

THE ENGINEERING AND MINING JOURNAL



(Published Every Saturday at 253 Broadway, New York.)
Entered at the Post-Office of New York, N. Y., as Second-Class Mail Matter.

VOL. LXIV. SEPTEMBER 25 No. 13.

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

Subscriptions are PAYABLE IN ADVANCE. For the United States, Mexico and Canada, \$5 per annum; all other countries in the Postal Union, \$7.
The address slip on the paper will show date of expiration of subscription. When change of address is desired both old and new address should be sent.
NOTICE OF DISCONTINUANCE.—The JOURNAL is not discontinued at expiration of subscription but is sent until an explicit order is received by us, and all arrearages are paid as required by law. The courts hold a subscriber responsible until the paper is paid for in full and ordered discontinued. PAPERS RETURNED ARE NOT NOTICE OF DISCONTINUANCE.

Main Office: 253 Broadway (P. O. Box 1833), NEW YORK.
Telephone Number, 3,095 Cortlandt.

New York Cable Address—"ROTHWELL." (Use McNeill's or A. B. C. 4th Edition Code.)
London Cable Address—"WELLSBOTH."

Branch Offices:
Chicago, Ill., Monadnock Building, Room 737.
Denver, Colo., Boston Building, Room 206.
Salt Lake City, Utah, 230 Atlas Building.
San Francisco, Cal., 207 Montgomery Street.
Birmingham, Ala., Chalfoux Building.

London Eng. Office, 20 Bucklersbury, 366 & 367. E. Walker, Manager.

English subscriptions to the JOURNAL may be paid at the London office at the rate of £7 = £1 8s. 9d.; the publications of the Scientific Publishing Company may be bought at the rate of 4s. 2d. to the dollar, net.

In commenting upon the Anaconda report in our last issue, we were made to say by a slip of the pen that the average cost of smelting the ore was 18.5 cents per ton instead of \$1.85 per ton. The data of the calculation having been given, probably no one was misled by the error.

The causes for the recent decline in the value of silver, and the partial recovery this week, are still obscure. The recent rise in price, however, must be exceedingly gratifying to many large interests, not the least of which are the smelters and refiners of silver-lead and silver-copper ores and bullion who have always on hand large stocks of silver in various stages of recovery, besides what fine metal they may have ready for market. A good many, we dare say, expected that when silver fell to 51½ cents it would not soon rise again, and this cataclystic decline was a hard blow to those engaged in the production and marketing of the metal. The price may go down again, but at all events the recovery to 59½ cents will give time to trim sails.

A decision which has just been announced by the Secretary of the Interior reverses a former ruling of the General Land Office in relation to mineral lands on railroad grants. This decision was given in a case which arose in the State of Washington on the Northern Pacific grant, where a local company had located and filed claim to a deposit of marble on which it proposed to open a quarry. The law specifies as mineral lands, which are not included in the railroad grant, lands containing ores of gold, silver, copper, lead, iron, tin, quicksilver and "other valuable mineral deposits." On the first hearing the Commissioner of the General Land Office held that marble could not be considered as a mineral deposit within the meaning of the law. This decision the Secretary now reverses, and gives the land to the claimant who located it. The decision is a just and rational one. If marble is not a "mineral deposit," we should be quite unable to classify it.

In the *Engineering and Mining Journal* for June 25th, 1897, page 656, it was stated that the operation of the Ashcroft process at the Cockle Creek smelting works of the Sulphide Corporation of Australia was not meeting expectations. Recently it was announced in London that the works had been closed down for the purpose of making certain alterations. The manager claims that these changes are limited to the substitution of tile conduits for certain iron pipes which were found to corrode very rapidly, and that the works will be ready to start again before the end of September. No statement has yet been made public as to the actual operation of the works or the results obtained, but the zinc production has not been large. A lot of 50 tons was shipped to London in August, and we believe this was the first shipment. The works were put in operation March 29th. The recent stoppage had an unfavorable effect on the shares in London.

The production of the Mount Morgan Gold Mining Company, Limited, of Queensland, from the formation of the company in July, 1886, to May 31st, 1897, was 696,888 tons of 2,240 pounds of ore which yielded 1,631,981 ounces of gold, an average of 2.34 ounces per ton. The proceeds from this amount of gold were £6,712,187. The cost of production, not including dividend duty and royalty was £2,124,860; including dividend duty and royalty it was £2,247,669. The company paid a dividend in the first six months of its organization, and has not failed to make a payment in each succeeding half-year, the total on May 31st, 1897, amounting to £4,400,000. This is certainly a magnificent record, the dividends amounting to 65.6 per cent. of the gross production of the mine, and there are few mines which can make so good a showing for so long a time. It has to be remembered, however, that the Mount Morgan ore is comparatively rich. For two years in the early history of the mine it averaged over 5 ounces, the maximum for a single half-year having been 5.8 ounces. Since 1892, however, the grade of the ore worked has been less than 2 ounces.

As the demand for anthracite coal becomes each year more closely limited to the consumption for domestic or household purposes, the managers of the coal companies must watch closely every movement which may tend to restrict its use, especially in the large Eastern cities. Just at present they are threatened with increasing competition from the gas companies, which are making efforts in many places, particularly in New York, to supplant coal by gas. The reduction in cost of gas and the many advantages which its use presents to the housekeeper in a city are continually urged upon the public, with a good deal of effect. In most places thus far the effort has been to increase the use of the ordinary illuminating gas, but there is strong probability that the supply of a special fuel-gas will be an important branch of the trade. The fuel gas plant established some time ago in Bridgeport, Conn., is in successful operation, and the experimental plant erected by the Dominion Coal Company at Halifax is doing so well that it is understood that arrangements are being made to begin work on the gas producers to supply Boston and neighboring cities. There seems little doubt that the inroads on the anthracite trade from this source will increase in importance,

CONTENTS.

Anaconda Report.....	361	Page.
Prices of Silver.....	361	
Mineral Lands on Railroad Grants.....	361	
Ashcroft Process in Australia.....	361	
Mount Morgan Gold Mining Company.....	361	
Anthracite Coal and Gas in Cities.....	361	
The Price of Lead and the Telegraph Quotations.....	362	
The Largest Dividend-Paying Mines.....	362	
The Western Coal Miners' Strike.....	362	
Iron and Steel Export.....	362	
New Publications.....	363	
Books Received.....	363	
Nitrosylized Blast Furnace Slag as an Addition to Hydraulic Cement—		
II.....		
A. D. Elbers.....	364	
Mineral Production of Alabama.....	364	
* A Belgian Underground Pumping Plant.....	365	
Antimony Mining in Italy.....	365	
The International Geological Congress at St. Petersburg—II.....	366	
The Copper Production of New South Wales.....	366	
* The Connections Between the Hardening Power and the Retardations		
of Low Carbon Steel.....	Henry M. Howe	367
Corrosive Mine Waters.....	368	
* Utilizing Coke-Oven Gases.....	369	
Canada's Newest Gold Field.....	J. T. Donald	369
Abstracts of Official Reports.....	370	
Acetylene Gas for the Generation of Power.....	371	
The Geology of Mexico.....	371	
* Illustrated.		
Personal.....	372	
Obituaries.....	372	
Societies and Technical Schools.....	372	
Industrial Notes.....	372	
Trade Catalogues.....	373	
New Patents.....	373	
Machinery and Supplies Wanted.....	373	
Mining News:		
United States:		
Alabama.....	373	
Alaska.....	373	
Arizona.....	374	
California.....	374	
Colorado.....	374	
Idaho.....	376	
Kentucky.....	376	
Maine.....	376	
Maryland.....	376	
Michigan.....	376	
Minnesota.....	376	
Missouri.....	376	
Montana.....	377	
Nevada.....	377	
New Mexico.....	377	
New York.....	377	
Oklahoma.....	377	
Oregon.....	377	
Pennsylvania.....	377	
South Dakota.....	377	
Tennessee.....	378	
Texas.....	378	
Utah.....	378	
Vermont.....	378	
Washington.....	378	
West Virginia.....	379	
Foreign:		
Africa.....	379	
Asia.....	379	
Canada.....	379	
Markets:		
Coal:		
New York.....	380	
Buffalo.....	380	
Chicago.....	381	
Pittsburg.....	381	
Metals:		
Iron:		
Pig Iron Production.....	381	
New York.....	381	
Buffalo.....	382	
Chicago.....	382	
Cleveland.....	382	
Philadelphia.....	382	
Pittsburg.....	382	
Gold & Silver.....	382	
Prices, Statistics, Imports and Exports.....	382	
Foreign Coins.....	383	
Copper.....	383	
Tin.....	383	
Lead.....	383	
Spelter.....	383	
Antimony.....	383	
Nickel.....	383	
Platinum.....	384	
Quicksilver.....	384	
Minor Metals.....	384	
Chemicals and Minerals:		
New York.....	384	
Charleston.....	384	
Liverpool.....	384	
Miscellaneous Dividends.....	385	
Late News.....	385	
Assessments.....	388	
Dividends.....	388	
Mining Stocks:		
Market Reviews:		
New York.....	384	
Boston.....	384	
Cleveland.....	385	
Los Angeles.....	385	
Salt Lake City.....	385	
San Francisco.....	385	
London.....	385	
Paris.....	385	
Rossland, B. C.....	385	
Stock Quotations:		
New York.....	386	
Ind. and Coal.....	386	
Philadelphia.....	386	
Pittsburg.....	386	
Boston.....	386	
Baltimore.....	386	
Cleveland.....	386	
Aspen.....	386	
Colo. Springs.....	386	
Denver.....	387	
Helena.....	387	
San Francisco.....	387	
Los Angeles.....	387	
Salt Lake City.....	387	
Rossland, B. C.....	387	
Mexico.....	387	
London.....	388	
Paris.....	388	
Valparaiso.....	388	
Shanghai.....	388	
Mining Co's:		
List of.....	389	
Current Prices:		
Minerals, Chemicals, etc.....	390	
Advt. Index.....	19	
Advt. Rates.....	20	

The Price of Lead and the Telegraph Quotations.

The silver-lead miners in Colorado and elsewhere in the West are again making an uproar over the misleading quotations of the lead market which are furnished by the Western Union Telegraph Company. That the quotations, which are thus furnished, are misleading is hardly worth the time of saying it. Last week the New York quotation of lead was reported in Denver as 4c. when sales were being made here at 4.30 to 4.40. What reason the telegraph company has for making such reports we do not pretend to say. Of course the producers of silver-lead ores, which are generally contracted to the smelters on a sliding scale per unit, according to the New York quotation, object strongly to what they consider to be highly unfair dealing.

However, we do not see any reason for this fresh outcry and excitement. It is not a new wrong which has been sprung on them. On the contrary, the matter has been discussed repeatedly in the *Engineering and Mining Journal* of previous years. In our issue of October 20th, 1894, we called attention especially to it. Ever since that time at least the sellers of lead ore have made their bargains with their eyes open. If they were not satisfied with the conditions they should not have agreed to them. It is not as if there were no other quotations available, since those of the *Engineering and Mining Journal*, which are based on actual sales in the New York market, are always obtainable. Doubtless the smelters make their rates on ores corresponding to the Western Union quotations, and if the miners should insist on settlement according to actual market quotations, the rates on ores would be raised. The miner might not realize any more than he does now, but it is nevertheless desirable that he should feel that he has been treated honestly.

The Largest Dividend-Paying Mines.

The last dividend paid by the Calumet & Hecla Mining Company, making its total distribution \$50,850,000, is worthy of special mention for the passing of the half-hundred mark in millions. The Consolidated California & Virginia, on the Comstock Lode, paid \$77,608,800, but besides this quondam possessor of the "Big Bonanza" there is no record of any mining company returning to its shareholders so much money as the Calumet & Hecla has done. In the United States, the Ontario has paid \$13,445,000, and the Granite Mountain \$12,120,000. There are no others with records of more than \$10,000,000. In Australia, the Broken Hill Proprietary Company has a record of £6,992,000, or £8,736,000, including shares of subsidiary companies which have been distributed; and the Mount Morgan one of £4,400,000. The shareholders in El Callao, of Colombia, have received \$9,666,440. The Robinson, in South Africa, has paid £1,642,499 (up to the end of 1896), and the De Beers' diamond mines £8,194,143 since the consolidation, while several of the companies which entered this union had paid large dividends before it was effected. The Rio Tinto copper mines of Spain have yielded their present owners £5,757,500 (from 1879 to 1896, both years inclusive); how much the ancients got out of them we have no means of knowing.

In referring to the above mines as being the largest dividend payers, we do not lose sight of the great bonanzas of Mexico and South America—Guanajuato, Zacatecas, Pachuca, Cerro de Pasco, Potosi and many others—of which the production was huge and the profit must have been enormous. The Spanish king received a fifth of the product as his royalty, and the adventurers, many of them at least, became rich. But of all this we have no definite records. Nor have we of many other famous mines of which the exploitation began long ago, like the mines of Laurium and Almaden, or those of the Harz and the Erzgebirge. Certain of these mines have been worked with fair continuity for nearly 900 years, and a small dividend per annum for many years may exceed a large one for a few years. The Calumet & Hecla, however, has had the good fortune to pay a large dividend for a good many years already, and the end is not yet in sight.

The Western Coal Miners' Strike.

The strike of the bituminous coal miners of the Western States, which practically ended last week, has now been formally closed by the issue of the circular of the United Mine Workers declaring it "off." The compromise finally accepted was a mining rate of 65 cents per ton of coal in the Pittsburg district, with the usual differentials for the other districts. The old Pittsburg rate was 54 cents, and the men asked for 69 cents. The new rate is, however, to continue only until the end of the year, when another will be established by conference committees. Nearly all the men have already returned to work except at a few mines, including those of the New York & Cleveland Gas Coal Company, where the operators did not accept the settlement.

The strike, which lasted a few days over two months, was an extensive one, nearly all the coal miners from Pittsburg to the Mississippi River joining in it, with the important exception of West Virginia. In that State only two districts were included, though the mining fate has been

lower there than anywhere else, except at a few of the Illinois mines. The work has been more regular, however, and the men were better satisfied, so that a small increase granted by the operators kept them at work. It was the steady output from West Virginia that prevented any serious scarcity of coal in the West during the strike. In this, as in former general stoppages of work, the West Virginia mines have had an opportunity to reach out for new trade, and they have obtained a footing in some markets from which they will not be easily dislodged.

With stocks on hand and the West Virginia supply there was little difficulty in providing for the western market, and there was no marked rise in prices anywhere. The only serious disturbance has been in the Lake trade, which has received only a small part of its usual supply, and it will be hard work to make up the shortage before the close of navigation.

One noteworthy feature of the strike was the almost entire absence of violence. Another, which was comparatively new, was the use of the courts to enjoin attempts at preventing work in certain mines. These injunctions involved some nice legal points, which can hardly be discussed here.

There can be little doubt that the situation of the miners was unsatisfactory, and that the increase in wages was needed. Whether it can be maintained in the face of the strong competition which has existed, and which will again be felt when the mines have all resumed work, is doubtful. The difficulty will come in December, when the mining rates are to be adjusted for the coming year.

Our Iron and Steel Exports.

Until a comparatively recent period our export trade in iron and steel was limited to small shipments to the West Indies and South America and to a few special classes of machines. It was the general opinion that our greater cost of labor shut us out from competition with Great Britain, Belgium and Germany in foreign markets, and our ironmasters professed to be entirely satisfied with the home trade. The United States accordingly was considered as a factor which could be entirely neglected in calculations affecting the iron trade outside of its own limits.

A change which many have considered to be only temporary and the result of exceptional conditions, has taken place within the past two years, though preparations had been made for it in the improvement of methods and reduction of costs which have been going on for many years under the pressure of competition. Exports of pig iron first began to attract attention about a year ago, and since that time their growth has been comparatively rapid, as it was found that the quality and price were suited to foreign requirements. Later the export of steel billets, wire rods and tinplate bars was undertaken, and this also has grown steadily. Recently, steel rails also have been exported in direct competition with the English rolling mills.

The following table shows the exports of iron and steel in various forms from the United States in the fiscal years ending June 30th, 1896 and 1897, as reported by the Bureau of Statistics of the Treasury Department:

EXPORTS OF IRON AND STEEL, FISCAL YEARS 1896 AND 1897.

	1895-96		1896-97	
	Quantity.	Value.	Quantity.	Value.
Pig iron.....	29,862 tons.	\$471,803	168,890	\$2,351,771
Bar iron.....	7,891,476 lbs.	175,089	7,764,205	188,646
Car wheels.....	14,635 number	104,215	18,548	112,157
Steel ingots, etc.....	5,988,592 lbs.	123,151	92,496,997	1,121,090
Nails and spikes.....	28,764,187 "	749,685	35,418,299	877,012
Plates.....	2,901,505 "	87,334	9,893,771	211,267
Rails.....	29,645 tons.	656,368	112,072	2,561,691
Wire.....	70,938,846 lbs.	1,506,885	107,729,155	2,242,617
Band and miscellaneous.....		1,774,696		2,023,292
Hardware.....		5,509,188		6,627,466
Machinery.....		21,614,439		29,414,317
Miscellaneous.....		8,386,023		9,819,914
Total value.....		\$41,160,877		\$57,490,305

The most striking gains shown in this table are in pig iron and in steel ingots and rods, comparatively crude products. Bar iron, nails and wire we have for many years exported in considerable quantity, chiefly to Mexico and South America; last year they showed noteworthy gains, with the exception of bar iron, and the slight loss in that item is largely due to the substitution of steel bars. Plates and rails show a heavy increase; hardware and machinery also gained largely. The table, moreover, does not represent fully the growth of the foreign trade, since it is well known that our manufacturers have secured many contracts for rails and other products, which will appear in the current year's returns. Including machinery, the table shows a gain last year of a little over 40 per cent. in the total values of the exports. In July the rate of increase was fully maintained.

It must not be overlooked that this export business is still small in itself and is to be considered only as a beginning. The exports of pig iron for the year, for instance, were less than a single week's production of the blast furnaces at the current rate of working. It is important, however, as showing what can be done, and also because the exports have served to a certain extent to regulate prices here by removing some of the surplus which was pressing for a market. The export movement has been assisted materially by the prosperous condition of trade in nearly

all the countries of Europe, and the heavy demand there for pig iron and steel in its manufactured forms.

It is to be hoped that this foreign trade will not be neglected as business improves at home. A foothold has been secured at some pains, and the advantage ought not to be given up. When business begins to decline in Europe it may be a matter of considerable difficulty to retain the trade there; but in certain countries, especially Russia and Japan, we have established relations which should enable us to enlarge our sales. There is no doubt that our ironmasters can meet their competitors, and the extension of foreign sales will be of great benefit to them, and to the country at large also.

NEW PUBLICATIONS.

NORTH CAROLINA GEOLOGICAL SURVEY: BULLETIN No. 3. GOLD DEPOSITS OF NORTH CAROLINA. By Henry B. C. Nitze and George B. Hanna. Winston, N. C.; Public Printers. Pages, 200; with map and illustrations.

The economic geology of the North Carolina gold deposits is well treated, and the most important mines of the region are fully described in this book. The names of the authors are a guaranty of faithfulness in the performance of the work and the bulletin will be a valuable source of reference as to these deposits of gold ores which are ever attracting a great deal of attention.

GEOLOGICAL SURVEY OF ALABAMA. REPORT ON THE VALLEY REGIONS OF ALABAMA. PART II. THE COOSA VALLEY REGION. By Henry McCalley, Assistant State Geologist. Montgomery, Ala.; State Printers. 1897. Pages, 862; with map and illustrations.

This report covers the physical features, geology and natural resources of the Coosa Valley Region of Alabama. The mineral deposits of this region are of much industrial importance. They comprise coal, iron ores, bauxite, clay of many kinds, pyrites, manganese ore, lead, gold, slate, marble and many kinds of building stone, cement material, mineral paints and numerous less important substances. To the casual reader the third chapter of the book, which deals especially with the minerals of economic importance, is the most interesting, though the entire report is of value to the geologist. The only technical paper included in the book is "The Gold Mining, and the Marble Industry of Talladega County," by W. Taylor, which occupies only 12 pages.

L'ANTIMONIO. By G. B. Traverso. Alba, Italy; Sansoldi. Pamphlet. Pages, 86; with plates.

The author of this treatise was for five years in charge of the antimony works at Rosia in Tuscany and at Su Suergiu, near Villasalto in the Island of Sardinia, these works belonging to the Societa anonima delle Miniere e Fonderie di Antimonio. In the preparation of his book he has drawn upon his experience at these works and also upon his observation at other works which he has visited. Apparently, however, his travels have not been extensive, since he makes no reference to many important deposits of antimony ore and much good practice in antimony smelting. In so far as the Italian mines and methods are concerned, however, the treatise may be accepted as a standard authority, and is therefore a valuable contribution to metallurgical literature. The value of the book is increased by a complete bibliography of the French and Italian literature on antimony, but unfortunately no English or German references are included. The drawings of furnaces which accompany the volume are excellent, but it is to be regretted that they do not bear dimensions, though the scale is given.

THE HYDRAULIC GOLD MINER'S MANUAL. By T. S. G. Kirkpatrick. London: E. & F. N. Spon, Limited. New York: Spon & Chamberlain. Price \$1.

In reviewing this book it is sufficient to mention that the total number of pages is 46, of which seven are taken up by engravings: 4 pages are occupied by a list of stores required for opening a hydraulic mine; six by notes "Useful for reference," which contain such useful items as "All rocks not calcareous are silicious"; "5 men working 10 hours = 1 horse working 8 hours"; "An English sovereign weighs 123.274 grains"; "An English shilling weighs 87.27 grains," which information may be valuable to a hydraulic miner in London, but in the field it is hardly worth while to carry a book to gain it. The last 15 pages of the book comprise an appendix, which contains a three-page article on "River Mining," wherein the digger is advised to provide himself with a remarkable equipment, but above all things to keep from "drink!"; a five-page article entitled "A Season's Gold Digging on the Yukon," which is reproduced from the *Field*, a London newspaper, and seven pages of "Simple Rules for the Discrimination of Gems." This leaves 14 pages of text to hydraulic gold mining, which is surely a subject of sufficient importance to deserve more space if it is to be treated at all. The book is not to be recommended as a technical treatise.

AMERICAN INSTITUTE OF MINING ENGINEERS. Papers published by the Institute, R. W. Richmond, Secy., September, 1897.

The last package of papers distributed by the secretary contains the following: Denton, "Methods of Iron Mining in Northern Minnesota"; Wellman and Hurst, "Biographical Notes of George W. Goetz"; Smith, "The Potsdam Gold-Ores of the Black Hills of South Dakota"; Sperry, "The Influence of Lead on Rolled and Drawn Brass"; Ries, "The Fullers' Earth of South Dakota"; Ries, "The Clays and Clay-Working Industry of Colorado"; Heath, "The Electrolytic Assay as Applied to Refined Copper"; Bacon, "The Development of Lake Superior Iron-Ores"; DeKalb, "A Combination Retort and Reverberatory Furnace"; Lewis, "The Chicago Main Drainage Channel"; Ingalls, "Notes on the Tin Deposits of Mexico"; Kelly, "A Mine-Dam"; Boss, "Some Dike Features of the Gogebic Iron-Range." Besides these there are the proceedings of the Lake Superior meeting, the list of members revised to August 1897, and discussions of the papers on "The Cyanide Process," "The Microstructure of Steel and the Current Theories of Hardening," and "The Cement

Deposits of Arkansas," which were printed in Volume XXVI. The papers of Professor Christy and Messrs. Furman and Packard in Volume XXVI. have brought out exceedingly interesting discussions not only in the Transactions of the American Institute of Mining Engineers, but also in those of the Chemical and Metallurgical Society of South Africa.

BOOKS RECEIVED.

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

Practical Ice-Making and Refrigerating. By Eugene T. Skinkle, Chicago Ill. H. S. Rich & Co. 1897. Pages, 235; illustrated.

Slide Valves. By C. W. MacCord, Jr. New York: John Wiley & Sons, and London, Eng.: Chapman & Hall, Limited. 1897. Pages, 168; illustrated. Price, \$2.

Annual Report of the Operations of the United States Life-Saving Service for the Fiscal Year Ending June 30, 1896. Washington, D. C.: Government Printing Office. 1897. Pages, 533.

CORRESPONDENCE.

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

The Anaconda Report.

SIR: In your comments upon the annual report of the Anaconda Mine in the issue of September 18th, you mention a very important point relating to investments in shares of mining companies; namely, the probable life of a mine. The present rate of dividends paid on the shares of the Anaconda Mining Company is, substantially, 10% per annum on their par value. If we assume that the future life of the mine is 20 years, at present rate of production, say 1,500,000 tons per annum, and that the present rate of dividends continue for that period, a person buying the shares at par and holding them for 20 years would receive 200% in dividends in that time, which is, substantially, equal to the return of the capital invested with interest at the rate of 5% annually. At the rate of 1,500,000 tons per year the mine would produce 30,000,000 tons in 20 years, and at 15 cu. ft. of "ground" to a ton, this quantity of ore would require a space of 450,000,000 cu. ft., and if the ore body averages 45 ft. in thickness, the superficial area would be 10,000,000 sq. ft., a space, say, 5,000 ft. (practically a mile) long by 2,000 ft. in depth.

The questions that naturally present themselves to a reasonably cautious investor are, primarily, the security offered by the contemplated investment; and, secondly, the rate of interest to be obtained. Therefore, it seems pertinent to suggest that an annual report to the shareholders of the company should contain a more definite statement in regard to the amount of ore reserves, and, incidentally, to inquire if it is reasonable to believe that the property can continue dividends at the present rate for 20 years longer, necessitating a gross production of about \$350,000,000, assuming that the value of the ore and the relative proportions between receipts and expenditures continue as at present.

New York, Sept. 18th, 1897.

E. M.

Western Australian Mines.

SIR: In the present year Western Australia has sprung from sixth rank to third as a gold producing colony in Australasia. The yields from the Kalgoorlie mines for the month of June were little less than those of Cripple Creek, and as yet the telluride ores, which are the mainstay here, have hardly been touched upon. During May the output of Kalgoorlie was 29,000 oz. of gold from 12,000 tons of ore, all free milling. During June 2,000 tons of telluride ore were treated and yielded 12,000 oz. gold. The shipments of telluride ores will be greatly augmented with the opening up of the lower levels and better arrangements for transportation.

Mining in Western Australia from an economic standpoint has improved 50% in the past 12 months. With the introduction of the cyanide process on the Lake View and Ivanhoe by Mr. Chas. Kaufman a great advance was made. By means of this over 100,000 tons of tailings will be treated, and, according to results already obtained, 90% of the gold can be saved. The water difficulty, which has been the bugbear of the mining industry here, has been greatly gotten over by the introduction of the Pelton wheel by Mr. John Dwyer, while manager of the Paddington Consols, Reison's Reward and Duke mines. The water found in the mines has to be used to obtain steam, and as it is highly mineralized it must be condensed before being put into boilers. Where large mills are to be operated a large expense is involved. Mr. Dwyer believed it was cheaper to "pump twice than to boil twice," and though the innovation was greatly ridiculed, placed in the first Pelton wheels used on the gold-fields. The cost of timber has been reduced in the past few months. Sawed native (gum) timber, which is too heavy and too hard to work well, has been selling for \$14 per 100 ft., but now Oregon pine is delivered on the mines at \$8 per hundred. The days when tailings carrying over an ounce per ton were thrown away and condensers treated water at a cost of 15c. per gallon before it could be used for steam are gone.

