two discs, 18 in. diameter, between which small compression tests are made. Pieces 6 ft. long, 18 in. diameter, round or square, can be compressed by the machine as used in tension.

The rear crosshead is a counterpart of the front one, and is connected with an anchor tail-block weighing eight tons, both mounted on cast steel wheels 12 in. diameter, running on a track the length of the machine. The connection consists of four steel rods 8 1/2 in. diameter, threaded at both ends. At the tail-block end is an arrangement

mercury gauge registering up to the full capacity of the machine, which is 2,160,000 lbs. Allowing for a stretch of 17% in parallel sections an eye-bar 50 ft. long can be broken in testing.

THE CHLORINATION OF GOLD ORES.

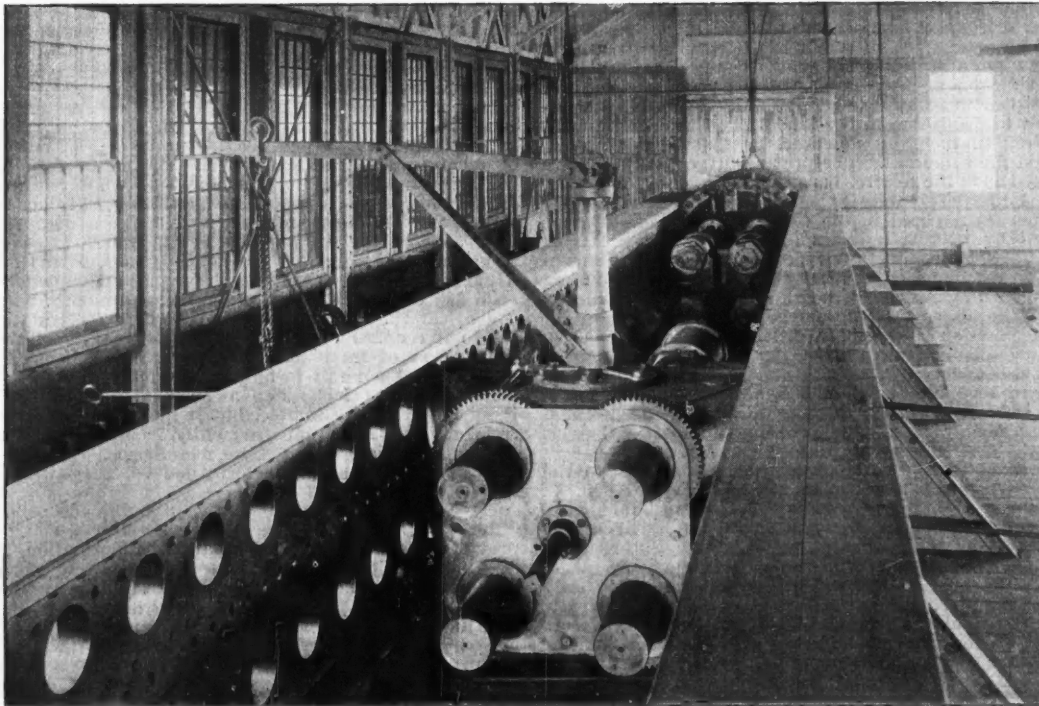
Written for the Engineering and Mining Journal by L. D. Godshall Ph.D.

The great depression in the price of silver and the consequent closing down of many of the silver mines has caused the attention of mining men and metallurgists to be directed to gold and the economic reduction of its ores.

The process commanding at the present time the most serious attention is that of barrel chlorination, which, though by no means new, has of late received many important improvements and modifications, that, fortunately, are free from patent rights or royalties.

This process may be applied to the treatment of gold ores either direct without previous amalgamation or concentration; or, second, may be applied to the treatment of concentrates; or, third, to the treatment of both concentrates and tailings obtained in ordinary amalgamation and concentration, the tailings so obtained to be chlorinated in the raw state.

1st. Chlorination applied directly to the ore is adapted to ores that carry little or no coarse gold and which either require roasting, and consequently dry crushing, or to ores which are easily chloridized in the raw state. In order to arrive at a decision as to the method to be adopted we must consider the amount of gold that can be obtained by plain amalgamation, the weight and richness of the concentrates obtainable, cost of labor and fuel, etc. If the ore chlorinates easily



HYDRAULIC TESTING MACHINE OF THE PHENIX IRON COMPANY.

of gears by which the distance separating the crosshead and tail-block can be lengthened or shortened. Between the rods, centrally placed, is a steel rod 6 in. diameter, fastened in the crosshead and passing through a friction box in the tail-block bored to receive it. The fit is tight and when rupture of a test-bar takes place, the crosshead recoils gently. The tail-block has four pin-holes 9 9-16 in. diameter (two on a side) receiving the anchor pins passed through the girders. These pins are of hard steel weighing 300 lbs. each. The tail-block is also fitted on top with a two-jib hand crane of 1,000 lbs. capacity for handling the pins, permitting the removal of pins on both sides of the machine at the same time.

The I-shaped girders are of steel 78 ft. long 52 in. high and weigh 60 tons; they are built up to 4 1/8 in. thickness of web. The top and bottom flanges are 6 x 6 in. angles, with cover plates 18 in. wide. The girders are held together by 7/8-in. rivets, spaced 3 in. apart, and are strengthened by 14 strong plates and angle brackets. The anchor pin-holes, 9 9-16 in. diameter, are bored with 18-in. centers lengthwise and 24 in. crosswise of the girder. Holes 2 in. diameter crosswise between the large holes serve for the introduction of a bar to the tap in and out, the pin holding the test piece. The girders and brackets rest upon and are securely riveted to seven cross-girders built up of steel 15 ft. long, 15 in. high, and 7 1/2 in. across flanges. The cylinder is secured to the principal girders by means of 80 bolts 2 in. diameter and the whole machine, weighing 100 tons, rests on a stone foundation to which it is held down by anchor-bolts in cast iron anchor-plates. The combined crosshead and tail-block is moved on the track by a two-ton hand windlass with two speeds placed a few feet back from the machine, by means of chains and chain sheaves.

A double-acting hydraulic pump working at a pressure of 850 lbs. per square inch supplies the pressure exerted and recorded on a

in the raw state it should be crushed wet, thus avoiding the expense of drying and dry crushing.

The most prominent instance of chlorination applied directly to the ore is in the Black Hills of South Dakota, where modern chlorination has achieved a well merited success. Instances of ores yielding readily to chlorination while in the raw state are rare, but are found in the surface ores of Cripple Creek, Colo.

2d. The chlorination of concentrates is applicable to ores carrying all or part of the gold associated with minerals capable of being concentrated; when free gold occurs in such ores, amalgamation either precedes or follows concentration. The most notable instances of this kind are found in the Carolinas, at the Treadwell mine in Alaska, and in some parts of California.

3d. The treatment of ores which contain coarse gold which is amalgamable, or very fine and free gold which cannot be amalgamated or concentrated, yet is easily chloridized in the raw state, or gold associated with iron pyrites or other mineral easily concentrated, has never, it is believed, been in practical operation, though ores of this character are found in large quantities in the Cripple Creek district.

The advantages of such a combination process are that from 40 to 70% of the gold can be extracted by amalgamation, a rich concentrate is obtained, representing from 2 to 5% of the original bulk of the ore, and containing pyrites of iron and other sulphides and tellurides, if present, requiring a thorough roasting before being chlorinated, and tailings containing gold easily chloridized raw. In this manner the coarse gold can be saved, expensive dry crushing, and still more expensive roasting be avoided on 90 to 95% of the ore, as well as saving us by volatilization and dust, in roasting.

To make the tests necessary to determine the applicability of chlorination, it is desirable that a method at once rapid, simple and accurate to an ore be used. The one used by the writer for many

years is believed to be as near perfection as possible; it is based on chlorination under pressure, and is as follows: Put in an ordinary quart beer bottle having an air-tight rubber stopper and clamp attached, from 100 to 500 grams of ore to be chloridized, add enough water to saturate and cover the ore about half an inch; then add, if fresh and of full strength, 7 grams of bleaching powder; if not of full strength, take 9 grams, add 10 c. c. of strong sulphuric or hydrochloric acid, put in stopper, fix clamp and shake thoroughly. In the laboratory it is preferable to use hydrochloric acid, as sulphuric would form sulphate of calcium, which might remain in the tailings in an insoluble state, and thus produce a slightly incorrect assay value. Strong and perfect bottles should be used in making the tests, otherwise explosions may occur. A towel or cloth wrapped around the bottle before the acid is added, will avoid all danger from this cause. The bottle should be shaken frequently for from three to five hours. It is well to let it stand over night under pressure of the chlorine. If many tests are to be made, time can be saved by securing the bottles to the inside of a suitable wheel, which is revolved slowly. Under such constant agitation the chlorination will frequently be complete in from one to three hours, depending on the character of the gold in the ore. The finer the gold the quicker it is dissolved by the chlorine water. With some ores agitation is not necessary, while with others it is, on account of the ore settling in a very compact and impervious state. When silver is present it is apt to form an insoluble coating of chloride on the gold, which is removed by agitation, and the gold is then more quickly acted upon. The testing of an ore by bromine is even more simple than by chlorine. All that is necessary in this case is a saturated solution of bromine water. After leaving the ore in contact with chlorine or bromine a sufficient length of time, it is washed,—most conveniently in a No. 6 beaker, decanting the clear supernatant liquid four or five times, or until no more chloride or bromide of gold can be detected; the residue is then dried and assayed.

The questions to be determined in the laboratory for the treatment of an ore in the raw state are the amount of chemicals required, the time of exposure to chlorine necessary, and the fineness to which the ore must be crushed to obtain the best results.

It is very difficult to determine in the laboratory the exact amount of chemicals required in the mill; however, by making a series of comparative tests on the same sample before and after roasting, some idea may be obtained as to the relative consumption of chlorine or bromine in the raw and roasted samples.

The degree of fineness required in the crushing should be very accurately determined by making a series of experiments on 20, 40, 60, 80 and 100-mesh samples of the same ore. If the ore should prove not adapted to raw chlorination, but be partly free milling and contain a small percentage of gold bearing minerals, capable of being concentrated, the above tests should be carefully made on the tailings after amalgamation and concentration. Such tailings from some ores would undoubtedly show a high extraction by raw chlorination on a very coarse product, producing at the same time a largely increased capacity in the mill and reducing the cost of milling proportionately. The time of exposure to chlorine or bromine required by the ore would probably merely indicate the number of barrels necessary to treat the desired amount of ore per day.

Treatment of Roasted Ore.—The laboratory work previous to the treatment of an ore requiring roasting should be very thorough. A good plan is to make a preliminary test as follows: A sample, carefully taken, is passed through an 80-mesh screen and assayed; 150 grams of the ore are then roasted in the muffle in two 4-in. roasting dishes, each containing 75 grams of ore, using the same temperature and time for each. The temperature should be the same as in ordinary oxidizing roasting, starting with a dark red heat and gradually increasing to a light red at the end of the operation. From one to two hours is sufficient for most ores if properly stirred. After the roasting is completed the ore is allowed to cool, is weighed, and the loss in weight noted. The sample is now again assayed to determine the loss of gold, if any, by volatilization. The sample is then chlorinated as usual and the tailings assayed.

This test, if properly carried out, should give a fair idea as to the applicability of chlorination to the ore when subjected to an oxidizing roasting. If the extraction in the above experiment has been reasonably good, further tests should now be made with regard to the fineness of the ore required to insure the most successful treatment. The experiment should now be repeated on 20, 40, 60, 80 and 100-mesh samples of the same ore. This is very important, as results will probably show the extraction on the different sizes to be entirely dependent on the physical characteristics of the ore. If very dense and close grained, even if the gold is comparatively free, or if associated with pyrites, and these occur in almost microscopical crystals, then fine crushing is almost always necessary; but if the ore is naturally very porous, or capable of being made so in the roasting, then crushing to a 16-mesh to the linear inch may give as high an extraction as crushing to 80-mesh.

After determining the most suitable mesh of screen to use, the next step will be to find the most suitable temperature in roasting. Some ores carrying a large percentage of sulphur, like concentrates, must be subjected to the usual slow, gradually increasing oxidizing roasting. Ores carrying less sulphur, or such as are partially oxidized, can be roasted in a very much shorter time, but require a higher temperature throughout.

Some ores entirely free from sulphur require a slight roasting. This is due to the fact that the gold is associated with the hydrated oxides of iron. This roasting is more properly called a calcination, as the heat used is just sufficient to expel the combined water.

The proper temperature in roasting may be determined by taking different samples of the same ore, the proper fineness having been previously determined. Three experiments will suffice to give a good idea as to the amount of heat to use. The first experiment should be conducted at a low heat from the start, gradually increasing to a light red at the end; the second started at a moderate heat, gradually increasing to a light red at the end; the third started at a light

red heat and kept so throughout. The time required for the three roastings should be the same—about two hours, to make sure that the first sample is thoroughly roasted. After roasting, each of the samples should be weighed, and the loss in weight noted, then assays made to determine the loss in gold, if any, by volatilization. The samples are then chlorinated and tailings assayed. If no loss of gold has occurred by increasing the temperature at the start and the extraction was equally good, then there is just one more point to be determined, the time required for the roasting. Five samples are taken and roasted, respectively, for one-quarter, one-half, one, one and one-half and two hours. The roasted samples are then again assayed for loss of gold by volatilization, chlorinated, tailings assayed and results compared.

The results obtained have now shown the proper fineness required in crushing, and the best method of roasting (if oxidizing roasting has been successful).

There is one more factor to be determined, the least amount of chemicals required. It is a very difficult matter to decide accurately on so small a scale as a laboratory experiment, since the actual condition of the working scale is not easily obtained with small quantities of ore. Indeed, in actual working, the consumption of chemicals seems to depend to a considerable extent on the size of the charge of ore, the larger the charge the smaller being the consumption of chemicals per ton of ore. This may be accounted for by the fact that an excess of chlorine or bromine is always necessary, and this excess will treat three or four tons just as well as one.

Treatment of Ores Subjected to a Chloridizing Roasting.—Some ores, when given a perfect oxidizing roasting cannot be successfully chlorinated, because they require too large an amount of chemicals to produce an excess of chlorine or bromine. This is due to the presence of certain oxides and sulphates of base metals in the ore, such as zinc, copper, calcium, magnesium, and others, absorbing the chlorine as fast as it is produced. When such is the case, the difficulty may be overcome by the addition of a certain percentage of salt in the roasting. The manner in which the salt is added depends upon the nature of the gold and other metals in the ore; but, as a rule, it is best to add it near the end of the roasting.

In a chloridizing, as in an oxidizing roasting, the same questions should be determined with regard to fineness of crushing, temperature of roasting and time of exposure of ore in furnace, together with the amount of salt, and when and at what temperature to add it. In addition to the foregoing experiments it is always advisable, although not absolutely necessary, to make a quantitative analysis of each ore treated. In practical work, where large quantities of ore from the same mine are constantly being treated and the ore is of a uniform nature, a part of the average sample may be laid away each day until, at the end of a week or a month, when these samples can be carefully mixed and an analysis of the resulting sample made, where a number of different ores are continually being treated, a comparison of these analyses, with chemicals used and results obtained, could not fail to be of great interest.

The foregoing looks like a formidable mass of work to be expended on any one sample, but it must be remembered that the ore from any one mine, and frequently from one district, acts in a very similar way with any definite metallurgical process, and when such problems are once satisfactorily solved, they will cause very little trouble thereafter.

The practical operations in the mill may be conducted in several different ways, but in this paper reference is made only to the improved system of barrel chlorination. Chlorination, as applied to the treatment of concentrates, has been so ably perfected by Thies, Butters and others, and as fully described by them, as to leave little or nothing to be said concerning this part of the process.

In the case of ores not suitable for concentration where chlorination must be applied directly to the ore either in the raw or roasted state, the obstacles are more difficult to overcome. Such ores are of common occurrence in many parts of this and other countries, but their successful treatment by chlorination has been rare. The most notable, and probably the only instance in this country where such success has been attained, is in the Black Hills, in South Dakota, where the Golden Reward Company has demonstrated that the process is a practical one. Several other companies in the same district have tried to imitate the Golden Reward people, but with very dubious results, showing that the problem of chlorinating gold ores successfully is not as simple as would appear to some. The method in vogue in the Black Hills has been so well described by Messrs. John E. Rothwell, Langguth and others as to require only a very brief synopsis in this paper of the more important features of the process.

The ore, after passing through the crushers and dryer, is further reduced by means of rolls, to pass through a 10 and sometimes an 8-mesh screen, great care being taken to obtain a product as nearly uniform as possible. A screen analysis of the ore as crushed in the Golden Reward mill gave the following results: Coarser than 10-mesh, 32.7%; 20-mesh, 29.6%; 40-mesh, 23.2%; 60-mesh, 7.0%; 80-mesh, 2.3%; 100-mesh, 3.2%; finer than 100-mesh, 4.0%; total, 100%.

This may have been an exceptionally coarse sample, although not supposed to be so, 8-mesh screens being used at the time the sample was taken; moreover, the fine ore is regarded as a nuisance, and the production of it is avoided as much as possible. The ore, after being crushed, is roasted in Bruckner and Howell-White furnaces, although the latter was not very popular in the Black Hills at the time the writer was there. After it is roasted the ore is charged into lead-lined barrels, having a capacity of from four to five tons of ore, where a sufficient quantity of bleaching powder, acid and water is added. The barrels are then revolved for about an hour and a half, at the end of which time the gold is supposed to be chloridized and dissolved. The barrel is then stopped and the gold solution removed from the ore by means of pressure, and a filter arranged inside of the barrel, the outlet of which is connected with a pipe leading to the precipitating tanks, or, in some cases, to the slime-settling vats, where, after standing a sufficient length of time, the clear gold-bearing solution is decanted into the precipitating tanks.

The gold-bearing solution containing a large amount of free chlorine is then treated with SO₂, until all the free chlorine is destroyed; when this point has been reached, the H₂S is turned on and the gold precipitated. The precipitated gold sulphide is collected in Johnson filter presses, dried, roasted, and the gold melted into bars. Such, in brief, is the process followed at present by the most successful chlorination mill in this country, where ore is chloridized without previous concentration. Five prominent features may be mentioned in the process, as described. They are: Crushing, roasting, chloridizing, leaching and precipitating. The chlorination and precipitation are simple and practical; in fact, too much credit cannot be given to Messrs. Rothwell and Langguth for perfecting this most excellent method. The crushing, roasting and leaching, however, have given, and are constantly giving, a great deal of annoyance and trouble. If the ore is crushed uniformly coarse the leaching is simple but the roasting difficult, and the extraction generally poor. If fine crushing is attempted, the capacity of the crushing machinery is very much diminished, and the leaching gives no end of trouble, while the loss in dust is heavy unless a sufficient dust chamber has been provided. The writer has been informed that it is impossible to leach very fine ore by the system employed in the Golden Reward mill. In 1888, while assistant to Mr. T. K. Rose, now of the Royal Mint, of London, he experimented with the ores of the Black Hills district, and found it a comparatively easy matter to roast and chlorinate them when crushed sufficiently fine, to 30-mesh. In January, 1893, the writer was again called upon by the Black Hills Milling and Smelting Company to demonstrate, if possible, the cause of their inability to chlorinate the ore. Rolls were used to crush the ore, and screens of 10 meshes to the linear inch. The roasting was accomplished by means of Bruckner and Howell-White furnaces, two of each kind being in operation.

The Howell-White's, however, were deemed unfit for the purpose intended, even after one had been built in front of the other, and the ore allowed to pass through both. Inasmuch as the construction of the mill did not allow fine crushing, many vain attempts were made to obtain satisfactory results with coarse ore, but without success. In the meantime a series of experiments were conducted in the laboratory with a view of overcoming the difficulty. The results of a few of these experiments are given below. A screen analysis of the ore gave the following results: Coarser than 20-mesh, 56.6%; 40-mesh, 20.4%; 60-mesh, 6.2%; 80-mesh, 2.4%; 100-mesh, 3.8%; finer than 100-mesh, 10.6%.

The sulphur and arsenic in the particles coarser than 20 mesh were very difficult to oxidize, making it necessary at times to prolong the roasting operation to 15 hours in the Bruckner cylinders to oxidize from 2 to 3% of sulphur and arsenic, and even then some of the coarsest particles, when broken apart, would show but a partial oxidation in the center.

Experiment Made to Determine the Effect of Fine Crushing.—Actual mill tailings from nine barrel charges of ore were taken, representing about 35 tons of ore. These tailings were screened and separated into their respective sizes, the different sizes then assayed, with the following results, showing the value from average samples in each case:

	Gold per ton.	Value.	Extraction.
Roasted ore before chlorinating	0.77 oz.	\$15.40	
Mill tailings from above.....	0.25 "	5.00	67.0 per cent.
" " coarser than 12 mesh.....	0.53 "	10.60	31.2 "
" " between 12 and 20 mesh.....	0.22 "	5.00	63.6 "
" " 20 " 40 ".....	0.22 "	4.40	71.4 "
" " 40 " 80 ".....	0.20 "	4.00	73.9 "
" " finer than 80 mesh.....	0.14 "	2.80	81.9 "

In experiments made to determine the effect of fine crushing the laboratory results obtained from ore roasted in Howell-White are an average sample, being taken of the ore roasted during 24 hours. The sample was then separated by screens into different sizes, and these products treated separately in the assay office with a strong solution of bromine water. The screen analysis of the sample gave the following results: Coarser than 12-mesh, 33.8%; 20-mesh, 55.2%; 40-mesh, 8.0%; 80-mesh, 1.5%; finer than 80-mesh, 1.5%. The results obtained were, with average samples:

	Gold per ton.	Value per ton.	Extr. p. c.
Roasted ore.....	0.77 oz.	\$15.40	
Office tailings, average of whole.....	0.28 "	5.60	63.6
" " product coarser than 12 mesh.....	0.38 "	7.60	50.6
" " between 12 and 20 mesh.....	0.22 "	4.40	71.4
" " 20 " 40 ".....	0.22 "	4.40	70.2
" " 40 " 80 ".....	0.14 "	2.80	81.9
" " finer than 80 mesh.....	0.01 "	0.80	94.8

Besides these given, a great many experiments were made in the assay office, all of which confirmed the above and pointed so conclusively to fine crushing as an absolute necessity. It was decided to experiment on this line on a larger scale, and some 40 tons of fine ore were obtained, part of which had been passed through a hand screen of 30 meshes to the linear inch, while the rest was almost raw fine dust. The screen analysis of this fine material was as follows: Fine raw ore, coarser than 40-mesh, 8.0%; 60-mesh, 10.4%; 80-mesh, 5.0%; 100-mesh, 18.6%; finer than 100-mesh, 63.0%; Flue dust, coarser than 60-mesh, 2.5%; 80-mesh, 8.8%; 100-mesh, 23.7%; finer than 100-mesh, 65.0%. This material was roasted in the Bruckner cylinders in nearly one-half the time required for the coarse ore. Not the slightest difficulty was experienced in leaching, while the roasting had not changed the physical character of the ore in the slightest degree. The operation of leaching was not conducted here as it is in the Golden Reward mill, the Rapid City works using a separate pressure leaching vat, into which the barrel discharges the chloridized ore. This is a better arrangement than a filter constructed inside of a chlorination barrel, if, as the writer has been informed, it is impossible to leach free ore in such a barrel. The pressure required to leach this material varied from 25 to 35 lbs. per square inch. The time required varied from 25 to 35 minutes, the leaching was perfectly uniform, as shown by samples taken from the face of differ-

ent sections of the charges. The tailings obtained from the different charges representing the fine ore were as follows: \$1.20; \$2.70; \$2; \$1.80; \$1.70; \$1.40; \$2.20; \$2.80; \$2.80.

(To be Continued.)

REVIEW OF THE CHICAGO MARKETS IN 1893.

Reported for the Engineering and Mining Journal by Our Special Chicago Correspondent.

THE IRON AND STEEL TRADES.

The year 1893 will be remembered as one of the worst years in the history of the iron and steel industries in the West. The two more prominent features in the trade were the almost uniform and steady decrease in prices of crude and manufactured material from which there has been little or no recovery; the other is the number of prominent concerns in the West which succumbed to the financial stringency. During the earlier months of the year there was a fair volume of business done in crude and finished iron, but since April there has been a marked falling off each month. So many firms were compelled by the general liquidation going on to watch their lines of credit so closely that practically a cash basis was established in place of the two, three and four months' time which had been so common. The Columbian Exposition was a drawing card to manufacturers, but the results so far have been disappointing. The outcome up to the present is not as had been expected. Substitution of steel for iron has made remarkable progress in all lines of industries in which they are component parts. In July the stagnation in the iron ore market caused some late boats to tie up and forced others into grain and coal carrying. The months of July, August and September were exceptionally dull, in some lines the dullness on record. Nearly all the mills in this vicinity were shut down for months, some of which have only resumed in part. Toward the close of the year conservation prevailed among all manufacturing consumers of iron and steel. In November came the break in steel rails, the price dropping from the Association figures of \$29 to \$24. It was expected that the reduction would stimulate business from railroads, but little response was noted up to the end of the year. The fall in the price of rails had a depressing effect on steel billets, and soft steels generally.

In pig iron the chief characteristic of the market has been the decline in prices of local as well as Southern. Another feature has been the substitution of certain grades of coke iron for Lake Superior charcoal iron in the manufacture of carwheels, malleables, etc. To such an extent has this been carried that there are now only a few furnaces making the latter grade. The enforced economies and conservative management which have prevailed at all the coke furnaces in this district have in a measure placed them in a safe position. There is not a blast furnace in operation, nor will there be until early in 1894, and then conditionally on the price of fuel and ore. Most of the larger implement makers have taken much less raw material than last year. The general foundry trade was fair for the early part of the year, and there was little revival until the last quarter, and then only in a moderate degree. The fall in price has been from \$1.50 to \$2 per ton on all grades. In December Southern furnaces endeavored to force prices 25c. to 50c. a ton, but the effort was unsuccessful. Production has been much restricted, but is still in excess of consumption.

As to structural iron and steel, only about one-third of the new enterprises which had been projected in the fall of 1892 were carried forward to completion. Structural material, excepting that required for the World's Fair, has been in light demand, particularly bridge and viaduct work. In the latter public opinion being in favor of elevated railroads has acted as a deterrent. Since January values have receded \$5 to \$6 per ton.

In Steel Billets and Rods, the demand throughout the year has been exceedingly light, and especially so since June 1st, and prices on both have dropped \$5 to \$6 a ton. January quotations for billets were \$24.50; December, \$19.25; rods, \$32.50 to \$26.50.

In Plates, during the early part of the year demand was moderately fair in a small way, the only heavy business being from the Pacific Coast, some large orders being placed from time to time for irrigation and hydraulic purposes, some of these contracts for steel plates being made at extremely low prices.

Under Merchant Steel heading come soft steels and special shapes for the agricultural implement makers, the trade in which has been rather disappointing, as while it has been in excess of 1890, and about the same as 1891, it is greatly behind the tonnage of 1892. Prices have declined \$4 to \$6 a ton.

For Bar Iron car orders early in the year took a considerable tonnage, but when the stringency in the money market came in May, business began to decline and after the annual shutdown of mills in July, few order books were sufficiently filled to resume until September, and some not until October. From first to last there has been no strength to the market, which in January was \$1.60; in December \$1.25 base was quoted by local mills.

In Black and Galvanized Sheets, as there has been steady growth of the iron roofing and building cornice industries the demand has been almost uniformly steady, and prices have held up remarkably well, showing only a slight drop throughout the twelve months.

One feature of the Nail trade is noteworthy; the larger centers and distributing points sell more steel cut than wire nails to local consumers, while the smaller towns in the interior use a greater proportion of the wire nails. During the first half year the demand was well sustained, but the latter part shows a material falling off. Wire nails show a decline of 35c. and steel cut about the same.

For Steel Rails the demand up to April was fair in small lots of 500 to 1,000 tons, and at the end of that month and early in May a number of contracts for larger quantities were closed. After the stringency began to be felt a large tonnage had to be refused by

the Illinois Steel Company here as financial arrangements were not satisfactory. The Union Works, part of the plants of the Illinois Steel Company, have been closed throughout the year, and but few rails were made at the Joliet Works. During the latter part of the year no orders to exceed 1,500 to 2,000 tons were given out. In September the South Chicago Works closed down and have not resumed, so that at the close of the year there was not a standard section of steel rails being rolled west of the Alleghenies, and such orders as could be filled were supplied from stock. In November occurred the break in steel rails, which dropped from \$30 to \$25.

In old material and scrap prices have steadily retrograded during the year. Old iron rails in January were selling at \$18.50; in December sales were reported at \$12. Steel rails were \$12@14, and are now \$7 to \$10. Old wheels have receded from \$14.50 to \$12.50. Early in the year there was some demand for selected steel rails for relaying—quite a good tonnage changing hands. Through the year the demand has been light for old iron rails, though more active from January to May than it has been since. Toward the close of the year some speculative buying occurred in carwheels, as the price was low and offerings large. Scrap metal—iron and steel—has been inactive, and toward the close prices were nominal. The decrease was \$2 to \$5 a ton according to grade.

ANTHRACITE COAL.

In anthracite coal the year opened well with a good volume of small orders from the territory west from here to the Missouri and Mississippi rivers, and with ample supply on docks and in yards. It was seen early in the year that stocks here would be well cleaned up before the opening of navigation, and the late cold weather caused a clearance of everything. In many cases the docks were bare, and not in years was the market in such good shape to receive vessel coal. Rumors of a break in the combination had a weakening effect in February. The heavy surplus of that month caused much inconvenience through inability to get supplies forwarded to the country. Bituminous coal was so short that many steam plants in the city were obliged to use anthracite, and several large office buildings were unable to raise sufficient steam to run the heating plants and the elevators. March maintained its old prestige as a good coal selling month in the several branches, wholesale, jobbing and retail, and stocks steadily decreased notwithstanding large receipts all rail coal. About April stocks were estimated at 260,000 tons, or barely enough to last, with a fair supply of all-rail, until opening of navigation. The Straits of Mackinac were opened April 15th and coal commenced coming forward by lake. The opening price in May was fixed at \$5.35, jobbers, commissions were curtailed, and much dissatisfaction manifested at the illiberality of the monthly settlements which were put into force. The feeling of a possibility of an advance in June somewhat stimulated buyers. May was unusually cold and trade active for small lots. Scarcity of cars at mines enabled shippers to move a good tonnage of dock coal. Pea coal was scarce and in good demand at \$3.25 delivered to consumer. The advance of 25c. in June was severely criticised, as it checked the buying movement. Still a good deal of coal changed hands at May circular with settlement to be made in October. The strained condition of finances affected sales and toward the latter part of June they fell off considerably. County and municipal contracts placed in this month showed that the regular circular was being cut. Another advance of 25c. July 1st only served to make matters worse. For a short time the stringent orders from producers East had its effect, but prices soon drifted back to the old figures. The separation of the Lehigh and Reading interests in August caused a further weakening in prices, which, coupled with the increasing depression added greatly to the dullness in the market. Careful estimates disclosed the fact that up to the end of August the tonnage sold was fully 50% less than for the corresponding month in 1892. Throughout September and October country dealers continued their conservative buying, and a waiting policy was pursued by most of them because of the scarcity of money, and others expected a break and further demoralization. Natural gas has proved a formidable competitor of anthracite. Some of the largest city consumers, hotels and big apartment houses, had their heating plants arranged for burning this fuel. The gas company made such favorable terms that consumers were only too glad to make the trial, and thus an immense tonnage was lost, the natural increase failing to fill the gap. At the close of navigation the docks and yards became glutted with coal, and many loaded vessels were tied up at the various docks. During December circular was nominally \$6.10, but sales were made at \$5.35, and less was asked on 1,000-ton lots. Consumers in town and country were alike hard pressed for cash. The loss of tonnage was heavy, and many shippers begin to think they will have large amounts to carry over until next season.

BITUMINOUS COAL.

Bituminous coal of all descriptions during the first five months of 1893 was in a strong, healthy position, and in January, February and March demand was active, operators and large shippers being at times unable to fill orders promptly. Coal-carrying roads were taxed to their full capacity. In February the severe weather rendered it difficult for shippers to supply fuel to regular customers, and all new business was accepted only contingent on ability to fill. Prices during the rush were held at high figures; instances were numerous where 10c. to 15c. and even 25c. per ton premium was paid for the "spot" article in 10 to 25 car lots. Indiana block sold freely at \$2.75 to \$3 per ton, and the cheaper grades in proportion. Toward the end of March the supply of bituminous coal was over-abundant. Strike talk among the miners in Ohio, Indiana and Illinois somewhat stimulated buyers early in April. In that month all of the Indiana block coal mines were consolidated into one company or combination, which acted as a clearing house for the whole, each individual operator marketing his product, but selling at the price fixed by the officers

of the combine. The big strike in the Hocking Valley in Ohio, in May caused little embarrassment in the market, as supplies were ample, shippers taking liberal quantities before the miners went out. Discontent among the mining community was general in May, and while strikes in one district or another were of daily occurrence the supply of coal was unaffected until toward the middle of the month. The opening of many new mines in the bituminous coalfields of Indiana began to affect the tonnage of the block coal men and prices weakened. The closing of the steel mills at Joliet threw a large quantity of the cheaper grades of coal on this market, causing a drop in prices. Other plants and factories shut down, and coal was offered at cost of mining plus the freight in order to keep the mines going at least a part of the time. At Lake Superior ports, dock companies obtained better prices for soft coal than last year and even the railroads were obliged to pay more for their fuel. A circular in July from the various railroads centering here insisting on payment of coal before removal caused a heavy curtailment in shipments of Ohio, Indiana and Illinois coal for this market. Operators exercised unusual caution in credits, so that while demand had fallen off and prices were demoralized there were few failures to quote, but the miners suffered for want of work, especially during August, September and October, as with one or two exceptions no railroad did any of the usual stocking. The regular consumer-coal trade among country dealers was marked by conservatism. The withdrawal of many passenger trains at the close of the Columbian Exposition was also a factor in decreasing the tonnage, which was not offset by any increase in freight traffic after the close of navigation. The year closed with a congested market for all kinds of bituminous coal, and prices are completely demoralized.

Coke early in the year was in fair demand with a good tonnage moving at steady prices, but since June the decline in inquiry and value has been steady. The market at the close of the year was weak at lower prices.

THE PITTSBURG MARKETS IN 1893.

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

IRON AND STEEL.

The year 1893 will long be remembered by the iron and steel interests and all connected therewith. Prices on all grades of these products reached during the year the lowest mark ever recorded. In January, 1889, Bessemer pig sold at \$24.50; the present price is \$10.90 @ \$11, a decline of \$13.50 per ton. The same year gray forge sold at \$19, and steel billets at \$37.50 per ton. The year's sales in 1893 reached 1,639,226 tons, a very liberal amount considering the great depression in trade generally, and the iron and steel business in particular, being only 431,997 tons below the previous year. The sales of iron ore amount to 4,011,000 tons, being 1,742,000 tons below the previous year. One very noticeable feature of the year is the strides soft steel made in taking the place of iron. Steel at present is cheaper than iron. Take, for instance, skelp iron, wide-grooved, which is sold \$1.30 per 100 lbs., skelp steel, wide-grooved, is \$1.15, the difference making a good profit. A recapitulation of the tonnage sales of raw iron and steel for the past five years show some remarkable changes on every article on the list, both raw and finished.

In December, 1891, No. 1 wrought scrap iron sold at \$24; to-day raw steel billets can be purchased for \$6 per ton less. In regard to the future, iron and steel prices are certain to advance, and it is out of the question for prices to remain as they are or to decline:

SALES OF IRON AND STEEL FOR FIVE YEARS, IN TONS.					
	1889.	1890.	1891.	1892.	1893.
First six months.....	552,948	741,357	966,657	967,339	1,112,381
Second six months.....	1,369,088	865,415	1,201,837	1,103,884	526,845
Total.....	1,922,036	1,606,772	2,168,494	2,071,223	1,639,226

We give below notes as to the range of prices: Muck bar in January, 1892, sold at \$25.75@26 per ton; continued about that range for several months, in fact was firmer than other descriptions. The market closed December, 30th, at \$24.50@24.65 per ton; January, 1893, the market opened at \$23, the first week; prices then declined \$1 per ton. Prices of neutral bar were better maintained than for almost any other kind of material. The market closed on December 29th at \$20.60@20.75; the year's decline being \$3.65@3.75.

Blooms, Billets and Slabs.—Sales during the year were large, with a wide range of prices. In 1892, January opened at \$25@26 per ton; these figures were only maintained for a short time. In February a syndicate was formed to maintain prices at \$25 per ton, but they soon fell to \$23@24. Sales were made at various prices, according to circumstances, the closing figures being \$22@22.50. In 1893 prices reached the lowest point ever known in the history of the steel trade. January opened at \$21.75@22.25. In March prices touched \$23.50. In April, May and June, \$21.75@22.25 were the ruling prices. September and October showed a further decline, with sales as low as \$17.50. November touched \$17, and December beat all records, with sales at \$16.70. The year's decline was \$5.40 per ton.

In Bessemer Pig, the first week in January, 1892, prices ranged from \$15.75 to \$16; closed the last week in December, same year, at \$13.70; the year's decline being \$2.30 per ton. The market opened in January, 1893, at \$13.65@13.75; it closed December 29, at \$10.82@11; the decline for the year, \$2.75@2.85 per ton. The present prices are the lowest on record.

Grey Forge iron showed a steady decline in values during the year; opening in January at \$12.25@12.50, it closed the last week in December at \$10, a decline of \$2.25@2.50 per ton. This means a decline of \$3.75 per ton in the past two years.

COAL OUTPUT.

Navigation on the Ohio during 1893 was very uncertain. Between strikes and low water the year's shipments were the smallest in

12 years. There were no shipments by river from June until November. The 1,240,000 tons loaded in the harbor and pools had to be cared for at considerable expense. The largest shipment on record was in 1888, 4,394,080 tons; this year's only reached 2,497,800 tons. The lower markets are fairly supplied with coal, and prices are down to a very low figure. The shipments for the past 12 years were as follows:

	Cincinnati. Tons of 2,000 lbs.	Louisville. Tons of 2,000 lbs.	Total. Tons of 2,000 lbs.
1882	1,378,480	1,467,160	2,845,640
1883	1,261,320	2,258,480	3,519,800
1884	965,240	1,232,040	2,217,280
1885	1,303,600	1,693,360	2,996,960
1886	1,329,160	1,537,400	2,866,560
1887	830,800	1,438,920	2,269,720
1888	2,053,560	2,340,520	4,394,080
1889	1,214,400	1,515,800	2,730,200
1890	1,704,640	2,042,160	3,546,800
1891	1,115,000	1,931,000	3,055,000
1892	973,560	1,549,960	2,523,520
1893	879,950	1,617,840	2,497,800

These figures show the inroads made in recent years into the river trade of Pittsburg by the West Virginia and other fields.

THE ENGELBACH & BRETHERTON SMELTING FURNACE.

The accompanying illustrations show a furnace for reducing and smelting sulphide ores designed by Messrs. S. E. Bretherton and A. L. Engelbach, of Leadville, Colo., and patented by them. The invention is embodied in the construction and arrangement of a furnace, whereby they are enabled to carry out a method, whose principal features consist in forcing air through a series of retorts, which are heated by the radiating heat of the matte and slag discharged from the blast furnace, then injecting a hydrocarbon gas into the air thus heated, in order to produce an oxidizing flame, and then forcing such flame into the blast furnace to reduce the ore therein. The apparatus is provided with blast furnace, comprising the crucible, the water-jackets arranged above the crucible, and the shaft connected with the upper end of the water-jackets. Into the latter open at all sides a series of tuyeres, connected with channels arranged within the wall of the blast furnace crucible, one end of said channels being connected by a pipe with a combustion chamber, into which passes hot air generated by a series of retorts; and into the said combustion chamber also extends a nozzle, through which a mixture of oil and steam is introduced, to mix with the hot air and to be burned in the said combustion chamber, to heat the retorts, as previously described. The oil is introduced to the nozzle by means of a pipe

in the oven lead a series of spouts, located one above the other, so as to draw off the separated matte, slag and other substances, according to their specific gravity.

The operation is as follows: When the blast furnace is charged in the usual manner, then the heated air from the connected retorts passes into the combustion chamber, to mix therein with the hydrocarbon mixture issuing through the nozzle, thus producing a gas which readily ignites in the combustion chamber and forms an oxidizing flame, which passes through a pipe leading from the combustion chamber to the channels in the blast furnace, and from the latter to the tuyeres into the charge of the blast furnace, so that the heat or oxidizing flame serves to fuse the sulphide ore without the aid of carbonaceous fuel. The molten product, consisting of matte and slag, gathers on the crucible of the blast furnace and passes from the latter through the spout into the crucible in the oven, to radiate heat in the chamber. The matte and slag separate on the crucible, and are drawn off at the proper time, through the corresponding spouts.

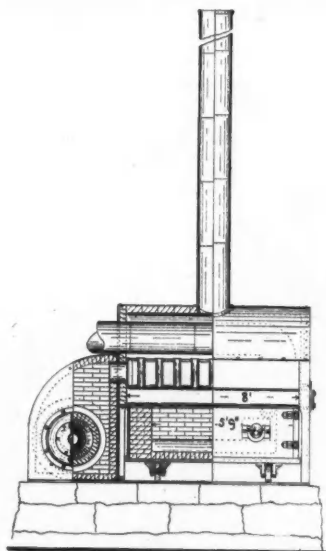


FIG. 1.

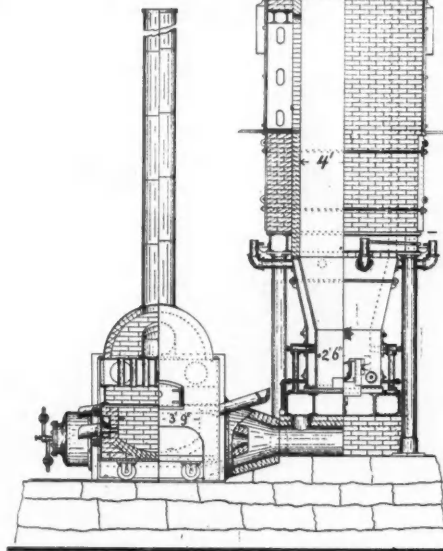


FIG. 2.

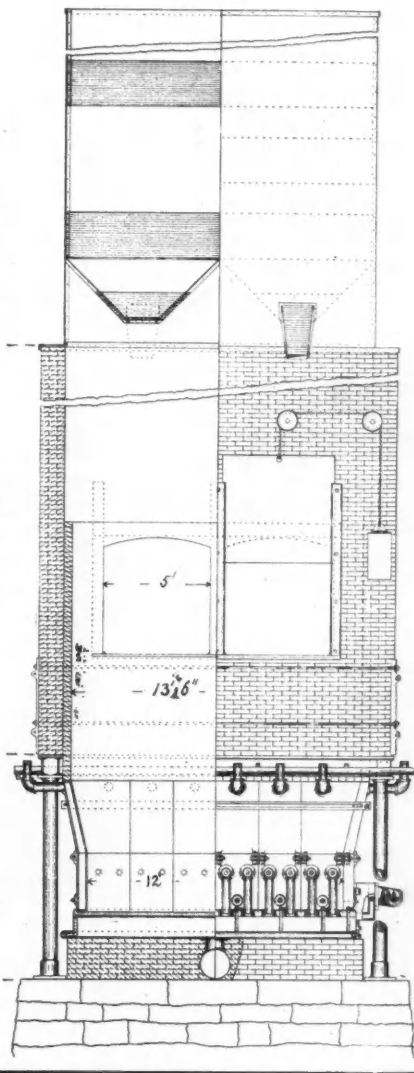


FIG. 3.

ENGELBACH & BRETHERTON'S FURNACE FOR SULPHIDE ORES.

connected with a suitable source of steam supply, and thus introduced into the combustion chamber, and a hydrocarbon mixture finally issues through the nozzle in the combustion chamber. The retorts for heating the air used in the combustion chamber are arranged within an oven, provided with a movable crucible, and having its heating chamber connected at its rear end with a chimney for drawing off the smoke and gases, after the same have passed over and under the series of connected retorts, of which the first one is provided with a nozzle for connecting the same with a suitable source of air supply, such as a blower, to force air through the series of connected retorts. On the end of the chamber opposite the chimney is arranged a furnace, in which a fire may be kept burning for generating heat to heat the retorts, in case a sufficient quantity of heat is not obtained from the matte and slag, passing onto the movable crucible and radiating its heat into the chamber to heat the retorts. The movable crucible is connected by a spout with the crucible of the blast furnace, so that the molten matte and slag in the blast furnace can pass through the spout into the crucible of the heating oven in which the heat, radiating from the said matte and slag, is utilized to heat the air passing through the series of connected retorts. From the movable crucible

It is understood that if other substances, such as speiss, for instance, are contained in the molten product, the same separate from the bullion, matte and slag, and are discharged through a corresponding spout from the crucible. If the heat radiating from the molten product in the crucible in the oven is not sufficient to heat the air passing through the retort, to say 1,000° to 1,200° F., then the furnace is fired, so as to supply the deficiency. By locating the channels, which are made of cast or wrought iron, fire clay or any other suitable fireproof material, in the wall of the blast furnace, no heat is lost by radiation, and at the same time but a short connection is necessary between the said channels and the interior of the blast furnace by said tuyeres. The heated gas in the channels has a tendency to keep the crucible at a high temperature, so that chilling of the molten mass on the crucible is prevented.

In the illustrations, Fig. 1 shows the heating furnace and crucible; Fig. 2 a part section, and part end view of the apparatus, and Fig. 3 a half section and half side elevation of the blast furnace, showing the arrangement of the blast, etc.

The ore only requires to be crushed fine enough to take the usual sample, and is then ready for the furnace. The product is matte

similar to that now shipped by the Montana and Arizona smelters. The advantages claimed are that no roasting is required, that there is a saving of fuel, and that all the heat from the waste products is usefully applied. The general arrangement and dimensions of the furnace are shown in the drawings.

THE "LUNKEN" RENEWABLE SEAT GATE VALVE.

As most engineers know, until recently the valve of to-day was little better than it was half a century ago, in all its imperfections and drawbacks. Lately there has been, however, a decided tendency to forsake the old-fashioned valves, and to take more and more to the use of straightway, or gate valves. As an example we illustrate herewith, a new gate valve, known as the "Lunken," and which appears to possess many excellent features in its mode of construction. From the illustrations it will be seen that this "Lunken" valve is somewhat unique and neat in appearance, and of a construction that indicates great strength. The hub or bonnet is held to the shell by a coppered steel clip or strap surrounding the shell, with its ends passing through the ears of the bonnet, and secured by nuts O. This clip is held from lateral movement by projections on the shell. The joint is packed by a hard lead washer of 1/64 in. thickness, the top faces of flanges each having a groove, to properly secure the washer. The valve can easily be taken apart without renewing the packing washer. The hub or bonnet is flat and narrow, and just of sufficient size to receive within it the valve disc when opposite interior sides. The threaded portion J of the stem, by engaging with these part threads, causes the valve to be opened or closed. The disc has a straight flat face or bearing against the renewable seat C, and is forced tightly against same by the self-adjusting wedging half-ring or horseshoe D, secured

able seat might rust tight in the shell. The ring end T of wrench is used to hold and guide the removable seat into place, so as to properly start the thread into the threads in the shell. Thus, to renew the seat in a valve it is necessary to proceed as follows: Take off bonnet E, loosen the seat with the spanner end M of wrench, engaging the lugs on interior periphery of seat. Then unscrew and take out seat. Then place the new seat on the ring end T of the wrench and insert into valve (see Fig. 3), holding the wrench in one hand (to hold and guide the new seat into place), while with the use of a knife or pointed tool in the other hand, the seat (which is knurled or milled on its outer edge) is turned and started into its threads. When properly started and screwed down, the other end of wrench (spanner end M) is applied to tighten the seat firmly. Thus in a few minutes and with perfect ease, any one can practically make a worn-out valve as good as new, the cost of the renewable seat or a new disc being but trifling. Another important feature is that the stem, when the valve is full open, seats itself (V against U), thus relieving all pressure on the stuffing-box, and permitting repacking of the same under pressure. The tie-band surrounding the shell adds greatly to the strength of the entire valve, and permits of its being taken apart easily with a small wrench. The shell is so short and rigid, and the wedging surfaces are so small that expansion and contraction do not affect it. Thus the disc will never wedge fast and become inoperative, which is the case with some kinds of double-seated gate valves. Having but a single disc and the wedging half-ring taking the place of a second disc, as a wedging resistance, this construction overcomes the objection in double disc gate valves, where liquids remain in the shell between the discs, and often freeze or injure the valve. It is impossible for anything to lodge on the seat of this valve, because the disc and seat have a parallel straight face, and as the pressure on the back of disc keeps it tightly pressed against its seat.



FIG. 1.



FIG. 2.

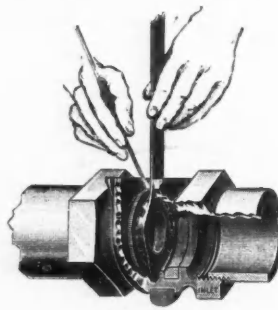


FIG. 3.

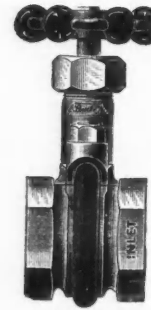


FIG. 4.

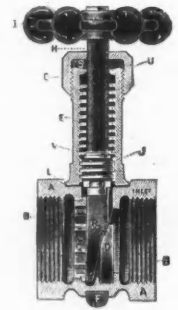


FIG. 5.



FIG. 6.



FIG. 7.



FIG. 8.