The gold produced in Western Australia is taken from mines that will not aggregate 500 acres in extent. Yet there has been but little interest taken in the mines here by American capitalists. The faith which the Londoners have in Western Australia, especially Kalgoorlie, was established by Americans, particularly Mr. Chas. Kaufman. CHAS. L. TAYLOR.

KALGOORLIE, W. A., July 24, 1897.

Production of Zinc Ore in New Jersey.—The Sterling Iron and Zinc Company, of Sussex County, shipped 78,080 tons of zinc ore in 1896, which is the most for any year in the history of the company. Of this output 3,718 tons came from Sterling Hill and the remainder from Mine Hill.

NITROSYLIZED BLAST FURNACE SLAG AS AN ADDITION TO HYDRAULIC CEMENT.—II.*

Written for the Engineering and Mining Journal by A. D. Elbers.

The tests for tensile strength, tabulated in my previous paper, were made by Dr. Chas. F. McKenna in his testing laboratory in Pearl street, New York, on May 26th last. As all of the briquettes had broken pretty near the middle of the stem, I ground down the stems of the respective pieces in such a manner that the one-half of each briquette became reduced to 1 1/4 in. in length—measuring through the center of the stem to the top of the head—and that its counterpart became reduced to 1 1/2 in. in length. In two or three cases I made an extra allowance of about 1/4 in. in order to compensate for apparent imperfections on the rim of the heads. The superficial area of the pieces thus prepared averaged about 2 sq. in.; each piece differing from its counterpart about 1/4 in. in length, and, consequently, about one-sixteenth part in volume. Thus each fractured briquette yielded two test pieces for the subsequent crushing tests.

The fractures of May 26th I put again under water from June 14th (the date on which the "cast" briquette had been tested) until July 4th; they were then taken out, kept dry until September 14th, re-immersed for 24 hours and ground to size on an ordinary grindstone, and on September 15th they were subjected by Dr. McKenna to the crushing test.

The results are as follows:

A.—TESTS WITH HIGH CLASS PORTLAND CEMENT.

No.	Composition of mixture.	Tensile strength per square inch, in pounds, after 16 to 18 days, as previously reported.	Resistance to crushing, in pounds, per total surface-area of about 2 sq. in. after 128 to 130 days.
1.	Neat cement.....	563	12,000—15,150
2.	" " " " " "	526	13,200—15,000
3.	Cement: 80%, slag: 20%....	426	11,180—12,780
4.	" " " " " " " " " "	335	11,870—12,910

B.—TESTS WITH AN INFERIOR PORTLAND CEMENT.

No.	Composition of mixture.	Tensile strength per square inch, in pounds, after 19 days, as previously reported.	Resistance to crushing, in pounds, per total surface-area of about 2 sq. in. after 131 days.
1.	Neat cement.....	310	6,100—6,400
2.	Cement: 60%, slag: 40%....	335	6,300—6,650
3.	" " " " " " " " " "	310	6,800—7,350

The resistance to crushing is stated separately for each of the briquette-heads, the first figure denoting the resistance of the shorter piece, and the second figure the resistance of its counterpart.

The briquette made by casting the slurred mixture into the mold, composed of cement "A": 90%, slag: 10%, and which broke, as previously reported, at 350 lbs. tensile strain per square inch when 17 days old, gave the following results: Crushing strain of the shorter piece, 9,450 lbs.; crushing strain of its counterpart, 10,770 lbs.

In analyzing the tabulated figures it will be readily noticed that the highest crushing strain of the respective specimens stands to the previously reported tensile strain in about the following ratio:

No. 1 A.....	13 1/2 : 1	No. 1 B.....	10% : 1
" 2 ".....	14 1/4 : 1	" 2 ".....	10 : 1
" 3 ".....	15 : 1	" 3 ".....	12 : 1
" 4 ".....	21 : 1		

This ratio increases with the proportion of the slag admixture.

The nitrosylized slag that was used for the above experiments had not been sifted, at least not after it had received its chemical treatment, which is apt to leave more or less of the particles in a clogged condition. The sample lot from which it was taken left about as much residue on a 90-mesh silk sieve as the cement "A," but the grain of that cement was evidently finer than that of the sifted slag, which, probably, accounts for it that the briquette containing 20% of the slag did not come up to the full compression strength of the neat briquettes of the same cement No. 1 "A" and No. 2 "A". Still it is likely that the 20% briquette would have excelled the compressive strength of the two neat specimens of "A" cement if the specimens had been kept immersed for a longer period—say for three months instead of from 37 to 41 days, all told.

The microscopical examination of the nitrosylized slag did not reveal anything of especial interest. Inspected under the Welsbach light, the particles of the nitrosylized slag appeared to be somewhat more translucent than those of the pulverized crude slag, which was to be expected.

CONCLUSIONS.

Coming now to the final conclusions, I feel no hesitation in asserting that nitrosylized slag is destined to become a very important factor in the cement industry as soon as the customary prejudices, which the introduction of such improvements has to contend with, have been overcome. Some years ago a noted investigator said of cement that "there is at present only one way of determining whether the judgment passed on a cement by any system of testing is sound, and that consists in waiting half a century to see how the work stands." This opinion has still some force, for our knowledge of the chemical structure of Portland cement is nearly as imperfect now as it was at the time of that statement.

But it would not be logical to apply this opinion to the use of an ingredient, or admixture, like the one that has been herein considered. With slag of such silicate-constitution as is known to make a good silicifier, there is no question whether it consists of silicates or of silicates and aluminates; nor does such slag "fall apart, absorb chemical water and recombine" as Portland cement does. It simply serves as a silicifier; its mutual relations with the cement or the reactions that the one can have on the other—are perfectly understood and easily determined; its noxious impurities are also well known and easily determined. All that remains to be shown then is, that the deleterious influence of the sulphurous crude slag does not obtain in the still sulphurous nitrosylized slag; in other words, that the sulphide contents of the crude slag are rendered as harmless by the superficial treatment of nitrosylation as if they were insoluble.

* No. I. appeared on page 661, *Engineering and Mining Journal* of June 26th 1897.

The proof is easily brought by comparing the behavior of cement pats that contain crude slag with others that contain nitrosylized slag, when they are subjected to the action of weak solutions of either of the strong acids after having been sufficiently long under water to become properly indurated, say, a month or two. The presence of the crude slag will always become noticeable by a rather strong evolution of hydrogen sulphide gas, whereas the specimens containing nitrosylized slag will scarcely evolve more of that—if any—than the neat cement is apt to do.

MINERAL PRODUCTION OF ALABAMA.

The following is the production of minerals as reported to Dr. Eugene A. Smith, State Geologist and Secretary Alabama Industrial and Scientific Society, by the producers for the month of July, 1897, and for the seven months ending July 31st:

	July.	Seven months.
Coal.....	Tons, 569,396	2,772,919
Coke.....	" 59,685	661,830
Pig iron.....	" 79,191	475,887
Iron ore.....	" 145,799	1,226,707
Limestone and Dolomite for flux.....	" 31,332	149,294
Bauxite.....	" 760	3,232
Building stone.....	Cu. ft., 4,560	26,260

The total number of employees engaged in the mineral industries in July is estimated at 12,295 against 14,962 in June, 13,169 in May, and 13,500 in April. The bauxite does not include that mined by the Southern Bauxite Company, which is shipped from Georgia. It should be noted that coal and coke are reported in short tons of 2,000 lbs., while iron ore, pig iron, limestone for flux and bauxite are given in long tons of 2,240 lbs. As compared with June there was a large increase, 149,360 tons, in coal, and a gain of 8,477 tons in coke, but a decrease of 3,400 tons in iron ore. Pig iron shows an increase of 8,600 tons.

THE WALKER METHOD OF FIRING HIGH EXPLOSIVES.

Before the Midland Counties Institution of Engineers, at its meeting on August 28th, Mr. J. Mein read a paper on the Walker hollow needle for firing high explosives, the object of which is to avoid the danger incident to the ramming of shots when the detonator and charge of high explosives are placed together in the shot-hole. In the existing method the detonator is placed in the explosive charge, and after both are placed in the hole the ramming is proceeded with. By the Walker method it is intended to place the charge in the shot-hole, complete the ramming, and, when this is done, the detonator is placed in position. It is obvious under such conditions that it will be impossible for a workman (either by undue violence in ramming, or by accident) to fire the charge. The tools to be used and the manner of using them are as follows: There is a hollow brass or copper needle, provided with a handle, and of sufficient length to suit any hole. The outside diameter of the needle is 1/2 in. and the internal diameter of the tube along its whole length is 3/8 in. At the end, the needle is slightly reduced in diameter, so as to admit of its being inserted into a paper tube 6 in. in length and of the same diameter as the needle. The paper tube is fixed in the charge, preferably in the process of manufacture, but not necessarily so, and forms a chamber for the reception of the detonator. A plain copper rod is used to push the detonator along the tube in the needle to its position in the charge of explosive; and as an additional precaution this rod is provided with a paper tip. The detonator is held in position by a simple spring made of cane or some similar material.

The paper tube being fixed in the charge the hollow needle is inserted therein, and the charge is then placed by means of the needle into position in the shot-hole. The ramming is then made, after which the detonator is placed in position by being pushed along the hollow needle by means of the copper rod. The detonator being now in position and secured by the springs, the copper rod and needle are simultaneously withdrawn, and the shot fired by electricity in the usual way. By the adoption of this method the desired end of effectually separating the charge of explosive and the detonator during the operation of ramming is effected. The total additional cost incurred by the use of this arrangement will not exceed 1c. per shot.

Coal for Mexico.—A consular report states that the demand for coal and coke in Mexico is becoming greater every year, in view of the increasing scarcity of fuel and the remarkable development of industrial enterprise throughout the country.

Norwegian Nickel Industry.—Prof. J. H. L. Vogt, in *Norsk Teknisk Tidsskrift*, makes comparison between the Norwegian and Canadian nickel ores. The Canadian ores average about 2.75% Ni; the Norwegian are of lower grade. The Ringerike ore assays about 1.7% and the Evje goes from 2 to 2.25%. This difference may be offset, however, by the cheaper coal and labor in Scandinavia. The cost of production at the Ringerike mine averages \$0.1474 per kilogram of nickel in the ore. In the smelting process at Ringerike ore, with 1.7% Ni is concentrated to a matte assaying from 8 to 10% Ni, but with modern furnaces a matte containing from 12 to 15% Ni and half as much copper might doubtless be made. Probably metal assaying 98 to 99.5% Ni can be produced in Norway at 40-2c. per kilogram, says Professor Vogt.

Elimination of Arsenic from Metallic Copper.—B. Thomas and J. T. Thomas, of Llanelly, Wales—in English. Patent 17,941 (August 13th, 1896)—propose to treat molten copper in a reverberatory furnace with a flux and currents of compressed air. As a flux, soda ash, nitrate of soda, or good black oxide of copper is used. Preference is given to the first. Nitrate produces more trouble in the subsequent treatment of the slag, and its cost is greater, while copper oxide, though equal to soda ash in many respects, brings more copper into the slag. An apparatus is described and illustrated, by aid of which the flux and compressed air can be introduced simultaneously into the furnace. It is claimed that by this method 10 to 14 tons of copper, containing 1.0 to 1.25% of arsenic, can be treated in 12 hours, to produce a copper testing 99.50% with only a trace of arsenic.

A BELGIAN UNDERGROUND PUMPING PLANT.

A pumping plant in the Ste. Catherine shaft of the Bascoup Colliery in the Hainaut District in Belgium is described by M. Edmond Briart in the *Revue Universelle des Mines* for May, 1897. The installation is interesting on account of the conditions imposed upon the engineers, and the arrangements made to conform to them. A modern pumping plant, with the latest improvements, was required, and all additional excavation was to be avoided, the engine being placed in an old gallery of the mine, which was lined with masonry and was 2.25 m. (7.4 ft.) in diameter. This diameter could not be changed, though the gallery could be extended in length if necessary. The plan selected, out of several which were offered, was that of M. Fouquembourg, of Wasmes, who furnished the machinery. The arrangement is shown in the accompanying drawings, Fig. 1 being a longitudinal section; Fig. 2 a plan; Figs. 3 and 4 transverse sections.

The cylinder, pumps and condenser are placed in the gallery A, which is 12 m. in length. The gallery B contains air and steam reservoirs. The pumps are of the Fouquembourg system; the steam cylinders are simple and are provided with Meyer valve gear. The pumps are direct-acting, the plungers being attached directly to the piston rods of the steam cylinders, while a prolongation of the rod also works the circulating pump of the condenser.

The bed frame consists of iron girders, set in pairs and bedded in

a reservoir 4 m. long and 0.60 m. in diameter, where any condensed water is separated. The engines draw steam from this reservoir.

The water pumped passes up through cast-iron pipes, which are less subject than wrought-iron to corrosive action. These pipes are provided with the necessary air valves, and also with expansion joints.

The dimensions of the engine and pumps are as follows: Steam cylinder, 0.670 m. diameter and 0.650 m. stroke; diameter of pump cylinder, 0.175 m.; diameter of water pipe, 0.147 m.; diameter of steam pipe, 0.142 m.; diameter of condenser, 0.320 m. The engine runs 45 to 50 revolutions per minute. The water is raised 360 m., and the theoretical duty is 26.16 liters of water per minute.

In practice it was found that working at 45 revolutions the engine developed 109 H. P., and the actual duty was 24.8 liters of water per minute. The vacuum in the condenser was 0.78. The average temperature of the water was 21.5° C. before entering the condenser, and 32.5° after leaving it.

ANTIMONY MINING IN ITALY.

The chief antimony deposits of this kingdom are situated in the Province of Tuscany and in the island of Sardinia. The Pereta mine in Tuscany is opened in a mass of chalcidonic quartz, in which stibnite is sparsely and irregularly distributed, which makes its winning difficult

FIG. 1.

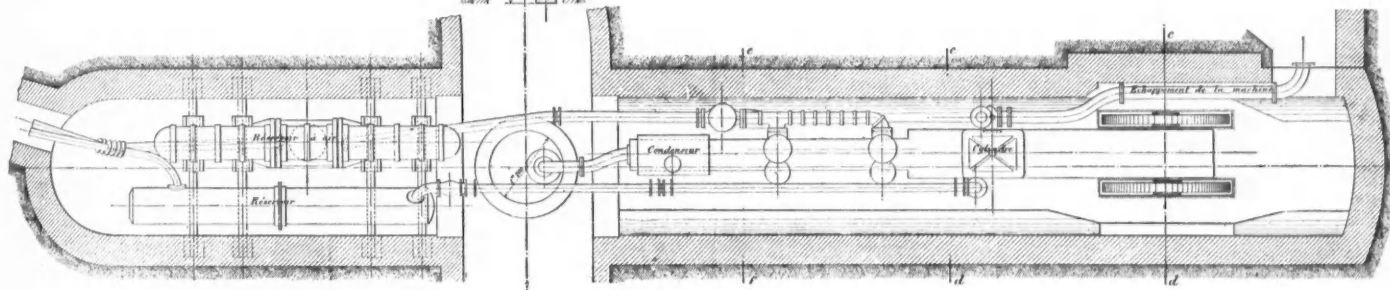
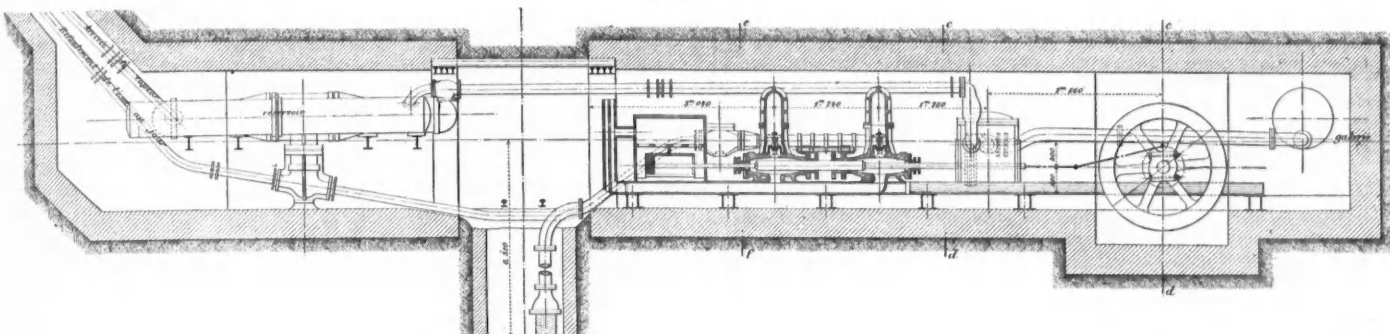


FIG. 2.

PUMPING PLANT AT BASCOUP COLLIERY, BELGIUM.

masonry running across the engine room or gallery. Upon these rest other iron beams running lengthwise, upon which rest the engine and the pumps.

The water is taken from a sump, and passes through the condenser, from which it goes to the pumps through a pipe fixed in the masonry. This arrangement, which has worked successfully, was first adopted to

and costly, especially since the quartz is very hard. The quartz deposit exists in the form of a great ellipsoid of which neither the hanging nor foot wall can be exactly determined. On account of the expense of working and the low price of antimony this mine is now idle. At Monte Auto there is a peculiar occurrence of antimony ore. Antimony glance is found in great blocks distributed in a black clay, in which no other kind of rock occurs except occasionally masses of dolomite which are impregnated with stibnite. Search for the original deposit has so far proved unsuccessful. The Cetine di Cotorniano mine at Siena is opened in a vein of blackish quartz-like rock in which, at the surface, antimony occurs as oxide, changing to very pure crystalline sulphide at a little depth. The deposit exists at the contact of the Rhaetic limestone with Permian slate at Su Suergiu, in Sardinia. Antimony glance accompanied by pyrites is found in the mica schist. G. B. Traverso, who had opportunity for a thorough study of these deposits, expresses the opinion in *L'Antimonio* that they are of sedimentary origin rather than of vein formation. Mining is vigorously carried on at Su Suergiu, where the production is quite as important as at any place in Europe. There is a good dressing works and a large smeltery, in which the ore is purified by lixiviation, after which it is shipped to Livorno for reduction. There are several other places in Sardinia where antimony deposits have been exploited with good results, but most of these mines are now idle on account of the low price of the metal.

Manufacture of Chrome Salts in Italy.—A company of Genoese capitalists has been formed to erect works for the manufacture of chrome salts at Cogoleto, near Savona. The new company has acquired possession of a very favorably situated mine of chrome ore on the Dardanellas, and owing to its advantageous situation it is expected that chrome salts can be produced in Italy more cheaply than they can be imported from England.

The Antimony Mines and Works at Dublovic and Pricov.—According to A. Irmiler, *Chemiker Zeitung*, 1897, 111, the ore ranges from 50 to 90% in antimony sulphide, and from 0.001% to 0.003% in gold. The ore is smelted in pots and retorts to crude antimony (sulphide). The purified sulphide is then reduced according to the roast-reduction method in reverberatory furnaces or according to the precipitation method in shaft furnaces. Irmiler chambers are used for the condensation of the fumes of Sb₂O₃.

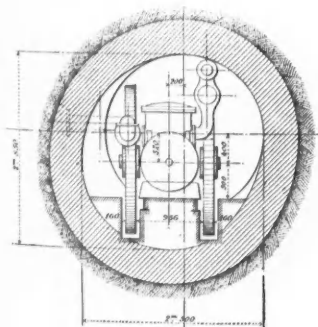


FIG. 3.

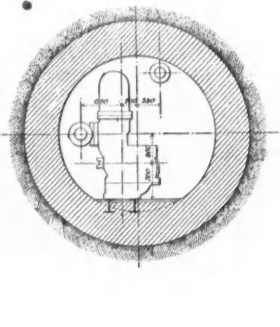


FIG. 4.

save space and avoid new excavations. It has recently been copied at the Gneisenau mine in Westphalia.

Steam is brought to the engine from boilers on the surface. The pipes are of galvanized iron, which has the advantage of being lighter than cast iron. Various kinds of covering to prevent loss of heat were tried; mineral wool was found good, but costly, and the best and cheapest has been slag packed closely between the pipe itself and an outer shell of sheet-iron. The steam pipe is furnished with expansion joints placed 50 m. apart. The elongation of the pipe noted so far has been 10 to 12 cm. at each joint. At the bottom of the shaft the steam passes into

THE INTERNATIONAL GEOLOGICAL CONGRESS AT ST. PETERSBURG—II.

Specially Reported for the Engineering and Mining Journal.

THE EXCURSION TO THE OURAL MOUNTAINS—CONCLUDED.

The village of Bérézovsk is situated 12 km. from Ekaterinburg, and the road leading to it passes along the shores of one of the numerous lakes of the region; this, like the others, show the peculiar phenomenon of a row of boulders following the sinuosities of the shore, which have been pushed up from the water line by the action of the ice continued year after year. The granite of the region (said to contain one grain gold to the ton) has been much decomposed and worn away by atmospheric agencies. This erosion has left the harder portions standing above the plain at certain points. The most interesting of these is, probably, the *lentes de pierre* near the city. These are three small masses of granite which rise 20 m. or more above the general level. Their sides have been smoothed and carved by the action of wind, sand and water, and on top there are shallow depressions like the beginnings of pot holes.

The placer workings at Jalonoff near Bérézovsk are now more important than those near Miass. Here the peat is 6 ft. or more thick, and is dried and used for fuel at the works and elsewhere. Heavy rain prevented our going into the pits. The methods pursued here are more thorough than those in use at Miass. The pay dirt is brought in carts up an inclined plane to a platform at the top of the vertical sieve. The sieve passes the finer material out upon the riffles, which are provided with amalgamating troughs and mats. The material settling in the first riffles is taken in wooden boxes to large square trays, where it is carefully raked over and stirred to ensure amalgamation of all the gold, more mercury being added at this stage if too little seems to have been put in on the riffles. Two men are stationed at the discharge of the sieve to watch for nuggets. One nugget of 20 gm. and one of 50 gm. were found during the half hour or so that our party was at the works. The riffles here are rather steep, but there is a settling-trough at the bottom, from which the water is raised by means of an Archimedean screw and used over again. About 320 tons of gravel are washed daily, with an average yield of 1.3 gm. gold to the ton.

Of much greater antiquity than these placer works and also of more importance are the quartz mines very near the town of Bérézovsk itself. The region is almost entirely occupied by vertical or highly inclined chloritic, talcose and argillaceous schists, which strike essentially north and south. These schists often contain masses of serpentine and granite and are intersected by a network of veins or bands of beresite. Beresite is almost always an altered rock; sometimes it looks like a fine grained granite, sometimes like a porphyry or felsite and sometimes it differs little from greisen, but it consists essentially of quartz and muscovite. The veins of beresite vary from 2 to 20 or even 40 m. in breadth, and some have been traced for more than 8 km.; their general course is north and south. The bands of beresite are cut obliquely (from west to east) by highly inclined or vertical veins of auriferous quartz, which are usually narrow, but sometimes attain a thickness of 0.7 m. and rarely are as much as a meter across. The gold-bearing quartz is sometimes compact and sometimes porous and contains pyrite and limonite. The gold occurs not only in the quartz, but also in the pyrite, and the other minerals which are found in the veins, as in galenite, for instance. The crushed rock averages 13 gm. gold to the ton. Thirty-six minerals are known to occur in these veins. The upper portions of the rocks near Bérézovsk are usually much altered and the porosity of the quartz appears to be due to the leaching out of sulphide minerals, especially pyrite. The beresite decomposes to a yellowish white clayey mass locally known as *beliak*, but the inclosing schists form a red clay called *krassik*.

After an all too short stay at and near Ekaterinburg the excursionists departed for Nijni-Tagilsk, where the afternoon of the first day was spent in examining the wonderful iron mines of Mt. Wyssokaia west of the town. The ore is magnetite and martite, occurring in a porphyry associated with much-altered tuffs. The region is traversed by numerous faults. The mines are vast open quarries with a comparatively small amount of underground work in addition. Surface decomposition has affected the rocks to such an extent that rounded masses of magnetite lie in the clayey residue like the boulders in a glacial moraine, and they are very easily taken out and transported to the furnaces. Much blasting is being done, however, in some of the mines. These mines, as well as all the others in the district of Tagil, belong to the heirs of P. Demidow, prince of San Donato.

The morning of the second day at Tagil we visited the surface works of the mines which produce the malachite which has been used so much by the Russians for ornamental purposes. This mine shows a very peculiar association of magnetite and malachite. The shaft is now at a depth of more than 200 m., and is still furnishing malachite of the same solid, excellent quality as always. The afternoon was spent at the manganese mines to the north of the town. These mines and the others which have been found in the district of Koucheva show the ore (pyrolusite) accumulated in nests and seem to indicate a certain relationship between the ore and the lower Devonian limestone. The manganese mines near Tagil are worked in two immense open cuts and the investigations which have been carried on make it probable that the ore occupies the axis of a synclinal fold which has suffered much from faulting. About 50 of the excursionists drove to the celebrated platinum placer works, which are about 40 miles westward from Tagil. The platinum has recently been found in workable quantities in a very basic igneous rock in the vicinity of the placer works, but it still pays better to work the placer deposits only. Tagil should not be left without making mention of the meritorious local museum, in which there are two large masses of solid malachite, one weighing about 1,000 lbs. and the other 650 lbs. In the museum of the mining school at St. Petersburg, however, there is a mass of even better quality, weighing about 3,300 lbs., from the same mine.

After leaving Tagil the first stop of interest to mining men was made at Kouchwa, where our party took carriages for Mt. Blagodat, the "iron mountain" of Russia. The ore is magnetite, and like that of Wyssokaia, at Tagil, is associated with moderately acid igneous rocks, orthoclase porphyries and syenites. The originally simple plan of alternating magnetite and porphyry has been much complicated by the occurrence of a system

of faults. Hand labor is employed for the most part in working the mine, and as the ore is very hard the expense per ton won must be considerable, even at the very low wages paid. One frame with four steam drills was noticed at work in one part of the vast open cut. Tramways are used in the mine, but the ore is handled several times before it reaches the furnace. One shaft is in use and the diamond drill has been sunk 500 ft. below its bottom, and all the way in solid magnetite. Only about 80,000 tons per annum is taken out of this mine at present.

Between Kouchwa and Nijni-Novgorod much geology was studied, and we had two grand receptions at Kazan, but no mines were visited, and between Nijni-Novgorod and St. Petersburg no stops were made for geological purposes. This brief outline of the grand Oural excursion may be closed, therefore, with a few words about the outfit. Two special trains were provided by the government for the use of the geologists. One consisted of about 15 sleeping cars, with two locomotives most of the time, the other consisted of new freight cars fitted up with tables to accommodate 20 persons at meals at once, together with refrigerator and other cars carrying food and drink and those for cooking. The dining train preceded the other, and the meals were always served at stations to the whole party at one time. Wherever places at any distance from the railroad were to be visited carriages were provided for all who wished to ride—no small item for about 150 persons in a mining region. On the Kama and Volga from Perm to Nijni-Novgorod (1,000 miles) a fine new steamboat was provided for our use. All the arrangements of the committee were carried out with remarkable success and the programme sent out months ago was followed with very little deviation.

On Saturday, August 28th, the Oural party reached St. Petersburg and met the geologists who had taken the excursions to Esthonia and Finland. On Sunday, noon, the congress was formally opened by the Grand Duke Constantine, President of the Imperial Academy of Sciences.

THE COPPER PRODUCTION OF NEW SOUTH WALES.

According to the report of the Department of Mines and Agriculture of New South Wales for 1896, the copper mining industry in that colony experienced a great revival during the year covered by the report. This was due especially to the reopening of the mines of Cobar, though operations were extended at Captain's Flat, Nymagee, Mount Hope and Burrage. The Great Cobar Mining Syndicate owns the largest copper mines in New South Wales. It has now two 60-ton water-jacket blast furnaces in operation. The mines and smelting works give employment to about 450 men. The production of the syndicate in 1896 was 66,431 tons of ore which yielded 2,650 tons of ingot copper. Additions and improvements are being made to the works which will give them a capacity of handling a good deal more ore. The matte is refined at Lithgow, where works were recently erected by the syndicate. The New Burrage mine has been purchased by the syndicate, which proposes to overhaul the mine and works and operate them in a systematic manner. The Nymagee mine, which yielded 381 tons of copper in 1896, has been acquired by the Great Cobar Mining Syndicate and water-jacket furnaces are now being erected there.

The next most important copper mining district of New South Wales is in the vicinity of Burrage in the Abercrombie Mountains, where the principal mine is owned by the Burrage Copper Mining Company. The ore is smelted to matte at the mine, and the matte is shipped to Lithgow for refining. A new copper lode was discovered in this district in the vicinity of Blayney in 1896 which it is expected will become an important producer.

The total exportation of copper from New South Wales in 1896 was 4,453 tons, against 2,793 tons in the previous year. The increase was not due entirely to new production, since the exportation of ore and matte amounted only to 15 tons against 1,058 tons in the previous year, whence we infer that nearly all of the copper ore in the colony is now being smelted at home.

Briquette Works in Germany.—The Johannsfreude lignite mine near Schildberg has just been acquired by a Berlin syndicate, which intends to establish a plant for the manufacture of briquettes.

Pottery and Kaolin at Limoges.—The United States commercial agent at Limoges devotes a recent report to an account of the history and methods of manufacture of the famous porcelain factories at Limoges. The deposits of kaolin at St. Yrieix, in Haute Vienne, from which the supply for Limoges is drawn, are described as the purest in the world, and answer to the formula given by chemists for true kaolin. The Limoges potters have made great progress in the art of firing china, and the old method, so common in other countries, was abandoned 10 years ago, on account of the high price of coal and the great loss in inferior goods. The old kilns were replaced by down-draft furnaces in two stories.

The Sumatra Rack Railroad.—This lately-constructed line is said to be the first of its kind built purely for industrial purposes over any considerable length. It forms a part of the Sumatra State railways and crosses the Barisan Mountain range; commencing at Kajoe Tanam, on the west slope, it reaches Padang-Pandjang, on the summit, and Batoe Tabal, on the eastern slope. A branch line is being constructed from Padang-Pandjang to Kota Baroe. This line is built for conveying coal from rich mines on the River Ombilien to the new port of Padang, opened in 1891. As described more fully in *Engineering*, the total length of the rack railway is 19 miles; the greatest elevation overcome is 3,875 ft.; the maximum incline is 8%, and the maximum radius of curve is 492 ft. The rack is of the Riggenbach type, made of two soft steel channels joined by riveted pins; this rack is bolted to cast iron chairs fastened to steel sleepers, which latter also carry the ordinary rails. The gauge is 3 ft. 6 in. The rack locomotives are also of the Riggenbach type and were built by the Esslingen Engine Works, near Stuttgart. Each car on the train, passenger and freight, is provided with an effective hand brake, to be used in helping the locomotive in an emergency. The maximum train loads are 65 tons up and 70 tons down for the steep western slope, and on the east side, 90 tons for up trains and 110 tons down. The mean speed is 8 miles per hour.]

THE CONNECTION BETWEEN THE HARDENING POWER AND THE RETARDATIONS OF LOW CARBON STEEL.

Written for the Engineering and Mining Journal by Henry M. Howe.

When low carbon steel is allowed to cool slowly from say 1,000° C., its rate of cooling is spontaneously retarded (thus proving that some heat-yielding change occurs in the metal) at each of three well marked points, of which the upper two, a_{r2} and a_{r3} , are identified by important indications with an apparently allotropic change in the iron itself, while the lowest, a_{r1} , is identified with a change in the condition of the carbon present, which here passes from the so-called "hardening" to the "non-hardening" or "cement" state. It was important to learn in what manner the loss of the hardening power, which occurs during slow cooling, is related to these retardations.

In 1895 I showed that while part of the hardening power of such steel is, during slow cooling, lost at and a little below a_{r1} , with at least roughly proportional change in the condition of carbon; yet a very large part is lost at the upper retardations without corresponding change in carbon-condition.*

This latter fact, of course, further supported the already strong indications that the hardening of steel is in some part connected with allotropy, and the fact that the condition of the carbon seemed to remain unchanged during the allotropic changes, and also certain properties of manganese and nickel steels jointly suggested to me a slight modification of the allotropic theory. This I put forward tentatively and with great reserve as the "carbo-allotropic" theory.

Professor J. O. Arnold has since twice supported my results, first in the discussion of my paper,† and again in a late publication,‡ by showing that the law which they established, viz., that much of the hardening power is lost at the upper retardations, holds true of two other steels differing markedly in composition from each other and from mine.

His last results are plotted in the accompanying figure, copied directly from his own diagram. They are particularly interesting, in view of the evidently very great care with which his experiments were conducted, and more especially of the well-marked break in the tenacity-quenching-temperature curve at each of the three retardation points. It is interesting also to note that his steel seems to show the same lagging of the loss of the hardening power at and below a_{r1} that mine showed. In both these respects his results support mine.

If, now, he will kindly test the remainder of my work and see in what range of temperature the change of carbon-condition occurs, he will increase the already great obligation under which his welcome results place us.

It is true that his language in both his communications would lead those unfamiliar with the subject to suppose that his results disproved instead of confirming mine. But in the former of these two cases this must be referred to an apparent complete failure to follow the reasoning, a failure which, with its consequent errors and incorrect accusations, besides some others, I have discussed in my reply;§ while in the latter of these two cases it must be referred to his overlooking the true meaning of his results, as I will try to explain.

His experiments enquire whether there are, in the tenacity-quenching-temperature curve, critical points|| corresponding to the upper retardations a_{r2} and a_{r3} , i. e., to the critical points in the thermal curve. And he asserts that there are not, but that the former curve is smooth in this range. He draws a smooth curve to represent his results, and assumes that the deviations of his results from this smooth curve are due to observational error.¶

Turning, however, to his results, we find that the tenacity-quenching-temperature curve, far from being smooth, actually has well-marked critical points corresponding to the critical points (i. e., retardation points), in the thermal curve: that the increase of tenacity as the quenching-temperature rises, far from being, as he asserts, proportional to the temperature, is concentrated at these retardation points. Indeed, of the increase of tenacity, 7.07 tons per square inch, which occurs as the quenching temperature rises from 650 deg. (which is apparently a little above a_{r1}), to above a_{r2} , over 90% takes place at the upper retardations a_{r2} and a_{r3} ; absolutely none either above or between them;

and less than 10% between a_{r2} and a_{r1} . His curve not only breaks but actually reverses* at both a_{r2} and a_{r3} .

I can see but two possible inferences which can be drawn from these results: Either (1) they are absolutely untrustworthy and teach nothing at all in regard to the question at issue, an inference which is improbable both because of the evident care exercised in the experiments, and because their results agree with Professor Arnold's previous ones and with my own; or else (2), so far as they teach anything, they go to show that the critical points sought in the tenacity-quenching-temperature curve corresponding to the upper retardations, not only exist but are well marked. The inference which Professor Arnold draws—that these critical points in the tenacity-quenching-temperature curve do not exist—seems to me absolutely excluded, because while unknown and conjectural experimental errors may cause the *prima facie* teachings of an experiment to be questioned or even rejected, I fail to understand how they can teach the opposite of those teachings. Of course, further observations may modify or even reverse the teachings of Professor Arnold's present ones; may show that these critical points are far more marked than in his present results, or that they do not exist. But I must insist that, so far as his present results show anything, they make for and not against the existence of these critical points.

He believes that "the increasing tenacity as the temperature of quenching rises is the measure of crystalline stresses internal and external." What crystalline stresses are I do not know; I have never heard of them before, at least in such a connection. Whether the increase in tenacity, i. e., the hardening power, besides being the *measure* of these stresses is also the *result* of them, i. e., whether he regards these stresses as the *cause* of hardening I fail to learn. If he does, then how does it happen that the curve representing these stresses breaks at each of the allotropic retardation points, if those stresses be not connected with allotropy?

He offers no evidence in support of his stress theory, and overlooks not only what I am tempted to call Mr. Sauveur's demolition of that discredited theory in his reply to the discussion of his paper "On the Microstructure of Steel," but also my own experiments and reasoning combating that theory, and reported simultaneously with my experiments which his present paper misrepresents.

I fear that his remarks—that I have found that my deductions, based on tests obtained with impure materials, were erroneous, and that the increase in tenacity which I supposed to be 40 tons appears as an experimental fact verified by myself to be only six tons—rest upon a complete

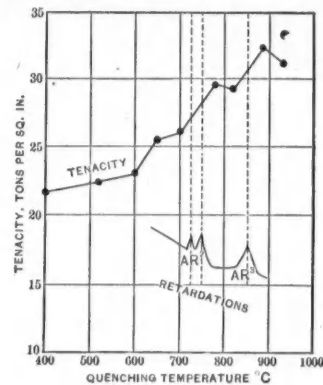


FIG. 1.

misunderstanding. At least I am not aware that I have found any such deductions of mine to be erroneous, nor that any increase in tenacity which I have supposed to be 40 tons per square inch has been shown by myself or anybody else to be only six tons. Indeed, I am not aware that any assertion, inference, or result of mine in this connection has been disproved by any one. As he does not locate my alleged assertions, and as my writings have been somewhat extended, I cannot be sure to what passage he refers; but I suppose that it must be this—"The tenacity of almost carbonless steel can be nearly tripled by quenching," a fact which, taken with certain others, I held "seemed to show irresistibly that some change other than carbon-condition may play a most important part in hardening."† This assertion of mine as to tenacity was and remains perfectly true; there is no discord about it and the other fact that certain other iron differing from it in composition, still more nearly pure, nearly free from both carbon and manganese, cannot be so greatly strengthened.

I am the more inclined to interpret his remarks thus because of his having previously fallen into a very like error of reasoning. I asserted that the tenacity of a certain suddenly-cooled steel containing 0.21% of carbon, 0.31% of silicon and 1.19% of manganese was say, 98.6 tons per square inch.‡ Professor Arnold found that the tenacity of steel containing like mine 0.21% of carbon, but unlike mine only 0.05% of silicon and

* The intrinsic improbability of results may lead us to question or even reject them; but so far as the results argue at all, it must be in the direction to which they themselves point, not in the opposite direction. For example, as we pass from left to right, the curve reverses and descends both just between a_{r2} and a_{r3} , and also above a_{r3} . Some might say this was so improbable that they disbelieve it in spite of the results, and refer this particular feature to experimental error. But note clearly that this is not because of but in spite of the results, and that the weight of the results, whatever it is, makes for this reversal; only their weight is insufficient to overcome the intrinsic improbability. I give this merely for the sake of illustrating the principle.

Applying this to the present case, let me make the distinction between the merely unwise and the absolutely unthinkable. To hold that the existence of the critical points which Professor Arnold reveals but denies is so improbable that it is not to be believed, would in my judgment indeed be unwise, in view of the three independent sets of observations (my own and both of Professor Arnold's) which have indicated that existence; yet it would not be unthinkable. It would be to reject the critical points, not because of but in spite of Professor Arnold's present results. But to hold that these results make against the existence of these critical points, when *prima facie* they make for it, is not merely unwise; it is unthinkable.

†Journal Iron and Steel Institute, 1895, II, p. 296.
‡Idem., v. 291.

* Journal Iron and Steel Institute, 1895, II., p. 292 et seq.

† Idem., 1896, I, p. 200.

‡ Engineering, July 9th, 1897. Engineering and Mining Journal, LXIV., p. 213, August 21st, 1897.

§Journal Iron and Steel Institute, 1897, I., p. 198.

¶Professor Arnold says:

"What Mr. Howe really required to prove was that associated with the break in the recalcence curve at a_{r2} there was a corresponding break of nearly six tons in a curve of which the co-ordinates were tenacities and quenching temperatures. . . In the absence of evidence from Mr. Howe on this vital point, upon which to a great extent his theory must stand or fall, the writer has carried out the following experiments: I do not fully understand why in the tenacity-quenching temperature curve a break at a_{r3} would not be as pertinent evidence as one at a_{r2} ; however, this need not disturb us in our immediate inquiry, since his results show critical points at both these retardations. Nor do I understand why it is essential to my theory that the loss of tenacity corresponding to the critical point at a_{r1} in this curve should be six tons rather than some larger or smaller quantity. I should have supposed that any well-marked critical point in this curve corresponding to either a_{r2} or a_{r3} would have been sufficient for my purpose.

Moreover, while I cannot for a moment admit that the absence of such critical points in case of Professor Arnold's steel would, in view of the existence of such points in case of the steel on which I experimented, have overthrown my theory; yet neither could I agree with Professor Arnold that the existence of these critical points now confirmed by him really establishes my theory, if that be his meaning, gratifying to my philo-progenitiveness though such a conclusion would be. His results, in my view, do not establish my theory, but merely support it by confirming part of the evidence on which it was based. This evidence, while it suggests and supports, cannot really establish, i. e., prove my theory.

¶Professor Arnold says of his present results, shown in the accompanying figure:

"It will also be seen that the critical thermal points a_{r2} and a_{r3} are as such without influence on the mechanical properties. In fact, between 500 deg. and 900 deg. cent. the increase of tenacity is proportional to the quenching temperature. The following Table shows the experimental errors in measuring the stress required to bring the observed results into absolute agreement with the above law."

0.05% of manganese, was only 33.4 tons; whereon he charged me with an error of $98.6 - 33.4 = 65$ tons per square inch.* We may condense this somewhat as follows:

Howe: When steel containing 0.21% of carbon, 0.31% of silicon, and 1.19% of manganese is quenched under certain specified conditions, its tenacity is 98.6 tons.

Arnold: Thou errest by 65 tons; the tenacity of steel containing 0.21% of carbon, but only 0.05% of silicon and 0.05% of manganese thus quenched is only 33.4 tons.

Howe: I was not talking about steel containing only 0.05% of silicon and 0.05% of manganese.

Or thus—

John: Lead is heavy.

Peter: Wrcng again, for hydrogen is light.

John: I was not talking about hydrogen.

His comments in his second paragraph on my experiments on the quenching of nearly pure iron are regrettable. He says "His (Howe's) results, however, were very erratic. To take extreme cases, one bar registered an increase of only 1 ton, whilst in another the stress had risen 8 tons per square inch. The above variations suggest serious experimental errors." He fails to say that the conditions under which these results were obtained were purposely widely different, so different as readily to account for this variation, the one-ton increase being obtained by quenching in water, the eight-ton increase by quenching in a freezing mixture!! Let an example illustrate this:

Howe: I find the specific gravity of mercury to be 199.8, that of iron 55.88, that of hydrogen 1.

Arnold: Your results are "very erratic." "To take extreme cases," you find the specific gravity in one case 1, in another 199.8. "The above variations suggest serious experimental errors."

Howe: Your recklessness has led you, doubtless unawares, first to a *suppressio veri* and next to a *suggestio falsi*. Did you think hydrogen as heavy as mercury, or water the equivalent of a freezing mixture? Or are you prepared to attack experiments unread?

I will now frankly admit that a great many things which I have neither said nor thought, and a great many opinions which I have never held, are doubtless incorrect and even ridiculous. I will further confess that I am not responsible for things I have never said and opinions I have never held, and that I am a very busy and hard-worked man. Now, this being so, is it too much to ask Professor Arnold, before further charging me with errors, and before further putting words in my mouth, to ascertain carefully whether they are my errors and words, and not to add hastily to my already heavy burdens the needless and annoying one of refuting incorrect accusations and disclaiming opinions never mine? I could speak more strongly; but, *cui bono*? I would give such powers as I have to increasing our metallurgical knowledge. May I not ask him to refrain from diverting them to so fruitless, distasteful and thankless a task as he has twice forced upon me?†

In saying this I do not lose sight of Professor Arnold's very valuable services. His experiments lay us under great obligation; they are most welcome and valuable.

Professor Arnold may perhaps be able to increase very greatly the value of his results. Mr. Hadfield, operating on iron not very unlike Professor Arnold's, showed that, while the mild quenching which he used increased the tenacity by only 35.4, it raised the yield-point by 81%. In short, his yield-point records were far more favorable to the allotropic theory than his tenacity results. Now, judging from Professor Arnold's description of his present experiments, he should have had excellent opportunity for observing the yield-point. If he can now favor us with it, we may get still further light from his experiments.

To sum this all up, he misrepresents my position and reasoning again, and misreads both his own and my experiments; his experiments fully support instead of contradicting mine; the alleged discrepancy in my results has no existence at all; nor, so far as I see, have the alleged errors in my assertions (since alleged to have been corrected by myself), any existence.

CORROSIVE MINE WATERS.

This is the subject of a paper which was read by Mr. L. J. W. Jones at a recent meeting of the Colorado Scientific Society. It was based on the result of investigations upon the water of the Stanley mine at Idaho Springs, the corrosive action of which was so great that ordinary iron pipe could not long resist it. Sometimes, indeed, when the exhaust steam of the pumps was discharged into the sump, piping would last only a week. Its life was lengthened by using compressed air instead of steam, but even then the expense of maintenance was a very serious charge.

A sample of the water contained a considerable amount of muddy brown precipitate, which consisted essentially of hydrated basic sulphate of iron. The filtered water had 0.3% of salts in solution, nearly all of this being metallic sulphates. Analysis of the filtered water was as follows: SiO_2 , 0.0438 parts per thousand; NaCl , 0.01345; Na_2SO_4 , 0.31172; K_2SO_4 , 0.15548; $\text{Al}_2(\text{SO}_4)_3$, 0.019787; ZnSO_4 , 0.12244; MnSO_4 , 0.42714; MgSO_4 , 0.46746; CaSO_4 , 0.63629; $\text{Fe}_2(\text{SO}_4)_3$, 0.60336; FeSO_4 , 0.009337; CuSO_4 , 0.191801; total, 3.002065.

* Journal Iron and Steel Institute, 1895, II, p. 294; Idem., 1896, I, p. 203; Idem., 1897, I, my reply to discussion on "The Hardening of Steel." By the way, the only evident effect of my appeal to him, made twice and in the name of fair play, to retract this and other obviously incorrect charges, seems to be this further apparently incorrect charge, different, though of a like species of incorrectness.

† The enunciation of my position which Professor Arnold gives in his opening paragraph appears to me not only misleading, but wholly and most conspicuously incorrect. The carbo-allotropic variation of the allotropic theory is in no way related to or dependent upon the hardening power of pure or nearly pure iron, so far as I can now see. Moreover, I have expressly pointed out that, while proof that pure iron can be hardened would support the allotropic theory most powerfully, proof that it cannot would not in the least oppose that theory, except in so far as it would remove a supposed piece of evidence in its favor. (See Osmond, p. 30, paragraph numbered 7, Author's edition of Mr. A. Sauvour's paper "The Microstructure of Steel," etc., excerpt *Trans. Am. Inst. Mining Engineers*, XXVII. Also my remarks in the discussion of the same paper, p. 3, division headed B, and my reply to the discussion on my paper "The Hardening of Steel," *Journ. Iron and Steel Inst.*, 1897, I, p. 197, paragraph numbered 5, and p. 207, paragraph beginning "Looking now at the matter," and the following five paragraphs. I have in these places set forth my views so fully and so lately that I hardly need repeat them here.)

† Not by about 25%, as both Mr. Hadfield and Professor Arnold incorrectly say.

Iron pipe being found worthless in this mine, lead-lined pipe was tried, which proved better than the iron, but was too soft to stand the friction. Wooden pipe, built on the Allen principle, was then tried. The staves were 2 in. thick, of Chicago pine, asphalted heavily and hooped with ½-in. No. 0 iron. This pipe, which was 4 in. in diameter, lasted over a year, but proved unsatisfactory on account of the loosening of the wood fibers which caught the pump packing and the pipe soon became clogged with precipitated ferric hydrate. A pipe of copper alloyed with a small amount of zinc was next tried, but this lasted only a short time. A gutta percha pipe was found to be too soft to stand the pressure and friction, giving way at the joints. As a result of these investigations it was decided to try bronze, and a pipe of this material has now been in use two years and is considered good for another year's service. When it has to be replaced aluminum-bronze will be employed and this, it is thought, will be entirely satisfactory. During the last two years pumping has been done entirely by compressed air, the compressors being worked by water-power.

In the discussion which followed this paper, Prof. E. B. Kirby described a pipe which had been satisfactorily used for corrosive waters at the Buell mine at Central City. This consisted of an ordinary iron pipe, lined with pine staves ½ in. thick. The cost was not great and after a year's use the wooden lining appeared to be sound and the iron uninjured. Mr. Philip Argall added that practically the same method of lining the pipe described by Professor Kirby had been used in Europe for over 50 years, and his own experience with pipes thus protected at the Wicklow copper mines had been eminently satisfactory.

Mr. Ernest Le Neve Foster described his experience at the Saratoga mine in Russell Gulch, Gilpin County, which has the reputation of having the worst water to contend with, pumps and column pipe being eaten out in a very short time. Upon taking charge of the mine, about four years ago, he observed that the action of the water was most severe on wrought iron and that cast-iron was attacked in a less degree; also that the action increased as the pressure increased, that is to say, that the lower pipes were eaten away more rapidly than those above, especially where small leaks occurred. These leaks enlarged rapidly, a pin hole becoming a large leak in the course of a few hours. It having become necessary on account of the destruction of the pumps and water column to install an entirely new plant it was decided to replace the steam pumps by a Cornish pump with bronze clacks and clack seats and all other parts of cast iron. Cast iron was also selected as the material for the stand pipe, and the pipe and flanges were cast in one piece. This plant was installed 20 months ago, since which time there has been no trouble from the corrosive action of the water, and the plungers are as smooth as when they were put in. Incidentally it may be mentioned that the action of corrosive mine water dripping on iron is much more severe than when iron is simply immersed in it. A drop of water falling from the roof of a drift upon a 12-lb. T-rail will cut it in two in the course of a few weeks.

Briquettes in Belgium.—The exports of briquettes from Belgium in June amounted to 55,694 tons, as compared with 37,398 tons in June, 1896, and 44,115 tons in June, 1895. The aggregate exports in the first half of this year were 270,985 tons, as compared with 234,195 tons in the corresponding period of 1896, and 228,486 tons in the corresponding period of 1895. In the latter totals the exports to France figured for 121,938 tons, 100,269 tons and 90,714 tons respectively.

Coal Exports of Great Britain.—During the month of August the exports of coal, coke, cinders and fuel from the United Kingdom reached a total of 3,406,053 tons, compared with 3,284,360 tons in August, 1896, and 3,427,625 tons in August, 1895. In the eight months of the present year to the end of August the coal exports were 24,508,139 tons, compared with 23,010,016 tons in the corresponding period of 1896, and 21,853,149 tons in the first eight months of 1895. The average values per ton were \$2.15 this year, \$2.12 in 1896 and \$2.26 in 1895.

The Chinese Iron Works.—A correspondent at Hankow writes to the *Shanghai Mercury*, under date of July 15th, that for years the Hanyang works have been a losing investment under the direction of the viceroy, Chang Chihlung. Sheng, on taking over the investment, was anxious to make it pay, and yet his hands were bound. Among the different propositions of the American syndicate was that of placing an American engineer in charge. The man selected was Hugh Kennedy, from the iron region of Pennsylvania. He was given only slight power at the outset, but more and more responsibility has been placed upon him, until now he is practically the general manager. With the increase of his power has come improvement in all the works. More material is turned out and better work done. There is no reason why these works, being under the control of Sheng along with his other enterprises, should not become a profitable business. Naturally there has been some friction between the German element and the one American, but at present there seems to be more of a cordial feeling between them, Mr. Kennedy being left free to make a success if he can.

Improvements at the Homestead Works.—The Carnegie Steel Company has decided to build ten 40 ton open-hearth furnaces at Homestead. This is to bring the capacity of the furnace department up to that of the rolling mill. At present the open-hearth equipment at Homestead is composed of five 40-ton furnaces, eight 35-ton, six 25 and one 12-ton. The work of excavating for the foundations for the new furnaces has already been commenced and it is expected to have them ready for operation by next spring. In addition to these a new and larger fitting shop will be erected at Homestead, and it is likely a new blooming mill will be built.

New records are being made at the various works of the Carnegie Company. The output at the present time is largely in excess of any period in its history. In August the Homestead Steel Works, Duquesne Steel Works and Edgar Thomson Steel Works produced 161,981 gross tons of ingots. Two Lucy furnaces at Pittsburg, nine Edgar Thomson furnaces at Bessemer and four furnaces at Duquesne, are in operation, their monthly production of pig iron considerably exceeding 150,000 tons.

UTILIZING COKE-OVEN GASES.

In the report of Mr. A. H. Wood, Commissioner of Labor and Inspector of Mines of Tennessee, for 1896 is given a description of an arrangement for using coke-oven gases to heat boilers and make steam, which is in use at the mines near Tracy City. A plant of this kind was put up at Victoria, Tenn., as long ago as 1876, but it was not a success. Several plans were tried at Tracy City, and finally the present plant was built in 1891. Some changes have since been made in it, and it is now operating in a very satisfactory way. The whole arrangement is shown in the accompanying engravings, Fig. 1 being a section of the ovens; Fig. 2 and Fig. 3 sections of the boilers.

The ovens are ordinary beehive, 10 to 11 ft. in diameter, built of fire-brick and sandstone. There are 34 in the block, 17 on a side, and placed back to back, not staggered. The flue was accordingly built with little interference with the oven walls. It is of fire-brick with fire-clay joints, having an area of 12 sq. ft. with arched top, and the opening into each oven is above the springing line, and is 12 in. round; this flue is rather smaller than it should be for so many ovens. After leaving the ovens, the flue is carried about 75 ft. to the boilers; just before reaching them it is split in two so as to distribute the gas evenly in front of all three boilers. The current is kept under entire control by a damper just outside the boiler-house, constructed of boiler-plate and channel iron, in which a stream of cold water constantly circulates, and by lids placed over the eyes of the ovens. Thus, while the boilers are in use, the damper is raised and the ovens covered, forcing the gas through the flue; at night, or when not in use, the damper is lowered, and the lids are removed from the ovens. The ovens are charged with five tons of washed slack, and the coke yield is from 57 to 59%. The present battery includes three flue boilers, 40 in. diameter by 24 ft. long. Several different arrangements of boiler settings have been tried at this plant, but the present arrangement, with two bridge walls, has been found preferable. As regards the coke made in the flue ovens, no chemical nor physical deterioration has been found to result from this treatment.

The experience here, so far, indicates the following points to be observed in the construction and management of such a plant to get the best results: 1. Build the flue of best material and of ample size. 2.

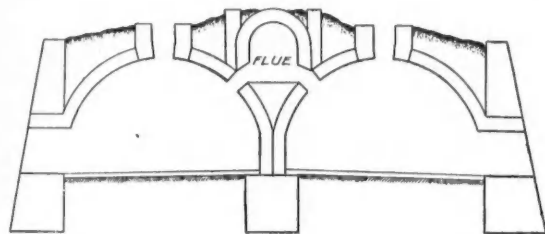


FIG. 1.