THE LUNKEN GATE VALVE.

loosely in the valve shell. The wedging on the disc is applied on two wedging surfaces diametrically opposite each other, these coming in contact with the bevelled ends of the half-ring or horseshoe wedge; thus the wedging-pressure is properly equalized on the entire disc, and insures a tight joint on the opposite face. The pressure of the steam or liquid on the back or wedge side of the disc also aids to make a tight closing valve. All valves above 2 1/2 in. size are provided with the "by-pass," which arrangement balances the disc before opening same, and thus reduces the friction and wear on seat and disc to a minimum, and makes the valve open easily, regardless of what heavy pressure may be on same. This automatic by-pass attachment is an improvement, and makes this gate valve a practical straightway steam and high-pressure valve. The by-pass is shown in Fig. 1, and, briefly explained, is an auxiliary valve formed in the top of the valve disc (immediately below the yoke that secures it to the flanged head of the stem H), and is operated by the stem of the valve, automatically, while opening or closing the main valve C. Channel N, passing through the disc, connects the inlet or pressure side of the valve with the outlet side, and the end of the stem H controls this channel, there being sufficient play in the disc coupling to allow the complete opening of channel N caused by the first one-sixth turn of the wheel in opening the valve. The renewable seat is an exteriorly threaded flanged ring that screws against a face or shoulder of the flange, the opposite side of which flange forms the seat or bearing surface for the disc to close against. The inner periphery of this seat has lugs or teeth K for the engagement of the spanner end M, of wrench, by which means, after taking off the bonnet E, the seat is tightened or loosened through the disc opening of the body, without disturbing the pipe connections. In iron body valves the renewable seat C screws into a second brass ring, permanently fastened in the iron shell, otherwise, owing to the rusting qualities of iron, the remov-

able seat might rust tight in the shell. The ring end T of wrench is used to hold and guide the removable seat into place, so as to properly start the thread into the threads in the shell. Thus, to renew the seat in a valve it is necessary to proceed as follows: Take off bonnet E, loosen the seat with the spanner end M of wrench, engaging the lugs on interior periphery of seat. Then unscrew and take out seat. Then place the new seat on the ring end T of the wrench and insert into valve (see Fig. 3), holding the wrench in one hand (to hold and guide the new seat into place), while with the use of a knife or pointed tool in the other hand, the seat (which is knurled or milled on its outer edge) is turned and started into its threads. When properly started and screwed down, the other end of wrench (spanner end M) is applied to tighten the seat firmly. Thus in a few minutes and with perfect ease, any one can practically make a worn-out valve as good as new, the cost of the renewable seat or a new disc being but trifling. Another important feature is that the stem, when the valve is full open, seats itself (V against U), thus relieving all pressure on the stuffing-box, and permitting repacking of the same under pressure. The tie-band surrounding the shell adds greatly to the strength of the entire valve, and permits of its being taken apart easily with a small wrench. The shell is so short and rigid, and the wedging surfaces are so small that expansion and contraction do not affect it. Thus the disc will never wedge fast and become inoperative, which is the case with some kinds of double-seated gate valves. Having but a single disc and the wedging half-ring taking the place of a second disc, as a wedging resistance, this construction overcomes the objection in double disc gate valves, where liquids remain in the shell between the discs, and often freeze or injure the valve. It is impossible for anything to lodge on the seat of this valve, because the disc and seat have a parallel straight face, and as the pressure on the back of disc keeps it tightly pressed against its seat.

RECENT DECISIONS AFFECTING THE MINING INDUSTRY

United States Circuit Court, District of Nevada.

Location of Mining Claims.

The location of a vein or lode, under the mining laws of the United States, is made by taking up a piece of land in the form of a parallelogram, not exceeding 1,500 ft. in length, and 600 ft. in width, 300 ft. on each side at the middle of the vein at the surface. The location must be distinctly marked on the ground, so that its boundaries can be readily traced. The question as to the sufficiency of the marking of the boundaries, depends to some extent upon the character and condition of the ground located. Where the location is made upon a comparatively barren hillside, the posting of stakes at each of the four corners of the location either by driving the stakes into the ground, or building of stone monuments so as to keep the stakes in place, is a sufficient compliance with the provisions of the law. When the location is marked so that its boundaries can be readily traced, the locator's right of possession becomes fully vested, and cannot become divested by the removal or obliteration of the stakes, monuments, or notice without the act

or the fault of the locator, if he performs the other acts required by law. The mining laws of the United States do not require any written notice to be posted upon the location when made, and, in the absence of any local rule or State law requiring a notice to be posted, the location, the boundaries of which are properly marked upon the ground, is valid without the posting of any notice. Where the statutes of the State, or local rules and regulations of the miners, require notices to be posted upon the ground at the time of the location, the construction given to the notices should be liberal, not technical. A mistake in the notice as to the direction and course, being "northerly" instead of "northeasterly," does not invalidate the location. Positive exactness as to the course is not required. The stakes and monuments referred to in the notice, and posted upon the ground, will control the direction stated in the notice. When a notice of location is recorded, it must contain the name or names of the locators, the date of the location, and such a description of the claim or claims located, by reference to some natural object, or permanent monument, as will identify the claim. A reference to a known mining claim is a sufficient compliance with the law requiring reference to be made to some natural object or permanent monument.—Book vs. Justice Mining Company, 58 Fed. Rep. 109.

British Coal Exports.—The exports of coal from Great Britain in November were 2,231,402 tons. For the 11 months ending November 30th, they were 26,732,170 tons, a decrease of 1,118,808 tons from the corresponding period in 1892. The coal shipped for steamers engaged in foreign trade this year was 7,436,087 tons.

More Money for New York Canals.—Senator Bradley has introduced a bill in the State Legislature providing for expending in the next few years about \$20,000,000 on the canals of New York State. The bill is entitled to "provide beneficial employment to the vast number of skilled and unskilled workmen in this State, and to facilitate commerce by forthwith enlarging New York's antiquated canals."

The San Francisco Midwinter Exposition.—This exposition was opened to visitors on January 1st, without special ceremonies, the work having been completed in a remarkably short time. There are five main structures. These are the Administration, Manufacturers and Liberal Arts, Agricultural and Horticultural, Fine Arts, and Mechanic Arts Buildings, all of which are grouped around a parallelogram, in the center of which are an electric tower about 250 ft. in height, several artistically ornamental fountains, statuary, and a wealth of palms, flowers and shrubs. This is known as the Grand Court. Many buildings surrounding the court and scattered in every direction over 160 acres are special buildings, erected by the different States, counties, and concessions at the cost of the States, counties, or individuals, for their exclusive exhibits.

The counties of northern California and those of the southern portion of the State have their own distinctive buildings, and Oregon, Colorado and Arizona have their exhibits housed in separate structures. The concessional features of the Midwinter Exposition are both numerous and interesting.

The '49 mining camp occupies a space 450 ft. long and 250 ft. wide. In the center of the camp is a street 450 ft. long, lined on each side with old time shanties, which do service as newspaper offices, saloons, hotels, theatres, and gambling houses, as in the days of yore, representing a typical mining town. Mackay's, Perkins' and Jones' cabins are set up just as they were when the millionaire miners deserted them. The camp promises to be one of the most interesting spots on the Exposition grounds, as it is the intention faithfully to represent the days of '49 by mock duels, trials, lynchings, and other episodes of those stirring times.

Water for the New York Canals.—State Engineer Schenck has completed his report on the subject of improving the supply of water from the Genesee River to the Erie Canal. The section of the canal from Rochester west is now fed from Lake Erie. In his report Mr. Bogart said that the State has acquired and retained a right fixed and permanent to use at any time so much of the water of the Genesee River as was necessary to maintain the navigation of the Erie Canal, and that the right thus acquired has never been relinquished or abandoned. He also stated that a dam in the Genesee River above Mount Morris, 58 ft. high, would store the amount of water sufficient to supply all the State requirements for the canal. A dam 130 ft. high was suggested as practicable, thus giving a water storage ample for both the canals and for power for the manufacturing establishments. In his report Mr. Schenck says that detailed examinations have been made at three locations for a dam, and one, called in the report the "Hogback" location, is recommended by him as the best site. He strongly advises the building of a dam 130 ft. high, which would approach to some degree the absolute control of the stream and secure to a large degree the full benefit of this most valuable resource. He says it is possible that the 130-ft. dam could be built in from 2½ to 5 years. He figures the cost of building a 58-ft. dam at the site favored by him as \$850,000. This would be merely to provide for the canal supply. For a dam 58 ft. high, but of sufficient dimensions to enable it to be afterward raised to 130 ft. in height, he estimates the cost at \$1,400,000. To build a dam, at the outset, 130 ft. high, he estimates the cost at \$2,100,000. This latter would supply all the interests of the State and the necessary power for the manufacturers at Rochester, giving them a regulated and equitable daily supply the year round.

The Manchester Ship Canal.—On Saturday, December 16th, the first public journey was made along the entire length of this canal. The occasion was the visit by invitation of a large party of journalists from every part of the country to inspect the canal and to announce after-

ward in their respective publications that the canal is now ready for traffic, and that the 1st of January will see a procession of merchant steamships passing up from the sea near Liverpool to the new Manchester docks. The canal is 35½ miles long and there are four locks which raise the water level at Manchester 60½ ft. above high-sea level. The minimum width at the bottom is 120 ft., and averages 172 ft. at water level, and its minimum depth is 26 ft. The total cost has been \$75,000,000, of which two-thirds was subscribed by the public and the remainder by the corporation of Manchester. In three places the canal is crossed by permanent railway bridges, at a height of 75 ft. above water level. There are also two high level road bridges and six swing bridges. At Barton, a few miles from Manchester, the old Bridgewater Canal is carried over the new waterway on a swing tank bridge. The water area of Manchester docks is 114 acres, and the area of quay space is 152 acres. The construction of the canal has occupied six years, and many difficulties were encountered, such as the washing away of incomplete works. There were no difficult features in the landscape to contend against, for the canal very closely follows the sluggish rivers, Mersey and Irwell, and there was never any ground over 100 ft. high to cut through. The material excavated was almost entirely alluvial deposits and sandstone. The average time occupied in the passage through the canal will be 10 hours, and with the use of electric light the canal will be navigable day and night. Already most of the steamship companies in the United Kingdom have arranged sailings to Manchester.

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 23D, 1893.

- 1,795 of 1893. Compound Steel Plates. S. & S. R. Chatwood, London.
- 2,046 of 1893. Tunneling Machines. H. H. Lake, London (R. W. Dinendahl, Germany).
- 2,710 of 1893. Salts of Alumina. J. L. Kessker, Clermont-Ferrand, France.
- 19,931 of 1893. A Safety Explosive. W. E. Liardet, Melbourne, Australia.
- 20,023 of 1893. Electric Welding. W. P. Thompson, Liverpool (C. L. Coffin, Detroit, U. S. A.).
- 20,030 of 1893. Cupola Furnaces. E. J. Bird, Big Stone Gap, Virginia.

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, DECEMBER 24TH, 1893.

- 511,334. Process of Making Coke. George C. Hewitt, Washington, D. C.
- 511,365. Lamp Support for Miners' Hats. John A. Simpson, East Cambridge, Mass., Assignor to Howard M. Sawyer and Charles H. Sawyer, same place.
- 511,372. Preserving Piles. Robert Sudden, Ventura, Cal.
- 511,381. Drop-Hammer. James White and Anson O. Kittredge, Brooklyn, Assignors to the Twist Pipe Company, New York.
- 511,383. Sheet-Metal Beam. James White, Brooklyn, N. Y.
- 511,392. Process of Embossing Sheet Metal. James White, Brooklyn, N. Y.
- 511,422. Rolling Mill. Stanley O. Haskin, McDonald, Tenn.
- 511,459. Carbonizing Apparatus. Isalah L. Roberts, Brooklyn, N. Y.
- 511,467. Power Auger for Mining Purposes. Charles H. Sergeant, New York, N. Y.
- 511,476. Furnace for Roasting Dust of Copper and other Ores. Charles Vattier, Paris, France.
- 511,536. Boiler Furnace. Joseph Lister, Chicago, Ill.
- 511,566. Machine for Crushing Clay. William S. Urquhart, Cambridge, and Henry P. Mallory, Newton, Mass.
- 511,567. Machine for Working Sheet Metal. Francis A. Walsh, Milwaukee, Wis.
- 511,623. Stone Dressing Machine. Charles Lohr, Milwaukee, Wis.
- 511,618. Method of Converting Cast Steel into Wrought Iron. William Parkinson, Philadelphia, Pa.
- 511,682. Electrolyzing Apparatus. Antoine J. O. Chalandre, Paris, France, Assignor to the Society Outhenin, Chalandre Fils et Cie., same place.
- 511,715. Stone Cutting Machine. Timothy Shea, Joseph L. Woodbury and Frank Whipple, Milford, Mass.

DIVIDENDS PAID BY MINING COMPANIES DURING DECEMBER, 1893.

NAME OF COMPANY.	Paid in Dec.	Paid since Jan. 1st, 1893.	NAME OF COMPANY.	Paid in Dec.	Paid since Jan. 1st, 1893.
Alaska Tr'dw'll, Alaska	.....	\$300,000	Kennedy, Cal.	\$45,000	\$480,000
American Coal	.....	90,000	Leadville Con., Colo.	12,500	12,000
American Turquoise	.....	60,000	Maid of Erin, Colo.	.....	150,000
Aspen, Col.	\$20,000	103,000	Mayflower Gravel, Cal.	10,000	120,000
Bald Butte	12,500	55,000	Minnesota Iron, Minn.	.....	420,000
Belden Mica, N. H.	5,000	60,000	Mollie Gibson, Colo.	50,000	1,230,000
Bimetallic, Mont.	.....	190,000	Morning Star D., Cal.	4,800	72,000
Calumet & Hecla, Mich.	.....	1,000,000	Mt. Diablo, Nev.	.....	30,000
Centennial - Eureka, Utah	30,000	187,500	Mercur, Utah	.....	50,000
Champion, Cal.	3,400	40,300	Napa Cons., Cal.	.....	70,000
Cleopatra	37,500	450,000	North Star, Cal.	.....	100,000
Coeur d'Alene, Idaho	.....	30,000	Omaha, Cal.	3,600	43,200
Colorado Central, Colo.	.....	27,500	Osceola, Mich.	50,000	100,000
Colorado Fuel Co., Colo.	.....	67,120	Pacific Coast Borax	.....	62,500
Cons. New York, Nev.	.....	10,000	Parrott, Mont.	.....	133,000
Copper Queen, Ariz.	.....	300,000	Pharmacist, Colo.	.....	84,000
Cortez, Nev.	.....	45,000	Pumas, Eureka, Cal.	.....	52,754
Daly, Utah	.....	187,500	Quincy, Mich.	.....	330,000
De Lamar, Idaho	.....	450,000	Red Cloud, Idaho	.....	10,000
Dexter, Nev.	.....	115,000	Richmond, Nev.	13,500	13,500
Elkhorn, Mont.	50,000	225,000	Rico-Aspen, Colo.	.....	50,000
Enterprise, Colo.	.....	125,000	Running Lede, Colo.	1,000	1,000
Franklin, Mich.	.....	120,000	Sierra Butte, Cal.	.....	30,626
Golden Reward, S. Dak.	5,000	60,000	Small Hopes, Colo.	25,000	21,000
Great Western Quick-silver, Cal.	.....	21,701	Standard, Cal.	.....	20,000
Hecla Con., Mont.	.....	60,000	Tamarack, Mich.	200,000	603,000
Homestake, S. Dak.	12,500	150,000	Trinity River Hydraul. Co., Colo.	2,500	27,500
Hope, Mont.	.....	175,000	Utah, Utah	.....	3,000
Horn Silver, Utah	.....	37,500	Victor, Utah	15,000	120,000
Idaho, Cal.	.....	63,550	W. Y. O. D., Cal.	3,000	27,000
Iron Mountain, Mont.	.....	30,000	Total	649,300	9,472,831

Readers of the "Engineering and Mining Journal" will confer a favor on the publishers if they will notify the "Journal" of any errors or omissions in the above table.

PERSONALS.

Mr. Thomas George, mining engineer, of Austin, Nev., is visiting the mines of Alaska.

Mr. J. B. Hammond, of San Francisco, is visiting Alaska, and at last reports was at Juneau.

Capt. C. H. Palmer, of Butte, Mont., general manager of the Butte & Boston Company, has been spending the holidays in Boston.

Mr. Jesse Lewisohn, of New York, has recently returned home after spending several weeks at Great Falls, Butte and other points in Montana.

Mr. James D. Hillhouse, State mine inspector, of Alabama, has been engaged in organizing local mining schools and has already established them at Adger and Blocton.

Mr. J. K. Bole has resigned the position of general manager of the Otis Steel Company, of Cleveland, to devote his time to other interests. Mr. Bole is one of the receivers of the Valley Railway.

Messrs. W. F. Etherington and A. G. Hapgood on January 1st formed a copartnership for the transaction of business as wholesale dealers in paper, under the firm name of Etherington & Hapgood, continuing the business heretofore carried on by W. F. Etherington, who has been one of the most popular and successful dealers in New York.

Mr. Stanley Gifford, treasurer of the Montana Ore Purchasing Company, recently returned to New York from Butte, Mont., where he spent several weeks in connection with the Murray-Heinze suit over the Estella mine. Mr. Gifford was one of the leading expert witnesses in the case.

Mr. T. W. Goad, mining engineer, of Denver, Colo., has lately returned from England, where he has interested a number of capitalists in the mining industry of Colorado. He organized the Gold and Silver Extraction Company of America, Limited, and the Mining Development Syndicate of Colorado, besides the Poorman Silver Mines Company of Colorado. The former company is owner of the McArthur-Forrest process in the United States; the Poorman mines are situated at Caribou, Boulder County, while the third company has been formed to acquire working options and leases of refractory and other gold and silver mining properties, dumps of ore and tailings, with the intention of erecting the necessary plant for the treatment of the ores.

OBITUARY.

David Davis, a native of Blonaven, Wales, and a prosperous coal operator of 50 years' standing, died at his home in Minersville, Pa., on December 30th.

Edward Cleveland Lynde, secretary of the Lackawanna Iron and Steel Company since 1854, died suddenly on December 30th, at his home in Scranton, Pa., aged 62 years. Mr. Lynde's death makes the third during the year of prominent officials of this corporation.

John Shay, 72 years old, one of the pioneer coal operators of Pottsville and Wilkes-Barre, Pa., and who for 10 years was business manager of the Pottsville Iron and Steel Company, and later head bookkeeper of the Philadelphia & Reading Coal and Iron Company, died in Pottsville, Pa., on December 30th.

Charles S. Larrabee, president of the Larrabee Iron and Machine Works, at Bath, Me., dropped dead at the Indian Head Proving Grounds, on the Potomac River, about 20 miles below Washington, D. C., on January 2d. He recently invented a fuse for naval purposes and his visit here was to experiment with the fuse at the United States Proving Grounds.

Worthington C. Smith, of St. Albans, Vt., died there on January 2d. He was born in St. Albans in 1823, and was graduated in 1846 from the University of Vermont, of which institution he was for many years a trustee. He engaged in mercantile business in 1848, and in 1858 purchased the St. Albans Foundry, which he successfully conducted until two years ago. He was a director, treasurer and president of the Vermont & Canada Railroad Company for many years, and one time president of the Missisquoi Railroad, and vice-president of the Central Vermont Railroad. He was a member of Congress in the 40th, 41st and 42d congresses, serving on the committees of manufactures and banking and currency.

James D. Yerrington, one of the best known men in the jewelry trade in this city and throughout the country, died on January 2d at his home, in Creskill, near Englewood, N. J. Mr. Yerrington was born in Providence, R. I., 60 years ago. He developed a remarkable facility in distinguishing the value of gems, and had been for many years recognized as one of the best gem experts in the United States. He was called in as an expert by a syndicate of English capitalists to determine the value of the Montana sapphire mines, and the final conclusion of the syndicate as to the purchase of the property was based wholly upon his report. He was appointed Commissioner of Awards on precious stones at the World's Columbian Exposition.

SOCIETIES AND TECHNICAL SCHOOLS.

Mining Institute of Alabama.—Mr. James D. Hillhouse, State mine inspector, is now preparing the organization of a mining institute for Alabama. This institute will especially benefit all the mine superintendents, mine bosses and foremen, in opening a way to exchange ideas and opinions, give the younger ones a chance to profit by the experience of the more advanced and bringing the miners and those interested in mining in close and constant intercourse. The Mining Institute of Alabama will meet once a month. The first meeting will be held in January, 1894.

Scandinavian Engineering Society of Chicago.—At a meeting held December 14th, Mr. Alf. C. Garde read a paper on "Silver and the Modern Methods of Extracting it from the Ore." As a preface the author gave a general history of silver, and then explained the different methods of reducing the silver from the ore, starting with the amalgamation process and Mr. M. P. Boss' improved continuous system. After describing a dry crushing and roasting silver mill and the conversion of metallic silver into chloride of silver, the author took up the chemical leaching processes. He next described a smelting plant with improved water-jacket furnaces, such as we used for silver carrying lead ores, and in connection herewith the method of desilverizing the lead on a large scale. The different methods of extracting silver were fully illustrated by a series of interesting drawings and sketches.

Engineers' Society of Western Pennsylvania.—At the regular meeting of the Society, December 19th, nominations for officers were presented. Mr. Thos. P. Roberts read a paper on "A Proposed Method of Increasing the Navigable Depth of the Upper Ohio River by Artificial Means." The paper covered by diagrams the low and high water stages of the Ohio River for the past 20 years, the amount of coal carried by barges down the river and the possibility of holding in reservoirs all possible waters to increase the flow of the river at low stages. The paper was fully discussed by the president and Messrs. W. L. Scaife, G. Kaufman, Thos. H. Johnson and W. G. Wilkins.

In the Chemical Section, December 26th, "carbonyl crystals" were shown. An invitation to attend the International Congress of Applied Chemistry, August 7th, 1893, at Brussels, Belgium, was read. Officers to be voted for at the annual meeting were nominated. Mr. James O. Handy read a paper on "The Exact Determination of Phosphorus by a Molybdate Method When Arsenic is Present in Iron, Steel and Ores."

Illinois Mining Institute.—At the December quarterly meeting, Mr. Murray, of Sparta, read the first paper, which, however, was rather a promise of a paper yet to be furnished when completed by the supply of further details of sights at the World's Fair of interest to the mining industry. Mr. Burt, of Springfield, was permitted to explain what was offered by him as an improved form of fan for the ventilation of mines, the principle of which seemed to consist in tapering each of four arms or wings, so as to render the velocity of the air current generated therefrom equal from heel to tip. After some discussion skeptical of the application of the plan to mine ventilation, the subject was postponed, with advice to Mr. Burt to prepare and present to the institute with his plan experimental data as to its operation. Mr. Newson, of Peoria, next read a paper on the subject of the prevailing dip of the coal strata in Illinois, announcing his own conclusion, that the prevailing dip in the Illinois coalfield is toward the southeast. This paper was followed by quite an animated discussion, it being claimed that in parts of southern Illinois the dip is just the other way. The paper read by Mr. Jeffreys at the meeting in May on the subject of sinking shafts in quicksand was then discussed. Messrs. Lloyd and Peters, with the aid of the blackboard, detailed some late unsuccessful attempts at such shaft sinking, where the quicksand was both deep and wet. But, finally, a reference to Mr. Dixon to the shaft just sunk at Ladd, in Bureau County, through a bed of quicksand 84 ft. in depth, led to a description by Mr. Ramsay of the construction of the crib and shoe, by means of which that success was achieved, and it was stated that the entire structure instead of being built in part of bulky and buoyant timbers difficult to force down straight, consisted throughout of a skeleton of iron, the shoe being somewhere in the neighborhood of 20 ft. in length and very narrow. The secretary read a paper by Mr. Ainsworth on the sinking of the shaft of a rock-salt mine, at Lyons, Kan., and some discussion of hand and power drilling followed. It was voted to postpone the next meeting until May.

Western Pennsylvania Mining Institute.—At the December meeting in Pittsburg, President Adams made an interesting address on mining and the influence of the Institute. George Gould, of Cannelton, Pa., read an interesting paper on "Electric Mining Machines," and advocated their use. The practical use of these machines was debated by a number of members who contended that compressed air machines were as good. J. T. Evans, mine inspector, of Johnstown, read a paper on "Which Gives the Most Useful Effect in Mine Ventilation,

Blowing or Exhaust Fans or Furnaces"? He said that the reason why there are more accidents in mines now than 10 years ago is the ignorance of the men now employed. A paper by William Clifford on "The Development of the Safety Lamp" led to the action by the Institute. He was of the opinion that a great improvement could be made on the safety lamp. John Blick, of Idlewood, agreed with him and suggested that a committee of eight, one mine inspector from each district, be appointed to make the necessary tests of lamps and decide upon a standard safety lamp. The committee was appointed as follows: Philip Hartman, South Fork; W. R. Wilson, Mansfield Valley; J. Blick, Idlewood; T. J. Evans, Pittsburg; Charles Connors, Uniontown; S. Taylor, Pittsburg, and William Jenkinson, of Meyersdale. James Blick read a paper on "Splitting Air Currents, so as to Comply with the Act of May 15th, 1893." He held that the air-splitting system has been in successful operation in his district, and he found a better quality of air in the mine than before the system was adopted. He went into a discussion of the double and triple entry systems. The following committee was appointed to make a test of a new fan at the Oliver Coke and Furnace Company's mines, near Uniontown: T. J. Evans, Johnstown; F. Z. Shallenberg, Pittsburg; R. W. Wilson, Mansfield Valley; A. Steiner, Wilkesburg, and Reuben Street, of Shaner station. The chair appointed a committee to investigate and report on the Blick plan of mine ventilation and report at the next meeting of the Institute as follows: S. Taylor, mining engineer, Pittsburg; William Duncan, mine superintendent, Uniontown; W. R. Wilson, mining engineer, Mansfield Valley; J. Blick, mine inspector, Idlewood; William Hartley, operator, Pittsburg; D. H. Thompson, mine inspector, Brisbin; George Gould, mine foreman, Cannelton, and Philip Hartman, mine superintendent, South Fork.