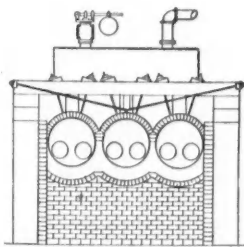


FIG. 2.

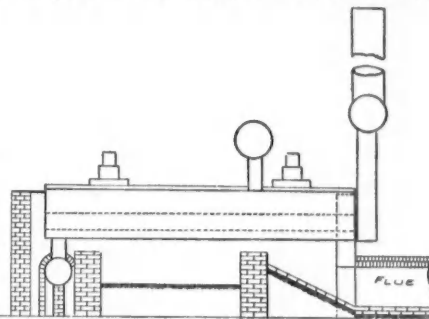


FIG. 3.

COKE OVEN BOILER PLANT AT TRACY CITY, TENN.

3. Have the boiler flues and stack of such size that the gas may meet with a minimum of friction in its passage; especially have the stack high enough. 4. Draw and charge the ovens very promptly and systematically, and take care to keep them covered, except when the damper is down, when they should be previously uncovered. 5. Keep the flue and boiler setting air-tight; do not attempt to supply fresh air with the gases at any point. This was tried at first here and elsewhere, and found to be a mistake.

The two plants here save from \$3,000 to \$4,000 a year in coal and wages. This company has also two similar plants at Pratt Mines, Ala., in successful operation, which save a large amount.

In 1895 the Howard-Harrison Iron Company erected a most complete plant of this kind in connection with a coal-washing plant, and it uses the gas for other purposes besides raising all the steam required at its large works.

Iron Ore Imports of Great Britain.—The iron ore imported into Great Britain during August last amounted to 401,411 tons, as against 455,218 tons in the corresponding month last year; 410,277 tons of this quantity were imported from Spain.

Cost of Mining Coal in Colorado.—A correspondent of the *American Manufacturer* gives an estimate of the cost of producing coal in the Northern Colorado district, the average output to each mine being about 16,000 tons yearly, of which 12,000 tons are shipped in the winter months. The district price paid the miner for mining the coal is 80c. per ton. To keep the mine in a safe and workable condition, and to handle the coal dug by the miners, there are required, say, two men to take coal from the miners and put it on the cage ready to be hoisted to the surface, two men to keep roads, entries, etc., in condition, two engineers—one day and one night—one blacksmith, one dumper; these men are all paid \$3 per day, or \$24; two box car men to shovel coal in railway cars at \$2.50, \$5; one superintendent and one clerk, \$6, making in all \$35, or \$1 per ton; mining, as stated, 80c.; timber (props), 10c.; rails, repairs, etc., 5c.; royalties (average), 15c., making cost per ton, \$2.10. This does not include office expenses, salesmen, salaries, return on investment or expenses of accidents. These figures are based upon a minimum output, and are consequently not fair for the year, as many of the fixed charges are no greater upon an output of 300 tons per day than upon 35. It is probably fair to place the cost of coal in the Louisville district for the year at \$1.75 per ton. A loss in the summer months is usually made up by a profit in winter.

CANADA'S NEWEST GOLD FIELD.

Written for the Engineering and Mining Journal by J. T. Donald.

Much interest has been aroused of late over the discovery of auriferous quartz veins on the north shore of Lake Superior in the vicinity of the Michipicoten River, and, of course, the usual crop of silly stories and exaggerated statements have appeared in the daily papers.

The facts of the case are as follows: An Indian, fishing in Lake Wawa, a small body of water, seven miles from the mouth of the Michipicoten River, observed a piece of quartz in which gold was clearly visible. He secured the fragment and showed it to the first white man he met, who happened to be F. A. Dickinson, a Port Arthur newspaper man; he gave the Indian a few dollars, and in return he was guided to the spot from which the specimen was obtained. Brief search on the adjacent shore disclosed a vein of rusty quartz, showing numerous specks of gold. Mr. Dickinson at once made application to the Mines Department of the Province of Ontario for a discoverer's grant of 40 acres; such a grant being made free to anyone who discovers a gold area at least 10 miles distant from any previously known gold claim. Having secured his discovery claim, Mr. Dickinson succeeded in interesting a Montreal merchant, who laid the matter before the writer. After examining a number of samples, I advised that the matter was worthy of investigation, and suggested an engineer of wide experience to be sent to investigate. This engineer, Mr. Alex. MacKenzie, with a small gang, spent some weeks on the ground, stripping veins, sinking test pits, etc., and there is no doubt of the existence of a promising gold field in the Michipicoten District. Some very high assays have been obtained and the veins are of fair width, from 8 in. to 2 and 3 ft., but no development has been made except that just mentioned.

During the past few weeks prospectors have poured into the new fields and many claims are staked out. A town site, known as Wawa City, has been laid out by an enterprising fishing firm who have steamers on the lakes. The new gold field may be reached in two ways: first, by the Canadian Pacific Railway ("Soo" Branch) to Sault Ste. Marie, thence, by steamer, to Gros Cap on Lake Superior, and thence, finally, seven miles by stage to Wawa City, on Lake Wawa. The second route is by

the same line of railway (main line) to Missonabie, a station to the north of Lake Superior, thence by canoes, which, with guides, may readily be obtained, a seven days' journey southward to Lake Superior.

On September 10th the Ontario government passed an order in council, bringing the Michipicoten gold-fields under a clause in the Ontario Mining Act, whereby it will be possible for any man possessing a miner's license to stake out a claim and proceed to work, without having to procure a surveyor's report, as was previously the case. The area proclaimed is about 1,500 square miles and embraces a large area of Huronian rocks.

As to the manner in which mining claims may be acquired and held in this newly constructed mining division, the following short summary of the provisions of the mining act will be useful for reference:

The first step for an explorer is to procure a miner's license, and there is no restriction as to race or nationality. On payment of a fee of \$10 the director of the Bureau of Mines may grant to any person applying for it a miner's license, which is good for one year, and not transferable, except by the consent of the director, and is not renewable until the yearly fee has been paid. A licensee who discovers ore or mineral within the division has the right to mark or stake out a mining claim thereon if it is on Crown lands and not occupied by another licensee, and he has the right to work it or transfer his interest to another licensee. He has also the right to organize a company to work the claim, or to employ miners who do not occupy any other claim.

A claim is deemed to be marked or staked out when a discovery post of wood or iron with the name of the licensee upon it is planted on an out-cropping or other sign of mineral within the boundaries, and a post of wood or iron is planted at each of the four corners in the order following: No. 1 at the northeast corner, No. 2 at the southeast corner, No. 3 at the southwest and No. 4 at the northwest corners, the number in each case to be on the side of the post turned toward the post which follows it in the order in which they are named. If one or more corners fall where the shape of the ground makes the planting of a post impracticable these corners may be indicated by a witness post at the nearest suitable point, in which case it is required to contain the same marks as for corner post, together with the letters W. P. (witness post), as a sign of the bearing and distance of the true corner from the witness post. The boundary lines of a claim as shown by these posts are required to be due north and south and due east and west astronomically; and by this provision there is little fear of the overlapping which is so frequent in the staking of claims in British Columbia and the Western States, where claims are laid out on the length of the veins regardless of astronomical lines. It will be observed that discovery of valuable ore or mineral is a prerequisite to the staking out of a claim.

The area of a claim is limited to 22½ acres, its dimensions being a square of 15 chains, or 990 ft., and the boundaries underground are lines vertical to the horizon. If the vein crosses the claim from east to west or north to south, its greatest length is 990 ft.; but should it cross the claim diagonally, its greatest length may be 1,400 ft.

ABSTRACTS OF OFFICIAL REPORTS.

Victor Gold Mining Company, Colorado.

The latest report covers the operations of this company from December 31st, 1896 (at which date the last annual report was issued), to June 30th, 1897.

Owing to the inability to market low grade or cyanide milling ores, except in a limited manner, the production, during this period, has been much reduced. The extension of the milling plant at Florence was commenced last February, to increase its daily capacity to 350 tons. Unavoidable delays have deferred its completion as anticipated. In the interim development work has been pushed, new ground proven and ore reserves augmented. Notwithstanding these drawbacks the mine has been operated at a profit for the six months.

The net value of the milling ores, which comprise over 75% of the tonnage, has increased \$1.14 per ton as compared with the general average heretofore realized, while the value of the smelting ores remains about the same as for the preceding six months.

The exploitation of the lower workings has opened larger bodies of ore than heretofore encountered, the veins showing greater strength and thickness.

The 3-in. water and 4-in. air pipe lines at the surface have been laid 6 ft. beneath the ground, 2,600 ft. in length; the former supplying water for boiler use as well as fire protection, the latter supplying air for the compressors and drill now installed, affording a considerable reduction in the cost of water and insuring economy and rapidity by the use of air drills. Some minor improvements were made to the buildings.

Since December 31st the various levels have been extended a total of 876 ft. Cross-cuts have been driven 290 ft. The shaft has reached a depth of 506 ft. Station No. 9 has been cut and the vein drifted on at this point 80 ft. south and 25 ft. north, all in good ore. Sinking is being continued daily, no water having yet been encountered.

The revenue and expenditure statement for six months ending June 30th shows: Cash in bank December 31st, 1896, \$51,025; net receipts from ore sales (freight and treatment charges deducted), \$141,046; miscellaneous, \$2,604; total, \$196,675. The expenditures were: Operating costs (including all improvements and supplies), \$109,046; taxes paid, \$1,558; dividends paid, Nos. 45, 46, 47, \$50,000; cash in bank June 30th, 1897, \$26,071; total, \$196,675.

On June 30th there were 4,149 tons of ore now at the mill awaiting treatment and settlement; estimated value, \$40,000.

The production for the six months included 983 tons smelting ore averaging, net per ton, \$97.40; 5,708 tons cyanide mill ore averaging per ton \$9.38.

During this period of curtailed production, the additions for enlarged and more economical operations have been made, paid for and charged to operating expenses.

Daly Mining Company, Utah.

The report of this company for the year ending December 31st, 1896, shows that the receipts from bullion sales were \$462,333; from sulphide sales, \$33,156; from ore sales, \$2,168; from miscellaneous sources, \$44,309. The balance on hand at the beginning of the year was \$195,721, bringing the total amount to be accounted for up to \$737,678. The expenditures were: For operating expenses, \$447,030; share of extension of drain-tunnel, \$33,897; miscellaneous expenses, \$15,188; dividend No. 76, \$37,500; total, \$533,615, leaving a balance of \$160,725 cash on hand at the close of the year.

Prospecting work was well kept up during the year, and the mine continues in good condition. A good quantity of ore is still to be taken from the upper level, although the cost of production will be increased from the fact that the ore there exists in narrow seams. It is intended to run the Ontario tunnel under No. 1 shaft, draining the ground above and giving 500 ft. of new ground from that level up to the deepest working at present on the vein at No. 2 shaft, and 700 ft. at No. 1 shaft. Shaft No 2 has been sunk nearly 100 ft. below the 1,200 level, and will be continued to the drain-tunnel level. During 1896 a total of 8,689 ft. of tunnel, crosscuts and raises were completed in developing the mine.

The company has spent a little over \$17,000 in the purchase of water rights and the construction of reservoirs and pipe line to supply the mine and mills with water. This work was carried out in connection with the Ontario company. In connection with that company also the Weber Coal Company is operated successfully, much reducing the cost of fuel consumed.

At the Marsac Mill no changes of importance have been made, except in general repairs. In the leaching department there has been no material change in the method of treatment. Lead is precipitated as carbonate since the refining of the sulphides began; the quantity of chemicals used being conditioned to suit the grade and class of ore worked. The average proportion saved was 96.55%. The average amount realized per ton of ore milled during the year was \$20.46, against \$23.01 in 1895, and \$21.65 in 1894. The average yield of the ore remained about the same, 37 oz. per ton, the reduction being due entirely to the lower price obtained for silver.

The ore statement shows that 20,259 tons net weight of ore were extracted, and 20,327 tons were milled. There were 24 tons of ore sold. The average value of the bullion product from the ore milled was \$20.46. The average value of ore sold was \$90.34 per ton. The total yield, including ore sold, was 714,373 fine ounces of silver, and 862 fine ounces of gold. The cost of mining per ton was \$10.21; hauling, 83c.; milling, \$7.16; marketing, 29c.; prospecting, \$1.92; general expenses, taxes and other charges, \$1.60. This makes up a total cost of \$22.01. The average receipt per ounce of fine silver was 69.68c., and the average cost 62.57c., leaving a profit of 7.09c. per ounce.

The company paid one dividend during the year of \$37,500.

The total amount paid by the company for cost of the drain-tunnel up

to the close of the year was \$335,506, being one-half the total cost; the other half being paid by the Ontario Silver Mining Company.

A statement appended to the report shows that up to the close of 1896 there had been extracted from the mine 270,002 tons of ore, from which there were obtained 11,158,930 oz. of silver and 11,203 oz. of gold. This statement includes the product on hand at the close of last year. The selling value, including the product on hand, was \$9,451,662, and the company has paid its stockholders a total of \$2,887,500 in dividends.

Ontario Silver Mining Company, Utah.

The report of this company, which covers the year ending December 31st, 1896, shows that during the year the total receipts from sales of ore and bullion amounted to \$775,069, while the receipts from miscellaneous sources, including interest, sales of property, profits on investments, etc., amounted to \$72,084, making a total of \$847,153. To this is to be added \$462,638 cash on hand at the opening of the year, making the total amount to be accounted for \$1,309,791. The expenses for the year were \$763,449, and there were paid in addition \$180,000 in dividends, making a total expenditure of \$943,449, and leaving a balance on hand at the close of the year of \$366,342. A further analysis of the expenditure is given below.

The statement of results and costs for the year shows that there were 28,912 tons of ore extracted from the mines; the ore milled amounted to 30,270 tons, and the ore sold was 532 tons. The mill statement shows the average assay of ore milled was 39.28 oz. per ton; the average assay of tailings was 3.21 oz. The proportion saved by amalgamation was 91.8%. The daily average crushed was 89½ tons. The total bullion reported, including that in ore sold, was 1,191,673 fine oz. silver and 725 fine oz. gold, the money value being \$776,854. The costs are given as below:

	Tons.	Amount.	Per ton.
Mining.....	28,912	\$241,951	\$8.37
Prospecting.....	28,912	126,769	4.38
Sundries.....	28,912	43,770	1.16
Hauling.....	28,380	12,476	0.44
Milling.....	30,270	186,460	6.16
Bullion expense.....	30,270	30,266	1.00
Total.....		\$641,693	\$21.51
Expenses, ore sold.....	532	1,190	2.24
Total.....		\$642,823	

The total production of silver, 1,191,673 oz., brought an average price of 65.19c. per ounce. The total cost was 53.94c. per ounce, and the net mining profit was 11.25c. per ounce, the total amount being \$133,071.

The following statement shows the actual distribution of profits for the year:

	Receipts.	Disbursements.
Bullion and ore sold.....	\$776,854	\$642,823
Decrease in cash balance.....	96,296	180,000
Outstanding checks.....	632	10,312
Mill construction account.....	1,922	33,897
Property purchase account.....	7,027	8,334
Interest and discount.....	1,369	1,111
Sundries (not cash).....	5,187	4,300
Total.....	\$889,527	\$889,527

The total length of the drain tunnel at the end of the year was 21,325 ft.; its total cost to that date was \$621,638, an average of \$29.15 per foot. The Daly Mining Company has paid one-half the cost of the tunnel.

During the year the drain tunnel was extended west 1,700 ft., making a total of 3,696 ft. in Ontario ground. About 400 ft. of crosscuttings was also run on the main tunnel line, including a drift 120 ft. long to the northward which cuts the vein. No prospecting was possible at that point, however, as the flow of water was so great as to drive the men out and partially fill the drift with waste. Samples of ore obtained at that point indicate that the vein would continue to yield as in the past. A large quantity of water was encountered and several times work had to be suspended to allow the flood to subside. At times the discharge of water at the mouth of the tunnel has been as high as 13,000 gals. per minute.

A part of this water is now utilized to run an electric plant situated below the mouth of the tunnel which consists of two dynamos, or generators of the three-phase system, 2,500 volts and four motors of 75 H. P. This plant provides power for the mills, mine and machine shop, besides furnishing over 800 lights.

The mill is in good repair, and has done excellent work during the year. The cost of milling as shown in the tables above was \$6.16 per ton, a decrease of 14c. as compared with 1895. During the year the company spent \$4,390 in the construction of reservoir dams at the outlet of the lakes which supply the mills with water.

The workings in the mine for the year were for the most part on narrow seams of ore and small ore bodies, making it difficult to keep down the cost of mining, but owing to the reduced cost of handling the water through the drain-tunnel the average cost of the ore raised was \$8.37 per ton, which is \$1.23 less than in 1895. The cost of prospecting increased. The total cost for mining and milling was \$21.51 per ton as shown in detail above, and was \$1.03 less than in 1895.

The Weber Coal Company was successfully operated during the year, and the property is in good condition for the future. Besides furnishing the coal required by the company, a considerable quantity from these mines was sold in Park City and a smaller quantity in Salt Lake. The coal property was increased by 120 acres acquired from the Government.

Notwithstanding the very narrow margin of profit shown on the silver produced the company was able to resume dividends in January, 1896, and during the year 12 monthly dividends, amounting to \$180,000 in all, were paid.

A table appended to the report shows that from the time the company was incorporated up to the close of 1896, a period of 19 years, there were 538,283 net tons of ore extracted from the mine; from which 33,085,117 fine ounces of silver were obtained. The total amount for which this was sold was \$30,988,511. The total amount paid in dividends during the same period was \$1,355,000. The company has therefore paid 43% of its total earnings to its stockholders.

ACETYLENE GAS FOR THE GENERATION OF POWER.

Mr. H. Schrey, in *Annalen für Gewerbe und Bauwesen*, says that it has been shown in experiments made by M. Ravel that 6.35 cu. ft. of acetylene gas generate 1 H. P. per hour. This is equivalent to a reduction of two-thirds as compared with petroleum. As to the explosiveness of mixtures of air and acetylene, 1.35 parts of this gas mixed with one part of air begin already to be explosive, and the explosive force of the mixture rises rapidly as the dilution with air increases, and attains a maximum when 12 volumes of air are mixed with one volume of acetylene. As the proportion of air is increased beyond this limit, the explosive force subsides, until at 20 to 1 it becomes entirely extinct. The flashing point approximates 480° C., whereas in the case of most other gases used to generate power the requisite ignition temperature is about 600°. The temperature of combustion is very much higher than that of the other gases with which it can be compared. Mr. L. Meyer has already called attention to the dangerous character of the explosion of acetylene mixtures. The special characteristics of this gas are accordingly: (1) Great rapidity of the transmission of flame; (2) low ignition temperature; (3) high combustion temperature; (4) extraordinary energy evolved in the explosion.

The apparatus employed by Ravel for his experiments was one designed for the purpose by Victor Fournier. A description is given of the apparatus, and also of the motor with which it was connected, made after Ravel's design by Houpiéd (Compagnie des Moteurs Parisiens). Special precautions were needed in conducting these investigations, as the force of the explosion was more violent than that of any other known mixture of gases. It is very dangerous to search for leakages of acetylene gas with a naked light, owing to the highly explosive character of the mixtures of this gas with air. It was found necessary with acetylene to employ twice as much lubricant for the cylinder as when using coal gas, and the cooling of the cylinder has a much more important effect upon the working of the motor than is the case with coal gas. In a small 2-H. P. motor the actual working showed that acetylene gas gave 2.1 times the work of the same volume of illuminating gas, and the contrast would be doubtless greater still in large motors. The employment of acetylene in gas engines of the type in common use would not, according to Ravel, be expedient for reasons given, but in a large engineering works in Italy some acetylene motors are being constructed for cycles, with the intention of employing in them a mixture of one-sixteenth of acetylene to fifteen-sixteenths of atmospheric air. These motors are intended to be run at 600 revolutions per minute, and to go for 15 hours without further charging. The weight is 19.8 lb., and the working cost is set down at 0.6d. per hour.

THE GEOLOGY OF MEXICO.

Bulletins 4, 5 and 6 of the Geological Survey of Mexico contain a summary of the geology of the Republic by Señor Don José G. Aguilera, of which the *American Geologist*, September, 1897, makes the following notes:

Geologically considered, Mexico is composed of three parts. The first, the most ancient and least extensive, consists of a great mass of granite, gneiss and schist, which occupies most of the south of the country, and reaches from the Pacific to the Eastern coast.

The second, containing deposits dating from Palaeozoic time to our own day, is found in the northern, southern, eastern and central parts of the country; and the third, almost of equal size and importance, is principally composed of eruptive rocks of modern date.

The Archæan rocks of Mexico are numerous and varied, and consist, among others, of a porphyritic gneiss like an "augengneiss," gneissic phyllades passing into the former, and mica slates conformable to the foregoing.

The existence of Silurian strata is evidently doubted. Sr. Aguilera says: "There are in our collection a few specimens of slate containing good individuals of *Orthis testudinaria* Dalman, a Trenton species. This was sent to Dr. Ant. del Castillo and bears the label 'E-tadode Guerrero.' But the late director went several times to the locality to verify the statement and could find no trace of any fossil in any rocks likely to have yielded it."

The Devonian system is apparently in the same state. A Devonian goniatite, said to have come from Apulco, has in like manner called out several journeys to the place, but all to no purpose.

The existence of Carboniferous strata is, however, proved by the occurrence of *productus semireticulatus*. But certain beds which had been referred to the Upper Carboniferous by Frazer, Heilprin and Hall have now, on more and better evidence, been placed in the Cretaceous system, as they hold *lima anomia*, *scaphites*, etc.

The Carboniferous of Mexico has thus far proven very barren: a meager list of four species is preserved and only two of them specifically identifiable, composing its whole known fauna.

The different formations composing the Mesozoic system are not all represented in Mexico, those which are found being the upper part of the Triassic and Jurassic and almost all of the Cretaceous. The rocks of the Triassic are quartzose sandstones and hard shales varying in composition both vertically and horizontally. In consequence of strong and long-continued erosion the rocks of this system have very largely disappeared, and a number of small patches is all that remains to testify to their extent when formed. The fossils are plants and were studied by the late Prof. Newberry, whose names, with few additions, comprise the whole list. The Jurassic is less known and has been confused in part with the overlying Cretaceous with which it is perfectly conformable. It holds a large fauna of well-known genera but of chiefly peculiar species. Among those from the Upper Jurassic are some such as *Agoeceras* and *Stephanoceras* belonging strictly to a rather lower horizon.

The Cretaceous deposits cover a wider area and are divided into Lower, Middle and Upper. Their composition resembles that of the preceding in being for the most part mechanical, and showing a great absence of lime. They are cut in many places by eruptive rocks of later date, Tertiary and even Quaternary, consisting of diorites, quartz-andesites, hornblende-syenites, granulites, diabases, etc. The fauna is fairly rich and

comprises numerous families, *Rhizopoda*, *Anthozoa*, *Echinoidea*, *Vermes*, *Lamellibranchiata*, *Gasteropoda*, *Cephalopoda*, *Pisces*, with one doubtful reptile.

Of the Tertiary only the Eocene and the Lower Miocene are present in any fullness, the middle and upper portions being very local. The former lies chiefly along the Gulf of Mexico and the latter along the Gulf of California. A list of fossils shows, as the author remarks, that it is not possible in all cases to draw a line between the Tertiary and Quaternary groups. The latter occupy a very large area in the upper valleys and central tableland. The materials are, as usual, loose and fragmentary, but some of them plainly indicate deposition from heated waters.

Petroleum in South Africa.—New oil fields have been discovered in South Africa by Professor Helfer and Dr. Weit. These fields have been located in the Transvaal, the Orange Free State, and in the neighborhood of the Karras plateau, not far from the shore of the Indian Ocean. The oil is said by the *Engineer* to be of excellent quality, and approaches the American and Galician crude in illuminating contents. Drilling will commence soon.

A Modern Electric Mining Plant.—The General Electric Company has completed its contract for installing a modern mining plant for the Diamond Hill Gold Mines, Limited, in Montana. The apparatus installed includes one 500-kw. multipolar dynamo, which generates current at a pressure of 2,080 volts; three induction motors (2,080-volt), having a capacity of 125 H. P. each, one induction motor of 50 H. P., two 30-H. P. motors (220-volt) for the concentrator, and a number of additional motors for batteries, air compressors and rock crushers. The contract included also an extensive lighting system.

Aluminum Castings.—The *Chemiker Zeitung* in a recent issue says that in aluminum castings a distinction must be drawn between castings which are practically finished on leaving the mold, and castings which are subsequently subjected to a forging or rolling process. The difficulty of producing sound aluminum castings lies in the great contraction of the metal on cooling. This difficulty can be overcome by adding phosphorus to the molten metal, in the proportion of about one gramme to one kilo. Thoroughly sound castings are obtained in this manner, but they are rather brittle, and therefore unfit for rolling purposes. Castings suitable for the last-named process are obtained by pouring some rape oil upon the surface of the metal, which is fused in iron crucibles. When all the oil is burnt off, the metal is run into the hot iron molds, and as soon as the contraction begins more metal is added. The ingots obtained in this manner are excellent for rolling, forging or wire-drawing purposes. Aluminum fused in graphite crucibles always has a tendency to crack in the rolling or forging, the more so the oftener it has undergone the process of melting in this kind of crucible. This appears to be due to the fact that aluminum takes up silicon from the crucible.

The Japanese Government Steel Works.—In an interview recently published in the *Hochi Shinbun*, Mr. Yamanouchi, head of the new government steel works, says that the ground for these works at Yahatamura, Fukioka, is already being prepared. The site was selected on account of the abundant supply of coal in the neighborhood, as it is estimated at least 216,000 tons will be required annually for the 60,000 tons of steel which it is proposed to produce. The pig iron and iron ore will be conveyed by sea from Kamaishi in the north of Japan. Coke ovens will be built on the coast, near the works.

As to the designs, Mr. Oshima, the chief engineer of the works, is now on a tour of inspection in America and Europe, and is making plans with an expert in Germany. It is probable that the machinery will be supplied from Germany, although that matter has not been determined. A branch of the Kyushu Railway will be built into the works. The machinery will arrive in Japan next year and some experimental work will be done in 1899. From 1900 onward the estimated amount of steel, that is, 60,000 tons per annum, will be manufactured. Mr. Yamanouchi says that the fear sometimes expressed that Japan is deficient in raw material—iron ore—is wholly groundless. Besides Kamaishi, there are other iron fields, and iron mines have been discovered in Kyushu. When the works are completed fully 2,500 men will be employed. The total cost of the work is estimated at 4,095,000 yen, of which 993,000 yen will be for buildings and 2,296,100 yen for machinery and its erection.

The Chilean Nitrate Industry.—Señor Don Alberto Herrman, in the *Boletín de la Sociedad Nacional de Minería* states that the cost of production at three nitrate mines is as follows:

	San Jorge, Cents.	Puntunchara, Cents.	San Pablo, Cents.
Extraction of the caliche.....	27 68	32 47	59 40
Circling.....	1 91	23 46	21 76
Dressing.....	32 08	37 62	48 80
General costs.....	7 32	9 01	12 87
Various.....	0 17	1 32	.....
Total.....	80 05	103 88	142 82

The Chilean nitrate industry has to contend against the competition of artificial soda manures and sulphate of ammonium, the output of which rapidly increases year by year, the discovery of nitrate deposits in other parts of the world, and the competition of guano rich in nitrogen, phosphoric acid and potash, like those recently discovered in the island of Corcovado, Peru. Lately, as is well known, the Chilean industry has been suffering a serious depression. The continuance of this is having an alarming effect on both the revenue and trade of Chile. Hundreds of workmen have been thrown out of employment in the nitrate districts, and they are being brought south, where, at the present time, there is no demand for labor. The government is being urged to provide work for these unemployed by starting several useful public undertakings, but as yet it has made no move in this direction. These workmen, accustomed as they are to the high wages of the north, find it very difficult to reconcile themselves to the lower wages prevailing in the south.

PERSONAL.

MR. R. A. HADFIELD has been elected a member of the governing body of the International Association for the Testing of Materials.

COL. W. M. RIDPATH, treasurer of the Le Roy Mining Company, of Rossland, B. C., was in Chicago this week on his way East.

MR. A. G. BROWNLEE, of the firm of Brownlee & Houghton, Chicago, is in Western Oregon, inspecting some gold mining properties. He will be absent for a couple of weeks.

MR. WILLIAM MACKENZIE, president of the Toronto Street Railway, and the largest stockholder in the Canadian Gold-fields Syndicate, Limited, is visiting Rossland.

MR. W. B. WILSON, formerly superintendent of the Silver Lake mines and other prominent San Juan properties, took charge of the Elkton mine at Cripple Creek, Colo., on September 1st.

MR. WM. G. ENGLISH, of Danville, Ill., has left that city for Rossland, B. C., where he will attend a meeting of the Le Roy Mining Company. Mr. English is a large stockholder in the company.

MAJOR-GENERAL WEBBER, C. B., is now in the Trail Creek division of British Columbia. Major-General Webber is a leading director of the British Columbia Bullion Extracting Company, which is about to erect reduction works for the treatment of low-grade ores near Rossland.

DR. H. M. AMI, of the Canadian Geological Survey, has returned from the northwest territories where he has been investigating the mode of occurrence of the remains of the mastodon which at one time inhabited Canada. He secured a very interesting series for the museum at Ottawa.

MR. EDMUND DE STUTZ, mining engineer of Geneva, Switzerland, has resigned his position as superintendent of the Continental Mines, of Globe, Ariz. He has accepted the appointment as general manager of the gold property owned by the Société Française in Coolgardie, Western Australia.

PROFESSOR ANTON VON KERPELY, director of the Hungarian Government Ironworks, has retired. This eminent metallurgist began his career in the government ironworks at Kis-Garam, and for many years acted as professor of metallurgy at Schemnitz. His present appointment under the Hungarian Ministry of Finance dates from 1880. He has been an important contributor to metallurgical literature.

OBITUARY.

MR. JOHN DARLINGTON, whose death is chronicled in recent English exchanges, was a well-known figure in London mining circles. He was born at St. Austell in 1826, and was a member of an influential Cornish family. His father possessed inventive genius and the son inherited it. Until his death Mr. Darlington was actively engaged in improvements in mining methods and machinery. For many years he was associated with some of the most important mining enterprises both in this country and abroad. His connection with the Montana mine is well known, as also his work in India, South Australia (Burra Burra) and South America. He was also a director of Nobel's Dynamite Trust (Limited). He had a high reputation both for ability and integrity.

SOCIETIES AND TECHNICAL SCHOOLS.

CIVIL ENGINEERS' CLUB OF CLEVELAND.—At the regular meeting of the club, September 14th, 1897, the paper of the evening was one by Mr. William H. Searles on "The Consulting Engineer in Municipal Affairs." He demonstrated the importance to a large city of having such an officer permanently engaged, rather than depending upon a temporary commission of engineers from a distance called to act at long intervals of time. The paper was well received, and elicited an interesting discussion. President Ritchie was in the chair. Messrs. Charles Warren Comstock and John William Easton were elected members.

THE CHEMICAL LABORATORY AT WIESBADEN.—The Wiesbaden Chemical Laboratory is, since the death of its founder, Geb. Hofrath Prof. Dr. R. Fresenius, now directed by his sons, Prof. Dr. H. Fresenius and Dr. W. Fresenius, and his son-in-law, Dr. E. Hintz, quite in the same way as hitherto. In the summer term, 1897, there were 54 students on the books. The assistants in the instruction laboratory were three in number, in the Versuchsstationen (private laboratories) 24. The next winter term begins on October 15. During the last term, besides the scientific researches, a great number of analyses were undertaken in the different departments of the laboratory on behalf of manufacture, trade, mining, agriculture and hygiene.

ENGINEERS' CLUB OF ST. LOUIS.—An informal talk by Mr. S. Bent Russell on the repairs that have been made to the conduit and settling basin

of the St. Louis water-works, was the feature of the 457th meeting of the association, though another entertaining address was that by President Flad, in which he described the launching of the new dredge *Zeta* at Grafton on August 25th, illustrating his explanation by some excellent lantern slides. The secretary read a communication from the Western Society of Engineers inviting the club to participate in its excursion to Niagara and Philadelphia. The thanks of the club were voted the Western Society of Engineers for this invitation. The meeting was held on the evening of September 15th. Two applications for membership were received.

FEDERATED INSTITUTION OF MINING ENGINEERS.—The eighth annual general meeting of the members of this institution was held in Edinburgh, Scotland, on September 14th. The following papers were presented: "Submarine Coal Mining at Bridgeness," by Mr. Henry M. Cadell; "The Irish Channel Tunnel Project," by Mr. James Barton, C. E.; "Slavery in the Coal Mines of Scotland," by Mr. James Barrowman; "Alternating Multiphase Machinery for Electric Power Transmission," by Mr. Walter Dixon; "One-rail or Trestle System of Light Railways," by Mr. F. J. Rown; "Observations on some Gold-bearing Veins on the Coolgardie, Yilgarn and Murchison Goldfields, Western Australia," by Mr. Edward Halse; "The South Rand Coalfield and Its Connection with the Witwatersrand Bantket Formation," by Mr. A. R. Sawyer.

MICHIGAN COLLEGE OF MINES.—The prospectus for 1897-98, is as usual very thoroughly practical, giving just the information desired by those deliberating upon the choice of a college. The institution at Houghton, has a large and capable corps of instructors, and seems fully able to furnish such scientific and manual training as the embryo mining engineer of to-day demands. The course of instruction includes mathematics, physics, mechanics, metallurgy, drawing, mechanical, electrical, civil and mining engineering, ore dressing, biology, mineralogy, petrography, geology. Most of these subjects are elective, the faculty insisting, however, upon geology and mining being two of those chosen; these are asked for because it is believed that in any institution dealing with the problems relating to the mineral wealth of the country, the student should have some knowledge of geology and of mining methods. Students desiring to enter as candidates for degrees or to pursue special studies are admitted under the elective system through examination, exhibition of diploma, special certificate or on presentation of evidence that they are prepared to follow with profit the special studies they elect. Three degrees are offered by the college: Bachelor of Science, S. B.; Mining Engineer, E. M.; Doctor of Philosophy, Ph. D. Further particulars may be obtained of the secretary of the Board of Control, Mr. Allen Forsythe Rees.

INDUSTRIAL NOTES.

Two carloads of mining machinery were shipped to the Kilton Gold Reduction Company, of Florence, Colo., last week by the Colorado Iron Works.

The Joseph Dixon Crucible Company, Jersey City, N. J., is placing on the market a graphite preparation designed to prevent the adherence of spelter when not wanted in brazing work.

The Buffalo Car Manufacturing Company, Buffalo, N. Y., has started its machinery after a five months' shutdown, according to report. It is said that 600 men will be employed on full time.

The bid of the Youngstown Bridge Company, Youngstown, O., for the Market street viaduct, \$169,550, has secured the contract. The viaduct will be 1,610 ft. long and the river span 185 ft. above low-water level.

The E. P. Allis Company, Milwaukee, Wis., has recently shipped eight car loads of mining machinery to South Africa. The company is at work on six large engines for the London Central Underground Railway.

Henry R. Worthington, the well-known pump manufacturer of Brooklyn, N. Y., has opened a branch office at No. 713-717 Perdido street, New Orleans, and another in the Century Building, 317 North Ninth street, St. Louis.

The forgings in the engine of the torpedo boat *Rogers*, which broke a few days ago, causing considerable damage to the machinery, are being replaced by forgings from the Bethlehem Iron Company, at South Bethlehem, Pa.

The Bath Iron Works, Lewiston, Me., will do away entirely with steam for power in all its departments, and five additional motors will be placed in position to furnish electricity to perform the work. At present there are six motors in operation.

General Manager Shook, of the Tennessee Coal, Iron & Railroad Company, and a delegation of Alabama Congressmen will, it is said, lay before the naval armor plate committee the advantages of the Birmingham district for the economical manufacture of steel for armor plate.

The Coronet Steel Company, of New Jersey, which is said to control a process for the manufacture of steel without flaws or blow-holes, is about to close negotiations for the purchase of the two large mills

at Fullerton, Lehigh County, from creditors of the defunct Catasauqua Manufacturing Company.

Messrs. Chas. E. Billin & Company, purchasing agents of Chicago, have bought for the Helena & Frisco Mining Company, of Gem, Idaho, two 250-H. P. Geary water tube boilers. These boilers are designed to carry 150 lbs. steam pressure, and will replace several old horizontal tubular boilers now in use in the mine.

The Illinois Steel Company has just shipped from its Bay View plant 23 carloads of steel rails for Kobe, Japan. The Northwestern and Union Pacific roads will transport the special train to San Francisco, where they will be turned over to a steamer for Japan. This is the first shipment of the kind said to be made from Milwaukee for that country.

The Delaware, Lackawanna & Western Railroad has placed the men in its shops at Scranton, Pa., numbering several hundreds, on 10 hours' time, an increase of two hours a day over the time worked for the last eight months. This is due to the necessity of maintaining and enlarging the rolling stock, owing to the greatly increased freight business on all the company's lines.

A large force is now employed on the Semet-Solway coke oven plant at Eueley, Ala., and good progress has been made. The plant has been laid out for 120 ovens, of which 60 are now in process of construction, and should be ready to start up about the first of the coming year. The plant at Wheeling, W. Va., which is of the same size, is also well advanced and will be pushed to an early completion.

The Griggs-Seabury Gun and Ammunition Company, into which the Brady Manufacturing Company, of Derby, Conn., has been merged, will establish a large plant at the shops of the Brady Company. Between 300 and 400 hands will be employed. The gun to be manufactured is of new design. Testing grounds are to be established up the Housatonic River. The company has a capital stock of \$1,000,000.

The Coronet Steel Company, of New Jersey, which is said to control a process for the manufacture of steel without flaws or blow-holes, is about to close negotiations for the purchase of the two large mills at Fullerton, Lehigh County, from creditors of the defunct Catasauqua Manufacturing Company. The mills will be rebuilt and enlarged, and will be started in six months. They will give employment to 2,500 hands.

The Tyler Tube & Pipe Company, of Washington, Pa., manufacturing charcoal iron boiler tubes, has completed the making of 60 tons of boiler tubes for the Japanese battleship *Kasagi*, being built at Newport News, Va. They were made under the supervision of Japanese experts. The same concern is now making tubes for United States battleships Nos. 7 and 8, in course of construction by the Cramp Ship & Engine Building Co., of Philadelphia, Pa.

The Prussian Minister of Commerce has lately called the attention of German engineering firms to India as a market for German machinery. In view of the competition of Great Britain and the United States, he recommends them to send experts to Bombay, Calcutta, Madras, Kurrachee and other centers to establish agencies and repairing shops there. That a good demand for machinery, if properly introduced, could be developed he considers to be beyond question.

Inquiries, it is stated, have been received in this country for a large number of cars for Russian government railroads. They cover all classes of cars, the greater number, of course, being freight cars. It is not stated whether it is proposed to build them on Russian plans, or whether some modifications are to be made from those now in use and the American plans adopted in part. Should these inquiries result in business there will be a large demand for iron and steel from the car builders.

The Williams Patent Crusher and Pulverizer Company has lately received among other orders two for the largest size machine for handling clay and shale for making brick in Norway. It is also patenting its machine in Great Britain, Germany, France, Belgium, India and Canada. It has established sales agencies recently at Philadelphia, New York, Buffalo and Cleveland, and has made shipments of machines to various points in Tennessee, Ohio, Pennsylvania, Mississippi, Texas, Missouri and New York.

Maris Brothers, manufacturers of traveling cranes, of Philadelphia, Penn., are erecting a new machine shop to meet the demands of their increased business, and the new building will be modern and designed to meet all the requirements of a handy and serviceable machine working establishment. The building will be 55 x 75 ft. Running the full length of the building will be a 10-ton power crane, having a span of 30 ft. A gallery on one side of the building will carry the lighter machinery. The framework of the building is of steel and the covering of the sides and roof will be of corrugated iron. Contract for the complete building has been let to the Berlin Iron Bridge Company, who designed the structure, and who will furnish and erect all the material.

A new carborundum plant has been established in Dresden, Germany, as a result of the visit of Mr. E. G. Acheson, president of the Carborundum Com-

pany of Niagara Falls, to that place. Mr. Acheson has returned from his European tour, and reports success. He states that a local company will operate the Dresden plant of 400 H. P. and that it will be run by current obtained from the municipal lighting plant of Dresden, which is operated by steam, but, despite this, Mr. Acheson looks for good returns from the German plant. The new factory will supply the German trade with carborundum in bulk, and will not manufacture it into wheels, etc., but the manufactured carborundum will be supplied from the Niagara Falls plant.

TRADE CATALOGUES.

A useful catalogue of measuring tapes, rules, etc., is that just issued by the Lufkin Rule Company, of Saginaw, Mich. It is certain that those requiring anything in these lines will find it to their advantage to study this catalogue before ordering. It contains several novelties that should prove practical.

The latest catalogue of the Bethlehem Iron Company gives a succinct account of the history of that famous firm as well as a list of the marine engine forgings that have from time to time been furnished to the government and private concerns during the past few years. A glance over this list shows that a very large percentage of the fleetest or most powerful vessels either of the Navy or of the pleasure fleet owe some of their speed or some of their strength to this company. Accompanying the catalogue are two pamphlets likely to be of interest to engineers, designers and builders, the one "Steel for Marine Engine Forgings and Shafting," the other "Steel Forgings for Pumping Engines."

NEW PATENTS.

UNITED STATES.

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

WEEK ENDING AUGUST 17TH, 1897.

588,524. ELECTROLYTIC APPARATUS. Edward Balbach, Jr., Newark, N. J. The combination of a cathode case, composed of a trough having its bottom divided into two portions, one of which is horizontal and the other of which is inclined, so as to slope down to and connect with the horizontal portion, throughout its length, and provided with a cathode plate; and an anode suspended therein, arranged to cover the horizontal portion of the bottom only.

WEEK ENDING SEPTEMBER 14TH, 1897.

589,858. PLACER MINING DREDGE. Arthur W. Robinson, Milwaukee, Wis. Combination of a scow or like support of excavating mechanism, a rotary and positively-driven screen, a submerged hopper, a centrifugal pump and means to feed the material from one to the other successively.

589,854. DEVICE FOR OPERATING FEED OR ROCK DRILLING AND CHANNELING MACHINES. Henry C. Sergeant, Westfield, N. Y., assignor to The Ingersoll-Sergeant Drill Company, New York, N. Y. Combination of a drill-cylinder, a drill-back to which the cylinder is fitted to move lengthwise, but which otherwise moves only with the cylinder, and a screw arranged parallel with the cylinder for affecting the movement lengthwise, of a prime mover carried by the drill-back to move therewith in all directions and geared with the screw for the purpose of applying thereto the power for raising or drawing back the cylinder, a drill or bit stock and a drill or bit.

589,911. ROCK DRILL. John H. Smith, Johannesburg, South African Republic. Combination of a drill cylinder and piston, an air-chest having a valve therein, of an auxiliary or supplementary air or steam inlet formed directly through the air-chest and forming a passage between the back port in the air-chest and the main feed-port, the back port being thereby placed in constant communication with the rear of the piston to form a cushion.

589,915. PROCESS OF RECOVERING IRON FROM SCRAP. Herman C. Wolterbeck New York, N. Y., assignor to the Electro-Chemical Storage Battery Company, same place. The process consists in placing the scrap in a heated solution of a caustic alkali, passing a current of electricity from the scrap through the solution to a suit the cathode, and simultaneously injecting into the solution a current of air.

589,935. ALLOY. Alpha F. Cothias, Ivry-sur-Seine, France. Patented in France June 24, 1896, No. 256,852; in Belgium June 30th, 1896, No. 122,226; in England June 30th, 1896, No. 14,479; in Austria July 31st, 1896, No. 3,442; in Spain July 31st, 1896, No. 19,417; in Hungary July 31st, 1897, No. 7,324; in Italy July 31st, 1896, No. 42,221; in Luxemburg July 31st, 1896, No. 2,582, and in Portugal August 1st, 1896, No. 2,275. The process consists of the melting together of copper and tin, adding zinc during the melting, remelting and letting the mass cool down to the consistency of paste; adding aluminium and hydrochlorate of ammonia and also phosphides.

589,959. PROCESS OF TREATING COPPER SULPHIDES. John J. Crooke, New York, N. Y. The process consists in roasting the pulverized sulphides with sodium chloride, leaching or lixiviating the roasted mass with an oxidizing solution, whereby the iron sulphides are largely converted into oxides, and the copper sulphides are only slightly decomposed, and then subjecting the copper sulphides and iron oxides to a melting or smelting operation to extract the copper in a metallic condition.

589,967. COMPOSITION FOR MANUFACTURING CALCIUM CARBIDES. Robert F. S. Heath, Camden, N. J., assignor, by direct and mesne assignments, of forty-nine one-hundredths to Henry D. Hughes, Strafford, Pa. A composition for the production of carbide of calcium and sodium, consisting substantially of quicklime nine parts, carbon four parts, and $\frac{1}{4}$ oz. of

sodium or potassium chloride to the pound of the aforesaid mixed lime and carbon.

589,991. ACETYLENE GAS GENERATOR. Nelson Likins, Minneapolis, Minn., assignor of two-fifths to F. H. Salisbury and W. E. Satterlee, same place. Combination of a case, closed at its top and open at its bottom, horizontally divided into two compartments by two or more floors having vented air spaces between them, the upper one of the compartments being adapted to serve as a water tank, and the lower one of the compartments being adapted to serve as a retort chamber; the compartments being connected by means of a duct extending through the floor, the duct having a gravity valve therein, through the operation of which the flow of water from the water tank to the retort chamber is automatically controlled; a removable retort chambered within the retort chamber, the retort being fashioned with double walls whereby it may be water sealed, and having an annular calcium carbide holder formed with perforated interior and exterior walls, whereby water may be admitted to the lower strata of the calcium carbide; an annular wall extending downward from the water tank to the retort chamber for the purpose of sealing the retort; a pipe extending from the retort chamber through the water tank thence to a telescope gas holder; and a chain connecting the gravity valve with the dome of the telescope gas holder, whereby the gravity valve is operated.

589,999. METHOD OF TREATING ORES BY CHLORINATION. Horace F. Brown, Chicago, Ill. The method consists in confining the ore in a highly-heated state against the escape and loss of the volatilized parts subjecting it while confined to the action of chlorine gas and then permitting the volatilized parts to cool under confinement and form stable chlorides.

590,057. METHOD OF CALCINING FRIABLE MATERIALS. William H. Fahrney, Chicago, Ill. The method consists in forming a tube open at both ends and projecting such tube into the presence of a current of heat and lengthwise of such current, whereby the tube will be at once treated by the heat and serve as a passage for the current.

590,139. MANUFACTURE OF TUBES, ETC., AND APPARATUS THEREFOR. Rudolf Bungeoth, Remscheid, Germany, assignor to the Deutsch-Oesterreichische Mannesmannröhren-Werke, Dusseldorf, Germany. The apparatus consists of a mold and a ram or punch working therein, with means for supporting the rear end of the body to be perforated, a movable anvil having its end of the same diameter as the punch and means for moving and yielding the said anvil according to the perforating force of the punch.

590,143. PROCESS FOR MAKING ALKALINE SILICATES AND NITRIC ACID. William Garraway, Glasgow, Scotland. The process consists in heating silica and an alkaline nitrate with superheated steam.

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.

A meeting of the committee appointed by the late International Gold Mining Convention to revise the mining laws and submit its report to the proper committee in Congress, was to be held at the Brown Hotel, Denver, Colo., on Wednesday, September 22d. The committee consists of C. J. Moore, Colorado; W. S. Keys, California; F. J. Newland, Nevada; W. S. Harkins, Idaho; W. A. Clark, Montana; G. B. Dennis, Washington; W. B. Paeter, Missouri; J. E. Todd, South Dakota; F. M. Lyman, Utah; R. A. Penrose, Arizona; W. A. Reynolds, New Mexico, and Lamar Cobb, Georgia.

There is another important committee which recently met in Denver but kept its conclusions secret. This is the committee on the establishment of a department of mines and mining, to occupy a place in the President's cabinet. This committee is composed of Hon. Lafe Pence, Colorado; Hon. E. V. Smalley, the noted journalist, of Minnesota; Judge M. D. Herring, Texas; Hon. I. R. Hedges, Pennsylvania, and W. F. Bechtold, Nebraska.

OIL PRODUCTION AND NEW WELLS.—According to the Oil City Derrick the completion of the new wells in the New York, Pennsylvania and West Virginia fields during August amounted to 557, with a daily production of 16,518 bbls.; there were 695 wells drilling at the end of the month. In the Buckeye, O., field 193 new wells were completed, with a daily capacity of 6,740 bbls.; on September 1st there were 263 wells under the drill. The Southeastern, O., field showed that 44 new wells were completed in August with a daily output of 465 bbls. and that 40 wells were at work on September 1st. The Indiana field completed 45 new wells during the month, which had a daily production of 850 bbls., and at the end of August 52 wells were drilling.

THE COAL MINERS' STRIKE.—Since the previous issue of the *Engineering and Mining Journal* some 22,000 miners have returned to work in the Pittsburgh soft coal region. Yet the mines are short-handed and almost any man who can use a shovel may find employment. The scarcity of coal at the lake ports is causing the gravest anxiety, and operators are striving with all their power to rush forward the quantity required before the close of navigation; but as there is also a lack of accommodation, it does not seem probable that they will be successful.

Although the strike is over, dissension is by no means at an end. When the strike was settled at 65c. for the Pittsburgh thin vein, the thick vein miners on the Youghiotheu inquired of the operators at what rate they were expected to resume. According to the sliding scale, the operators contended the miners should work for 15c. a ton less than the thin vein. The miners refused to accept the ultimatum and offered to return at 13c. less than the established price of the district, and were willing to resume at 14c. less pending a settlement. Such disputes as this have been frequent.

That the strike was born of despair seems to be very generally conceded; the wages paid have been cut to starvation limits. In Ohio the average yearly earnings of the pick miners for 1896 were but \$239 31, and out of this sum there were deductions for powder and pick sharpening. This left the men less than \$4 50 a week. Had the men been able to get steady employment, even at the low price of 54c. a ton, which was all some of them were receiving, they could have made more than twice as much as they actually did, but the average number of days they were working was but 3 $\frac{1}{2}$ a week. In Indiana the men did not make more than \$4 a week on an average, that being the result of 2 $\frac{3}{4}$ days' work a week. In Illinois they were better paid, receiving \$5.62 a week for 3-4 days' pay. These figures have been calculated from the labor reports for the year 1896, and it appears that the conditions of 1897 have been, even before the strike was declared, fully 10% worse. It may therefore be assumed, without danger of any considerable error, that the miners of the three great soft-coal producing areas received but \$3.60 to \$5.30 a week for the first six months of 1897.

To show the anxiety of the operators to get out coal to fill contracts, it may be mentioned that the Moon Run Coal Company, one of the largest companies operating in the Pittsburgh field, has been content with an output of 1,000 tons a day for several years, whereas an attempt is now to be made to turn out 2,500 tons a day. The force of the mine has been about 200 miners, but for the present it is to be raised to 500, provided that number of men can be found.

Several of the large coal firms, especially those that do an important lake trade, have been trying to buy up all the loose coal of the small operators, but with little success.

ALABAMA.

JEFFERSON COUNTY.

MARY LEE.—The company which owns these coal mines expects to have the coal washer ready for business, coke ovens prepared to be lighted and the mines in such shape as to allow an enlargement of the output by the end of October, if not sooner. Superintendent Reid states that about sixty of the coke ovens are ready now to have fire placed under them. The others will be completely repaired before the end of another month. The headways, air shafts, manholes and other accommodations in the mines are being pushed as rapidly as possible. The entries are being worked farther into the coal and more rooms are being made. It is proposed to enlarge the output considerably, and about October 1st a large number of miners will be put to work.

LIMESTONE COUNTY.

TOLEDO TRIPOLI COMPANY.—This firm was established in Toledo, O., recently by Wm. Burge, George Wonts and P. Laidlaw, for the working of a large quarry in Alabama. These gentlemen have over 30 acres of land at Hayes' Mill, on which there are rich deposits of tripoli with 98% of silica in its composition.

ALASKA.

On September 21st Mr. Joseph Ladue, the founder of Dawson City, was introduced to President McKinley by Secretary Alger. Mr. Ladue had been summoned to Washington to consult with the executive as to the methods to be adopted to relieve the certain suffering in store for those now on the Yukon during the winter. Mr. Ladue estimates that there are about 6,000 people in the Klondike region, and that there are provisions for only about 3,000. He thinks the idea of attempting to arrange for carrying supplies down the Yukon by ice engines is utterly impracticable, as when the river freezes the ice in the center is forced up, forming great hills. He believes that all persons who have not sufficient provisions and who can return to St. Michaels before the river freezes should do so. He says that navigation will not close for a month, and advises that a courier be dispatched immediately across Chilcot Pass to the Klondike region to urge all who can to embark on the last outgoing steamer. This suggestion probably will be adopted. In addition he advises the establishment of stations along Chilcot Pass with dog trains for conveying relief supplies.

The Alaska Central Railway Company has been incorporated in Phoenix, Ariz., by the filing of articles with the territorial secretary. The capital stock is \$5,000,000. The incorporators named are John Underwood, E. F. Greenlaw and A. F. Lyon, and the road projected is from tide water to Prince William sound, up Copper river and across the divide to a point on the Yukon near the international boundary, a distance of 400 miles. Behind this scheme are reported to be Elijah Smith, of the Oregon Improvement Company, W. J. Cudaby and P. D. Armour, the Chicago packers, as well as several California capitalists.

It is somewhat difficult to believe that the following proposal as outlined in an Ottawa despatch will

be deemed to merit serious consideration by the Dominion Government. The dispatch is as follows: "Mr. J. K. Kerr, Q. C., Toronto, is here to day laying a somewhat novel proposition before the government. He had an interview with Mr. Sifton regarding the matter. Mr. Kerr offers the services of a volunteer company of 100 able-bodied Canadians to assist the Klondike police in maintaining law and order. The men will be armed with the best repeating rifles and any quantity of ammunition. At the same time they will work in the gold mines. What Mr. Kerr asks from the government is that in return for their presence the government will grant to the Yukon-Klondike Co-operative Mining and Trading Company, Toronto, the choice of lands now held in reserve by the government."

BERNERS BAY.