INDUSTRIAL NOTES.

The extensive firebrick works of R. B. Wigton & Sons, of Philipsburg, Pa., have shut down.

The Joliet plant of the Illinois Steel Company, which employed 1,000 men, has shut down indefinitely.

The Wilson Machine Company, at Columbia, Pa., has started up its works, after an idleness of several weeks.

The Warren Foundry and Machine Company, Phillipsburg, N. J., started up January 2d, with about half a full force.

Notices have been posted in the shipyard and shops of the Globe Iron Works Company, at Cleveland, O., of a 10% reduction in wages.

Stack No. 1 of the Allentown (Pa.) Rolling Mill is being blown out, and No. 2 stack is being banked, with a probability of being blown out in a few days.

The steel mill of the Bethlehem Iron Company, South Bethlehem, Pa., resumed operations on January 2d, and the billet mill on January 3d, giving employment to over 1,000 men.

The Millowners' Association, of Covington and Newport, Ky., have given notice that their mills will be run hereafter "without prejudice to, but independent of, any labor organization."

The East Lebanon, Pa., rolling mills resumed operations this week for the first time since last April, when the mills were destroyed by fire. They give employment to about 100 men.

A dispatch from Scranton, Pa., says that the Scranton Axle Company is about to erect a large addition to its works. The North Steel Mills have resumed work, after a short shutdown.

The Portland Rolling Mills elected the following officers: President, C. R. Milliken; directors: C. R. Milliken, W. F. Milliken, N. C. Rice, J. W. Leavitt, S. Peters; secretary and treasurer, J. W. Leavitt. A semi-annual dividend of 3% was declared.

Davies & Thomas' Springdale foundry and machine works, at Catsaunqua, Pa., have reduced wages 10%, and will start up next week on full time on a contract for electric railway castings which will keep 100 men busy until summer.

The Homestead, Pa., plant of the Carnegie Steel Company resumed operations in every department on January 2d. About 2,500 men were given employment. It is understood that the company has orders sufficient to insure operation until April.

The old Donaghmore furnace, at Lebanon, Pa., owned and formerly operated by the heirs of R. W. Coleman, is being razed to the ground. It was erected in 1855 and has been managed by Col. D. S. Hammond since the inception of the enterprise.

The Reading (Pa.) Rolling Mill started up January 2d, with 350 men. The prospects for continued work are fair, the firm having received an order which will keep the mill in operation for a time. This mill is part of the plant of Cofrode & Saylor, and is about being taken out of the receiver's hands and reorganized.

The Bessemer and rail mill departments of the Maryland Steel Company, at Sparrow's Point,

Md., shut down on December 30th for an indefinite period, owing to a lack of work. The blast furnaces will continue in operation another week, when they too will shut down. The construction and marine departments of the company will continue running on full time.

A dispatch from Youngstown, O., says that the Mahoning & Shenango Valley Iron Manufacturers' Association has served notice on the officials of the Amalgamated Association demanding a reduction in the present puddling scale of \$4.75 per ton to \$3.75, claiming that by reason of the low wages paid puddlers in non-union and Eastern mills they are compelled to ask the reduction. The puddlers will not accept the lower scale.

The Montgomery Iron Company, of Port Kennedy, Md., made an assignment on January 2d to the Guarantee Trust and Safe Deposit Company, of Harrisburg, Pa., for the benefit of creditors. A. S. Patterson, the president of the company, declines to estimate the assets of the company, which are mostly real estate. The liabilities, he said, are \$330,000. He did not think, he said, the company would pay 10% to creditors. The failure was foreshadowed a few days ago by that of the Mahoning Rolling Mills, both of which have their general offices in Philadelphia, and Mr. Abraham S. Patterson being president of both. The plant at Port Kennedy was built in 1854. It is called the Montgomery Furnace. It was blown in in 1857 and was so prosperous that it had to be remodeled in 1863 and again in 1869. In 1890 the whole plant was remodeled and the improvements had not yet been finished when the assignment was made. Two new roasters for magnetic ore were also recently added. The company was organized in 1854, incorporated the next year and its charter was made perpetual in 1886. The authorized capital is \$150,000, all of which was paid in. It has always been a close corporation. The amount of dividends paid had never been given to the public.

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.

The general offices of the Philadelphia Smelting and Refining Company, now located at Pueblo, Colo., are to be removed to Denver, Colo., at an early date. Offices in the Equitable Building, corner of Seventeenth and Stout streets, have been leased by the company, and it is expected that they will be ready for occupancy by February 1st.

Viking Gold Mining Company.—Articles of incorporation of this company, of Colorado and Utah, were filed on December 29th with the county clerk of Salt Lake County, having previously been filed with the Secretary of the State of Colorado. The incorporators are: James J. Hagerman, Wolcott E. Newberry and Percy Hagerman, and the company is formed for the purpose of holding and disposing of mining, milling and ore reducing property and water rights; mining, tunneling, milling and smelting; erecting buildings, mills and reduction works and do a general mining business. The capital stock is placed at \$300,000, divided into 3,000 shares of the par value of \$100 each. The term of the existence of the company is but 20 years. Colorado Springs, Colo., and Salt Lake City, Utah, are named as the principal places of business. The company has mines at El Paso County, Colo., and Camp Floyd district, Utah, those in the latter district being recent acquisitions. The officers of the company consist of five directors, Wolcott E. Newberry, F. M. Taylor, J. J. Hagerman, J. A. Hayes and Percy Hagerman.

Oil.

In its annual review of the oil trade, the New York News Bureau says: The general position of the oil trade is the most encouraging that has confronted producers and holders for some years past. The limit of production, in all districts east of the Rockies, appears to have been reached some time ago, and while it is known that there are considerable deposits in Wyoming and perhaps in other Western States, the transportation eastward would doubtless be so costly that, at anything like present figures, the product of that region is not likely to be found competing with that of the States from Indiana eastward, and certainly not for Eastern export. In western Pennsylvania the extensions of producing areas have not been important, but in West Virginia and eastern Ohio they have been larger, though their yield has not been sufficient to offset the decrease in the older districts. The receipts from the wells in the Eastern districts this month have averaged 75,000 barrels daily, and the shipments 95,000 barrels, making a decrease in stock of about 600,000 barrels. In western Ohio and eastern Indiana districts the receipts from the

wells and the shipments have averaged, respectively, 33,000 barrels and 40,600 barrels, indicating a decrease in stock for the whole month of about 230,000 barrels, or a stock reduction of close on \$50,000 from all districts for the month. The total stock of all oils produced in eastern Ohio, West Virginia and western Pennsylvania is about 12,450,000 barrels; decrease since August 1st, 1892, about 6,300,000 barrels. The production in southern California is increasing and on December 15th was reported at between 2,000 and 3,000 barrels daily. The exports of crude, refined, etc., from the United States from January 1st to date were 833,363,000 gallons; increase 142,244,000 gallons, equal to about 4,500,000 barrels crude equivalent. During the last week of January, 1893, crude Pennsylvania oil certificates sold at 53½ cents per barrel. In the past week the same certificates, calling for the same quality of oil, sold at 79 to 79½ cents. Seller January sold at 79 and seller February at 80.

ALASKA.

Mexican.—The Mexican mill, on Douglas Island, has started up. Its full capacity is 250 tons a day.

Nowell Gold Mining Company.—On the Sylvester mine, at Sumdum, which has been bonded by this company, on August 20th, the men, in two shifts, began running a cross-cut tunnel into the mountain to tap the ledge a distance below the croppings. Recently the ledge was tapped a distance of 173 ft. from the mouth of the tunnel, and 100 ft. below the croppings at the surface. The men cut into the ledge a distance of 5 ft., finding a heavily mineralized quartz and rich gold sulphurets.

ARKANSAS.

Johnson County.

Western Coal and Mining Company.—This company, which has its headquarters in St. Louis, Mo., has developed a coal mine at Coal Hill on a tract of coal land of 8,000 acres, and has a well-equipped coal mine fitted with screening and cleaning machinery, conveyors, traveling band, etc.

CALIFORNIA.

California's gold output is to be represented in some appropriate way at the San Francisco Mid-winter Fair, and there are many designs proposed. One that meets with a great deal of favor is in the form of a great sphere 19 ft. 2 in. in diameter, mounted upon golden columns and gilded to represent the precious metal. From the floor to the top of a golden grizzly bear which is to surmount the sphere will be a distance of 37 ft. 9 in. Upon the side of the great globe will be the following inscription: This sphere represents the exact amount of gold produced in California, viz., \$1,300,000,000. Another proposition is to construct an enormous coin, the size to be such as would properly represent the amount of gold supposed to be in it. Still another idea is that of suspending a great gilded cube from the ceiling of the Mechanic Arts Building, in which the mining exhibit is to be made, while the proposition to exhibit a model of an ingot worth \$1,300,000 is also made.

Eldorado County.

(From our Special Correspondent.)

Grand Victory Mine, Placerve.—The mine has an ore body 60 ft. wide, but work was suspended some time ago, owing to the gold passing off in the tailings. An 80-stamp mill was constructed several years ago, but it also has lain idle. A San Francisco company has now gained control of the property and the ore is being subjected to an entirely new process simply as an experiment. The pulp, after crushing, is run into vats and submitted to a current of electricity.

Gregory Mine.—Recently this property was reopened by a local company and a gravel deposit uncovered that will pay from \$10 to \$20 per carload of 1,000 lbs. It is covered to a depth of about 300 ft. with lava, and is cemented so hard as to require the milling of all the gravel. Several other claims along this channel are also to be opened soon.

Oro Fino Mine.—Since this mine was bonded by Alvinza Hayward and his partners the 20-stamp mill has been remodeled and chlorination works constructed for the reduction of the sulphurets from the mine. The ore is of low-grade and the operations now being carried on are quite extensive; they are merely to test the mine. If results are as anticipated the mill will be increased to 80 stamps. The shaft is down about 200 ft., with the grade of ore improving with depth.

Seam Mines, Georgetown.—This group is owned by local residents. The mines are really quartz mines operated by hydraulics. Small seams of quartz bearing rich pockets are found crossing a decomposed slate, which is blasted by heavy charges of powder, broken up and washed away by this hydraulic pressure. The pockets thus found have almost invariably proved very rich.

Nevada County.

(From our Special Correspondent.)

Gold Bank Tunnel.—It is expected that this tunnel will be under full headway in the early spring. It is intended to be to this county what the Sutro tunnel is to the Comstock, as it will tap all the mines in Nevada City and the Grass Valley district. The scheme is being engineered by Eastern capitalists.

Mount George Mine, Nevada City.—New hoisting works are being erected, and a new shaft will be put down 200 ft. when the weather moderates. San Bernardino County.

The reduction works at the Needles have been leased to Sheridan & Fairfield, who are experienced and practical millmen, and who intend to start the works up shortly.

Tuolumne County.

A late issue of the Sonora "Independent" contains the following items anent some of the mines of this county:

Blue Blazes.—This property lies between the Star and the Tiger mines. The vein is not as large as the Star, but rich in free gold; also, the sulphurets are of very high grade. There are two shafts of very little depth on this property, and there is no water to contend with, being well above water level.

Buzzard Roost.—This mine is located on the Stanislaus River, nearly 200 ft. above the level of it. The vein is from 3 to 4 ft. wide and runs northeast and southwest in granite formation, but seated in slate. The rock has a milling value of \$6 to \$7 per ton in free gold; the sulphurets have a percentage of three or four, and a value from \$150 to \$200 per ton. This company will erect a five-stamp mill immediately. The company has a free water power, with a ditch about three miles long, taking the waste water from the Vine Springs. This mine is developed by a tunnel and shaft. The shaft is only 18 ft. deep, but the tunnel is entered 85 ft., of which is a cross-cut, and drifted on vein 40 ft. Total, 125 ft. It has also an 11-ft. arastra. The same company that owns the Buzzard Roost has located an extension across the Stanislaus River, the vein being of same size, and prospects even more in free gold to the ton than the Buzzard Roost. This extension is again to the southwest of the latter mine. A tunnel is going to be opened on the vein just above the river level, which will give backs of at least 2,000 ft., but is situated in Calaveras County.

Koenig.—This mine is situated to the north, and is on the same vein as the Buzzard Roost. A tunnel is in nearly 300 ft. The rock goes from \$6 to \$7 per ton. This property has a five-stamp mill, also run by water power, free. The vein is a true fissure, cutting the formation and may be traced for miles, even into Calaveras County, as above described.

Mandich.—This mine is situated in Brown's Flat. It has the only milling vein in that vicinity as yet discovered. The first work done was the sinking of a shaft to 38 ft. near the top of the hill. The owners are at present running a tunnel to tap this shaft, when stoping will be commenced. A new mill at the bottom of the hill is in course of construction, and when this is completed and running, a tramway will be built. They have the vein from the mouth of the tunnel and with the amount of quartz already extracted from the shaft, crushing can be commenced immediately. After the quartz has been stoped in the tunnel, the shaft will again be sunk and another tunnel entered 50 ft. from the mill, which will tap the shaft at nearly 400 ft. The vein varies in width from 12 to 24 in., and is well charged with free gold, which will average about \$30; the sulphurets will reach nearly \$100 per ton.

Star.—This mine is located on Rose Creek. There are two shafts and one tunnel. The latter is entered several hundred feet. The vein is from 4 to 5 ft. The rock on the shoot is rich in sulphurets. The ore has paid, in free gold, \$20. No. 1 shaft is sunk 60 ft., 30 ft. below the bed of the creek, and the ore is very base, but of very high grade. No. 2 shaft is sunk on a parallel vein, a depth of 50 ft. The rock paid in free gold \$12 to \$15 per ton. Total extracted, \$70,000.

Tiger.—This mine is also located on Rose Creek and south of the Star mine. It is opened extensively by three tunnels. The rock has paid on the shoots over \$20 per ton. A good deal of the ground has been stoped, which paid well. There was, at that time, a five-stamp mill on the property, which is now burned down.

COLORADO.

The State coal mine inspector has prepared the following estimate of the number of tons of coal mined during the first four months of his incumbency in the office, with a comparison with the figures for 1892:

Month.	1892.	1893.	Dec.
August.....	282,017	223,668	58,319
September.....	280,813	242,056	47,757
October.....	297,383	268,661	28,892
November.....	376,122	278,084	98,038

The number of employees during the four months of 1893 named was as follows: August, 5,012; September, 4,912; October, 5,591; November, 5,910. Wages have remained unchanged, excepting at New Castle, and there the miners are now on a strike against the reduction.

Colorado Fuel and Iron Company.—This company makes the following statement of its production of coal during 1893: Sopris mine, 348,476; Engleville mine, 234,734; Berwind mine, 108,033; Rouse mine, 275,995; Walsen mine, 71,846; Robinson mine, 56,366; Pictou mine, 97,133; Coal Creek mine, 118,345; Crested Butte mine, 155,172; Antracite mine, 75,691; Ruby mine, 8,155; New Castle mine,

82,388; Spring Gulch mine, 99,258; Sunshine mine, 17,100 tons. From the Sopris mine 65,980 tons of coke were produced and 47,620 tons from Crested Butte. The Elmore and Cardiff ovens produced 76,143 tons and 56,184 tons respectively. The total production was 1,748,697 tons of coal and 245,930 tons of coke.

United Coal Company.—This company, according to the Denver "Times," owns nearly all of the large lignite and bituminous coal mines in the northern portion of the State, and some located in the southern. The mines are the Acme and Caledonia, at Louisville; the Simpson, Excelsior and Gladstone, at Lafayette; the Long's Peak and Cleveland, at Erie; the Oak Creek, at Williamsburg; the Solar, at Walsenburg; and the Peerless, at Aguilar. The tonnage of the mines for the past year was 325,000 tons from the lignite mines and 175,000 tons from the bituminous mines. Total, 500,000 tons. The product is marketed as far east as Sioux City, Council Bluffs, Kansas City and Topeka. The company has also secured a contract to supply the State institutions of Texas and the Colorado product also goes to Shreveport, La. Also several cities in the South, coming in competition with the product of the mines of Alabama. The officers of the company are: President, James Cannon, Jr.; vice-president and secretary, H. C. Brooks, Sr.; auditor, E. P. Phelps; general sales agent, L. E. Andrews; superintendent of bituminous mines, William McNeal; superintendent of lignite mines, L. S. Jones; mining engineer, D. M. Simpson.

Custer County.

Bull-Domingo Mining Company.—From the 600 level up the Bull-Domingo is now being worked on a lease by some of the miners, says the Silver Cliff "Rustler." The company is operating the other levels. Instead of sacking the concentrates as heretofore, they will hereafter be shipped from the mill in bulk.

Eagle County.

The following of Red Cliff mining news are taken from our local exchanges:

Belden.—The force on development work on this property has been increased. At a point 500 ft. down the incline a new cross-cut has been started to the right, which will cut the channel at this depth and open up the stoping ground 300 ft. above, while determining the exact trend of the channel on its passage to the ore bodies beyond. Already the drift shows the proximity of a large channel. An electric hoist will shortly be placed in the mine.

Ground Hog.—The shipments from this mine last week distributed among the various lessees \$6,000. All the leases have channels of rich gold ore on which to continue, notably the Stonebreaker lease, which shows a chute of ore said to assay 44 oz. in gold. The shipments from this lease last week consisted of three different grades of ore, which netted respectively \$770, \$390 and \$370 per ton, gold values running from 15 to 35 oz. per ton and \$150 in silver.

Holy Cross District.—A Crawford mill will shortly be shipped to the camp. A revival in the mining industry of the Holy Cross district is expected.

Polar Star.—This property is expected to resume about January 10th, with a working capital of \$75,000. The property will be under the management of Captain Thatcher, of Aspen.

El Paso County.

(From an Occasional Correspondent.)

Anaconda.—The output for November with 30 men at work exceeded \$30,000.

Cripple Creek mines are doing better than the most enthusiastic admirers ever dreamed. The November output was the largest in the history of the camp, and the output for December, in spite of the holidays, will exceed that of November.

Pharmacist.—This property shows marked improvement in the lower levels. It is the deepest mine in the camp; the shaft has been sunk 340 ft. The trouble with the early history of this mine was that the owners wanted to pay dividends before any or sufficient development was done; the mine is now rapidly being put into shape and the resumption and continuation of dividends is an assured fact.

Pike's Peak.—This claim recently shipped 1 1/4 tons of 300-oz. ore, and during five months about 30 lbs. of gold were panned out, the lowest grade of fineness being 993 5, and one shipment at the Denver mint gave 999 fine, a degree of purity, I believe, unequalled in the annals of mining. This camp is now the Mecca of "new process" fiends, and they are receiving the encouragement due for their time, thought and treasure.

Victor.—This is still the premier mine of the camp; the output per month varies from 90 to 100 tons.

Lake County.

(From our Special Correspondent.)

Iron Ore.—The mining of this ore is now one of the mainstays of this camp. Leadville is the only camp in the State where fluxing iron is found in paying quantities. Not only is it called upon to furnish this essential to the smelters of the State, but also to the Colorado Fuel and Iron Company's steel plant at Pueblo. The iron output of the camp is pretty close to 1,000 tons per day. Among

the principal iron producers are the Dunkin, R. E. Lee, Annie, Chrysolite, Denver City, Big Chief, Lee Basin, Small Hopes, Morning and Evening Stars, Catalpa & Crescent, Carleton, Elk, Pendery, Henriett & Maid, Grey Eagle, Iron-Silver, Emmett and Little Silver properties.

Leadville District.—The output for the year 1893 amounts to \$8,579,195. This is an increase over 1892, which output amounted to \$8,160,389. There is a heavy increase in the gold production of the camp which materially swells the 1893 figures. The total production of bullion from Leadville ores was made up as follows: Net tons of ore smelted, 351,794; gold produced, 44,413 oz.; silver produced, 8,537,883 oz.; lead produced, 36,274,889 lbs.; copper produced, 1,101,961 lbs.; zinc produced, 735,000 lbs. The total output for this district from 1879-1893 inclusive amounts to \$188,289,403. The gross tonnage of the camp for the year is divided up as follows: Catalpa & Crescent, 13,000 tons; Welden, 2,000; White Cap, 2,000; Morning Star, 30,000; Evening Star, 3,000; Big Chief, 12,000; Louisville, 3,500; Continental Chief, 8,000; Commercial Mining Company (Capitol shaft), 750; Wolcott, 7,223; Hibsche lease, 1,811; Doris, 500; Stag Mining Company, 11,000; Bison Mining Company, 2,700; Iroquois Company (Glass Pendery), 4,350; Wolfstone, 26,356; Maid of Erin silver mines, 20,457; Grey Eagle and Pocabontas Consolidated Mining Company, 21,542; Orion lease, 3,317; Denver City, 3,400; Lee Basin, 500; Union Mining and Leasing Company, 2,230; La Plata, 1,368; Matchless, 10,000; Mike & Starr, 10,000; Lillian, 1,500; Antioch, 5,000; Mahala, 23,181; Agassiz, 2,880; Fanny Rawlings, 2,500; Valley, 1,000; Midnight, 2,800; Elk, 1,200; Emmett Mining Company, 4,000; Boreel Company, 7,350; Leadville Consolidated, 1,095; Small Hopes, 18,086; Adelaide, 506; Chrysolite, 1,997; Iron Silver Mining Company, 2,010; Nisi Prius, 2,800; Twin Lakes district, 1,000; Seneca Company, 700; Little Chief, 1,850; Wm. Wallace, 3,200; R. E. Lee, 1,500; Eliza, 200; Silver Cord, 17,000; leases, 25,000; grand total, 339,035 tons.

Robinson District.—The Wiefley tunnel has just been supplied with a large concentrator which adds greatly to the output. The difficulty between the operators of the Cabinet group has been settled and work has been resumed. Three new shafts are going down near the Washington property in order to facilitate the handling of the large ore bodies already disclosed. The Robinson, Rattler, Diamond B., Felicia and Grace are all shipping.

Wildcat.—On this property, located near the Niles-Augusta, the new shaft which has been going down for some time, has succeeded in opening up the second contact ore body. The chute disclosed is the one opened up in the Niles-Augusta and followed into the Wildcat ground where it was found that the faulting had cut the chute, so the sinking of a new shaft was necessary. Preparations to ship are now being made.

Saguache County.

United Mines Company.—At a meeting of the directors of this company, of Creede, held in Denver, on December 29th, the following officers were elected: W. B. Felker, president; Bryon E. Shear, vice-president; D. H. Moffat, treasurer; W. H. Bryant, secretary; and L. N. McLane, manager. The company owns the Golden Eagle, Happy Thought, Argenta and Ironclad properties. The manager was instructed to proceed with the active development of the mines, and contracts will be let at once.

FLORIDA.

Marion County.

Illinois Phosphate Company.—This company has contracted for another large phosphate plant to be erected at once at Early Bird. The contract has been awarded to McLanahan & Stone, of Hollisburg, Pa., for the complete plant, consisting of their patent steel log washers, engines, boilers, screens, conveyors, etc.

IDAHO.

Lemhi County.

Lemhi Mining, Milling and Reduction Company.—This company, with mines at Gibbonsville, has opened Chicago offices in the Teutonic Building. This company is incorporated under the laws of Illinois, and has for its president Mr. John A. Quayle. The company is at present placing a fine cyanide plant in the mill at Gibbonsville.

Owyhee County.

Black Jack.—The contract for driving the Idaho cross-cut ahead, which will eventually tap the Black Jack ledge 300 ft. below the eighth level, was let to R. B. Anderson and Charles Webb, of Idaho City, who are now pushing work on the same. This tunnel will be, when completed, 1,400 ft. long. Connections will soon be made in the sixth level, for air. At present they are forcing air into the mine with a fan.

Mississippi.—This is one of the few patented claims on War Eagle Mountain and is situated on the northwestern slope, says the Idaho "Avalanche." The claim is developed by a 400-ft. drift on the vein, a winze 42 ft. deep, and an upraise of about 20 ft. The ledge is strong and well defined, the pay streak averaging 1 ft. in width the whole length of the drift, of good, free milling, gold ore.

Ontario.—This mine, in Nigger Gulch, Florida Mountain, is being opened by a cross-cut which will cut the ledge at a considerable depth. This is a gold property.

Trade Dollar.—Drifts have been started north and south from the upraise, at the 119-ft. level. Only a small force is working at present, but it will soon be increased, and other drifts run from the 210-ft. level. They are working rich ore.

KANSAS.

Atchison County.