BERNERS BAY MINING AND MILLING COMPANY.—Extensive development has been made this year upon the property discovered late last fall. It is understood that the proprietors are perfectly satisfied with the result of their explorations. The main ledge is 6 ft. wide. From wall to wall is 32 ft., the walls being of granite. The vein bears north and south about 23° east. It is easily traceable for 1,000 ft. from point of discovery and 500 ft. lower, and it also outcrops 1,000 ft. higher than the point of discovery. The ledge is said to be highly mineralized, a good concentrating ore, and to contain free gold. In appearance it is very similar to the Bald Eagle ore and closely resembles that from the Jua in mine. There appears to be an unlimited quantity of it. A force of men is employed now in opening it up. No mill test has yet been made.

COMET.—There have been but six men stopping in the Comet mine for some weeks, and they have kept the mill going half time; the remainder of the force has been occupied in development work. There has been a great exodus of miners to the Klondike and work has been retarded somewhat, but their places will be filled gradually.

ARIZONA.

GRAHAM COUNTY.

A narrow-gauge railroad from Guthrie, on the Arizona & New Mexico Railway, to Morenci, 16 miles, is to be built by the Copper Queen Consolidated Mining Company of Bisbee.

CALIFORNIA.

AMADOR COUNTY.

(From Our Special Correspondent.)

CENTRAL EUREKA.—The shaft at this mine at Suttar Creek is down 700 ft., and three crosscuts through the ledge have been made, which shows it to be from 10 to 14 ft. in width. The ore mills from \$3 to \$7 a ton. A contract has been let to sink 200 ft. deeper; when this depth is reached new levels will be run, and a mill erected if the development work should warrant. Mr. W. R. Thomas is superintendent.

HUMBOLDT COUNTY.

The Klamath River dredge, now at work on the Klamath River, is reported to be doing well. Pay gravel has been found at several points in the river-bed.

It is reported that J. R. McNeil and George Hammer, of Willow Creek, have discovered a vein which assays phenomenally high in copper and silver, and carries a little gold. Rich float has been found for years.

INYO COUNTY.

(From Our Special Correspondent.)

INYO COUNTY MINING AND DEVELOPMENT COMPANY.—This company was organized to operate the Last Chance No. 2, the Southwest, and the Sunshine mines. It is located near Darwin, was formerly owned by Charles B. Lane, who sold it to the present company for \$80,000 after taking out \$140,000. The new owners have taken out enough ore to warrant the erection of a smelter to reduce the ore.

MONTEREY COUNTY.

(From Our Special Correspondent.)

CARMELO COAL MINE.—A. M. Allen, of Oakland, Cal., has secured an option on this property, near Point Lobos, 10 miles from Monterey, and is making arrangements to open it up. The mine has been closed for the past four years owing, it is said, to want of capital. It is now filled with water and the machinery is in bad condition.

NEVADA COUNTY.

(From Our Special Correspondent.)

PROVIDENCE.—At this mine, one mile west of Nevada City, that which is known as the intermediate ledge is 2½ ft. thick at the 1,300-ft. level, and widens as sinking continues. The ore is high grade. In about 10 days the underground hoist will be ready for use. This mine employs over 100 men.

RIVERSIDE COUNTY.

(From Our Special Correspondent.)

RIVERSIDE GOLD MINING COMPANY.—This company is developing the gold ledges found on the 50,000-acre tract that extends from near South Riverside to the neighborhood of Perris, on which are located the Temescal tin mines, formerly operated by an English company. The results so far are satisfactory, and arrangements are being made to erect a 20-stamp mill.

SAN BERNARDINA COUNTY.

(From Our Special Correspondent.)

BELL.—At this mine, at Holcomb Valley, supposed to be the continuation of the famous Rose ledge, a deposit of clay and gravel has been discovered which assays very high.

SAN DIEGO COUNTY.

A deposit of asbestos has been located near Mesa Grande which is said to promise well.

SHASTA COUNTY.

(From Our Special Correspondent.)

BULLY HILL.—The tunnel at this mine near Copper City is in 1,000 ft., and some good ore is being shipped to the reduction works at Vallajo Junction, via Bella Vista. The ore carries gold and copper and yields good returns. Important improvements are being made at the mines.

CROWN POINT.—This mine, six miles west of Delta station, comprising three claims, has been purchased by John T. McGhee and John R. McLean for \$2,500. Included in the sale was a water right to 300 inches of water from the south fork of the Dog Creek.

MOUNTAIN COPPER COMPANY, LIMITED.—A most extensive and disastrous fire occurred at this mine, 11 miles northwest of Keswick, on the afternoon of September 13th. The fire originated in the old mill building on the north bank of the Slick Rock Creek. This building contained a complete 20-stamp mill, a large chlorination plant, the engines and boilers which operated the dynamo, and other machinery. After this building was destroyed the fire swept away the residence of F. E. Wilson, superintendent of the mines, the assay house, the residence of A. W. Wise, business manager, the saw mill, lumber, hardware and general stores, bunkhouses, saloon, row of cottages and 400 cords of heavy pinewood. The powder house caught fire just after 40 tons of giant powder had been removed. The post office was also destroyed. The entire working force was called out to fight the fire, but nothing could be done. Several workmen are missing. The loss includes the huge air compressor and Burleigh drills located in the power building. The origin of the fire is unknown, and the loss will probably reach \$100,000, partially covered by insurance. This is a great catastrophe to the company, the property having been put in successful operation at an enormous expense.

SIERRA COUNTY.

(From Our Special Correspondent.)

BUTCHER'S RANCH.—This mine, 10 miles north of Sierra City, at an elevation of 6,500 ft., is again idle, although the results of the work of the lien-holders has been encouraging, they having recently uncovered a ledge near the face of the tunnel. More capital will be procured this winter and the work pushed on a larger scale next spring.

YOUNG AMERICA.—At this mine, seven miles north of Sierra City, a fire has destroyed the boarding house, office, mill and all the surrounding buildings. This large property together with about 150,000 tons of tailings was purchased last year by S. M. Green & Company, of Milwaukee. This company erected a large cyanide plant with a daily capacity of 100 tons a day.

TUOLUMNE COUNTY.

(From Our Special Correspondent.)

GERRYMANDER.—The main shaft at this mine is down 210 ft. At 50 ft. the ledge was crosscut, and a drift run which is now in 100 ft. The vein shows 10 ft. at this point. At the 140 ft. a station was cut and drifts run both north and south, 75 and 25 ft. respectively, each in high grade ore. Another station will be cut when the 250-level is reached. Arrangements are being made to put in a mill and air compressor plant. There is said to be 2,000 tons of ore on the dump and as much more blocked out, all high grade. Twelve men are employed. Mr. J. L. Joseph is superintendent.

RAWHIDE.—On the 500-ft. at this mine, 2½ miles northwest of Jamestown, a strike has been reported. The face of the drift is said to show an 18-ft. ledge which mills very high. Sinking still continues to the 1,300-ft., while the 1,200-ft. level is being opened up.

COLORADO.

BOULDER COUNTY.

A railway that will be a great benefit to miners in Boulder and Ward is that now under construction, to be known as the Colorado & Northwestern. Large quantities of ore that cannot be hauled 20 miles at a profit will be utilized. The road will be completed by December 20th. The district tapped

EL PASO COUNTY.

(From Our Special Correspondent.)

ANGLO-COLORADO EXPLORATION SYNDICATE LIMITED.—During the past summer this company floated its principal property as a separate company known as The Rigi Group Gold Mining Company Limited, of which Charles J. Moore is manager and consulting engineer. This property comprises 16 acres of patented ground situated on Battle Mountain immediately east of and adjoining the Portland property, and north of the Independence Mine, and includes the Rigi, Lizzie May, Lulu and Yucatan claims. Six veins have been opened on this property, and payable ore discovered in three, from two of which nearly 400 tons of ore have been shipped of varying grade. The developments are: First, sinking the main working shaft 9x4½ ft. in the clear, its present depth being 220 ft. Second, crosscutting from the same at 135 ft. and 210 ft. in depth, to cut what is known as No. 2 vein—the uppermost crosscut showing a very close approach to the vein; and, third, drifting along the same vein from shaft No. 1 at a depth of 150 ft. from the surface. This last-mentioned working has run in payable ore for over 50 ft. and at present shows 6 in.

to 8 in. of ore in the face, which assays from 2.5 oz. to 25 oz. gold per ton. Last winter and spring ore bodies were discovered in three different places on vein No. 2, and the object of the present development is to cut vein No. 2 at a depth which will insure ample stopping ground when the new levels shall have intersected the ore shoot already proven above. The company is working shafts No. 1 and 2 directly, and tributaries are working from the surface vein No. 4 which was discovered last winter, and is yielding low-grade payable ore. The tributaries' shaft is now 40 ft. in depth and they are drifting along this vein.

COLORADO & PHILADELPHIA REDUCTION COMPANY.—Twenty Wilfley concentrating tables have been placed lately in the plant at Colorado City. They will re-work about 30,000 tons of tailings, which have accumulated there since these works started a little over a year ago, and also the tailings made by the plant at the present time about 200 tons a day. It is intended to concentrate about 75 to 1, and thereby make a smelting product worth about \$80 a ton, the value of the tailings averaging \$1.25 a ton.

ELKTON MINING AND MILLING COMPANY.—Two 125-H. P. high pressure boilers and a large hoist are being put in preparatory to sinking the main shaft 200 ft. The present depth of the shaft is 400 ft. About 550 gals. of water per minute are being handled now from the 400-ft. level, and this amount is easily taken care of by either of the large triple expansive Knowles pumps which they have in place in the pumping station. It does not look as if the Elkton management had any doubts as to the persistency of the ore shoots in depth, judging from the substantial character of the proposed additions to the plant. The net production, that is the value of the ore after deducting freight and smelting charges, for the 14 months from June, 1896, to July, 1897, was 604,419.15. Dividends to the amount of \$306,960.51 have been paid and the company has a cash surplus on hand of \$261,500, of which \$124,316.50 is invested in government bonds.

GOLDEN CYCLE COMPANY.—This company has resumed sinking the Legal Tender shaft, and proposes to sink 100 ft. before driving out for the ore body. The Tabet lease on the La Belle of the Golden Cycle property is producing regularly a fair grade of ore.

HALF MOON.—The Johnson and Hartig lease on the Half Moon claim of the Matao Company has just been extended for a period of two years from October 1st, 1897. It is producing better ore and more of it than ever before.

HULL CITY PLACER.—This property, on the same slope of Bull Hill, is being operated by twenty-four sets of lessors. Of these three sets are shipping, and most of the others have fair prospects of being shortly in ore. The White lease is the principal shipper; the output has steadily increased since the present lessee took hold of it.

IRON MOUNTAIN MINING AND MILLING COMPANY.—The galena claim of this company has made a shipment of about 4 tons of ore carrying between 8 and 9 oz. in gold and about 16 oz. in silver. This property shows rare promise of becoming a mine very soon.

LILLIE.—The Lillie is producing about 20 tons of ore daily, one-third of which is high grade smelting ore and the remainder of a medium grade which is shipped to cyanide or chlorination mills.

ORPHAN BELLE.—Work on the Parker and Gardner lease on the Orphan Belle property is being vigorously pushed. It is looking well and will be a steady producer very shortly.

VINDICATOR.—This mine is shipping regularly a large amount of ore to the New El Paso Chlorination Works at Florence.

GILPIN COUNTY.

(From Our Special Correspondent.)

BONANZA.—Development work is being prosecuted on the Bonanza property in Chase Gulch. Lessors have shipped ore giving returns of over \$100 per ton.

FORFAR.—The Forfar mine, in Russell Gulch, is the heaviest producer in camp, its last month's shipments being nearly 1,000 tons; and this month's shipments will average 40 tons a day, a considerable increase. The shaft on this property is down only 215 ft., and the ore body is one of the biggest in Russell Gulch. The principal work consists in driving and stopping in the lower east level, at a depth of 210 ft. The ore is of a low grade, but shows improvement now. The force employed at present numbers only 20 men, and the Collins Bros., who are successfully working this property, intend to resume sinking operations at an early date.

GOLDEN ROSE.—Ores shipped heretofore have belonged to one of three classes, ranging in value from \$56 to \$140 in gold a ton. The milling product going on the dump runs \$30. The vein at 800 ft. shows much the same average value as at the surface. The pay streak is from 8 in. to 15 in., and the width of the vein 4 ft. No drifts are over 100 ft. long. A project, it is mooted, is afoot, having for its object an association for common ends with the adjoining Western Belle and Grasshopper.

HOLLAND.—A new boiler has arrived at the Holland property, in Russell Gulch, which has recently been taken hold of on a lease and bond. A new shaft house is in course of erection.

KLEIN GERMAN.—At this mine, in the Central district, a force of 15 to 20 men is employed. This

property is being worked through the Bobtail tunnel, the ore being all taken out that way, making a considerable saving in haulage. The ore shows increased values. The average monthly output is in the neighborhood of 250 tons.

LOMBARD.—A boiler and engine have been hauled out to the Lombard mill at Yankee Hill, and will be set up at once. This is owned by Dr. Alex Ashbangle, of Central City, who also intends to put in 10 rapid-drop stamps in the mill, as the present capacity of the mill is insufficient to treat the output of the Lombard property.

MINNESOTA.—At this mine, in Russell Gulch, recently taken hold of by the Collins Bros., of Denver, 200 tons of ore was shipped to the Rocky Mountain concentrator last month. The ore was hauled to the lines of the Tramway Company, on whose cars it was reloaded. As soon as possible a switch will be built to connect with the lines of the Tramway. Day and night shifts are at work, and it is expected this month's shipments will nearly double those of August.

PEWABIC.—This mine, on Pewabic Mountain, adjoining the Forfar mine, is one of the best properties in Russell Gulch, but has been idle for several years. Water troubles were the main cause for suspending operations, after experimenting with steam pumps, which, however, proved a failure. A good Cornish pump, if placed in the property, would easily handle the water. The property was bought in at sheriff's sale a few weeks ago for the sum of \$111,000.

SUCCESS.—Messrs. J. R. Quigley & Company, of Denver, have nearly completed their contract for the putting up of a new shaft-house on the Success mine, in Lake District. The size of the shaft-house is 25x35 ft., and a new plant of machinery of 35 H. P. capacity is also being put up. The Success Gold Mining Company, composed of Denver and Chicago parties, operates the property. A shaft is down over 200 ft. and has been retimbered for a distance of about 150 ft. The same company operates the Meeker, adjoining the Success, and in the former shaft sinking is being carried on at a depth of nearly 300 ft., and some shipments of ore of a fair grade are being made from this property.

HINSDALE COUNTY.

(From Our Special Correspondent.)

BLACK CROOK.—Preparations are being made to put in new machinery at the Black Crook, on Hotchkiss Mountain. The property will then be more thoroughly developed than ever. This was formerly one of the richest producers of the district.

BLACK WONDER.—Messrs. E. C. Davis and J. H. Allen, the latter being president and treasurer of the Black Wonder Company, have each donated 50,000 shares of the stock to the company for the purpose of putting the mill in first-class running order. Fifty thousand shares of this stock will be sold at 20c. per share, the proceeds to be devoted to repairing the mill and putting in a sampler. The other 50,000 shares will be sold at the same figure in order to send additional men to Alaska in the interest of the company.

GOLDEN FLEECE.—This famous old property is also soon to be equipped with improved machinery, and a large force of men will shortly find employment in it.

LAKE COUNTY.

(From Our Special Correspondent.)

BANKER MINING AND MILLING COMPANY.—Under the direct management of Mr. John Guth, of New York City, who arrived here last week, and who represents the New York City owners, this property started work on September 22d. Work will be pushed on it's Breece Hill property. The Banker is located on the west side of Breece Hill, and about 2,200 ft. from the Johnny. At a cost of about \$7,500 the mine has been equipped with a big plant of machinery, and the work of sinking resumed. The work starts in at the old workings at a depth of 350 ft., and it is believed that at a depth of 500 ft. a rich ore shoot, likely the Johnny, will be encountered. In the old workings two levels were run at 160 and 210 ft., respectively. Some ore has been opened, but not in a quantity to ship, and the management feels confident that the rich ore shoot will be reached after sinking a further 100 to 200 ft. The undertaking is a big one, but yet is only one of a number of big enterprises that promise to bring Breece Hill to the front as one of the richest mining sections in the country. The John H. Swoyer estate, of Wilkes-Barre, Pa., is a large owner in the Banker. The New York owners are: Jacob Groy, president; Peter Scherr, vice-president; Geo. Sculer and John Guth, treasurer and general manager.

BIG SIX MINING COMPANY.—The lessees on this property are shipping 25 tons of ore a day holding good gold values. Most of the work is being done on the 200 ft. level of the Nettie Morgan shaft, from which ore is being shipped which runs on an average \$20 to the ton in gold, lead and silver. The Big Six shaft is also being operated, but this work is done under sub-lease, and is in the way of prospecting. A diamond drill has just been brought into use, and an effort is being made to locate the ore body in this part of the company's ground.

ELK.—The working force at this property has been increased, and operations are now being pushed in two levels with very good results, and shipments are to be increased before the end of this week. The

levels at a depth of 210 ft. and 287 ft. are being pushed through a good body of iron ore, which its improving with development, and shows an increasing lead value. Commencing on September 25th shipments will be increased from 20 to 45 tons daily. In the meantime the management will continue prospecting for the big Carbonate Hill lead ore shoot, and they believe that they will locate it from the lead stringer now being followed.

LITTLE STAR AND TWINKLE.—These properties, lying near Hill Top, are also being actively operated, and are in the same formation. While prospecting and developing the properties the lessees are taking out a large amount of very good lead ore, which is increasing in size and value with development work. This ore also assays from eight oz. to 15 oz in silver and \$1 to \$2 in gold to the ton. Shipments are to be increased.

MAB.—These people, who are after the Mahala ore shoot and who have sent the Mab shaft down from the surface, have attained a depth of 920 ft. and have stopped sinking in order to put a 15-ton hoister and other machinery into position. This work will be completed by Saturday, when sinking will be resumed, and the shaft sent down a further distance of 40 or 50 ft. where they hope to cut the ore short. This failing, drifts will at once be started to find it. The Mab people are also preparing for water which they anticipate may cause them some trouble at this depth.

MAID OF ERIN SILVER MINES.—The Henrietta property of this group is being operated by different sets of lessees, and is producing mostly iron ore. However, there is some lead ore coming from several of the leases, which, at the present price of lead, assists in netting a profit for the operators. The shipments of lead and iron on the Henrietta amount to 4,000 or 5,000 tons a month.

RESURRECTION MINING COMPANY.—It was but recently that I described at length the important work being carried on by this company in the Resurrection shaft. At the present time Manager Carnahan has the shaft down 750 ft., and is running miles of drifts, opening up the known ore body and prospecting for new ones. It is shipping 20 to 25 tons daily of good grade gold ore. The Sedalia and Monarch properties, also working nearby, make, with the Resurrection, the greatest trio in the Little Ellen Hill section. A vast amount of development work is being carried out.

ROBERT E. LEE.—Different sets of lessees are operating on this property. Work is being carried on in bodies of oxide iron, and shipments are regular.

SILVER LAKE GROUP.—In conversation to-day with Manager Hugh Dyatt, of the Silver Lake and Atlantic and Pacific claims on North Star Mountain, I learn that he is now working the same to a good profit under lease and bond in escrow. He is operating four tunnels, one of which is in 150 ft., and in a full breast of ore, and the other, in 200 ft., is passing through a body of free milling ore. Mr. Dyatt is driving for the sulphide shoot, and has just gotten the other two tunnels fairly under way. He has a large ore shoot in quartzite running with the dip of the mountain; it is 20 ft. to 24 ft. wide, and from 30 to 35 ft. deep. Regular shipments are to be commenced at once. The stuff he is shipping assays from \$8 to \$40 in gold and \$2 to \$5 in silver to the ton. In addition to this ore shoot they have a large body of concentrating ore available.

SMALL HOPES CONSOLIDATED MINING COMPANY.—These people are continuing active operations under the management of Mr. S. W. Mudd, and doing a good deal of work on their ground. The Marian shaft, which was being sent down to 1,300 ft., reached that depth some time ago, and drifting is now the order of the day. They are in some 250 ft. and are looking for a new ore shoot. In the meantime shipments are regular and some 3,500 tons of ore, most of which was of a low grade, was shipped during August. Much of the ore shipped comes from the Forest City workings. The water for the entire group is handled by the Emmet shaft of the company's property, and last month the average amount of water handled amounted to 700 gals. a minute. There is a great deal of development work being done, and the management is quite confident of opening up another ore body.

SAN JUAN COUNTY.

(From Our Special Correspondent.)

ESMERALDA.—A carload of ore was shipped recently which netted \$55 a ton in gold. This most satisfactory result has stimulated the operators to greater efforts, and six men have already been added to the regular force. Others will be added as soon as sufficient stopping ground can be opened up. The upper tunnel has been leased to Mr. J. M. Morgan, who has a large force at work breaking ore from an 18-in. streak.

IOWA.—It has been found necessary to shut down this property for several days, in order to complete several towers on the new tramway.

LEAD CARBONATE.—This group, comprising several valuable properties, is rapidly coming to the front, under the supervision of A. M. Jackson. A small streak of ore has just been cut, assays from which give 7.68 oz. gold and 136.62 oz. silver to the ton.

MINERAL CREEK MILL.—This plant, soon to be in running order, is to be operated in connection with the Golden Horn mine. The plans have just been approved and forwarded from the main office in

London, upon the arrival of which work will begin in earnest. L. W. Murphy, Ouray, Colo.

MINNEHAHA.—This property has been taken under lease by J. M. Morgan. The first carload of ore shipped netted \$26.47 a ton in gold. Though but a small force is working at present, the outlook is very encouraging.

OCCIDENTAL MINING COMPANY.—Twenty-five men are being employed on the Silver Ledge, owned by this company. Over 200 ft. of water has been pumped from the 400-ft. shaft, and the property should soon be in condition to resume operations. The mine has been under water for five years. The machinery for the new mill has not yet arrived, but is expected daily.

PROVIDENCE.—This property, together with the Providence Extension, is being worked by Pearce, Janey & Lytton. A 12-in. streak of ore has lately been opened up which assays 1.5 oz. gold and 65% lead.

SOUTH MINERAL.—Six carloads of good ore await shipment from this property. This Animas canyon mine has been until lately considered a mere prospect, but it is now held to be one of the most valuable claims in the district.

SAN MIEGUL COUNTY.

Much excitement is felt throughout the county over the new strike at Ophir, as it promises something big in the way of mining enterprises. The discovery was made by V. P. Yeager, A. T. Hathaway and W. Grigsby in a section to which old-timers had given little notice. The property is situated a few hundred yards from the town site of Ophir, in Waterfall canyon, just south of the Suffolk mill. The ore is contained in an immense dike of quartz-porphry, very pyritiferous, the eruptive sheets lying nearly flat, and so conforming with the general strata of the surrounding country. This vast eruptive mass is enormous in area, and to all appearances extends thousands of feet in every direction and is interseamed with a network of stringers and pockets of decomposed quartz, which contain the free gold. The ore can be won by quarrying; and if it will average \$4 in amalgamating values, with rough sortings, it will mark an era in the history of this district. There is sufficient ore in sight to furnish a supply of hundreds of tons a day for many years to come, and for convenience and natural facilities for economical development it is unsurpassed. Upon locating their first claim on this blowout or dike, the gentlemen mentioned had a sorted lot of 20 tons packed down to the Suffolk mill for a test run, which yielded \$20 in gold per ton on the plates by amalgamation. They were astonished at the result, and immediately staked a dozen more claims before the returns were made public. They now have about 15 men at work taking out ore, which is being conveyed down to the Suffolk mill for treatment. The product can be mined and delivered to the mill at 50c. a ton, and should it run only a few dollars per ton a profit will be realized.

BELLE CHAMPION.—This property in the Saw Pit district is now being worked under lease by James Blake. He is taking out a quality of ore that exceeds in value any ever taken from the mine. A carload recently sent out assayed from \$60 to \$200 a ton in gold and silver values. The new ore body opened up is said to be an expensive one, and a larger force is being employed than for some time past.

JAPAN MINES COMPANY.—This company has resumed sinking the 100 ft. shaft from the main level of the Japan, and it will continue to be sunk steadily until a depth of 400 ft. has been attained. As the shaft sinks drifts will be run on the vein each way at intervals of 100 ft. for the purpose of blocking out new stopping ground. The Japan concentrating plant is turning out two carloads of high grade gold, silver and lead concentrates every 24 hours, and the gross value of the monthly production of first-class ore, shipped in its crude state, and concentrates is said to be from \$75,000 to \$90,000.

SWEETHEART.—A rich strike was recently made on this property in Navajo basin, Mt. Wilson District, owned by Seneca Young, by intersecting the vein at a depth of several hundred feet with a crosscut tunnel. The vein carries a 6-in. pay streak showing free gold, and said to be worth \$10,000 a ton. As drifting from the intersection progresses, the vein is increasing both in size and value, and prospectors in that region are considerably wrought up over it.

SUFFIELD-GLOBE MINING AND MILLING COMPANY.—It is reported that this company is contemplating enlarging the capacity of its mill from 40 to 100 stamps. More ore is now being extracted from the company's properties than the mill can handle, and in one claim alone there is sufficient blocked out to supply 50 stamps for some time to come. The mine and mill are at Ophir; Mr. W. J. is general manager.

TERRIBLE & BUTTERFLY.—Two trial mill runs of ore from these properties, near San Bernardo station, owned by K. Benson, was made last week, and the plate returns were \$7 and \$11 a ton in gold. The rock was picked at random from the vein, which is from 5 ft. to 15 ft. wide, and the returns are a good average showing of the lower grade product. Besides the plate values there were a considerable quantity of concentrates that carried gold, silver and lead. Experts have been examining these properties recently on behalf, it is said, of the London Exploration Company, owner of the Tom Boy mine.

IDAHO.

LINCOLN COUNTY.

Sweetser & Burroughs, of Pocatello, are at work successfully with their gold dredge on the Snake River, near Minadoka. Their boat works the sand from the bottom of the river and handles about 2,000 yards of dirt in 20 hours.

ONYBEE COUNTY.

DE LAMAR MINING COMPANY.—The following are the returns for the month of August: Crushed during the month, 4,676 tons; bullion produced in the mill, \$44,325; estimated value of ore shipped to smelters, \$354; miscellaneous revenue, \$85; total produce, \$44,760; total expenses, \$39,250; profit for the month of August, \$5,510.

KENIUCKY.

BELL COUNTY.

EAST JELICO COAL COMPANY.—The annual meeting of this company was held at Middlesboro recently, and the following officers elected: G. D. Jackson, president; D. P. Whitsett, vice-president, and F. G. Tice, secretary; C. L. Schaum, A. H. Whitsett and John F. Brown held over as directors, and R. G. Yingling and J. W. Whitehill were elected.

STRAIGHT CREEK.—These mines at Pineville, which were closed recently, have been bought by an eastern syndicate and will be operated on a more extensive scale.

LEE COUNTY.

MAGUIRE COAL COMPANY.—This company, with a capital of \$35,000, has been chartered at Beattyville by C. L. Dorman, Walter Jameson and Logan Thomas.

MAINE.

FRANKLIN COUNTY.