Atchison Home Coal Mining Company.—Articles of incorporation have been filed by this company, of Atchison. Capital stock, \$11,000. Directors: E. R. Felt, George W. Grover and Harry Putnam, of Atchison; A. S. Goodrich, of Vally Falls, and R. G. Grover, of Topeka.

Leavenworth County.

Leavenworth Home Coal Mining Company.—This company has been incorporated, with a capital stock of \$159,000. The directors are David A. McKibben, John M. Lang, Harvey D. Rusk, Walter C. Sprague and James L. McKibben, all residents of Leavenworth. D. A. McKibben and J. M. Lang were heavy creditors of the old Home mine. They foreclosed a mortgage they held and then bought the property in at the sheriff's sale and have organized a new corporation.

MICHIGAN.

Copper.

Arnold Mining Company.—The late assessment has furnished funds sufficient to put this company out of debt and continue work through the present year.

Centennial Mining Company.—The boilers at this mine are being overhauled, and it is reported that work will be started up early in January.

Iron—Marquette Range.

The figures for the leading iron mines for the year just closed are given by the Ishpeming "Iron Ore" as follows: The total tonnage sent out for the year now about closed amounts to 1,237,846, and is made up as follows: Ames, 1,103; Cleveland, 218,130; East New York, 911; Iron Cliffs, 130,851; Lake Angeline, 351,989; Lake Superior, 329,624; New York, 25,000; Winthrop, 180,238; total, 1,237,846. Compared with the business of 1892, this shows a shortage of 269,147 tons, which, considering the general condition of trade, is a remarkably good result.

Ames.—This is a new property, says "Iron Ore," and practically takes the place of the East New York, which has been abandoned by the owners of the fee, who lacked sufficient funds to carry on the business. Their pumps are buried by the water of the mine, and it is said that considerable good-quality ore was also left in sight. The Ames is owned in fee by the same parties who possess the fee of the East New York, and the new property is but a short distance to the north and east of the old. The Ames has one prospecting shaft in ore and a working shaft is now down below the first level of the mine. They expect to start mining ore in earnest with the first week of the new year, and hope to make a profitable output the coming season. The ore is of good quality, holding about 64% iron, and is well under the Bessemer limit in phosphorus. Should it prove to be what its friends expect it will add much to the stability of the city in which it is located.

MINNESOTA.

Iron—Mesaba Range.

(From our Special Correspondent.)

Canton.—In one day this mine hoisted 903 tons of ore, the best record in its history.

Consolidated Mines.—The Mountain Iron and Rathvon mines, of this company, on which extensive stripping has been carried on, have been obliged by the cold weather to suspend operations till March. About 350 men are thus thrown out of employment, and not a mine in the Mountain Iron or Virginia districts of the Mesaba is in operation.

Roucheleau-Ray.—This company has given an option for lease to the Higgins Wildcat Company on six promising 40-acre tracts in 8 and 9, 58, 16. A bonus of \$50,000 is to be paid on the option, if taken. The Higgins Wildcat Company is an extensive holder of iron and pine lands, but has never done anything in iron.

MISSOURI.

Bates County.

Wise Coal Company.—This company has been incorporated by J. M. Wise, Sidney Haines and others to mine coal near Rich Hill.

Jasper County.

(From our Special Correspondent.)

Joplin, Jan. 1.

Saturday evening closed the calendar year in this lead and zinc mining belt, which includes southwest Missouri and southeast Kansas. The past year opened under the most favorable conditions and lead and zinc ore were in good demand and satisfactory prices were paid the mine operators, but in the month of May prices commenced to decline and in the latter part of June only \$16 per ton was offered for the best grades of zinc ore.

and even at that price the smelters were not able to dispose of the metal at a profit. Smelters then shut down part of their furnaces and a number of the largest mine operators closed their mines while others only gave employment to a small force of men and kept them employed in prospecting and developing, so that the production of ore was principally confined to the small operators. The latter part of September there was some demand for ore at prices ranging from \$17 to \$18.50 per ton, which price was advanced in November to \$19 to \$20 per ton and the majority of the mines resumed operations; some ore was sold at \$21 per ton, but prices again declined to \$18 to \$19, so that the year closed with a dull market and low price paid for ore. The total value of the production of lead and zinc ore for the year 1892 was \$4,580,787, while the value of the production for 1893 will not exceed \$3,750,000. According to reports from the mining industry throughout the Western States, I feel that we have not suffered as much from the general financial embarrassment of the country as other points have, and, on the whole, we have had a prosperous year. Much new development has been made during the past year, particularly in the new Spring City district, in Newton County, south of Joplin. These new and very productive mines have been opened up due east of Joplin and at the present time new land is being opened west of Joplin. One thing in particular to our credit is that we have had no bad business failures and no bank failures, such as have been common elsewhere. We cannot say that the new year will open up with any marked improvement, but the operators feel that within less than three months there will be an increased demand for ore which will insure better prices.

Following are the sales of ore from the district for the past two weeks: Joplin mines, 2,229,670 lbs. of zinc ore and 765,780 lead, value \$22,910; Webb City mines, 929,990 lbs. of zinc ore and 144,530 lead, value \$10,730; Cartersville mines, 1,586,040 lbs. of zinc ore and 414,200 lead, value \$22,747; Zincite mines, 162,580 lbs. of zinc ore and 25,070 lead, value \$1,848; Oronogo mines, 35,570 lbs. of zinc ore and 192,120 lead, value \$3,051; Lehigh mines, 30,750 lbs. of zinc ore, value \$282; Galena (Kan.) mines, 1,638,000 lbs. of zinc ore and 840,000 lead, value \$27,163; district's total value \$88,731.

MONTANA.

Lewis & Clarke County.

Montana Mining Company, Limited.—A dispatch from the mine gives the following information: Have driven cross-cut from old workings in 400-ft. level and encountered the continuation of New Castletown vein recently discovered in No. 3 level. Have advanced 8 ft. in ore. The width of the vein is not yet determined.

Missoula County.

Charcoal.—This mine, on Camas Prairie, is working a small force and shipping ore regularly.

Helena & Victor Mining Company.—The Curlew mine, near Victor, owned by this company, says the Helena "Independent," has been a somewhat erratic dividend payer. The ore is concentrated in a 100-ton mill, located near the mine. The concentrates produced have always been high grade. Recent developments have disclosed bodies of ore which are now being worked at a profit, notwithstanding the low price of the white metal. One of these ore bodies was struck on the 500-ft. level and gives promise of permanency. It is thought to be a continuation of the ore chute which, in the 200 and 300-ft. levels, made much money for the company a little over three years ago. Another ore chute was also struck this winter in an entirely new portion of the mine and at a depth of about 100 ft. The grade of ore in this is very high, going, it is said, between 300 and 400 oz. in silver to the ton. The greater part of the indebtedness incurred by the company after the disastrous caves of 18 months ago has been paid, and the company by the first of the year will be able to show a balance on the right side of the ledger. A considerable increase was recently made in the working force at the mine.

Keystone.—This mine, in Spring Gulch, is being worked under lease, and 16 men are employed.

Silver Bow County.

The Murray-Heinze injunction suit over the Estella mine came to an end Friday, December 15th, after a 16-days trial, by the unanimous verdict of the jury in favor of Heinze, after less than two hours' debate. December 16th, as was shown by the telegram published in our columns. This suit attracted much interest among the miners and mining men of Butte. (Should the present verdict be sustained on appeal Murray would become liable for the damages caused Heinze, to cover which Murray was compelled by Judge McHatton, upon granting the injunction, to file a bond for \$125,000.

Bi-Metallic Mining Company.—Work on the big tunnel is to be begun about January 15th.

Gilt Edge Mining Company.—This company, at Malden, will have a 500-ton mill in operation by next June. It is said the plant in use thus far has cost in the neighborhood of \$130,000, and as much more will be expended in the next six months. The mill will be run all winter unless unforeseen accidents occur. They are now milling about 70

tons per day, the ore running about \$8 per ton. The company now employs about 40 men.

Poorman Mining Company.—At the annual meeting recently the following board of directors was elected: Benjamin C. Kingsbury, John Noyes, Patrick Clark, E. H. Irvine, T. M. Lowry, H. L. Frank, Robert Crix. The following officers were elected: President, B. C. Kingsbury; vice-president, E. H. Irvine; secretary, C. S. Eltinge; treasurer, J. V. Long.

West Elba.—This mine is again being worked under lease by G. A. Kornberg, Bert Avery and Charles Johnson, says the Butte "Inter-Mountain." A new 50-H. P. boiler and engine are being placed in position. The lessees will sink the shaft from the 225 to the 300 level, and at the same time will open up a winze from the same point. This mine under the former lease produced some very rich ore. One shipment last summer yielded 469 oz. silver and \$40 in gold to the ton. The vein has been from 6 in. to 3 ft. wide, and has always furnished rich ore. About 15 men are now employed on two shifts.

NEVADA.

Elko County.

Coptis Mining Company.—This company's mine at Tuscarora has been leased to a syndicate composed of Battels & Co., Lewis & Co. and Hamilton & Co.

Esmeralda County.

Silver Peak District.—A company was recently incorporated in San Francisco to develop the mines in Silver Peak district. The directors are: F. S. Chadbourne, Allen Foote, J. G. Burgin, T. Farless and B. Gamble. The capital stock is placed at \$2,000,000, of which \$25,000 has been subscribed. The incorporation has purchased 20 locations in the district from John I. Blair, of New Jersey. The plans of the incorporation include the construction of a 150-stamp mill which it is expected to have in running order about the middle of next July. The ore in Silver Peak district is exclusively gold-bearing and there are numerous locations there being developed by miners on a small scale.

Eureka County.

Diamond and Excelsior.—These mines, in Eureka district, recently consolidated and incorporated under one title, consist of two groups of mines situated on the eastern slope of Prospect Mountain and comprise some of the oldest locations in that part of the district. The plans of the companies are not yet fully matured, but they have announced the following facts: The Excelsior mine will remain for the present comparatively inactive, and the Diamond mine will be worked with less than one-half the force of men that were employed in it before the price of silver dropped. The main shaft is now down 473 ft., and will be continued to a depth of 1,000 ft., and levels will be opened for the purpose of exploring the mine to that depth for still more extensive operations. At a depth of 1,000 ft. the bottom of shaft will be about 1,700 ft. below the surface workings and 500 ft. deeper than any other workings in Eureka district. The yield of the Diamond mine for last year, notwithstanding that no ore was extracted during the months of July, August, September and October, and a part of November, will aggregate not much less than 7,000 tons, with an average gross value of about \$30 per ton in gold, silver, lead and iron.

Lander County.

Austin Mining Company.—Mr. P. T. Farnsworth, manager of this company, has gone to Austin on business connected with the work now doing there. The company is at present employing 80 men in its mines near Austin and a heavy force in the concentrator, which is turning out a large amount of concentrates. Shipments are now received at the Salt Lake City office of the company every week.

Lincoln County.

Magnolia.—Operations at this property are resumed and promise to be permanent, says the Pioche "Record." A small force only now is employed and ore is being shipped to the mill at Hiko, 10 teams being engaged in the work. About 800 tons are already out, which is expected to average \$100 a ton in gold, and on this grade of material milling will be commenced. Seven men are employed about the mill, and it is expected to be running shortly. The mill is in good condition considering the length of time it has remained unused. As soon as milling begins about 15 men will be put on at the mine, and this force is expected to supply ore enough to keep the mill running steadily. The ore is brought down on the Golden, or north side of the gulch, and a grade is constructed from the divide on the Helene road through Golden.

Storey County—Comstock Lode.

Segregated Belcher & Midas Mining Company.—The superintendent's latest weekly official letter says that in the company's mine a mixture of porphyry and quartz is showing in the face of the north drift from the south raise above the 1,100 level. A small streak of quartz is being followed upward from the 1,100 level. The south raise from the 1,200 level is in porphyry, clay and quartz.

Crown Point Mining Company.—In the Crown

Point mine the drift that was started last week from the top of the 300 level raise has been connected with the small drift from the shaft. From the top of this raise a drift to the southeast has been started to follow a small streak of quartz. The raise from No. 2 cross-cut, 700 level, is up 35 ft. The top is in low-grade quartz and porphyry.

(From our Special Correspondent.)

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

Mines.	Ore Hoist'd	Car Sample Assay.	Ore Milled.	Av. Bat'y Assay.	Bullion for Week.	Total.
Con. Cal. & Va....	39 ^a	53.04	.....	.....	.....	.....
Chollar....	232	35.14	223	\$25.69	.....	.....
Hale & Norcross	15 ^a	29.54	.....	.....	.....	.....
	23 ^a	19.61	.....	.....	.....	.....
Savage....	320 ^a	27.16	220	23.33	\$3,438.82	289 lbs. ^b

^a 1234 Cars. ^b Crude bullion shipped to Carson Mint.

Consolidated California & Virginia Mining Company.—Good ore has been struck on the 1,650 level, in the raise above the Segregated Belcher 1,100 level, and on the Andes 420 level. Good ore has been extracted for some time from the 1,650 level, but a richer body was uncovered last week. On this level the workings are in virgin ground, and thus opportunities are offered for a big vein of ore. The ore ran by assay \$53.38 per ton.

Hale & Norcross Silver Mining Company.—The Supreme Court calendar for the January term has been issued. The celebrated case of Fox vs. the above company and others, is set for Wednesday, the 14th. The amount involved is \$1,011,000, with interest from the date of the judgment—May 28th, 1892.

NEW JERSEY.

Morris County.

Richard Mine.—An accident occurred at this mine, at Port Oram, in which two men were killed and four badly injured. The men were working about 600 ft. under ground when the accident occurred. They had been trying to loosen a mass of rock that weighed over 25 tons, but found that it was impossible to move it in the least without blasting. Three miners were sent to examine it, and pronounced it safe to work under. The men started to drill, and had scarcely begun to work when the entire mass fell upon them.

NEW MEXICO.

Grant County.

Texas.—According to the Silver City "Southwest Sentinel," this mine is still pushing development with good results. The main shaft is now down about 200 ft. The third level, 100 ft. below the second level, will be started at once and drifting and stoping will then be started also. The result of the shipment of 9,148 lbs. of ore sent to the Philadelphia Smelting and Refining Company, at Pueblo, Colo., netted the operators \$608.78. In the meantime they were pushing down the shaft 75 ft. Another shipment of about five tons of high-grade ore was made on December 22d to the same works.

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

Cook's Peak Mining Company.—The property of this company is at Hadley, nine miles north of Florida, on the Atchison, Topeka & Santa Fe Railroad. It is a true fissure vein, largely made up of decomposed porphyry, varying in color from white to green. The walls themselves are porphyritic in character. The ore is spar and galena. The average value of 300 tons shipped during the latter part of 1893 gave returns of 70 oz. silver, 4% lead and 0.08 oz. gold. The average shipments for the past two years have shown 61.6 oz. silver, 4% lead and 0.08 oz. gold, which has netted the company an average of about \$70 per ton. The property is worked from a shaft with five levels, the lowest 525 ft., but development work is now being done in sinking the shaft to the 625 ft., and about half the distance has been covered. We expect to cross-cut the vein some time next February. There is some 470 ft. of continuous ore yet unstopped on the 525-ft. level. The mine produces two grades of ore, the first class, or shipping ore, is sent directly to the Rio Grande smelter, at Socorro, and the second grade is concentrated at the mine by means of two hand jigs and four steam concentrators of four compartments each, with a capacity of 45 tons every 10 hours, giving from 5 to 5½ tons of concentrates. This is all sacked and shipped to the same smelter. The water in the mine does not give much trouble, and only affords a sufficient supply to work the concentrators. The mines are at present being worked, the miners having accepted a reduction in the price of labor that will about offset the reduced market value of the product.

OREGON.

Douglas County.

(From our Special Correspondent.)

International Nickel Mining Company, Riddle.—In order to raise money to carry on operations the Anglo-American Nickel Company, Chicago, has deeded its property in trust to W. H. Dyrrenforth, who will hold it for the benefit of bondholders. Bonds aggregating \$1,500,000 have been issued,

bearing 6% interest and made payable in Portland. The affairs of the two companies owning an interest in these mines are becoming complicated. J. J. P. Odell & Co., the banking firm, of Chicago, brought suit a short time ago to foreclose a mortgage of \$60,000 on the property. There is also an attachment suit for \$10,000 brought by W. A. Harris against the same company.

PENNSYLVANIA.

Anthracite Coal.

The Schuylkill Coal Exchange, of Pottsville, in its monthly circular says: The collieries of the Philadelphia & Reading Coal and Iron Company drawn to furnish prices of coal sold in December, make the rate of wages to be paid for last two weeks of December, 1893, and first two weeks of January, 1894, 3% above the \$2.50 basis.

Bituminous Coal.

The Pittsburg papers state that the miners' convention held last week at DuBois, representing Clearfield, Center, Cambria, Jefferson, Huntingdon, Clinton, Indiana and Tioga counties, which contain upward of 16,000 miners, voted to join the United Mine Workers' of America as a national organization in preference to the Knights of Labor or a new organization. The coal operators who are working under the district price of 65 cents per ton have given no intimation to the miners' officials that they will order an advance. President D. J. Crawford, of Indiana, is engaged among the river miners continuing the work of organization. He will also, with the railroad miners' officials, make a visit to the mines on the Wheeling division of the Baltimore & Ohio Railroad, where the rate is not being paid. Within the past three weeks more than 1,000 miners have become members of the United Mine Workers, who have heretofore refused to attach themselves to any organization. President Crawford states that with the prevailing feeling among the men it is simply a question of waiting a short time for all to come in.

A dispatch from Grove City says that the coal companies operating the Chestnut Ridge, Haltville, Black Diamond, Williams, Speer and Trout mines notified their employees on January 2d of a 20% reduction in wages. The present rate for mining is 65 cents per ton. The miners are excitedly discussing the situation, and are talking strike. About 1,000 men are affected by the reduction.

A press dispatch from Pittsburg says that the strike of the railroad coal miners on the Wheeling division of the Baltimore & Ohio Railroad, which was inaugurated January 2d, is now complete. The miners affected are those of the Pittsburg & Chicago Gas Coal Company, at Snowden and Gastonville, Henry Florsheim and D. M. Anderson's, located near Finleyville. About 3,000 men are interested and the struggle will likely be a stubborn one. The men are determined to remain out until the 65-cent rate is paid.

An execution for \$29,278 was issued on January 3d against S. S. Blair, superintendent of the Tyrone & Clearfield Railroad Company, and a well known operator in the Clearfield region. He was involved in the McCoy, Liverlight & Co. failure.

A dispatch from Pittsburg says that the purchasers of Somerset County coal lands are looking up the lines and preparing to open mines in anticipation of the coming of the Beech Creek Railroad. Two corps of engineers have made their appearance along Laurel Hill Creek. The coal lands owned by the late James G. Blaine along the Monongahela River are for sale.

SOUTH CAROLINA.

Phosphates.

Carolina Mining Company.—This company will at once make preparations to re-equip its phosphate plant and resume operations in river mining.

Coosaw Mining Company.—This company will re-equip its phosphate plant and resume river mining.

SOUTH DAKOTA.

(From our Special Correspondent.)

The following is a statement of the total output of the gold mines of South Dakota for the year 1893:

Name of mine.	Number of stamps.	Tons reduced.	Product.
Homestake	240	350,000	\$1,200,000
Highland	120	180,000	840,000
Deadwood Terra	260	180,000	300,000
Caledonia	30	81,000	180,000
Big Missouri	30	27,000	81,000
Hawkeye	40	18,000	45,000
Minerva	20	5,143	16,000
Columbus	10	15,000	45,006
Bartholemew & Nilson	20	3,000	10,800
Minnesota	..	200	700
Standby	20	7,000	15,000
Keystone	20	18,736	65,000
J. R.	10	6,720	94,000
Ruth City Hardner	20	..	15,000
Hildebrand	..	..	5,000
Consolidated, chlorination.	..	..	25,000
Rapid City	..	..	1,000
Red Cloud	..	..	100
Golden Reward	..	32,500	486,000
D. & D. Smelter	..	50,000	540,000
Two Bears, concentrating	20	..	65,000
Ores shipped to foreign plants	..	..	15,000
Placer gold	..	..	32,000
Total	900	975,400	\$4,098,500

In the 43 mines now in operation there, 1,402 men are employed. Of the 43 mines, all but 7 of the small ones are embraced in the district, eight miles square, of which Deadwood is the center. The Homestake Mining Company employs 855 men out of the total number, and the Golden Reward Company 100. These figures include only the miners and not millmen and others engaged in top or outside work. It is estimated that one-half of the male population of the Black Hills are engaged in mining in its various phases.

Lawrence County.

Bullion Mining Company.—Development work on the recent strike of silver-lead ore in the Bullion mine, near Galena, shows it to be a vertical vein, improving as the work progresses, says the Deadwood "Times." The discovery was made in a drift from the main tunnel. In following the vein the drift turned from its original course and is now running nearly due south, and is 10 ft. underneath the tunnel, from which it was started.

Cleopatra.—A strong shoot of ore was recently opened in this property, situated on Squaw Creek, in Carbonate district, which assays from \$18 to \$25 gold per ton, says the Deadwood "Times." It is the brown iron rock highly crystallized. The shoot is 4 ft. thick and 6 ft. wide. The discovery was made easterly from all other workings on the claim in an open cut which was started on a small seam appearing on the surface. The cut is 8 ft. wide and 20 ft. long, in the face of which is to be seen the solid ore.

Deadwood & Delaware Smelting Company.—This company's works closed down on December 28th, throwing 50 men out of employment. Before closing the plant a general clean-up of all the ore on hand was made and smelted. There is nothing new to report in regard to the transfer of the property to the new company "headed by Harris Franklin," who secured an option on it a short time ago, says the Deadwood "Times." It is asserted, however, that the deal will be perfected during the present month. A change of ownership and management will probably result in the continuous operation of the plant.

Homestake Mining Company.—According to the Deadwood "Times," this company is delivering wood at the Terra and Caledonia mills, at Terra-ville, and it is said that those properties will resume operations. The "Times" says that Superintendent Grier has been promoted to a more important position with the company at New York, and that Mr. J. S. Childs will be appointed superintendent.

South Dakota Mining Company.—This company has started a tunnel on its Garden City property, which it is intended to drive 600 ft. to tap the ore body known to exist in the Eva and Edna mines. When the desired point is reached an upraise will be made and the ore mined out in stopes. At the Annie Creek mines of the company a 300-ft. tunnel has been commenced, which will be driven along the strike of a vertical vein of ore. A shaft will also be sunk on the same vein 200 ft., where it is expected quartzite will be encountered. Progress is being made on the line of the ditch and flume, one-fourth of a mile of grading being performed daily.

TENNESSEE.

Bradley County.

(From our Special Correspondent at Chattanooga.)

Blue Springs Mining Company.—This company has contracted with the Walburn-Svenson Company, of Chicago, for a 50-ton concentrating plant, for the purpose of separating lead and zinc ores, and expects to have same in operation by February 10th.

Hamilton County.

(From our Special Correspondent at Chattanooga.)

New Soddy Coal Company.—Capt. H. S. Chamberlain and Mr. D. P. Montague became proprietors about a year ago. The coal mines belonging to this company, situated on the eastern brow of Walden's Ridge, on the Cincinnati Southern Railroad, 25 miles from Chattanooga, are in full operation and the daily output, 600 tons, is greater than ever before. The entire coking plant, 165 ovens, are in operation, turning out 160 tons of furnace coke daily.

Polk County.

Ducktown Sulphur, Copper and Iron Company.—This company is now smelting 150 tons of copper ore per day.

Pittsburg & Tennessee Copper Company.—This company is erecting a plant that will cost not less than \$100,000, including sheds for the purpose of roasting ore.

TEXAS.

Presidio County.

San Carlos Coal Company.—This company has purchased from the State of Texas two sections of school lands for \$10 per acre. The company is a West Virginia corporation, and its officers are S. A. Johnston, president, and A. A. Straub, secretary, both of Allegheny County, Pa.

UTAH.

Beaver County.

Horn Silver Mining Company.—Operations at this company's mines at Frisco, which were discontinued on December 24th for Christmas, were resumed on December 28th, the same large force

being put to work in the mines and on the concentrator which is being put in by the company. The latest advices from Frisco are to the effect that the new mill will be ready for operation shortly after the middle of the present month.

Rob Roy Mining and Milling Company.—An execution has been issued to enforce a judgment granted in favor of miners and other creditors against this company, in amount \$695 and costs of suit. It is reported that P. T. Farnsworth, general manager of the Horn Silver Mining Company, recently bought a considerable interest in the Rob Roy.

Juab County.

Mammoth Mining Company.—The 40-stamp mill at the Mammoth has been completed, and the crushers are already at work crushing ore. The plant will be ready to start reducing ore by next week, and will probably be started by that time. The plant has a capacity of about 125 tons of ore per day. The company has two dumps of second-class ore containing about 100,000 tons, which can be worked profitably by this plant. The ore contains some gold besides from 15 to 20 oz. of silver to the ton.

Salt Lake County.

The shipments of ore and bullion from Salt Lake City for the week ending December 23d were as follows: 950,700 lbs. bullion; 53,400 lbs. copper matte; 2,431,280 lbs. silver and lead ores.