NORTH JAY.—At this quarry of the Maine & New Hampshire Granite Company may be seen the largest piece of granite ever taken out of that quarry and probably out of any quarry in the country. It contains over 2,000 cu. yds. and weighs over 5,000 tons. Out of this piece of stone, which is clear white without a flaw is to be cut a shaft 85 ft. long, 50 ft. wide and 8 ft. thick, for a monument for a party in Texas. Among the large orders now being filled by the company are the granite for buildings in New York, Detroit, Allegheny and Washington. The present force at the North Jay quarry alone is 300 men beside the carvers and general help, and this force will be enlarged to 600 men in a few weeks.

MARYLAND.

ALLEGANY COUNTY.

CONSOLIDATION COAL COMPANY.—This company has opened the largest unbroken tract of big vein coal about two miles northwest of Ocean. The outlet to the Carlos branch of the Cumberland & Pennsylvania Railroad consists of 1,400 ft. of double and 1½ miles of single track. The breach into the side of the hill at opening A is 250 ft. deep, and the six benches above measure from mine track to top 65 ft. About 250 men are at work, 150 in and about the opening and 100 on the Cumberland & Pennsylvania Railroad branch.

MICHIGAN.

COPPER.

(From Our Special Correspondent.)

During the last two weeks considerable attention has been paid to this company's stock, transactions on the Boston Exchange having been very large and fluctuations wide, prices rising to a high point. The Centennial property lies north of and adjoining the Calumet & Hecla; the three master lodes of Lake Superior, the Calumet Conglomerate, the Osceola Amygdaloid and the Kearsarge Amygdaloid are believed to cross the property. The developments of the Osceola Amygdaloid consist of two shafts, Nos. 1 and 2; these shafts are 750 ft. adart. No. 1 shaft has been sunk to a depth of about 450 ft., No. 2, 550 ft., and these shafts are connected by the first, second, third and fourth levels. Drifting also is being done north and south of both shafts. Already there are at least 2,000 ft. of stopping ground opened. The shafts are being sunk to a greater depth and will be connected at the fifth and sixth levels. On the Calumet Conglomerate No. 6 shaft has been sunk 595 ft. and shows a vein of copper rock 4 ft. wide; in the fifth level of No. 6 shaft going north the vein is 8 ft. wide, and the same shoot of copper has been struck in the fourth level. The developments of the Osceola Amygdaloid are promising, and it is stated on good authority that 300 tons of rock per day can be sent to the mill from openings already made, sufficient to keep the mill running for a year. The company has one Ball stamp capable of treating 225 tons of rock per day. It has been the policy of the management not to start the mill until they were sure that sufficient openings had been made to run the mill continuously. The stamp mill is in good order and will probably be started in a very short time. On July 1st the company had on hand a cash \$72,000 and no debts. The expenditures of the mine are about \$6,000 per month.

Concerning the proposed consolidation of the Tamarack, Jr., the Osceola, the Kearsarge and the Iroquois very little can be said. The law of Michigan limits the capital stock of any mining corporation to 100,000 shares whose par value shall be \$25 per share. There are 40,000 shares of Tamarack, Jr., 50,000 shares of Osceola, 40,000 shares Kearsarge

issued, and 10,000 shares in the treasury unissued. By a vote of the Iroquois stockholders the property was sold to the Kearsarge company for 8,000 shares of that company's stock, and this transaction has been ratified by the stockholders of the Kearsarge. How the 100,000 shares of the consolidated stock to be issued will be appropriated has not yet been decided, but it is generally believed that the Osceola company will have share for share; this would leave 50,000 shares to be distributed between the Iroquois, the Tamarack, Jr., and the Kearsarge. It has been suggested that a certain proportion of the shares shall be retained in the treasury to provide for new stamps, machinery, etc.

The Tamarack, Jr., company has never published any reports. It has always lacked stamping facilities; it had the use of the old Tamarack and Osceola stamps for about four days in the week in the last year. Its indebtedness at the first of the year was in the neighborhood of \$80,000, which, it is said, has been reduced probably to less than \$30,000.

The Kearsarge produced last year 1,337,226 lbs. of fine copper from 1.99% of copper contained in the stamped rock. It lacks milling capacity, but has good ore reserves.

The Osceola produced last year 6,251,304 lbs. of fine copper, the stamped rock yielding 1.26% copper. The costs were 9.64 cts. per pound of copper. A good deal of new ground had been opened.

IRON—MENOMINEE RANGE.

ARAGON.—Material for two Babcock & Wilcox tubular boilers of 528 H. P. to carry 150 lbs. of steam has been received. The exploratory work on Sec. 6, 39-29 is showing up very well. The ore lens lately found is being stripped and its area is very extensive. There now seems no room to doubt that a merchantable body of ore has been found.

PENNSYLVANIA COMPANY.—The steam shovel was taken from this mine last week to do a week's scooping at West Union.

MINNESOTA.

(From Our Special Correspondent.)

Col. W. E. Dorwin, who has been contractor on the Mesabi Range for several years, and who of late has been working the Hale for the Thomas Iron Company in connection in some way with Crake, Bates & Co., of Cleveland, has left the range and is now in Chicago, where he has charge of work for the Heath Rail Joint Company. He is accused by a newspaper on the range of defrauding its men out of some \$1,500 sent him in payment for ore. There are, however, two sides to the story, and Mr. Dorwin, on his part, retaliates by making some strong accusations of wrong-doing against certain parties. He is an old and once very prominent Eastern railway contractor, and he has always had an excellent reputation, but he has been somewhat unfortunate of late.

The discontinuance of ore loading by steam shovels on both Mesabi and Vermillion ranges has made quite a difference in receipts at both Duluth and Two Harbors docks, and while there were as high as 1,000 cars a day received at Duluth some days last month, there are now not more than 700. At Two Harbors there had been 215,000 tons handled for the month to the 15th, a movement at the rate of 130,000 tons less for the month than during August. The 2,000,000 tons mark has been passed at these docks, and there yet remains quite a large amount of ore to go down, though all but contract ore is being left alone because of the increase of freights. Freights have dropped 5c. a ton from the high water mark of a week ago, and may remain low for some time, as wheat is not moving into Duluth as fast as was hoped for.

H. H. Porter, of the Minnesota Iron Company interests, was over the line of the company's road last week, accompanied by local officials. It is understood that it was determined to do much in the way of improvements during the coming year. As was told in these columns last week, the docks are to be rebuilt and new rolling stock to be added, as well as 200 ore cars remodeled at the Two Harbors shops.

It is probable that the Duluth, Mesabi and Northern will also increase its rolling stock. It has been using several hundred cars belonging to the Wisconsin Central road nearly all the summer.

IRON—MESABI RANGE.

According to a correspondent of the Duluth *News-Tribune* an extensive deposit of iron at the east end of the Mesabi has been discovered. Capt. Dan Cole was the finder, and the discovery was made just east of the Hale mine at Biwabik. The developments so far are reported to have shown up 40,000,000 tons of good ore. The new find is reported as a stripping proposition, with a surface not averaging over 11 feet. Considering that the famous Mountain Iron property, one of the most wonderful deposits in the Lake Superior region is supposed to have but 20,000,000 tons in sight, should the estimates as to the recent discovery be accurate the importance of the find becomes evident. According to the correspondent the development of the find has been going on for several months in secret.

FAYAL IRON COMPANY.—At this mine two steam shovel men, neither of whom had handled a shovel till this year, loaded from the stock pile in 10 hours 226 cars of ore, and all without the assistance of an engine and crew to spot cars. It is stated that the record could have been made 270 cars with a train crew to handle cars to the shovel.

HALE MINING COMPANY.—This mine has been closed and the pumps pulled; it has been an unsuccessful experiment and a continuous source of trouble for those operating it.

LAKE SUPERIOR IRON COMPANY.—At the Hull mine of the company two bailers with a capacity for 1,000 gals. each are being put in as additional safeguards against flooding. The mine is increasing its force and nearly all the 300 men at work for the company are at this property. About 1,000 tons of ore are hoisted daily. The stock piles of both Hull and Rust are all cleaned up. Nearly all the men employed underground at the Rust and Day have been transferred to the Hull this week and the two properties will be idle for the present. The average wages paid miners at the Day last month was \$2.26 and at the Rust \$2.14.

SPARTA IRON COMPANY.—Regular shipments were begun this week, the company having sold enough ore to keep itself fairly busy till the close of navigation. Two shovels are now at work.

MISSOURI.

JASPER COUNTY.

(From Our Special Correspondent.)

JOPLIN ORE MARKET.—The demand for zinc ore was strong last week, but there was no advance in price, though sharp competition for lead ore kept the price within 75c. of the preceding week. The shipments of zinc ore showed an increase of one carload and lead sales an increase of five carloads over the preceding week. The increase over the corresponding week of 1896 was 25 cars of zinc ore and eight cars of lead ore. Six carloads of Joplin zinc ore and half of Oronogo and the Springfield products sold at \$22.50 per ton. Other ore ranged down, according to quality. The highest price paid for zinc ore last year was \$20 a ton. There was an increase of five cars of lead ore over the preceding week, and an increase of eight cars over the corresponding week of last year, when lead ore sold at \$14.50 per thousand pounds. Lead ore during the past week brought \$28.25 delivered, for nearly all the product, though some was bought for \$27.50 during the early part of the week. The price of pig lead at St. Louis dropped 10c. per hundred, but it seemed to have no effect on lead ore.

Following are the sales of lead and zinc ores for the week ending September 18th:

Joplin zinc, 1,040,940 lbs.; lead, 351,250 lbs.; value, \$21,287. Cartersville zinc, 1,337,270 lbs.; lead, 247,970 lbs.; value, \$20,308. Webb City zinc, 664,130 lbs.; lead, 95,840 lbs.; value, \$9,324. Galena zinc, 2,902,000 lbs.; lead, 614,070 lbs.; value, \$43,712. Aurora zinc, 715,000 lbs.; lead, 35,000 lbs.; value, \$6,916. Stotts City zinc, 223,510 lbs.; value, \$2,459. Oronogo zinc, 239,180 lbs.; lead, 2,620 lbs.; value, \$2,665. Springfield zinc, 88,000 lbs.; value, \$957. Belleville zinc, 17,400 lbs.; lead, 8,560 lbs.; value, \$422. District totals for last week: Zinc, 7,229,430 lbs.; lead, 1,354,430 lbs.; value, \$103,080. District totals for 38 weeks: Zinc, 244,469,670 lbs.; lead, 40,999,840 lbs.; value, \$3,051,151.

BOLEN LEAD AND ZINC COMPANY.—This company, operating on the Norton land southeast of Joplin, has built a fine concentrating plant. It was started up last week, and everything is working well. At 55 ft. it has a 10-ft. face of rich dirt to start on. There are 14 shafts being sunk on this land, and in one of them at 45 ft. a fine zinc ore prospect has been developed.

DRYDEN, MURDOCK & COMPANY.—They have a lease on 10 acres of the Carter land. Drifting is going on at 160 ft. on a good run of lead that produces every day 2,000 lbs. of ore. This week they will start another drift on lead dirt.

E. D. SMITH & COMPANY.—The Inez Mining Company have seven shafts down on its lease, five of which are producing pay dirt.

FRY & COMPANY.—On the Summit lease, in four days last week, in cutting a 6 ft. by 9 ft. drift, they took out dirt that cleaned up over 8,000 pounds of lead ore. When it is opened up it will be a very rich mine.

G. B. YOUNG.—This proprietor has leased 80 acres of land south of Joplin to Kansas parties. They have already one drill hole down, and at 117 ft. struck a fair body of zinc ore in open ground. Next week they will have two drills at work, and will thoroughly prospect the land before subleasing.

HOBER MINING COMPANY.—On the Three Friends lease, in sinking a shaft at 36 ft. the lessees are taking out large lumps of lead ore in open ground.

J. M. JAMISON & COMPANY.—These people are on the Hollingsworth lease at Central City. At 83 ft. they struck a rich face of zinc ore, and penetrated 9 ft. into it and yet find ore in the bottom of the shaft. Three months ago Mr. Jamison was driving a hack in Galena at \$25 a month, but to day he is worth several thousand dollars.

MABEL P. MINING COMPANY.—The proprietors have two lots adjoining the Burlington mine in Leadville Hollow, and have developed a fine jack prospect. Within the last week the shaft has been sunk into 8 ft. of zinc ore, and the drill hole shows 15 ft. more of the same quality. The shaft is 132 ft., and over a year has been consumed in sinking it.

MOON SHINE.—This is a good tract, and will soon be as large a producer as it was several years ago. The two pumps are thoroughly draining the ground. Mr. Smith and his Nebraska partners are in luck developing both lead and zinc ores.

MONTANA.

GRANITE COUNTY.

MANHATTAN & MONTANA MINING COMPANY.—A meeting was recently held in New York by this company at which a new board of directors was chosen. This includes Hermann G. C. Thofehrn, president and general manager; Charles B. Smith, secretary and treasurer; Joseph F. McLaughlin, and H. Esk. Moller. The latter three gentlemen are of New York City. This board held a meeting a few days ago at which reports were read concerning the work already done on the company's property. So far this work has consisted principally of exploration and development operations. Two tunnels are being run; one on the lead to a distance of 1,000 ft., and the other on the crosscut, 750 ft., in order to expose the entire ore body. The work already accomplished has exposed the ore on the hill, 1,500 ft. vertically and 1,050 ft. horizontally. There are two vertical veins 4 to 6 ft. and 7 ft. respectively on the top of the hill which meet the main vein at its base. This latter vein increases in width on the walls of the hill and runs from 9 ft. on the surface to 20 ft. at the bottom. Carefully selected samples of the ore averaged when assayed \$18 and over per ton, and generally it is 80% free milling.

MADISON COUNTY.

SILVER CROWN MINING COMPANY.—The report of a great copper strike in Madison County was circulated in Butte last week. Three months ago John W. Coughlan, cashier of the Mountain Con. office, in Butte; Richard J. Dwyer, manager for Pat Mullins, and John S. McGroarty, superintendent of the Electric Light, Railway and Townsite Company, of Anaconda, took a lease and bond for \$1,100 on the group of mining claims in Madison County known as the Bluff property, owned by Thomas Bluff, William Lamb, Jane Bluff and Thomas S. Bayliss. The bonded claims are the Copper Belle, Populist, Silver Crown, Manhattan and George Washington, and are located on the Madison River, about four miles from Norris and two and a half miles from Red Bluff. The lessees organized themselves into the Silver Crown Mining Company, and for three months have been prosecuting development work on the properties. Shortly after commencing work they uncovered a lead-silver ledge, but at about a depth of 15 ft. the ledge scattered. They then sunk on the vein with the hope of striking the lost ledge, and in doing so uncovered the hanging wall of a copper vein, and then drifted 35 ft. before reaching the foot wall. Assays run 20% copper, 12% silver and \$5 gold.

SILVER BOW COUNTY.

(From Our Special Correspondent.)

ALEX. SCOTT.—This claim, lying between the West Colusa and Modoc mines, has been operated under lease and bond and developed to a depth of 500 ft. It is stated that the ore which has been "spotted" is becoming more regular in value. Shipments of ore have been made from the claim, which yielded over 60% copper.

ANACONDA COPPER MINING COMPANY.—At the diamond sinking is in progress below the 1,200-ft. level. At the High Ore the shaft is being sunk from the 1,400-ft. to the 1,600-ft. At the Montana Consolidated No. 1 sinking is going on below the 1,400-ft. level; at No. 2 the shaft is down 1,500 ft. About 800 tons of ore is hoisted daily at these two shafts.

BOSTON & MONTANA CONSOLIDATED MINING COMPANY.—This company secured in the United States Court September 8th an extension of time to prepare for its suit against the Montana Ore Purchasing Company for \$500,000 damages for ore alleged to have been extracted from its ground through the workings of the Rarus, owned by the latter company, on the ground that it will take four months more to develop the ground in dispute so as to try the case intelligently. Judge Knowles in granting the continuance to the February, 1898, term of court said he would perhaps not have done so but on account of his experience with mining experts he did not wish to try a case where reliance must wholly be placed on their opinions. He had seen men equal in knowledge come into court and testify to diametrically opposite things. In the suit entered by the Montana Ore Purchasing Company for \$1,000 damages for the wrongful detention of survey notes, maps, etc., in which the Boston & Montana and C. S. Batterman are made co-defendants, the company denies all knowledge of the maps and denies that it ever possessed them. Mr. Batterman in his answer states that during the year 1896 he was engaged in the business of a civil and mining engineer, offering his professional services to the public at large; that in February, 1896, he was engaged by the Montana Ore Purchasing Company to survey and make maps of the underground workings of the Rarus, and that the original notes are his sole and exclusive property, as is the universal custom among civil and mining engineers.

BUTTE & BOSTON MINING COMPANY.—This company is making preparations to work on a large scale. At the East Grey Rock, the new compressor is running, furnishing power for machine drills at both Grey Rock shafts. At the Harrington placer drifting on the 200-ft. levels is in progress. At the Silver Bow preparations are being made to place a hoist at the winze, which is sunk 100 ft. on the vein below the 1,000-ft. level. This company also has a suit entered for \$165,000 damages for ore extracted from the Michael Davitt claim through the Rarus.

COLORADO SMELTING AND MINING COMPANY.—At the Gagnon a tower is under construction to hoist the waste high enough to dump on the company's ground west of the old Original shaft. The company has suspended operations on the Old Glory.

GOLDSMITH MINE.—This silver-gold property, which has been operated extensively under lease and bond for nearly a year, is shut down.

HESPERUS.—The lessees have quit work on this mine, situated south of Park street, Butte, after crosscutting over 500 ft. No ore was discovered.

LEXINGTON.—This mine, which at one time produced \$80,000 a month in silver and gold, is idle. The shaft is down 1,500 ft. There is a 60-stamp mill, hoisting engine, pumps, etc., on the property.

NEVADA.

ELKO COUNTY.

DEXTER MINING COMPANY.—Shipments have been made to the Salt Lake Reduction Works that show 48.70 oz. of silver and 35.38 oz. of gold to the ton. The value of the last consignment of 18½ tons was \$13,800. In addition, the bullion and cyanides shipped by the mine bring the total output of the property for three weeks to \$24,640.

STOREY COUNTY.

At the election of officers of the Virginia (Nev.) Miners' Union, held September 3d, the result was as follows: President, Patrick Bannon; vice-president, W. W. Dunn; financial and recording secretary (librarian), John F. McDonell; treasurer, John L. Finnegan; conductor, John Snow; warden, Thomas O'Toole; finance committee, Jacob Baumann, William O'Leary, J. B. Kenney; library directors, W. E. Redmond, T. J. Moran, John M. Quine, M. S. Flynn, Joseph Sparks, J. Baumann; trustees, M. P. McDonald, John Young, M. James, P. J. McNamara, W. J. Fiely. John F. McDonell defeated Jack Welch for secretary and librarian with a vote of 194 to 52. McDonell has been secretary nine consecutive times.

NEW MEXICO.

AMADOR COUNTY.

(From Our Special Correspondent.)

ONEIDA.—The shaft at this mine, two miles north of Jackson, is down 1,200 ft. When the 1,788-ft. level is reached, stations will be cut and levels run.

GRANT COUNTY.

BAYARD MILLING AND SMELTING COMPANY.—This company employs 16 men upon the Texas, Grant and Rio Grande mines in development work. The great increase of water in the drift on the 300 ft. level of the Texas mine is taken by the miners as an indication of the near approach to a larger ore body. Samples of the ore, argentite, which was found in this mine recently, is reputed to assay 1143 oz. silver and 2.48 oz. of gold per ton.

PINOS ALTOS GOLD MINING COMPANY.—About 100 men are employed upon the various properties recently purchased. The Hearst shaft on the Pacific vein, formerly known as the Pacific Gold shaft, has been sunk 200 ft. in the past three months. A new steam hoist has been placed upon the Gillette shaft on the Pacific vein, formerly known as No. 3 shaft of the Bell and Stevens properties. This new hoist has a capacity to hoist a ton of ore at a speed of 1,000 ft. a minute. On the Mina Grande the company has let a contract to run an adit from the outcrop of the vein on the south part of the claim, running north 1,100 ft. A new steam hoist has also been procured for the shaft. On the Ohio the tunnel level is being driven ahead and the shaft from the level pushed downward with all possible dispatch.

TREASURE MINING COMPANY.—This company has 30 men employed upon the Atlantic mine, and five men at the mill, which is only running day shifts. The drift at the 425-ft. level has been run 100 ft. south and is being driven ahead steadily. A winze has been started from the 300-ft. level to connect with the 425 ft. level at 250 ft. south from the shaft. This winze will ventilate the lower workings of the mine. As soon as the winze is completed and the drift on the 425-ft. level makes connection with it, the work of sinking the main shaft will be resumed. By surveys made it is only 45 or 50 ft. vertically to the junction of the Atlantic and Deep Down veins, at which point a large body of ore is expected to be found. The shaft will be continued below the junction of the veins to the 550-ft. level where a drift will be driven north 1,000 feet. In the meantime while this deeper development is in progress, the mill is kept running one shift upon ore extracted from the 300-ft. level, which has attained a length of 1,000 ft. north from the shaft and still shows the same body of pay ore in the breast, as is found all along the drift. The 425-ft. level as far as driven shows equally as well in extent of ore body with some improvement in the value of ore extracted. This property has undoubtedly improved as depth is attained. About four tons of concentrates, worth \$50 per ton, are made daily and shipped to the Silver City Reduction Works.

SANTA FE COUNTY.

ORTIZ GRANTS.—According to recent advices these valuable grants in South Santa Fe County have been sold by the Chaffee estate, of Denver, L. M. Lawson, of New York, Senator S. B. Elkins, of West Virginia, and R. C. Kerens, of St. Louis, owners of the Ortiz mine in South Santa Fe County to a New York and London mining syndicate for \$1,500,000. The prop-

erty consists of 60,000 acres, which includes much of the best auriferous territory in New Mexico. L. S. Burn, an English mining engineer, has spent six months investigating the mineral resources thereon, and his report has recently been verified by a Mr. Fleming, of New York.

(From Our Special Correspondent.)

ORTIZ MINE GRANT.—This property, consisting of 60,000 acres of gold-yielding lands of New Mexico, has been purchased by a New York and London mining syndicate for \$1,500,000. The above property was owned by the Chaffee Estate, L. M. Lawson, Senator S. B. Elkins and R. C. Kerens.

NEW YORK.

WASHINGTON COUNTY.

HATCH HILL QUARRIES.—Large deposits of red slate have been found near North Granville. Several quantities are already in operation. The Ainsworth quarry has been leased by Edward Willis, and O'Brien & Flaherty and James O'Donnell are opening new quarries. The Baker Company, a limited liability concern, will erect a first-class mill at its quarry for the manufacture of tiling, wainscoting and all kinds of high-grade interior work. The slate beds of this mill lie on a side hill, thereby facilitating the removal of "top" slate, and they have been proven by means of a diamond core drill to be 35 ft. in thickness, and at least 100 ft. in width. The officers of the Baker Company are: Charles I. Baker, president; Fred P. Allen, vice-president and treasurer, and William V. Baker, secretary, all residents of Troy.

OKLAHOMA.

The Wyandotte Mining Company has been incorporated at Guthrie recently, with a capital stock of \$7,000,000, by Hon. D. T. Flynn, ex-Governor C. Renfrow, Hon. D. A. Harvey, J. C. Hunt, J. M. and L. B. Bowaugh. The company has leased nearly all the lands of the Wyandotte and Quanah Indian reservation, in the northeastern corner of the Indian territory adjoining the Joplin District, and will open extensive mines at once.

OREGON.

BAKER COUNTY.

NORTH POLE.—A 6-in. pay sheet has been uncovered which is said to assay \$1,200 to the sack.

WHITE ROCK GOLD MINING COMPANY.—A 10-stamp mill has been ordered for the Perry mill, and concentrators are to be located at the old mill site half a mile from town. Five stamps will be used for its owners and the other five kept dropping on custom work. George N. McCoy will be manager and D. N. Mathias will be superintendent.

PENNSYLVANIA.

LEHIGH COUNTY.

GOOD LUCK SLATE COMPANY.—This company was recently organized to operate in the Old Lehigh tunnel slate quarry at Lower Slatington, Pa. This quarry has been lying idle for many years, although it is said the best slate in this section was found here. The company consists of F. J. Lentz, Owen Kern and Francis Remaly.

SOUTH DAKOTA.

"The work of surveying the land embraced in the suspended Black Hills forestry reserve is proceeding as rapidly as possible. A few days ago an additional surveying corps, making three in all, was placed in the field, as it was found that the original two corps were entirely inadequate to complete the work this season, as must be done. The people have the same privileges that they had before President Cleveland's proclamation establishing the reserve was issued. They are at liberty to make mineral locations as before on the mineral lands, and to prospect and pursue mining and milling operations; also to use the timber for mining purposes, for fuel or for domestic purposes, under reasonable regulations, by procuring permission from the Secretary of the Interior, only they are more secure than before because the government throws a safeguard around their property by preventing, so far as possible, destructive forest fires.

LAWRENCE COUNTY.

HARDIN MINING COMPANY.—A sudden influx of water has compelled this company to suspend operations. A larger Blake pump to throw 200 gallons a minute is to be installed. New piping will be put in the shaft. There is ample boiler power to run two large pumps in addition to the hoist. Before the work was stopped the drills had sunk 9 ft. into the ore, and had not reached the bottom of it then. It is a clean, fine pyritic ore, the lowest assay running \$20 gold a ton. Assays have run as high as \$55 a ton in gold. As soon as the shaft is emptied of water and sunk through the ore the vein will be crosscut.

HOMESTAKE.—The result of a 15 day run at the Homestake is the largest amount of bullion recovered in the history of the company. Eight bricks of a total value of \$190,000 have been shipped to the sub-treasury, New York. This clean-up was larger by \$30,000 than any heretofore made, but Mr. Grier, the superintendent, is reputed to be confident that future clean-ups will be of equal value. If so the yearly output would be \$4,500,000, or \$1,000,000 in excess of former years.

RUA.—A shoot of ore 30 ft. wide has been opened containing 15 ft. of concentrating ore. About 10 tons a day is being shipped.

PENNINGTON COUNTY.

HOLY TERROR GOLD MINING COMPANY.—The first dividend was paid on September 13th. The amount distributed was \$9,000, being 3c. a share. The ore being taken from the mine is exceedingly rich and a large body has been exposed on the 500-ft. level. Superintendent Fayel is in charge of the mine, and the mill has been placed in the best working condition possible. New machinery has been installed in both mine and mill, and it is believed the company will soon be able to pay regular monthly dividends to its stockholders.

TENNESSEE.

POLK COUNTY.

Work is now going on at the Ducktown copper mines, and a considerable force of miners is at work there.

TEXAS.

NACOGDOCHES COUNTY.

EAST TEXAS.—W. P. Galloway has started up this coal mine at Garrison again. The mine has been closed down for some time. The coal is lignite of the finest quality.

SHELBY COUNTY.

A new coal mining company with a capital of \$50,000 has been organized at Timpson. The mine that the company has purchased is on McCarty & Morgan's farm, near Timpson. It is contemplated to work 100 men, when in operation.

UTAH.

(From Our Special Correspondent.)

SHIPMENTS FROM SALT LAKE.—During the week ending September 18th there were sent East 25 cars, or 894,963 lbs. lead-silver bullion; 1 car, or 46,345 lbs. copper bullion; 41 cars, or 771 tons lead-silver ore.