The receipts of ore and bullion in Salt Lake City for the week ending December 27th were to the aggregate of \$134,172, of which \$73,347 was in bullion and \$60,825 was in ore. The receipts of Mingo bullion during the week were \$34,264; Hanauer bullion, \$15,480; base bullion, \$24,600. Ore receipts during the week were \$39,825 by McCormick & Co., and \$21,000 by T. R. Jones & Co.

VERMONT.

It is reported that the Vermont Slate Trust will not organize for 1894. Some of the makers desire to sell their stock on hand, and will refuse to sign the contracts, trusting that with a reduction of prices they can dispose of their surplus. The quarries that are not under the control of the trust are now running on full time.

VIRGINIA.

Henrico County.

Gayton Coal Company.—This company has been incorporated for the purpose of mining coal, etc., with a capital stock of \$10,000 and privilege of increasing to \$25,000. John C. Haddock, of Glen Summit, Pa., is president; Ware B. Gay, of Boston, Mass., vice-president; W. J. Winegar, of Richmond, secretary, and W. S. Hurst, of Westfield, N. J., treasurer.

WISCONSIN.

Iron—Gogebic Range.

Montreal.—It is said that work will be resumed early in January at these mines, near Hurley.

FOREIGN MINING NEWS.

BRAZIL.

Ouro Preto Gold Mines.—The report for the year ended June 30th says the new company was registered on April 10th last, and the whole of the shares allotted. The revenue account shows that the value of the gold produced during the year was £44,701. The total expenditure was £39,872, leaving a balance of profit of £4,852 to be carried to profit and loss account, which has been dealt with as follows: £1,586 has been written off for depreciation of buildings, machinery and plant at the mines; £3,340 has been paid for interest on the debentures; £69 has been paid for income tax; leaving a debit balance of £144 to be carried to next account. The quantity of ore crushed was 39,692 tons, as compared with 39,766 tons in the previous year, and the gold produced was only £192 less than in 1892. The costs in Brazil, however, have increased to the extent of £3,678.

BRITISH COLUMBIA.

A private letter received at San Francisco, Cal., from Revelstoke states that the Canadian Pacific Railway is likely to make a rate of \$9 per ton on the silver-lead ores which abound in that vicinity, to the reduction works in and around San Francisco. If such a rate be made there will be an active movement of such ores in this direction.

CAPE BRETON.

Dominion Coal Company.—The coal exports from Cape Breton mines, operated by the Whitney syndicate, last year exceeded 1,000,000 tons, an increase of 100,000 tons.

PERU.

The important discovery of large beds of nitrate has been made on the north coast of Peru, near Port Chimbote, according to recent dispatches. Official analyses of specimens from the beds are extremely favorable.

SOUTH AFRICA.

Transvaal.

African Gold Recovery Company.—This company announces that 36,810 oz. of gold were recovered at the Rand and 3,500 oz. in other districts during November by means of the cyanide process. The 36,810 oz. formed 26% of the total Rand output for the month.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Jan. 5.

PRODUCTION OF BITUMINOUS COAL, in tons of 2,240 lbs., for week ending December 30th and year from January 1st:

	1893.		1892.	
	Week.	Year.	Week.	Year.
Shipped East and North:				
Phila. & Erie R. R.	796	79,071	98,033	
Cumberland, Md.	54,130	4,141,691	3,836,284	
Barclay, Pa.	428	44,069	67,520	
Broad Top, Pa.	3,382	574,695	656,238	
Clearfield, Pa.	62,918	3,841,810	4,007,610	
Allegheny, Pa.	22,069	1,271,476	1,281,461	
Beech Creek, Pa.	42,721	2,702,451	2,221,159	
Pocahontas Flat Top.	51,724	2,819,123	2,678,596	
Kanawha, W. Va.	62,894	3,250,516	2,757,561	
Totals	306,083	18,727,882	17,607,465	
Shipped West:				
Pittsburg, Pa.	22,597	1,236,115	1,267,697	
Westmoreland, Pa.	26,321	1,797,669	1,805,653	
Monongahela, Pa.	6,292	683,392	672,381	
Totals	55,210	3,727,286	3,745,731	
Grand totals	361,293	22,455,168	21,353,196	

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending December 30th, 1893, and year from January 1st, in tons of 2,000 lbs.: Week, 5,672 tons; year, 3,881,599 tons; to corresponding date in 1892, 5,425,968 tons.

Anthracite.

The opening week of the new year finds the anthracite coal trade in an exceedingly dull and quiet condition, utterly devoid of any features of interest and now, as it was during the entire month of December, altogether a weather market. There is little or no business doing—that is, business of any consequence. None need be expected until the weather becomes decidedly colder. Such weather as we have had of late has not tended to give operators much encouragement.

Though the market is far from being in good condition, it is by no means so badly off as to justify the extremely pessimistic opinions of it which have been expressed lately. Stocks in producers' hands are not abnormally heavy and in dealers' yards they are lighter than has been usual at this season of the year. Active measures have been adopted by almost all the operators to insure a safe and desirable curtailment in output, it having been agreed at the last meeting of the salesagents to restrict the production for January to 2,500,000 tons. This is a step in the right direction, which will benefit first of all the producers themselves.

Prices, on such business as has been done have ruled fairly steady. Lower prices just now probably might not bring about a greater volume of business in this market, but it is safe to say that present values are higher than they should be and that any increase in the demand will probably induce a decline. Late advices from Philadelphia are to the effect that no trouble is experienced in making purchases from all the anthracite companies at the June circular rates despite the agreement made by them to uphold the July circular.

Pea and buckwheat continue in good demand; both of these sizes are very scarce. There is no demand for any of the other sizes.

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	\$4.00	\$4.25	\$4.60	\$4.60
Free white ash	3.90	4.15	4.60	4.60
Shamokin	4.50	4.80	4.60	4.60
Schuykill red ash	4.30	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 December 30th, was 185,000 tons, of which 20,000 tons were sent to Port Richmond and 20,000 tons were sent to New York waters.

NOTES OF THE WEEK.

Judge Butler, in referring the petition for the removal of the Reading receivers to a master, incidentally decides several other questions. One of these is that there was nothing blamable in their action in making payments to brokers to release securities of the company which Mr. McLeod had pledged in his stock transactions. In making such payments they were merely protecting the company and cannot be regarded as in any wise indorsing the acts of Mr. McLeod. The court thinks, however, that Mr. McLeod's course in the matter may properly be inquired into with a view to ascertain whether he is accountable and should be proceeded against. The court refused to refer the allegations of discrimination in favor of the Lehigh Valley road, the alleged illegal car contract and other matters, and holds that President Harris had a right, as president of the company, to promote a scheme for reorganization.

Bituminous.

The year does not open in a propitious manner, so far as the bituminous coal trade is concerned. The market this week has been in as poor a condition as it was last week, if, indeed, it is not poorer. Orders, both transient and on unfilled contracts, have been and still are, extremely scarce. Nearly all the producers are restricting their output to a greater or lesser extent. All consumers are pretty well

filled up and naturally are not desirous of taking any more coal at present.

To some extent trade is going back to the lower shipping ports. This indicates that there have been a few more far Eastern orders in the market, although they make no showing of any consequence.

All-rail trade is fair. The same talk that was going the rounds in the trade a few weeks ago has been revived in regard to the main line roads "protecting" proportionately their shippers in the event of the duty on coal being removed. Any talk on this subject is premature. No definite information can be obtained one way or the other.

Cars are plentiful and transportation is up to all demands. In the vessel market a great number of the smaller coasters have gone into winter quarters, and those which are still in commission are seeking for trade this side of Cape Cod, making the shipment of the smaller orders difficult. Large-sized vessels are in fair supply and sufficient for the demand.

We quote ocean freight rates as follows from Philadelphia: To Boston, Salem and Wareham, \$1; Providence, New Bedford, New Haven, Bridgeport and Allyn's Point, 90c.; Portland, \$1@1.05; Portsmouth, \$1.05; Lynn, \$1.10@1.25; Newburyport, \$1.15; Bath, \$1.05@1.10. From Baltimore, Newport News and Norfolk rates are 10c. higher. To the following Southern ports rates from Philadelphia are: Jacksonville, \$1.25; Savannah, Fernandina and Port Royal, \$1.

Boston.

Jan. 4.

(From our Special Correspondent.)

It could hardly be expected that the first week of January would really be any more active than the last week of December, and as a matter of fact it was not. The yardmen want to get their yard orders squared up first and then they will probably wait for the barometer to fall before purchasing. The market for the next month at least will be a so-called weather market. If a very cold spell comes on them coal will move from the yards and will be followed by a demand from wholesalers. At present the yards are doing very little. In this city very little confidence is placed in the action of the companies' agents, as the limited output of 2,750,000 tons is unusually small and the companies are not likely to live up to it. At the end of the month it will be the same old story, over-production, notwithstanding these extremely dull times.

The companies quote the following prices: Stove, \$4.45; egg, \$4; free broken, \$3.75; chestnut, \$4.45. Individual operators sell in this market for 20c. under the circular.

There are practically no new orders being placed for soft coal. Some few cargoes are arriving, but they are for large consumers who are receiving it on old contracts. Prices quoted on cars here are: Cumberland, \$3.80; New River and Pocahontas, \$3.80; and Clearfield, \$3.50.

Freight rates are very steady. They are: From New York, 75c.; from Philadelphia and Hampton roads, \$1; from Baltimore, \$1.10; to Sound ports, from 10 to 15c. less than the foregoing.

Retail prices are: Stove, \$6.25; nut, \$6.25; egg, \$6; furnace, \$5.75; Franklin, \$7.75; Lehigh, \$6.25; Lehigh furnace, \$6; soft coal, \$4.25.

Buffalo.

Jan. 4.

(From our Special Correspondent.)

The year 1894 has opened very quietly as far as the coal trade is concerned. Prices of anthracite unchanged and the quotations for bituminous nominally without variation. Business with manufacturers must improve very materially before an increased demand for bituminous coal will be manifested. The comparatively mild weather results in only a limited burning of anthracite fuel. A hand-to-mouth policy has been and is still pursued by out-of-town retailers, involving less risk from bad debts.

The opening prices of anthracite coal free on cars at Buffalo or Suspension Bridge are as follows: Grate, \$4.90; egg, stove and chestnut, \$5.15 per 2,240 lbs. The retail prices in Buffalo are as follows: Grate, \$5.50; egg, stove and chestnut, \$5.75; pea, \$4 per 2,000 lbs. screened and delivered within city limits. Bloosburg coal sells at \$4 per 2,000 lbs., delivered. The range for bituminous coal per 2,000 lbs. in car lots on track is \$1.60@2.25 for Reynoldsville and Fairmount regions; \$1.50@2.15 for Mercer County and Alleghany Valley regions, and \$2.15@2.40 for Pittsburg region of the Alleghany Valley sizes from screened lump to slack.

The Buffalo, Rochester & Pittsburg Railroad Company gave an order for 200 gondola cars last week.

Capt. William P. Henry has resumed his duties as manager of the Lehigh Valley line of propellers, with headquarters in Buffalo. Captain Gordon has retired from the Lehigh, but will continue to manage the Northern Steamship Company's boats; his offices will be located here.

Chicago.

Jan. 3.

(From our Special Correspondent.)

Anthracite Coal.—We have had but one day of freezing weather here during the past two weeks, consequently the condition of the coal trade here is deplorable. Prices are being cut

whenever a possible sale can be made. Stocks continue to accumulate on the tracks, and are growing larger with each day. Orders given for future delivery some time ago are now being countermanded or extended.

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, \$6.75; small egg, range or chestnut, \$7@7.25.

Bituminous Coal.—The tonnage for the past week has been very light, with little prospect of any improvement within the next few weeks. Like anthracite the prices on bituminous are being cut to obtain business. Quotations for 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.—Sales are not numerous, although it is advancing a great deal in the esteem of the people here. The price of Connellsville coke has fallen considerably, the quotation being this week \$3.90 for furnace; other cokes are quoted as follows: Connellsville crushed, \$4.10; New River foundry, \$4.15; Walston furnace, \$3.85; foundry, \$4.

Pittsburg.

Jan. 4.

Coal.—The Pittsburg operatives are very much discouraged at the present outlook of the coal trade. The lower markets are well supplied with coal. There is a considerable amount on the way to the Southern markets, together with several million bushels loaded in the pools and harbor; the owners, at least some of them, are not anxious to ship, owing to the low prices that prevail. The best offer in Cincinnati and Louisville was 4½ to 5c.; most of this coal now on the market was mined at the 3-cent rate, so that the operatives claim they are losing money on it. Considerable was added to the cost by being detained here all summer on account of low water. Coal is now being mined at various prices, from 1½ to 2@2¼, according to location. There are a large number of river coal miners idle in the pools. At West Elizabeth, July 3d, the Joseph Walton Coal Company in the second pool offered their men 2¼c. and five months' steady work; it was declined on the ground that the price paid at most mines was 2½c. The fact that several mines are working at less than the district price seems to be the great difficulty in the way of general resumption. The outlook is not a favorable one.

Connellsville Coke.—Rumored coke combination to force up prices. An official of one of the large coke companies in speaking of the outlook in the coke trade and the ruinous price at which it is selling, said: There is probably no article of American manufacture that has been subject to such decline in prices within the last two months as coke. This commodity, which for its production requires plants costing millions of dollars, is selling at prices that in some cases will not yield profit enough to keep the works in repair. The question that arises to the thinking man is whether these low prices are the result of honest competition for trade, or are caused by the endeavor of a single interest to gain control of the coke business in the United States. With steel at cost attention is now turned to coke, and an effort is being made to force competition into a combination. The increased shipment will be seen in the following aggregate of 92,826 tons, as against 84,888 tons the week previous.

The shipments were as follows: To Pittsburg, 1,380 cars; to points east, 1,897 cars; to points west, 1,880 cars; total, 5,157 cars. The year closed at a very low figure, viz.: Furnace coke f. o. b. cars at ovens, \$1; foundry, \$1.35; crushed, \$1.65; freights to Pittsburg, 70c. per ton.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Jan. 5, 1894.

Pig Iron.—The present year opens with the same conditions prevailing in the iron market which characterized the close of 1893—the "Black Year" of the trade. We do not believe that the situation is any worse than it has been; indeed there are many encouraging features which forecast a better future, though at present the market is not good, and the depression appears to be greatly exaggerated for political effect.

Prices to-day are unchanged. We do not think that 1894 will be so disastrous a year as was 1893, for business is reviving, and prices will be rising instead of falling. Stocks are light, and the production, although sufficient for the abnormally light demand of to-day, certainly is inadequate to meet the normal requirements of the trade. The iron market has been called the industrial barometer; and as we are confident that trade throughout the country will improve, we believe that the iron market will share in the renewed prosperity.

So far as the local market is concerned nothing of interest can be reported of the week under review. No business of any consequence has been done.

The tidewater prices of the Thomas Iron Company are as follows: No. 1, \$14.50 per ton; No. 2, \$13.50; No. 3 or No. 2 plain, \$12.75. For regular brands we quote as follows: Northern brands: No. 1, \$13.75@14.25; 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: Coltness, \$21.50@22; Eglington, \$19.50@20; Summerlee, \$21.50@22.

Billets and Rods.—We do not hear of any business in billets and rods, and the market continues very dull. Reports from Philadelphia and Pittsburgh indicate that prices are as low as ever. We quote nominally as follows: Domestic billets, \$19@20; foreign billets, \$28@29, tidewater. Wire rods, domestic, \$28@29; foreign, \$39@40, tidewater.

Manufactured Iron and Steel.—Nothing new or interesting can be reported of manufactured iron and steel. No sales are reported and prices show no improvement whatever. We quote nominally as follows: Angles, 1'00@1'80c.; axles, scrap, 1'70@2c. delivered; steel, 1'70@2c.; bars, common, 1'40@1'50c.; refined, 1'50@1'85c. on dock; beams, up to 15 in., 1'70@1'90c.; 20 in., 1'85@2c.; car track channels, 2@2'10c.; channels, 1'70@2c. on dock; steel hoops, 1'75@1'9c., delivered; links and pins, 1'70@1'80c.; plates, flange, 1'95@2'10c.; firebox, 2'3@2'8c.; flange, 2'10@2'25c.; marine, 2'50@2'75c.; sheared, 1'80c.; shell, 1'65@1'95c., tank, 1'50@1'70c.; universal mill, 1'50@1'75c.; tees, 1'80@2c., all on dock.

Merchant Steel.—In this market there has been no change in the position of merchant steel, either in prices or as to the volume of business doing. Reports from Pittsburgh, published in our industrial notes column, indicate a resumption of work and greater activity among the steel mills of that section, but prices continue more or less as they have been for several weeks past. We quote: Tool steel, \$6.25@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.—We do not hear of business doing in this market. 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 very quiet. 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 sales in either spiegel or ferro during the week. Prices are nominally: Spiegeleisen, 10@12, \$21@22, 20%, \$25@26. Ferromanganese, \$55@56.

Steel Rails.—No sales of rails have been announced during the past week. The market continues exceedingly quiet, and with so many railroads in the hands of receivers, or scarcely earning operating expenses, there is not much hope for improvement in demand in the near future, but the combination takes care that prices are not regulated by demand. Many of the Eastern mills, as will be seen in our industrial notes column, are running, but it is generally on business secured during the late break in the combination. Rails are quoted at \$24.80 tide water.

Buffalo. Jan. 4.

(Special Report of Rogers, Brown & Co.)

Since New Year's day some activity has developed. This consists principally of small orders ranging from 100 to 200 tons and inquiries for round lots for six months' delivery. There is no visible increase in the rate of consumption. The orders now being placed are evidently for immediate use. We quote for cash 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. 3.

(From our Special Correspondent.)

Another week has been added to the record for continual dullness and depression in the pig iron circles. Although a little better business is noted, the fact is that business remains exceedingly dull. Consumers, both large and small, both feel uncertain relative to the future. They are therefore unwilling to buy more than for actual wants. After inventory of stocks has been made some slight improvement is expected. The furnaces North and South have made no change worthy of notice. In the South a number of the furnaces now running will blow out early in the year unless the market materially improves.

Pig Iron.—This has apparently been a more satisfactory week in the pig iron market than for a number of months past. A number of contracts for delivery in from four to six months hence have been closed, and the number of inquiries has increased. Quotations are unchanged, but a disposition to cut prices is noted, prices being more elastic than for a long time. Quotations per gross ton f. o. b. Chicago are: Southern coke, foundry, No. 1, \$13.65; No. 2, \$12.15; No. 3, \$11.65. Southern coke, foundry, soft, No. 1, \$12.40; No. 2, \$11.65; Lake Superior charcoal, \$15.50@16.00. 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 silveries 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.—There has been no sale of importance during the past week, the market being unusually quiet. 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.—Mill business remains very dull, and sales from stock show but slight improvement. 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.—No movement of any account is noted. The dullness is more apparent now than ever. However, it is confidently expected that as soon as buyers have made their annual inventory a much better business will be the outcome. December sales surpassed November sales slightly. Prices remain the same, which are: Smooth finished machinery steel, 2'10@2'30c.; open hearth tire steel, 1'90@2'10c.; ordinary Bessemer bars, 1'65@1'75c.; toe calks, 2'20@2'30c.; ordinary tool steel, 6'50@7'00c.; special brand tool steel, 12@20c.; crucible spring, 3'30@3'75c.

Galvanized Sheet Iron.—Demand remains exceedingly light, with no early signs of improvement. The general quotation on Juniata is 70, 10 and 5% off for mill shipments. Jobbing quantities are selling at 70 and 10%.

Black Sheet Iron.—Business is extremely dull and but few orders reported, all of which are but for small quantities. Prices for small lots from stock are: Nos. 24, 25 and 26, 2'90c., and No. 27 common, 3'00c. Same gauges and steel sheets are 3'10@3'20c. less 10c. per 100 lbs. for large lots.

Bar Iron.—The usual run of small orders prevail, but not a large sale is reported. It is safe to say that the present prices are as low as will prevail during this depression. 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.—Hardly a sale of any importance has been made during the past week, and the outlook is not very bright, although the new year is now almost a week old. Quotations are \$19.25@19.50 Joliet. No call whatever for rods.

Steel Rails.—Not a sale of note, nor a sign of any improvement is to be observed here in the steel rail market. Prices are \$25@27.

Scrap.—A slight improvement is noted, but the sales run entirely to small lots. Prices remained unchanged, which are as follows: 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.

Nails.—There is not much doing in either steel cut or wire nails. Sales are mostly from stock. Jobbing prices are: Cut nails, per keg, \$1.25@1.30, and for wire nails \$1.35@1.45.

Old Rails and Wheels.—This market is featureless, the demand being very limited for either old iron or old steel rails. Quotations are: Old steel rails, \$7.50@10; old iron rails, \$12.50. Old car wheels are quiet at \$10.50@11, according to quantity.

Philadelphia. Jan. 4.

(From our Special Correspondent.)

Pig Iron.—At the opening of the year all good brands were held at firm prices, because of the good statistical position and the possibility of an upward tendency in prices. No. 1 Foundry was sold at \$14.75@15, Virginia No. 1 very close behind; No. 2, \$14.25@14.50; Forge iron sold at from \$12.50 to \$13.25. The feeling then was that a good year was ahead of us, and that with such a multitude of requirements looming up, crude iron would certainly hold its own. This hope was partially realized. Prices began to move up a little in market reports, though many good buyers testify to the fact that they secured all their winter iron at January quotations. By the opening of April good brands of No. 1 were held at \$16.50@17.00, while No. 2 sold at \$15.00, with a few brands held at \$15.50. But even then a feeling of alarm existed, for furnaces were banked here and there. Concessions on ordinary brands were quite frequent, and makers of better brands began to feel uneasy. Good No. 1 Lehigh was offered at \$16, and No. 2, \$15. Forge was easily had at \$14@14.50, but there was little confidence in holding this advance over January prices. The opening of summer witnessed a collapse in prices to January quotations. Buyers bought in a small way, and iron began to drag heavily. Forge fell away to \$12.50@13, and was hard to move even at these prices except in small lots. During the summer, even under declining production, prices weakened and buyers refused to listen to sellers.

No. 1 was slow in October at \$14.25 and for No. 2 \$14 was readily taken. Forge sold at \$12@12.50, and only in a small way. Apprehension was general and producers continued to restrict. By the close of the year it seemed as though the bottom had cer-

tainly been reached, but even at this hour one or two new factors in the shape of competition have unsettled calculations. The Eastern pig iron makers suffered slightly more than those west of the mountains.

Steel billets started out strong and active at about \$24, but this figure did not hold long. The good margin stimulated production, but this generated a degree of competition which soon depressed prices, though not until after the opening of the second quarter of the year. Billets sold readily in April at \$24.75@25.25 delivered, but the influences that had been started turned quotations on their downward course. Early summer quotations were \$23.50, though offers at \$23 were quickly accepted. By October manufacturers were chasing after orders at \$21, and by the close of the year \$19 would not be refused.

Muck bars also started out at good prices, \$25, but the demand for this product was light throughout the year, dropping to cost price during the summer.

The merchant iron trade throughout the East has been disappointing throughout, largely because of Western competition. Prices started at \$1.60, rose to \$1.70 in April, fell to \$1.60 in July, \$1.50 in October and \$1.40 in December.

Skelp iron as well as sheet fluctuated in demand all through the year, varying but little in price for the first half of the year, then suffering a decline for the balance of the year.

In plate and structural material there was a slight hardening in quotations during the first three months of the year; after that these products began to weaken, demand at the same time declining to practically cost price at the close of the year, the chief cause late in the year being the desperate competition from western Pennsylvania.

Concerning steel rails, there is scarcely any room for remark. Opening at \$29, they touched a nominal quotation of \$30 in April, then fell to \$29, and later in the year to \$24. With 20 per cent. of the mileage either in the hands of receivers or earning no dividends, there is no room for anticipation. At the same time the natural and inevitable necessities of the country will soon develop a demand that will help trade.

Old iron rails opened nominally at \$18, but fell to \$14.

The statistics of production for the year tell the story of the year better than quotations. While there were apprehensions of dullness, no such depression as has been experienced was looked for. As for 1894, each man can be his own prophet.

Pittsburg. Jan. 4.

(From our Special Correspondent.)

Raw Iron and Steel.—Since our last report the year of 1893 has passed into history, leaving no one to regret its departure, carrying with it the lowest prices of iron, steel and finished material that are without a parallel in the history of this country. In fact, the past week has developed nothing of special importance to the trade; wages are still in a very unsettled condition, in fact so much so that at some points a strike is even talked of. The Mahoning and Shenango Valley Iron Association have served notice on the officials of the Amalgamated Association demanding a reduction on the present puddling scale of \$4.75 per ton to \$3.75, claiming that by reason of the low wages paid puddlers in non-union and Eastern mills they are compelled to ask the reduction. The reduction will not be accepted by the puddlers, and if the manufacturers are successful many of the puddlers will seek other occupations.

As is usual at the close of the year, business is still limited to the actual requirements of purchasers, and there is hardly any inducement that is attractive enough to lead buyers to contract for either crude or finished material for work not actually on hand. Prices are the lowest ever before known in the history of the trade, and there is apparently no room for further reduction in rates without going below the cost of manufacture. This is the position in which many manufacturers are placed, who refuse to sacrifice quality in order to secure orders. Competition between the Eastern and Western mills continues very active. The idleness of so many furnaces tends to keep the supply of pig iron down to the demand, while the fact that so many of the mills are running only part time renders the market very sensitive to any change in conditions. Trade has been depressed so long that a change for the better must come in the very near future, is the opinion of some well-informed iron men. A prominent manufacturer in the valley in speaking of the iron trade and prospects for the future said: "During the past week I had one of our bookkeepers make an examination of our business for the past six months as compared with the last six months of 1892, and found that it had fallen off over \$500,000. This shows a tremendous shrinkage in trade."

Finished Iron and Steel.—Beginning with pig iron it will have been noted that the report was very discouraging to manufacturers. Under the next heading it will be seen that matters were still worse, and by following the course of the market in regard to steel in its more advanced condition, we come to the worst of all. Utter demoralization is the only term that will define the situation. The year began with comparatively few orders at many of the mills.

Coke Smelted Lake and Native Ore.		Blooms, Billets and Slabs.	
Tons.	Cash.	1,000 Billets, Jan., at mill.....	16.75
1,000 Bessemer, Jan.	\$11.00	1,000 Billets, Jan., Feb.	16.50
1,000 Bessemer, Jan., Feb.	10.90	1,000 Billets and Slabs, Jan., Feb., at mill.....	16.70
1,000 Bessemer City Furnace, prompt.	11.00	700 Billets, Feb.	16.65
500 Bessemer, Jan.	11.00	Muck Bar.	21.00
300 Bessemer, Jan.	11.00	500 Neutral, Jan.	20.75
500 Gray Forge, Jan.	10.00	300 Neutral.	20.75
500 Gray Forge, Jan., Feb.	10.00	Ferro-Manganese.	52.50
500 Gray Forge, Jan., Feb.	10.00	150 80%	52.50
500 Gray Forge, prompt.	10.00	Steel Skelp.	1.10
200 Gray Forge.	10.00	400 Wide grooved. 1.30 4 m.	1.30
200 No. 2 Foundry.	11.00	Sheet Bars.	21.50
200 No. 1 Foundry.	12.00	350 At mill.	21.50
200 No. 2 Foundry.	12.00	Steel Wire Rods.	24.00
100 No. 1 Foundry.	12.25	200 5 gauge American at mill.	24.00
100 No. 2 Foundry.	11.25	500 R. R. Cast Scrap, Net.	9.00
50 White Iron.	10.35	200 Wrought Turnings, net.	7.00
50 No. 1 Silvery.	15.25	100 Cast Borings, Net.	5.00
50 No. 1 Foundry.	12.25	100 Soft Steel Scrap.	10.00
Charcoal.			
25 No. 2 Foundry.	17.50	Gross.	10.00
25 Cold Blast.	26.00	Old Rails.	14.50
25 Warm Blast.	25.00	550 Iron Valley, delivered.	14.50
25 Cold Blast Extra.	28.00		

METAL MARKET.

NEW YORK, Friday Evening, Jan. 5, 1894.

Prices of Silver per Ounce Troy.

Dec.-Jan.	St. Ex.	London Pence.	N. Y. Cts.	Value of sil. in \$1.	Jan.	St. Ex.	London Pence.	N. Y. Cts.	Value of sil. in \$1.
30	4'85 3/4	31 3/4	68	526	3	4'85 3/4	31 3/4	67 3/4	525
1	4'85	31 3/4	67 3/4	525	4	4'85 3/4	31 3/4	68 3/4	527
2	4'85	31 3/4	67 3/4	525	5	4'85 3/4	31 3/4	68 3/4	530

*Holiday.
Silver has been quiet here and the market in London has been weak, yet purchases by shorts have contributed to steady a market that otherwise would have been a declining one, since trade is dull and no prospect of immediate revival.

The United States Assay Office at New York reports the total receipts of silver for the week to be 63,000 oz.

Gold and Silver Exports and Imports at New York, Week Ending December 30th, 1893, and for Years from January 1st, 1893 and 1892.

Week	Gold.		Silver.		Excess of Ex. or Imp.
	Exports.	Imports.	Exports.	Imports.	
1893...	\$31,935	\$33,888	\$826,523	\$3,470	E \$821,400
1892...	72,822,449	63,017,178	33,797,533	3,195,644	E 40,407,160
1892...	71,196,786	23,295,916	8,518,586	3,057,768	E 53,361,688

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

During the five days ending January 4th the exports and imports have been as follows: Exports, gold, \$17,700; silver, \$621,288. Imports, gold, \$27,184; silver, \$61,863. Of the gold exported, \$500 was American coin, and went to London. The remainder, \$3,200 Spanish and \$12,000 American coin, went to the West Indies. Of the silver exported, \$35,000 American silver went to Paris; all the rest, of which \$5,600 was Mexican and \$1,900 English coin, and the remainder American, went to London.

NOTES OF THE WEEK.

But little change can be reported in the condition of business. People generally are taking stock and looking over last year's work, and are not yet ready for new business.

Some of our contemporaries have been saying that 1893 opened with "unexampled prosperity." This, it seems to us, is far from the truth. A year ago, while many factories were busy, trade generally was in a very uncertain condition. Business men were looking with apprehension at the heavy gold exports and the withdrawal of foreign capital, of which they believed them to be an indication, and there were other factors, to which we have heretofore referred, which made the situation at the best a doubtful one.

Mr. Springer has introduced in the House of Representatives a bill providing for a commission to consider and report on the currency question.

A bare majority of the Ways and Means Committee has voted to report to the House of Representatives in the Revenue bill a provision for taxing all incomes over \$4,000 yearly. This will meet with strong opposition, and will probably be withdrawn by the caucus which is now to pass on the bill before presentation.

The indications are that the opponents of the proposed new tariff law intend to fight for delay and to obstruct its passage in every possible way—which is much to be regretted, for the whole busi-

ness of the country is paralyzed until the tariff question is settled. Delay in this is extremely injurious.

In Philadelphia, January 2d, in accordance with the Revised Statutes, the 733 dies used in the coinage at the mint last year were destroyed, under the supervision of Coiner Steele, in the presence of Superintendent Bosbyshell and Assayer Eckfeldt. The metals coined during the past year aggregated in value \$39,170,435.15, as follows: Gold, \$33,011,980; silver, \$5,023,523.45; minor, \$1,134,931.90. The dies destroyed were: Double eagles, 13; eagles, 81; half eagles, 28; quarter eagles, 6; silver dollars, 14; half dollars, 21; quarter dollars, 68; souvenir quarters, 4; dimes, 45; nickels, 143, and cents, 310.

The gold and silver used in the industrial arts is the subject of a careful calculation in the forthcoming report of the Director of the Mint, as in previous reports of the Mint Bureau. The gold and silver furnished by private refineries during the calendar year 1892 was ascertained by correspondence with all firms in the United States known to be engaged in the manufacture of gold and silver bars. A portion of the bars thus supplied to manufacturers and others bore the stamp of the Philadelphia Mint or the Assay Office at New York, and after deducting these the aggregate of the bars furnished for industrial use by private refiners was found to be as follows:

Gold Used.	Fine ounces.	Value.
Domestic bullion.....	587,012.84	\$1,213,464
United States coin.....	362,760.26	749,892
Old plate, jewelry, etc.....	1,122,620.48	2,320,682
Total.....	2,072,393.58	\$4,284,038
Silver Used.	Fine ounces.	Value.
Domestic bullion.....	1,482,915.26	\$1,917,395
United States coin.....	199.55	258
Old plate, jewelry, etc.....	163,165.92	210,962
Total.....	1,646,280.73	\$2,128,525

The aggregate furnished by both private refiners and the Government is given in the following table:

Material.	Gold.	Silver.	Total.
Domestic bullion.....	\$10,588,703	\$7,204,210	\$17,792,913
United States coin.....	787,334	5,152	792,486
For. bullion and coin.....	771,686	1,249,801	2,021,487
Old material.....	4,468,685	647,377	5,116,062
Total.....	\$16,616,408	\$9,106,540	\$25,722,948

There was no material variation in the amount of gold and silver used in the industrial arts during the calendar years 1891 and 1892, the value of the gold in 1892 being \$16,616,408, against \$16,644,952 in 1891; of silver, \$9,106,540 (coining value) in 1892, as against \$9,631,746 in 1891. Data relating to the weight and value of bars furnished for use in industry during the fiscal year 1893 were received from government institutions only.

As the gold movement is a matter to which much importance is attached, we give below a comparison of imports and exports at the port of New York for the full year. The totals for the country are not yet made up, but the movement outside of New York is comparatively small:

	1893.	1892.	Difference.
Exports.....	\$72,822,449	\$71,196,786	L \$1,625,663
Imports.....	63,017,178	23,295,916	L 39,721,262
Excess of exports...	\$9,805,271	\$47,900,870	D \$38,095,599

The magnitude of the outflow of gold, which began in the latter part of 1892 and continued well into the year lately closed, will be seen from this table. The counter-movement, which marked the second half of 1893, greatly reduced the net exports, but was not sufficient to offset the shipments altogether, leaving the balance nearly \$10,000,000 against us.

While complete statements are not made up as yet, it will be of interest to compare the exports and imports of silver at the port of New York for 1893; the figures are as follows:

	1893.	1892.	Increase.
Exports.....	\$33,797,533	\$8,518,586	\$25,278,947
Imports.....	3,195,644	3,057,768	137,876
Excess of exports...	\$30,601,889	\$5,460,818	\$25,141,071

The silver received here is nearly all from Mexico, South America and the West Indies. The large exports this year have for the most part gone directly to London, though doubtless much of the white metal has ultimately found its way to India and China.

The averages of the New York bank statement for the closing week of the year for three years past compare as follows:

	1893.	1892.	1891.
Loans.....	\$417,606,900	\$437,722,000	\$438,616,400
Deposits.....	506,437,800	444,589,400	468,218,200
Circulation.....	13,111,900	5,554,600	5,537,400
Specie.....	106,316,400	75,968,300	95,972,200
Legal tenders.....	101,108,200	42,018,600	37,814,400
Total reserve.....	207,424,600	117,986,900	133,786,600
Excess reserve.....	80,815,150	6,839,550	17,232,050

For the week ending December 30th, 1893, the changes shown are increases of \$2,877,375 in reserve; \$1,319,900 in loans; \$1,795,700 in specie; \$2,979,200 in legal tenders; \$7,500,100 in deposits; a decrease of \$144,600 in circulation. There is again a large increase in deposits with a comparatively small increase in loans; that there should be any increase in the latter is somewhat unexpected.

Comparing this year's statement with that of the closing week of 1892, we find that deposits have increased by \$61,848,400, while loans are \$20,115,100 less, a total difference of \$81,963,500. The reserve, which at the end of 1892 showed an excess of only \$6,839,550, is this year no less than \$80,815,150 above the 25% legal requirement. These figures show very clearly the present condition of business and the comparatively light demand for money, even at the easy rates now prevailing. To put it in another way, at the end of 1892 there was 98.5 per cent. of the deposits loaned out, while now only 80.5 per cent. can be found so employed.

The United States Treasury statement on Thursday, January 4th, showed balances, in excess of outstanding certificates, amounting to \$92,201,879, made up as follows: Gold, \$79,929,615; silver, \$5,856,223; legal tenders, \$5,067,502; treasury notes, etc., \$1,348,539. This shows an increase during the week of \$160,589 in the total, but a decrease of \$1,749,996 in the gold.

The total values of the imports entered at the New York Custom house in 1893 was \$218,350,234, against \$217,556,846 in 1892. The amount of duties collected in 1893 was \$115,371,728, against \$128,744,123 in 1892.

On Friday the gold balance had still further declined to a little over \$77,000,000, the lowest point yet touched. This is due to the heavy interest payments made January 2d and the following days.

It is generally believed that the amount of interest paid to foreign holders of loans and securities is less this January than for some years past. A large amount of securities has been returned during the past year, much of it in payment of our exports.

The rate of interest is so low that gold shipments to Germany, where money is just now in demand, may be looked for at any time; at least that is the general opinion.

Domestic and Foreign Coins.

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

	Bid.	Asked.
Mexican dollars.....	\$55	\$56
Peruvian soles and Chilean pesos.....	4.22 1/2	4.54
Victoria sovereigns.....	4.85	4.89
Twenty francs.....	3.86	3.90
Twenty marks.....	4.71	4.78
Spanish 25 pectas.....	4.80	4.85

Other Metals.

Copper.—The general depression in trade has not been without its unfavorable influence on the prices for this metal, which has been giving way, without, however, bringing about an increased volume of business. Manufacturers are still complaining about lack of orders to enable them to work full time, and the prospects for a change for the better in this direction are apparently not of a very promising nature. As the production on the other hand, is going on at its wonted rate, the unavoidable consequence must, of course, be a decline in values. Lake copper can be bought at 10 1/2 c., and, we understand, at even a little less than that from second-hand holders; first hands, however, are as yet practically out of the market, their price being 10 3/4 c., which, however, is shaded by outside holders. We quote: Electrolytic copper at 9 1/2 @ 9 3/4 c.; casting copper, at 9 1/2 @ 9 3/4 c., and for Arizona pig guaranteed 96%, at 8 3/4 @ 9 c.

The market abroad shows a further decline, G. M. B's. closing at £41 7s. 6d. for spot, and at £41 17s. 6d. for three months hence. Other descriptions we quote as follows: English tough, £44 10s. @ £45; best selected, £46 @ £46 5s.; strong sheets, £53 @ £53 5s.; India sheets, £50 10s. @ £51; yellow metal, 4 1/2 d.

The statistics for the end of the month show an increase of 500 tons, as per cable advices from Henry R. Merton & Co., London.

Statistics of European copper stocks, etc., as reported by New York Metal Exchange for December, in tons of 2,240 lbs.:

	Dec. 30, 1893.	Dec. 15, 1893.
Liverpool and Swansea, Chili bars, etc.....	30,020	29,850
Liverpool and Swansea other and English.....	5,250	4,660
London.....	4,700	4,800
France.....	2,700	3,200
Total.....	42,670	42,510
Afloat from Chili.....	3,700	3,500
Afloat from Australia.....	900	900
Total.....	47,270	46,910
Supplies, all Europe:	1893.	1892.
Total for month.....	13,800	6,100
Of which Chili charters.....	2,700	1,500
Of which from North America.....	8,100	3,500
Deliveries, all Europe.....	13,400	6,100

The above figures show an increase of 360 tons on December 31st, as compared with statistics of December 15th.

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

Copper:	Plates	20 tons
Antwerp—Friesland.....	41	41
.....	41	41

£8 5s. @ £8 15s. per ton; 70%, £9 5s. @ £9 15s. per ton; 74%, £10 5s. @ £10 15s. per ton; 76%, £11 5s. @ £11 15s. per ton net cash. For parcels under 10 tons 5s. per ton extra is charged.

For forward delivery makers are prepared to make concessions.

Bleaching powder is in a lifeless state and very difficult to move, at about £8 7s. 6d. @ £8 15s. per ton net cash for hardwood packages, while for all 1894, a concession of from 10s. to 15s. per ton would be made.

Bicarb. soda is selling to a fair extent at the reduced price of £6 15s. per ton, less 2½% for 1 cwt. kegs, with usual allowances for larger packages.

Chlorate of potash is slow of sale at 7¼ @ 7½d. per lb. for prompt delivery. We quote: January-March, 7½ @ 7¾d.; January-June, 7¼ @ 7½d.; and January-December, 7¼d.

Sulphate of ammonia is only offered to a limited extent and prices are nominally unchanged at about £14 @ £14 5s. per ton, less 2½% for good grey 24-25% in double bags f. o. b. here. Nitrate of soda is in limited demand at £9 10s. per ton, less 2½% for good export quality in double bags f. o. b. here. Carb. ammonia—Lump, 3¼d. per lb.; powdered, 3¼d. per lb., less 2½%.

MINING STOCKS.

NEW YORK, Friday Evening, Jan. 5.

[For complete quotations of shares listed in New York, Boston, San Francisco, Aspen, Colo.; Baltimore, Pittsburgh, St. Louis, London and Paris, see pages 22 and 24.]

The year just past was the dulllest that the mining stock market of this city has ever experienced. So little business was done that it has become almost an exaggeration to speak of a "mining market." Not a single "boom" was started, not a single "deal" in any of the stocks was attempted. We shall have occasion at a later date to refer in detail to the course of the market during 1893.

If the week just ended is to be taken as indicative of what dealings in the mining stock market will be during 1894 we may expect even duller and more uninteresting times than last year. Such sales as were made were unimportant in size and devoid of any significance whatever, unless some be found in the fact that the public appears utterly oblivious of the existence of a mining stock market. To some extent the holiday on Monday was responsible for the small volume of business done; on the other hand, not a single sale was reported at the exchange.

The Comstocks were exceedingly quiet and utterly devoid of features. Comstock tunnel shows the heaviest transaction of any stock on the list, 1,300 shares having changed hands at 70c. Of Consolidated California & Virginia, 400 shares were sold at \$3.45 @ \$4.15, the former quotation being the closing price. Ophir shows sales of 400 shares at \$1.75 @ \$2.25. There was a solitary transaction of 100 shares of Best & Belcher at \$1.90, and another of 100 shares of Mexican at \$1.15.

Of the Colorado stocks, Chrysolite shows a sale of 500 shares at 20c. An equal number of shares of Leadville Consolidated was sold at 12c.

The Victor Gold Mining Company, of Cripple Creek, has declared dividend No. 11, of \$15,000, or 7½c. per share, payable in Denver, Colo., on January 10th, and in New York City on January 15th.

Ontario, which had not been traded in for some time, was fairly active this week for a stock which has always been held so closely. Sales of 625 shares at \$6.25 @ \$7 are reported.

We are informed that 60 stamps are working in the Phoenix Mining Company's mill with good results, and that they are crushing more ore than was expected that they would be able to do.

NOTES OF THE WEEK.

The superintendent of the Brunswick Consolidated Gold Mining Company writes as follows from Grass Valley, Cal., under date of December 27th: The ledge in the 700 drift looks fairly well, showing more sulphurets and a little gold. We made 6 ft. of ground for the week. No work was done Christmas. The rock in the stope shows a little gold and plenty of sulphurets.

Boston. Jan. 4.

(From our Special Correspondent.)

The market for copper stocks the past week has ruled extremely dull and prices show no sign of advancing with the opening of the new year. The market for ingot copper has had a weakening tendency and this has influenced traders to hold off until the conditions are more favorable. There is a little investment buying of the dividend-paying stocks at a slight concession from the prices current last week, but the speculative element is wanting and brokers are not getting rich on their orders at present, but are looking hopefully to the future for a better business.

Boston & Montana and Butte & Boston have been the most active stocks on the list. The former sold up to 27¼ on the last day of the year 1893, but declined subsequently to 26¼, closing at \$27; the latter has been well sustained and sold ¼ higher at 9½, losing only ¼ at the close.

Calumet & Hecla has declined \$2 from \$300 to

\$298 on small sales, and Tamarack from \$161 to \$159. There is very little stock of either offered in the market.

Osecola looks weak and there is some desire on the part of holders to sell, on belief that the company will not be able to earn over \$2 per share the coming year. Small sales are reported at \$28 @ \$27½, a loss of \$1 since last week. Franklin is firm at \$10¼ @ \$11, but sales are small. No sales of Quincy were reported for the week, but \$122 is bid for it and \$125 asked. Atlantic sold at \$12 for 50 shares, only being a gain of ½% over last sale. Centennial sold at 3¼ @ 3½, and closed 3½ bid.

Tamarack, Jr., advanced from \$20 to \$20½ in the early dealings, but the last few days it has been heavy and declined to \$19; the best bid today was \$18. We hear of no special reason for the decline.

Wolverine sold at 2½ @ 2¾ for small lots, but for round lots \$2 was the best price.

3 P. M.—Boston & Montana sold this afternoon at \$27¼, a gain of the fraction, and Calumet & Hecla recovered to \$300 on sale of 72 shares. Franklin sold in a small way at \$11. Others unchanged.

Colorado Springs. Jan. 1.

(From our Special Correspondent.)

Cripple Creek produced in 1893 \$2,400,000, showing a gain of 300% over 1892. For the last quarter of 1893 it was \$1,050,000. The output of the incorporated stock companies was:

	Tons.	Value.
Victor	1,300	\$269,000
Anaconda	1,700	136,800
Pharmacist	1,250	86,500
Sunmit	7,850	132,000
Gold King	2,600	76,000
Union	220	57,200
Zenobia	1,700	57,000
Isabella	2,100	103,000
Work	650	31,500
Calumet	500	28,000
Ingham	300	40,000

The deepest shaft in the camp is the Pharmacist, 352 ft., and the longest tunnel is that of the Chicago & Cripple Creek Company, on Globe Hill. Steam hoisting plants are in operation on 21 properties. About 1,000 miners are working on the producing mines and an equal number of men on non-producers, hauling ore and in the mills.

There are 85 shipping mines in camp, with new ones opening up weekly. Some \$250,000 has been invested in 12 mills and 140 stamps are dropping steadily at present.

The Colorado Midland, from Divide, and the Denver & Rio Grande, from Florence, will be running cars into camp early in 1894. With cheap transportation the number of actual shippers will be doubled within a few months. The sales for the holiday week were 844,000 shares. Market both strong and firm.

Creede shows a gain over last year. The ore output for 1892 was \$4,000,000; for 1893 it is estimated at \$5,572,800, an increase of \$1,572,800. The working forces on the big mines are the same as before the slump in silver. Notwithstanding the low price of silver, the larger producing mines, it is claimed, can be run at a profit, the saving being made in freight, the present improved methods of handling large bodies of ore, and last, a heavy cut on miners' wages.

Aspen's output for 1892 was \$8,162,000; for 1893, approximately, \$5,500,000, showing a decrease for the year of \$2,662,000.

Argentum-Juniata is in demand at advancing prices. The mine has been full of water for 18 months. A call for a special stockholders' meeting is issued for the purpose of securing funds for future work.

In every section of Colorado a great deal of prospecting for and working of gold properties will be done next summer.

San Francisco.

(From our Special Correspondent.)

San Francisco, Jan. 5 (By telegraph).—The opening quotations to-day are as follows: Best & Belcher, \$2; Bodie, 20c.; Bulwer, 5c.; Chollar, 50c.; Consolidated California & Virginia, \$3.70; Gould & Curry, 95c.; Hale & Norcross, 75c.; Mexican, \$1; Mono, 10c.; Navajo, 10c.; Ophir, \$1.65; Savage, 80c.; Sierra Nevada, \$1.05; Union Consolidated, 90c.; Yellow Jacket, \$1.05.

London.

Dec. 26.

(From our Special Correspondent.)

During the past week there has been a strong and healthy tone among American mining stocks and some genuine business has been done. The supply of shares of all sorts is, however, extremely small and insufficient, otherwise there would have been more business carried through. As it was the total volume of transactions continued small. It is encouraging to see the prices of really good stocks commencing to creep up gradually. DeLamars have improved 3s. @ 4s. during the last fortnight and now stand above par at £1 2s. 6d. The directors of this company have underestimated the returns and probably thus present a unique example of cautious estimates. If it were not for the founder's shares, this stock would be about the best in the London market. Harqua Halas have also advanced again. Elkhorns are now at 12s., a higher point than they have reached since

the closing of the Indian mints. Jay Hawks keep steady at the higher price of 8s. 3d. Montanas have kept the ball rolling during the week and are still at 8s. 0d. and thereabouts. The new discovery which caused this boom has been confirmed by another cable which states that the mine manager has driven on the new lode 30 ft. north and 20 ft. south, and that both ends look well; the mill value of the ore so far extracted is from \$35 to \$40 per ton. Idaho exploring shares have been bid for during the week, but have not advanced above 6d. in price. The liquidator of the Yankee Girl Company writes to say that the amount of the subscriptions toward the scheme of reconstruction has been quite insufficient to purchase the property from the receiver for the debenture holders, and steps are therefore being taken to sell the property in the open market. An offer of £16,000 for the property, made by an American party, is now being considered by the receiver.

The Palmarejo Company's stock has received a filip from the report for November. During the month the mill is reported to have worked 26 days and treated 1,700 tons, producing \$56,000. The expenses were \$33,000. Apparently the company is now on a paying basis, and people who rely on the report have bid for the stock. Consequently the shares stand at 1s. 6d. now, as compared with 6d. a fortnight ago. The manager, in course of a long report on the extended work which has been done in the mine for the past few months, states: The work seems but small, yet I have kept my development work well in advance of our needed supply of ore for our mill. Most of our work has been, and is being done, above the sixth level of the Blanca, only a small amount is being done in Los Hilos, between the third and fourth levels, and between the fifth and sixth levels in the old San Jose work. The men working at these points are taking out ore on tribute. What ore they take out is of good grade. South level Blanca—The ledge is very strong, and by cross-cutting to the wall, we hope to come upon ore. The Blanca workings are looking as well as they have at any time since I have worked them. Prieta mine—Fifth level—A greater portion of this level has been driven in good milling ore. Near the western end the ore is not quite up to grade, giving us only about 23 oz. per ton, which compels us to leave it in the mine as waste rock. No. 1 south, Tucson level—This is a new point of operation known as the "Ladrones works." It lies back of the Tucson tunnel level, about 20 ft. Width of ore is about 3 ft.; assays from 35 to 40 oz. per ton, as it is broken from the face of drift. The manager of the Holcomb Valley Company reports that an experimental run of the Bucyrus plant has yielded \$150 from 252 cu. yds., or on an average 59c. per cu. yd. This report being a trifle more encouraging than previous ones, has had the effect of renewing attention to the shares of the company and a little buying has taken place.

The directors of Golden Feather Channel (Cal.) in their report for the past year state that the superintendent's estimate of cost, from December 1st until the date of getting in returns in 1894 is £3,200. As they only have £1,800 on hand the deficiency will have to be supplied in some way. The directors hope to be able to raise the balance among themselves and their friends without appealing to the shareholders, but they will ask the shareholders to sanction a further issue of priority shares, should it be found necessary. Colonel McLaughlin, manager of the mine, has sent a report dated November 27th, in which he says that on November 23d the first winter storm set in, and continued with increasing severity. On November 24th the river flowed over the crest of the head dam and drove the workers out of the claim. No mining had been attempted this season, but he thinks he will take out some \$1,500 when he cleans up the sluice. This gravel is, he says, much better than any yet encountered, being more compact, the bedrock also much more favorable, and he says there is no doubt, among those most competent to judge, that the cream of the claim is just ahead.

DIVIDENDS.

Bald Butte Mining Company paid dividend No. 21 of 5%, \$12,500, December 28th, at the office of the company in Helena, Mont.

Rice-Aspen Mining Company, dividend of 2½ cents per share, \$50,000, payable January 15th at the office of the company, Tabor Block, Denver, Colo.

Victor Mining Company, dividend No. 11, of seven and one-half cents per share, \$15,000, payable at the office of the company in Denver, Colo., January 10th, and at the office in New York January 15th. Transfer books close January 8th.

MEETINGS.

Beaver Branch Coal Company, at the office of the company, No. 134 South Fourth street, Philadelphia, Pa., January 10th, at 12 o'clock noon.

Decatur Coal Company, at the office of the company, No. 234 South Fourth street, Philadelphia, Pa., January 8th, at 12 o'clock noon.

Penn Iron Mining Company, at the office of the company, No. 218 South Fourth street, Philadelphia, Pa., January 17th, at 2 p. m.

NEW YORK MINING STOCK QUOTATIONS. DIVIDEND-PAYING MINES. NON-DIVIDEND-PAYING MINES.

Table with columns for Name and Location of Company, Dec. 31, Jan. 1, Jan. 2, Jan. 3, Jan. 4, Jan. 5, SALES, and Name and Location of Company, Dec. 31, Jan. 1, Jan. 2, Jan. 3, Jan. 4, Jan. 5, SALES.

*Ex-dividend. †Dealt in at New York Stock Ex. ‡Assessment paid. §Assessment unpaid. D Dividend shares sold, 2,425. non-dividend shares sold, 1,500. Total shares sold, 3,925.

BOSTON MINING STOCK QUOTATIONS.

Table with columns for Name of Company, Dec. 29, Dec. 30, Jan. 1, Jan. 2, Jan. 3, Jan. 4, SALES, and Name of Company, Dec. 29, Dec. 30, Jan. 1, Jan. 2, Jan. 3, Jan. 4, SALES.

Dividend shares sold, 3,042. Non-dividend shares sold, 3,415. Total shares sold, 6,457.

CURRENT PRICES.

These quotations are for wholesale lots New York unless otherwise specified. Acid—Acetic, chem. pure, 17¢ @ 19¢. Commercial, in bbls. and obys., 01 1/2¢ @ 02¢. Carbonic, liquefied, 18¢ @ 25¢. Chromic, chem. pure, 1.00. Hydrobromic, dilute, U. S. P., 25¢ @ 30¢. Hydrocyanic, U. S. P., 45¢ @ 50¢. Hydrofluoric, 20¢ @ 30¢. Alcohol—95%, 7 gal., \$2.30 @ \$2.40. Absolute, \$3.80. Ammonia—Lump, 1.75 @ \$1.85. Ground, 1.85 @ \$1.90. Powdered, 04 1/2¢ @ 05¢. Lump ton, Liverpool, 45¢. Aluminum Chloride—Pure, 1.25. Amalgamating solution, 60¢. Sulphate, 1.90 @ \$2.50. Ammonia—Sal., in bbl. lots, 07 1/2¢ @ 08¢. Carbonate, 07 1/2¢ @ 08¢. Muriate, white, in bbls., 08 1/4¢. Aqua Ammonia—in cys., 03¢ @ 04¢. Antimony—Oxymur, 10¢ @ 11 1/2¢. Argolis—Red, powdered, 15¢. Arsenic—White, powdered, 03¢ @ 03 1/2¢. Yellow, 06¢ @ 07¢. White at Plymouth, 212 @ 216. Asbestos—Canadian, 350 @ \$300. Italian, car. e. i. f. L'pool, 18¢ @ 20¢. Ashes—Pot. 1st sort, 4.75 @ 5. Pearl, 05 1/2¢ @ 06 1/4¢. Asphaltum—Prime Cuban, 04¢ @ 05¢. Hard Cuban, 28.00 @ \$30.00. Trinidad, refined, 30.00 @ \$35.00. Egyptian and Syrian, 05¢ @ 07 1/4¢. Californian, at mine, 12.00 @ \$26.00. at San Francisco, 15.00 @ \$29.00. Barium—Carbonate, pure, 45¢. Carbonate, commercial, 06¢ @ 10¢. Chlorate, crystal, 75¢. Chloride, commercial, 05¢ @ 10¢. pure, 18¢. Iodide, 04¢ @ 07¢. Nitrate, 06 1/4¢ @ 07¢. Sulph., Am. prime white, 17.50 @ \$19. Sulph., foreign, floated, 21¢ @ \$24. Sulph., off color, 11.50 @ \$15.00. Carb., lump, f. o. b. L'pool, 24 @ 30. No. 1. Casks, Runcorn, 43 @ 50. No. 2. bags, Runcorn, 43 @ 50. Saurite, 10¢. Bichromate of Potash—Scotch, 11¢ @ 12¢. American, 11¢ @ 12¢. Bichromate of Soda—09 1/2¢ @ 10¢. Borax—Refined, 08¢ @ 09¢. San Francisco, 08¢ @ 08 1/2¢. Concentrated, in car lots, 07 1/2¢ @ 08¢. Refined Liverpool, 42¢. Bromine—25¢ @ 35¢. Cadmium Anion—1 lb., 23.00.

Cadmium Iodide—1 lb., \$5.50. Chalk—1 ton, \$1.50 @ \$2.25. Precipitated, 04¢ @ 06¢. China Clay—English, 1 ton, \$18 @ \$18.00. Domestic, 1 ton, \$9 @ \$11. Chlorine Water—10 @ 25. Chrome Yellow—10 @ 25. Chrome Iron Ore—1 ton, San Francisco, \$10.00. Chromalum—Pure, 1 lb., 35¢ @ 40¢. Cobalt—Oxide, 1 lb., \$1.60 @ \$1.70. Copper—Sulph. English Wks. ton, \$20 @ \$21. Vitriol (blue), ordinary, 1 lb., 03 1/4¢ @ 03 3/4¢. extra, 04 1/2¢. Nitrate, 1 lb., 02 1/4¢. Copperas—Comm. 100 lbs., 85¢ @ 95¢. Best, 100 lbs., \$1.35 @ \$1.50. Liverpool, 1 ton, in casks, \$2 @ \$2 10¢. Cerundum—Powdered, 1 lb., 04 1/2¢ @ 09¢. Flour, 1 lb., 03¢. Cryolite—Pow., 1 lb., bbl. lots, 07¢ @ 08¢. Emery—Grain, 1 lb. (1/2 kg.), 04 1/2¢ @ 05¢. Feldspar—Ground, 1 ton, \$6.00 @ \$10.00. Crude, \$2.00 @ \$3.00. Fluorspar—Powder, No. 1, 1 ton, \$20 @ \$30. Lump, at mine, \$6 @ \$8. French Chalk—Fuller's Earth—Lump, 1 ton, \$10 @ \$30. Glauber's Salt—in bbls., 01¢ @ 01 1/4¢. Glass—Ground, 1 lb., 09¢ @ 10¢. Gold—Chloride, pure, crystall., 02¢ @ 03¢. pure, 15 gr. c.v., 1/2 doz., \$5.40. liquid, 15 gr. g. s. v., 1/2 doz., \$5.50. Chloride and sodium, 05¢ @ 06¢. Oxide, 15 gr. c.v., 1/2 doz., \$2.25. Gypsum—Calcined, 1 bbl., \$1.25 @ \$1.50. Land Plaster. Iodine—Resublimed, 1 oz., 30¢ @ 33¢. Iridium—Oxide, 1 lb., \$90. Iron—Nitrate, 40°, 1 lb., 01¢ @ 01 1/4¢. 47°, 1 lb., 02¢ @ 02 1/4¢. Kaolin—See China Clay. Kieserite—1 ton, \$9 @ \$10. Lead—Red, American, 1 lb., 08 1/2¢ @ 07 1/4¢. White, American, in oil, 08 1/2¢ @ 07 1/4¢. White, English, 1 lb., in oil, 08 1/2¢ @ 08 1/4¢. Acetate, or sugar of, white, 06¢ @ 06 1/4¢. Granulated. Nitrate, 09¢ @ 12¢. Lime Acetate—Am. Brown, 09¢ @ 95¢. Gray, \$1.75 @ \$1.87 1/2. Litharge—Powdered, 1 lb., 06 1/4¢ @ 07 1/4¢. English flake, 1 lb., 06¢ @ 06 1/4¢. Magnesite—Crude, 1 ton of 1,015 kilos, \$14.75. Calcined, 1 ton of 2,240 lbs., \$22.00. Brick, 1 ton of 2,240 lbs., \$47.50. Manganese—Ore, per unit, 23¢ @ 28¢. Oxide, ground, 1 lb., 02 1/4¢ @ 06 1/4¢. Mercuric Chloride—(Corrosive Sublimed) 1 lb., \$3 @ \$4. Powdered, 1 lb., \$5. Marble Dust—1 bbl., \$1.25 @ \$1.50. Metallic Paint—Brown 1 ton, \$20 @ \$25. Red, 1 ton, \$20 @ \$25. Mica—in sheets according to size, 1st quality, 1 lb., 40¢ @ 50¢.

Mineral Wool—Ordinary slag, 01 1/4¢. Ordinary rock, 02 1/4¢. Ground, 1 ton. Naphtha—Black. Nitric Acid—1 ton, \$10.00. Ochre—Rochelle, 1 ton, 01 1/4¢ @ 01 1/2¢. Washed Nat Ox'rd. Lump, 1 lb., 06 1/2¢ @ 06 3/4¢. Washed Nat Ox'rd. Powder, 1 lb., 07¢ @ 07 1/4¢. Golden, 1 lb., 08¢ @ 05¢. Domestic, 1 ton, \$12 @ \$20. Oils, Mineral—Cylinder, light filtered, 7 gal., 14¢ @ 16¢. Dark filtered, 7 gal., 10¢ @ 13¢. Extra cold test, 7 gal., 20¢ @ 24¢. Dark steam refined, 7 gal., 07 1/2¢ @ 17¢. Phosphorus—1 lb., 5¢ @ 55¢. Precip., red, 1 lb., 80¢ @ 85¢. white, 1 lb., 85¢ @ 90¢. Plumbago—Ceylon, 1 lb., 04¢ @ 05¢. American, 1 lb., 05¢ @ 07¢. Potassium—Cyanide, 1 lb., C. P., 52¢. 67 1/2¢ @ 70¢. mining, 28¢ @ 30¢. Bromide, domestic, 1 lb., 23¢ @ 32¢. Chlorate, English, 1 lb., 18¢ @ 18 1/4¢. Chlorate, powdered, English, 1 lb., 18¢ @ 19¢. Carbonate, 1 lb., by casks, 82 1/2¢ @ 05¢. Canstic, 1 lb., pure stick, 05 1/2¢ @ 06¢. Iodide, 1 lb., \$2.50 @ \$2.80. Nitrate, refined, 1 lb., 06¢ @ 08¢. Bichromate, 1 lb., 10¢ @ 11 1/4¢. Yellow Prussiate, 1 lb., 21 1/2¢ @ 22 1/4¢. Red Prussiate, 1 lb., 39¢ @ 40¢. Pumice Stone—Select lumps, 103 1/4¢ @ 15¢. Original cks., 1 lb., 01 1/4¢ @ 02¢. Powdered, pure, 1 lb., 01 1/4¢ @ 01 1/2¢. Pyrites—Non-cupreous, p. units, 10¢ @ 11¢. Quartz—Ground, 1 ton, \$6.00 @ \$10.00. Rotten Stone, Powdered, 1 lb., 03 1/4¢ @ 03 1/2¢. Lump, 1 lb., 06¢ @ 07¢. Original cks., 1 lb., 04 1/4¢ @ 05 1/4¢. Rubbing stone, 1 lb., 03 1/4¢ @ 04¢. Sal Ammoniac—Lump, in bbls., 70¢ @ 80¢. Salt—Liverpool, ground, 1 sack, 70¢. Domestic, fine, 1 ton, \$7 @ \$7 1/2. Common, fine, 1 ton, \$4.50 @ \$5. Turk's Island, 1 bush, 26¢ @ 28¢. Salt Cake—1 ton, \$10.00 @ \$15.00. Saltpeter—Crude, 1 lb., 03 1/4¢ @ 04¢. Soapstone—Ground, 1 ton, \$6 @ \$8. Block and slab according to size. Sodium—Prussiate, 1 lb., 22¢ @ 24¢. Phosphate, 1 lb., 04¢ @ 05¢. Stannate, 1 lb., 06¢ @ 12¢. Tungstate, 1 lb., 30¢ @ 35¢. Hyposulphite, 7 cwt., in casks, \$1.70 @ \$1.80. Strontium—Nitrate, 1 lb., 08 1/2¢ @ 09¢. Sulphur—Roll, 1 lb., 01 1/4¢ @ 02 1/4¢. Flour, 1 lb., 01 1/4¢ @ 02 1/4¢. Sylvinit, 27 @ 35, S.O.P., per unit, 3.75. Tale—Ground French, 1 lb., 01 1/4¢ @ 01 1/2¢. American No. 1, 1 lb., 01 1/4¢ @ 01 1/2¢. American No. 2, 1 lb., 006¢. Terra Alba—French, 1 lb., 65¢ @ 80¢. English, 1 lb., 65¢ @ 80¢. American, No. 1, 1 lb., 60¢ @ 80¢. American, No. 2, 1 lb., 40¢ @ 50¢.

Tin—Crystals, in kegs or bbls., 14¢ @ 15¢ feathered or flossed, 20¢. Muriate, single, 07¢ @ 12¢. Double or strong, 54° B., 10¢ @ 15¢. Oxymur. or nitro, 19¢. Vermilion—Imp. English, 1 lb., 80¢. Am. quicksilver, bulk, 57¢ @ 59¢. Am. quicksilver, bags, 58¢ @ 60¢. Chinese, 85¢ @ \$1.00. Trieste, 90¢ @ 95¢. American, 11 1/4¢ @ 12¢. Zinc White—Am., Dry, 1 lb., 04 1/4¢ @ 05¢. Antwerp, Red Seal, 06 1/4¢ @ 07¢. Paris, Red Seal, 07 1/2¢ @ 08¢. Muriate solution, 06¢. Sulphate crystals, in bbls., 1 lb., 03¢ @ 03 1/4¢.

THE RARER METALS.

The prices given below are the prices in Germany, and are per gramme except where otherwise stated: Arsenic (metallic), per kilo, \$0.25. Barium (ex amalgam), 2.12. Bismuth (metallic), per kilo, 7.75. Cadmium (metallic), 6.25. 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-Yttrium (oxydat.), 10.00. Gallium (cryst.), 100.00. Germanium (fus.), 37.50. (pulv.), 35.00. Glucium (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 (pulv.), 124¢. Molybdenum (pulv.), 4.25. Niobium (pulv.), 1.00. 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), 62 1/2¢. Strontium (per electrol.), 7.25. (ex amalgam), 3.25. Tantalum, 4.75. Tellurium (fusum), 1.50. (precipitates), 224¢. Thallium, 0.93¢. Titanium, 1.13. Tungsten (pure), 06¢. Uranium, 1.00. Vanadium, 4.00.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Table with columns: Name and Location of Company, Capital Stock, Shares, Par, Assessments, Dividends, Total Paid, Date and amount of last. Lists various mining companies and their financial details.

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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 \$12,500,000. § Previous to the consolidation of the Copper Queen with the Atlanta, August, 1885, the Copper Queen had paid \$1,350,000 in dividends. ¶ Previous to this company's acquiring Northern Belle, that mine paid \$2,400,000 in dividends against \$425,000 in assessments.

COAL AND COAL RAILROAD STOCKS.

Table with columns for Stock Names, Dec. 30, Jan. 1, Jan. 2, Jan. 3, Jan. 4, Jan. 5, and Sales. Lists various coal and railroad stocks with their respective prices and trading volumes.

Total shares sold, 63,871.

INDUSTRIAL AND TRUST STOCKS.

Table with columns for Stock Names, Dec. 30, Jan. 1, Jan. 2, Jan. 3, Jan. 4, Jan. 5, and Sales. Lists industrial and trust stocks with their prices and trading volumes.

Total shares sold, 340,005.

CALIFORNIA.

San Francisco.

Table titled 'CLOSING QUOTATIONS' for San Francisco, listing various stocks and their prices for Dec. 29, 30, Jan. 1, 2, 3, 4.

COLORADO.

Aspen.

Table titled 'Aspen' listing various stocks and their prices for Dec. 26.

COLORADO.

Colorado Springs, Dec. 31.

(Specially reported by W. H. McIntyre.)

Table listing various Colorado Springs stocks and their bid/ask prices.

Reported sales for the week ending Dec. 30, 1893, 832,000 shares.

Denver.

Table titled 'Denver' listing various stocks and their prices for Dec. 29th, including high and low sales figures.

Total shares sold, 420,02

MARYLAND.

Table for Maryland stocks, listing Baltimore companies and their bid/ask prices for Jan. 4.

MINNESOTA.

Table for Minnesota stocks, listing Duluth companies and their bid/ask prices for Dec. 26.

Table for Minnesota stocks, listing various companies and their bid/ask prices for Dec. 26.

Table for Minnesota stocks, listing various companies and their bid/ask prices for Dec. 26.

MONTANA.

Helena.

Specially Reported by S. K. Davis.

Prices for the week ending Dec 13.

Table listing various Montana stocks and their bid/ask prices for Dec 13.

PENNSYLVANIA.

Philadelphia.

Table listing various Philadelphia stocks and their bid/ask prices for Jan. 4.

Pittsburg.

Table listing various Pittsburg stocks and their bid/ask prices for Jan. 4.

MISSOURI.

Table for Missouri stocks, listing St. Louis closing quotations and bid/ask prices for Dec. 27.

London Quotations.

Table for London Quotations, listing various international stocks and their bid/ask prices for Dec. 19, 1893.

New York Mining Stocks.

(Latest quotations.) Jan. 5.

Table listing various New York Mining Stocks and their bid/ask prices for Jan. 5.

ASSESSMENTS.

Table titled 'ASSESSMENTS' listing various companies, their assessment numbers, dates, and amounts.

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.

1303 SUPERINTENDENT WANTED.—A large jobbing foundry, having a capacity of 40 tons per day, and running principally on architectural cast-iron work, desires to secure the services of an experienced superintendent; must thoroughly understand the practice and economical production of heavy and light castings by the most modern foundry practice; must understand the mixing of iron and be competent to figure on work; to the right man, who can take general charge, we can offer extraordinary inducements, and will, as soon as ability is demonstrated, give interest in the business. Address COLUMNS, 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. BLOWEK, 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 \$50 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, CORLISS, ENGINEERING AND MINING JOURNAL.

Situations Wanted.

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

WANTED—POSITION AS FOREMAN Smelter or Assistant Superintendent in copper works and mines. Good assayer, 15 years' experience in copper smelting. Address "ABERHAWK," ENGINEERING AND MINING JOURNAL. No. 15,768, Jan. 13.

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. No. 15,884, Jan. 20.

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. No. 15,888, Jan. 20.

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. No. 15,774, Jan. 20.

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 transmission, shop work and structure work, wishes a position. Age 44. Salary of second consideration. References. Address B. H. C., ENGINEERING AND MINING JOURNAL. No. 15,760, Jan. 20.

AN ACTIVE AND ENERGETIC COAL mines and coke works manager will be open for an engagement at New York. Thirty-one years' practical experience in coal mines; nine years superintendent of large and fiery mines in Pennsylvania. Has thorough knowledge of coking, coal prospecting, planning and all inside and outside details connected with the successful management of coal mines. Now employed as Mining Engineer by a large coal land corporation in one of the Southeastern States. Highest references from present and past employers. Address "LANARK," ENGINEERING AND MINING JOURNAL. No. 15,759, Jan. 13.

YOUNG MAN OF 24, GRADUATE IN MINING, with three years' experience in railroad and general engineering work, at present county surveyor, desires position as assistant mining engineer. Address GEO. B. GILL, Searcy, Ark. No. 15,748, Jan. 13.

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. SHERROD, Decatur, Mich. No. 15,754, Jan. 20.

A FIRST CLASS TOPOGRAPHICAL draughtsman and expert letterer, with long experience, desires a position. Address TOPOGRAPHICAL, ENGINEERING AND MINING JOURNAL. No. 15,769, Jan. 20.

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. No. 15,881, Jan. 20.

GRADUATED CHEMIST WITH PRACTICAL experience wants position. General analytical work and assaying. Address M. S. R., ENGINEERING AND MINING JOURNAL. No. 15,773, Jan. 27.

A 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. No. 15,747, Jan. 27.

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. No. 15,767, Jan. 27.

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. No. 15,885, Feb. 3.

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. No. 15,887, Feb. 3.

WANTED—POSITION AS SUPERINTENDENT or foreman of a gravel or quartz mine. Twenty years' practical experience. Address MONTANA, ENGINEERING AND MINING JOURNAL. No. 15,761, Feb. 3.

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. No. 15,888, Feb. 17.

CHEMIST AND ASSAYER, AT PRESENT engaged in the West, desires position with milling or smelting company. Best references. Address G., ENGINEERING AND MINING JOURNAL. No. 15,885, Feb. 17.

RESPONSIBLE POSITION WANTED BY A graduated chemist and engineer; superintendency or assistant superintendency in steel works or blast furnaces preferred; is a metallurgist and can burden furnace; is well up in modern engineering practice; thoroughly understands machinery and the economies of production; can design and build mills or furnace plants. Address "MODERN ENGINEERING," ENGINEERING AND MINING JOURNAL.

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.

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.

The Most Successful Process for the Extraction of Gold. IMPROVED BARREL CHLORINATION.

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.

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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 \$5,000 will be awarded to the best project, and a prize of \$4,000 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 \$2,000, 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 scaled letter containing the device are to be presented to the manager of the bureaux of the Hungarian royal ministry of commerce (Budapest, Lanczbid, 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 Mansourah to Menzaleh 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.

SEWER CONSTRUCTION.—Sealed bids for building a storm water sewer on 12th, 13th, Dale and 17th streets will be received by the City Clerk of Sioux City, Ia., until January 16th, 1894. There will be about 1,200 ft. of 3-ft. 4-in., 300 ft. of 4-ft. 6-in. and 3,300 ft. of 6-ft. brick sewer, and about 500 ft. of 12, 15 and 18-in. pipe sewer, about 30 brick inlets and 15 manholes. Plans can be seen and specifications and bidding blanks can be obtained at the office of the City Engineer. Two bids are asked; one conditional upon payment on monthly estimates in cash and one on payments on monthly estimates in "sewer bonds" running two, three, four and five years, bearing interest at the rate of 6 per cent. KNUDE SUNDE, Chairman Sewer Committee.

MINERAL OIL—JEFFERSONVILLE, IND.—Sealed proposals in triplicate will be received here until the 17th day of January, 1894, for furnishing at the Q. M. Depot here 100,000 gallons mineral oil of 135 degrees flash test, in cases of two five-gallon cans each. Government reserves the right to reject any or all proposals, and to accept the whole quantity, or any portion of the mineral oil bid for. All information furnished on application here. Envelopes containing proposals should be marked "Proposals for Mineral Oil," and addressed to Colonel HENRY C. HODGES, Assistant Quartermaster General, U. S. Army, Depot Quartermaster.

DREDGING.—U. S. ENGINEER OFFICE, Galveston, Tex.—Sealed proposals in triplicate for dredging in Trinity River, Tex., will be received at this office until January 20th, 1894, and then publicly opened. Specifications, blank forms and all available information will be furnished on application to this office. A. M. MILLER, Major Corps of Engineers.

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