STACKS IN BLAST.—Probably the present time affords the low-water mark for ore receipts from Utah mines, as already the smelters report a larger supply. Of the Germania's five stacks, two are in blast, also one copper reverberatory; Pennsylvania's five stacks, one in blast; Hanauer's four stacks, one in blast. All told they are handling about 13,000 tons a month. Hanauer next week will fire up another 40-ton stack, with a third soon to follow. The Hanauer furnaces are the smallest of the State's plants. This does not represent the output of smelting products, as the ore and concentrate shipments East are from 600 to 900 tons a week.

BEAVER COUNTY.

(From Our Special Correspondent.)

BEN HARRISON GOLD AND COPPER MINING AND MILLING COMPANY.—Incorporation articles were filed with the Secretary of State on September 16th, the capitalization, \$300,000; shares, \$1, with 100,000 shares set apart for treasury purposes. Head office, Salt Lake; annual meeting, first Monday in January. Officers and directors are: F. Eberhardt, president; J. J. Trenam, vice-president; F. M. Bishop, secretary; C. S. Humphrey, treasurer; T. B. Widner, all of Salt Lake. Realty consists of the Ben Harrison and Galveston lode claims, in Beaver Lake mining district.

JUAB COUNTY.

(From Our Special Correspondent.)

EVA.—In the ground adjoining the Joe Bowers water was encountered last week at 287 ft. A pump will probably soon be put in.

FOUR ACES.—On 500 level north an ore seam 1½ to 2 ft. thick recently came in from which a dozen tons were mined last week and is still improving.

HOPE SILVER AND LEAD MINING AND MILLING COMPANY.—Incorporation articles filed with the Secretary of State on September 15th; capitalization, \$200,000; shares, \$1, with 100,000 shares set apart for treasury purposes; stock assessable; no single assessment to exceed 1% of capital stock, nor can an assessment be levied oftener than 60 days. Head office, Salt Lake; annual meeting, third Monday in September. Officers and directors are: Abial B. Sawyer, president; James O. Gale, vice-president; Charles S. Horne, treasurer; Abial B. Sawyer, Jr., secretary, all of Salt Lake, and John Edwards, of Eureka. Realty, the Cleveland lode claim, near Silver City.

NEW STATE.—Development is about to be resumed and a steam hoist is talked of. This ground is in Ruby Hollow, next to the Lady Aspinwall, which in the 70's produced a large amount of high-grade silver.

SIoux-AJAX TUNNEL.—For the time being work is at a standstill.

Southern Eureka.—The shaft is down nearly 500 ft., at which point crosscuts will be started, exploring for the extension of the Centennial-Eureka ore zone.

TETRO.—Annual stockholders' meeting was held in Salt Lake on September 14th, when 165,000 shares were represented out of the \$300,000. The informal report presented showed that \$15,000 was expended in development, consisting of 1,800 ft. of tunnels and drifts, exposing bodies of low-grade silver ore. So far no shipping product is encountered. The work done was considerably under the average cost. It was decided to close down until such time as silver shows a better front. There are no debts and \$1,425 is in the treasury. Officers and directors for the current year are: James A. Pollock, President; John Eaton, vice-president; Ernest Williams, secretary-treasurer; S. J. Carpenter and A. Christensen.

TINTIC SHIPMENTS.—For the week ending September 18th the following ore consignments were sent forward: Bullion Beck, 20 cars; Centennial-Eureka, 2 cars; Ajax, 9 cars; Gemini, 12 cars; Uncle Sam, 5 cars; Humburg, 2 cars; Swansea, 6 cars; South Swansea, 3 cars; North Star, 1 car. The shipments of concentrates were: Eureka Hill, 5 cars; Mammoth, 5 cars; Sioux Mill, 1 car. From Dragon Iron 26 cars hematite for flux.

UNDINE.—A special stockholders' meeting was held at Provo, September 17th, to consider ways and means for continuing work. It was decided to levy an assessment, and the directors met immediately and declared one of 1c. a share, payable October 15th. Work will be resumed next week.

PIUTE COUNTY.

(From Our Special Correspondent.)

BRECKENRIDGE-MAMMOTH.—Much of the ore recently uncovered is said to carry \$800 to \$2,000 in gold, much of it being amethyst quartz showing free gold. The seam is 3 in. to 10 in. wide in a quartz vein 3 ft. to 6 ft. wide. A shaft has been started further down the hill. Indications are most promising. The main working crosscut tunnel, which is to tap the three veins of the group at 200 to 400 ft. depth, is in 410 ft. and is being steadily advanced. After another 50 ft. the vein will be looked for daily. Breckenridge Mammoth is the talk of Piute and Sevier counties, and beyond any question it is to be credited with the most important discovery of the year in this or the several adjoining mining districts.

CONGRESS.—High-grade gold quartz in a narrow seam has recently attracted attention to the Congress vein. It is being prospected. Manager James Long, Jr., of the Breckenridge-Mammoth, has just secured a bond on this tract.

GOLDEN STAR COMPANY.—Another car of 7-oz. gold rock, with a good sprinkling of silver, was shipped from the Blue Bird last week. It was marketed in Salt Lake, as will be future shipments. The previous car went to Denver and netted some \$3 more a ton than could be had from Salt Lake refineries—a shortcoming which is now corrected. The vein holds its own. Exploration is again in progress on the Grasshopper, owned by the company, with a favorable showing.

HOLLAND.—A second tunnel is begun about 50 ft. below the upper tunnel, and in the same good ore. The Acme amalgamator, recently set up for an experimental trial, is doing excellent service in winning the values from the fines from the upper workings, and is to be a fixture. A shipment of No. 1 ore is sacked ready to be sent out. The owner, W. F. Snyder, states that a mill will be in order as early as possible next season, for the vein even now can easily maintain a production of 25 tons of good milling stuff in 24 hours.

MILLER.—On September 15th the bond expired, and as it was not taken up the property reverts back to the original proprietors.

SALT LAKE COUNTY.

(From Our Special Correspondent.)

FORTUNE.—On Thursday a lot of 146 tons that ran better than 40% lead, 11 oz. silver and \$1 gold was marketed at Salt Lake.

HIGHLAND BOY.—The last uncovering in the drift on the ore body from No. 5 tunnel shows the best yellow pyritic copper yet brought to light. In driving 22 ft. 40 odd tons were mined, running 8% to 16% copper and \$4 gold. The face shows equally well. The new mill is giving satisfaction.

NEW STATE.—Little Cottonwood Canyon has made several small shipments. The latest is from the New State; a lot of 3,500 lbs. going \$62 gold, 7% copper, 3 oz. silver per ton. There are several small quartz seams in porphyry, on which development is in progress, which show free gold and choice copper ore, though not in quantity as yet.

PEDRO.—Last week 100 tons were shipped. It is said this mine has the largest lead reserves in Bingham. In the near future it will be worked energetically.

SWEDEN.—Lessees E. Moss and T. Fenstad have opened a 6 in. seam of 60% lead, 42 oz. silver ore, from which a ton a day is being taken.

TOOELE COUNTY.

(From Our Special Correspondent.)

ELECTRIC POWER.—The two companies, one to utilize the latent power in Provo River, the other that of Jordan River, competing in the Mercur field are pushing work quietly. Each is confident of being ready for business in December.

GOLD COIN.—Face of incline shaft at 45°, down 50 ft., has 5½ ft. of \$3 10 gold ore, almost a profit-paying product. At the surface the values of the vein were under 75c. A contract was let to sink 100 ft., at which point drifts will be started. Exploration has been under way but a little more than a month and this is the best development made in this corner of the Mercur region.

UINTAH COUNTY.

(From Our Special Correspondent.)

HYDROCARBON AREA.—Some 2,000 square miles are embraced in the region now being examined by Prof. George Homans Eldridge, of the Geological Survey, which work is being done far more thoroughly than that of two seasons ago.

UTAH COUNTY.

(From Our Special Correspondent.)

ANTHRACITE.—A discovery in Slate Canyon, four

miles east of Provo, which may prove the first workable seam of anthracite in Utah, is just made known. Early in August S. S. Jones called the attention of John L. Loy, Frank Muller, J. C. and T. R. Cutler to the coal indications, since which time development has been in progress. A tunnel 450 ft. from the discovery cut, lower down the hill, driven 70 ft. through wash, found coal in place last week. The seam dips 40° from the horizontal, is fully 5 ft. thick, though the coal is much broken. The roof is a black clay shale, and locally the floor is styled a lime slate. It burns with the characteristic blue anthracite flame, and in a few days, when more solid formation is reached, samples are to be thoroughly tested.

VERMONT.

ORANGE COUNTY.

BARRE QUARRY COMPANY.—This company, of which we have already noted the organization, was incorporated under the laws of Maine with \$150,000 capital. Alvin V. Sortwell, of Cambridge, Mass., is the president. The other officers are mostly residents of Barre. The output of the quarries are estimated at 100,000 tons per annum. It is not the intention of the new company to engage in granite cutting and many of the large quarry owners who have relinquished the management of their quarries will remain in the cutting trade and become purchasers of their own granite from the syndicate, C. E. Tayntor & Company is the only concern which refused to enter the new organization.

WASHINGTON.

(From Our Special Correspondent.)

It is reported (but your correspondent has been unable to obtain either a verification or a denial from interested parties) that the Wilman Brothers' properties, including the Golden Cord and Comet mines, have been leased and bonded or sold to the Rockefeller syndicate. The buildings at the former mine are being enlarged and repaired. The mining, railroad, smelter and other properties in which Mr. Rockefeller is interested in this part of the country have been inspected this week by F. T. Gates, of New York, who stands almost as near the Rockefeller business "throne" as Mr. Rockefeller himself. These facts may have some connection with the aforesaid rumor.

According to a recent despatch from Seattle, William Price, of McKeesport, Pa., is there representing a strong Pennsylvania company that is to erect and operate a steel plant at Port Angeles. Mr. Price states that work will commence within 60 days and pushed to completion. The main object will be the manufacture of tin plate. The tin that will be used will be imported from Tasmania, and can be laid down on the Sound for much less than in the Eastern manufacturing towns of the United States. Washington will supply the different ores necessary to produce the pig iron.

OKANOGON COUNTY.

(From Our Special Correspondent.)

PALMER MOUNTAIN.—The main topic of discussion in Okanagon County and Spokane at present is the rich strike just made by the Palmer Mountain Gold Mining and Tunnel Company. At a distance of 400 ft. from the mouth of the tunnel, and at a distance of 185 ft., a vein of low grade free-milling ore, 3 ft. in width, was encountered about the first of the month. This week, 85 ft. beyond the first vein, and at a depth of 200 ft., another free-milling vein, one foot in width, sampling high in gold and \$2 50 in silver, was crossed. Both are blind ledges. The ore from the latter is similar to the best grade of the famous Black Bear, located further up the mountain, the gold being visible. It is not so much the size or value of these discoveries that is the occasion of so much satisfaction to those whose faith in Palmer Mountain has not been shattered in times of adversity, but it is the proof that the ledges "go down" and hold their value. Two shifts with air drills are extending the tunnel 8 ft. a day.

SNOHOMISH COUNTY.

(From Our Special Correspondent.)

DEER CREEK.—Negotiations are pending for the transfer of the Deer Creek Gold and Copper Mining Company's Helena group of claims to Dennis Ryan and associates, of St. Paul and Butte. Contentions among stockholders and directors, lack of capital for development work and the Klondike craze have combined to keep this property in idleness this season.

FORTY-FIVE CONSOLIDATED.—Twenty-four miles of pony trail down the river to the Great Northern Railroad; four miles of pony trail over the range to the Everett & Monte Cristo Railroad, at Silverton, over half a mile of which has been blasted out of the solid rock; the most commodious, comfortable and substantial mining camp buildings in the county; a water-power sawmill, having a daily capacity of 15,000 ft. of rough lumber; a 2,000-ft. tram from the Magus mine to the trail; tunnels, winzes and raises aggregating 1,000 ft. in length; the mine and the upper camp lighted by electricity—these are among the most prominent improvements completed. A new and more substantial tram, with increased capacity, from the mine to the base of the mountain, 3,700 ft.; another tram 13,200 ft. in length, from the lower terminal of the smaller one over the range to the Everett & Monte Cristo railroad, 2,000 ft. of flume to furnish water-power for operating the large tram are all under contract to be completed October 15th. The new trams have a guaranteed capacity of 120 tons a day.

Among the improvements which the company contemplates for next season is a 75-ton concentrator, and a tram to the Hard-to-Beat claim east of and on the same vein as the Magus. The company owns a group of eighteen lode claims at the head of Williamson Creek, a branch of the Sultan River, also several mill sites at each terminal of the main tram. Mining operations and development work have been confined to the Mountain Ram, Magus, Dupree and Hard-to-Beat, all located on a true fissure in slate. The vein varies from 4 ft. to 18 ft. in width, and is traceable for over 18,000 ft. The gangue is mainly dark blue slate, veined with quartz and talc, and carries galena, white iron, gray copper, and ruby and brittle silver—a choice variety, as shown by smelter returns. There are three grades of ore, running about \$100, \$20 and \$8 respectively.

INDEPENDENT.—Six to 8 ft. a day is the progress made on tunnel No. 2 of this property, with the three-drill compressor plant recently installed. The mine is only 20 minutes' walk from the depot at Silverton. The vein is from 4 to 22 ft. wide, between walls of slate, with pay streaks varying from a few inches to 3 ft. wide, and is exposed for over 1,000 ft. The ore is a fine-grained white iron and iron sulphides in gray quartz, with an occasional pocket of galena. It ranges in value from \$10 to \$15 throughout, and concentrates from 8 to 12 into 1, with a saving of 85 to 90% of the value, which is principally gold. The pay streaks sample \$40 to \$130 per ton. Both No. 1 and No. 2 are adit tunnels, having a length at this writing of 80 and 450 ft. respectively. A new level for the double-track working tunnel, 130 ft. below No. 2, and near the base of the mountain, will be driven this winter. Plans have been prepared for a 50-ton concentrator, with provision for enlargement, to be erected next season at the mine. The water power which now operates the compressor plant will be increased to operate the mill. W. T. Nicholson, formerly with the Monte Cristo Mining Company, is superintendent of this mine.

MONTE CRISTO.—The upper terminal of the Pride tram is being removed down the mountain several hundred feet to what is known as the "new discovery," where a new level has been started, and from which point a winze is being sunk to meet the raise from Mystery tunnel No. 3. From 4 ft. to 6 ft. of galena and arsenical iron ore are exposed in both winze and raise. The Pride cook and bunk houses are being removed across the gulch, where they will be rebuilt as additions to the Mystery buildings. The force at the Pride-Mystery will be doubled as soon as the connection between the two mines is made, probably within 60 days. The diamond drill which has been prospecting the Monte Cristo Mining Company's Seventy-six mine at intervals during the past year has been removed to tunnel 3 of the Mystery, from which the I. X. L., a parallel claim, is being prospected.

PENNSYLVANIA MINING COMPANY.—The air drills are averaging 5 ft. a day on the double-track crosscut to the Foggy lode, which is expected to be reached about March 1st, 1898, barring accidents.

SPOKANE COUNTY.

PACIFIC MARBLE COMPANY.—Secretary Bliss has reserved the decision of former Commissioner Lamoreux of the general land office in the cases of the Pacific Coast Marble Company against the Northern Pacific Railroad, involving a valuable deposit of marble in the Spokane land district of about 120 acres. The secretary's decision is adverse to the railroad company and jeopardizes its title to lands formerly claimed under its grant which are valued at several million dollars. The question decided is whether the railroad company under its original grant can patent lands containing non-metalliferous mineral, such as marble, gypsum, slate and phosphates. Under the grant to the company it can patent lands along its line which do not contain gold, silver, cinnabar, lead, tin, copper "or other valuable mineral deposits." The company contended that marble is not mineral, and the controversy is over the possession of 120 acres of marble quarries, near Spokane, Wash. Other cases involving gypsum, marble, slate and other non-metalliferous minerals have been pending, awaiting the present decision. The ruling of the secretary is that marble and other non-metalliferous minerals are, properly speaking, minerals under the scope of the law, and are therefore excepted from land grants. The present decision is notable for the fact that Commissioner Lamoreux held only a year ago that marble and such deposits were not minerals, and under his ruling the Northern Pacific took out patents on large tracts of land. The original claimants of these lands will now undoubtedly sue the Northern Pacific for the properties. In the decision rendered mineral is defined as being "whatever is recognized as mineral by standard authorities on the subject, whether of metallic or other substances."

WEST VIRGINIA.

KANAWHA COUNTY.

PLYMOUTH.—Carver Brothers are making arrangements to resume work at these mines with a largely increased force. During the high water of last February the tippie was washed away, and since that time the mines have been closed down. Work has been begun on a new tippie to replace the one destroyed, and it is expected that work will be resumed shortly.

FOREIGN MINING NEWS.

AFRICA.

TRANSVAAL.

The gold output of the Witwatersrand mines for the month of August is reported at 259,603 crude oz., the highest yet shown in any one month. It is 3,074 oz. more than was reported in June. The total for the eight months ending August 31st was 1,890,313 crude oz., which compares with 1,470,803 oz. for the corresponding period in 1896, and 1,636,571 oz. in 1895. At the usual rate for Witwatersrand gold, the production for the eight months of this year was equal to 1,542,496 fine oz. gold.

ASIA.

INDIA.

COLAR GOLD FIELD, MYSORE.—The production of the mines in August was 33,085 oz. gold, the largest quantity ever reported in a single month. For the eight months ending August 31st the total output was 252,032 oz.; which compares with 208,440 oz. for the corresponding period last year. The production of the leading mines in August was: Mysore, 11,003 oz.; Champou Reef, 10,435 oz.; Nundydroog, 4,784 oz.; Ooregam, 4,617 oz.; Coromandel, 1,178 oz.

CANADA.

BRITISH COLUMBIA.

Certain interested parties have left for Ottawa to interview Hon. Mr. Sefton with a view to inducing him to reopen the old trail that runs from Quesnelle in the Cariboo District to Telegraph Creek on the Stickeen. From Ashcroft on the Canadian Pacific Railway to Klondike by this route would be 1,000 miles approximately, 350 of which would be by water down stream. If this trail were cleared out British Columbia ranchers could drive their cattle into Klondike. The British Columbia government is making a wagon road between Telegraph Creek and Teslin Lake. The petitioners will also ask that the government telegraph line be extended between Quesnelle and Telegraph Creek, giving direct communication with Stickeen; eventually it could be continued on to Klondike.

BRITISH COLUMBIA—AINSWORTH.

HIGHLANDER.—A 200-ton concentrating plant and tramway are being put in by the owners, the Messrs. Stevenson, of Philadelphia. Returns from the U. S. assay office, Charlotte, N. C., of Highlander, gave \$29.70 a ton in gold. Mr. Maxwell Stevenson is manager.

BRITISH COLUMBIA—ALBERT CANYON.

WAVERLY & TANGIER.—These claims were sold to John Grant and Grant Govern for \$75,000, the last of the purchase price being paid over August 1st. The new owners have 50 men working on a wagon road to the mines. The ore is gray copper and galena, assays of which are reported to have run as high as 1,500 oz. of silver to the ton, but it averages \$200 in silver and 6 oz. in gold. On the Tangier the men have driven a tunnel 15 ft. through solid gray copper and galena and have not struck the hanging wall yet. On the Waverly the ore runs an average of 150 oz. of silver and 2 oz. of gold. On the Waverly they have worked down 50 ft. The pay streak is 6 ft., which includes considerable concentrating ore.

BRITISH COLUMBIA—EAST KOOTENAY.

KOOTENAY COAL COMPANY.—The Montreal owners of the coal-fields in the Crow's Nest Pass are making arrangements for the speedy development of the same. Two of the directors, accompanied by two mining engineers of experience, are now busy among the coal seams, making surveys, preparing plans and fixing upon the places where actual mining operations are to commence. The directors who are there superintending these operations are William Fernie, Fort Steele, and Robert Jaffray, Toronto, president of the Globe Newspaper Publishing Company. The engineers are M. W. Blackmore, M. E., from Glace Bay, Cape Breton, and Mr. Ramsay, M. E., from Denver, Colo., engineers who have had wide experience.

BRITISH COLUMBIA—LILLOOET.

GOLDEN CACHE.—The mill has been built, but the tramway will not be ready for a few weeks, and until this is the case no ore will be put through the mill.

IDA MAY.—This claim, recently sold for \$20,000 to J. B. McLaren, of Ottawa, has been the cause of a great deal of attention being drawn to this district, and a large number of claims have been staked in consequence.

BRITISH COLUMBIA—NELSON.

HALL MINES REDUCTION WORKS.—The Hall Mines Smelting Company has had trouble with the Nelson Electric Light Company. Since the latter cut the circuit the works were in total darkness until the company installed a fine electric light plant of its own. But the smelting works cannot find water as easily, and there the light company has the upper hand. Everything is now running very smoothly under the management of Superintendent Headley. The Athabasca Mine has made another shipment to the Hall Mines smelter, this time 2,500 tons. The ore appears to increase in value. It is asserted that a number of the best men at the smelting works will follow Paul Johnson, the late superintendent, to Mexico.

BRITISH COLUMBIA—SLOCAN.

WAKEFIELD.—The only mine affected by the de-

cline of silver in the vicinity of Silverton will be the Fisher Maiden. The rumor that the Wakefield was to close down is denied by those in charge. They will employ in the neighborhood of 30 men continuously, and will be shipping all winter.

WHITEWATER.—More men are being taken on at this mine and the force will be steadily added to, as it is intended to have 90 men at work before the winter sets in. Although large shipments of ore have already been made, practically no ore other than that taken out in development has been shipped.

HILLSIDE.—A rich strike was made on the Hillside claim at Whitewater. In the incline shaft being sunk on the vein, at a depth of 10 ft., 6 in. of clean ore and carbonates and 2 ft. of scattered concentrating ore was found on the foot wall. The ledge, which is 18 ft. wide on the surface, is strong and well defined, and as the ore shoot is widening with every foot of depth great results are expected. A double shift will be put on and a 50 ft. crosscut started immediately. The shaft is within 1,000 ft. by an air line of the K. & S. track.

BRITISH COLUMBIA—WEST KOOTENAY.

(From Our Special Correspondent.)

A distinguished party of men of science headed by Dr. Dawson, director of the Geological Survey of Canada, recently visited the Trail Creek gold mines. The party comprised C. LeNeve Foster, Professor Royal School of Mines, London, England; Mrs. Foster and daughter; Mr. J. Scott Keith, Secretary Council Royal Geographical Society; Professor Crookshank and Mrs. Crookshank, of London; Sir George Robertson, a member of the Royal Geographical Society; Mr. T. Hudson Pearce and Mrs. Pearce, London; Dr. W. T. Blandford; Mr. Hugh Robert Mill and Mrs. Mill; Mr. E. H. Chapman; Sir Berdin J. Leech, a Manchester manufacturer, and Mr. Charles Darbyshire. The mines visited were the LeRoil, War Eagle, Center Star and Iron Mask. Dr. Foster said that he looked for a fine camp at Rossland, but he had not realized until then the possibility of the mines in Trail Creek.

ALBERTA.—This company, which until very recently has been running two drills, has temporarily suspended work. The surface showing is said to be very good. A tunnel has been run in on this property and also on the ground of the Iron Colt, a distance of 720 ft. The headquarters of the company is in Spokane, Washington.

CLIFF.—Work has been discontinued in the tunnels. Operations henceforth will be confined to the ore shoot about 250 ft. from the face of the tunnel on the upper level. Should the ore prove to be persistent the compressor will be started again. About 1,000 ft. of tunneling has been done on the property. Some of the richest copper ore in the camp has been turned out from the Cliff. The ore which has lately been shipped from this mine has so far averaged about \$23.00 a ton.

COLUMBIA AND KOOTENAY.—This company has suspended work, pending, it is said, the completion of the negotiations which have been going on for the purchase of the property. As this company's compressor furnishes power to the Iron Colt, that company has had also to suspend work for the present.

MONTE CRISTO.—This company, under the directions of Mr. George Pfunder, is pushing the development of the mine to the fullest extent. The main tunnel is now in Monte Cristo Mountain, a distance of 850 ft. The ore body is nearly continuous the entire distance of the tunnel. Near its face a winze has been sunk 25 ft. This winze is on ore which lies under the hanging walls without any indications of the foot wall. A crosscut is being made from the main tunnel of the Monte Cristo, through the Colonna ground. Two parallel veins of ore 2 and 3 ft. wide encountered in this crosscut, and the indications of striking the large ore body known to exist on the Colonna are stated to be favorable. There are on the Monte Cristo about 1,300 ft. of tunnel, winze, upraise and crosscut. The bottom of the winze is about 320 ft. below the surface of the mountain. Some fair grade ore is to be seen on the dump.

O. K.—A meeting of the stockholders of this company will take place in Victoria, B. C., September 27th. It is understood that the company will go into liquidation.

SILVER BELL.—This property has passed into the hands of Boston parties who are represented by Mr. J. A. Harrington and Mr. F. W. Connolly. They have leased the property for one year with the right of renewal. The Silver Bell comprises two claims, the Lone Jack and the Nancy Lee. Development work to the extent of \$12,000 was done on the Silver Bell under the previous manager, Mr. G. A. Pounder. There is a 100-ft. shaft and an engine, boiler, hoist and two drills. The vein so far shows gold, copper, and silver, though as yet no considerable mineral body has been encountered. Development work is to be vigorously pushed under the new management.

SILVER QUEEN MINING COMPANY.—Development work consists of about 165 ft. of tunneling, with an open cut of about 70 ft. The main lead is 14 ft. wide, and assay values have run as high as 400 oz. of silver. Fair gold assays have also been made from this property, but it is essentially a silver proposition.

NORTHWEST TERRITORIES—ALBERTA.

Some copper claims have been staked 25 miles north of Banff, on the eastern flank of the Rockies. They are said to assay 48% copper, \$16 gold and 40 oz. silver. The formation is limestone.

Referring to the coal discoveries now being developed by the Crows' Nest Pass branch of the Canadian Pacific Railway the *Lethbridge News* says: "This immense coal-field extends from the Crows' Nest Pass right down the Elk River and covers an area of not less than 144 square miles. These coal-fields have been visited and reported upon by Dr. Selwyn, C. M. G., late director of the Geological Survey of Canada, who makes the calculation that there are 49,952,000 tons per square mile. Even if one half of this is available there are in each square mile 24,976,000 tons. In reality inexhaustible. These coal lands are about the same altitude as the Canmore and Banff coal-fields in Alberta on the eastern slope of the Rockies, namely between 4,000 and 5,000 ft. The first great series of coal seams are not far from the west end of the Crows' Nest Pass, and are between Martin and Michael creeks, northern tributaries of the Elk River. Here there are no less than 20 seams of coal. They are seen one above the other, the outcrops being quite visible, stretching through gulches and along ridges right up to the summit. Fourteen of these seams are cannel coal. Three of them, the Peter seam, the William's seam and the Jubilee seam, are respectively 15, 20 and 30 ft. wide. The total width of the seams is 132 ft. After leaving these seams, and some distance away, there is another seam about four miles up Coal Creek, another tributary of the Elk River, near the mouth of a steep, rocky gully. This is a fine seam and is 7 ft. thick. The next great series of seams are in the Elk River valley, about seven miles from Coal Creek. The first seam is about 1,500 ft. up the mountain on the top of a broken-down cliff of massive sandstone. This seam is from 25 to 30 ft. thick, with a slate parting about 2 ft. Higher up, about 130 ft., on a similar broken-down cliff of sandstone, is another erect seam of 30 ft. thick. Then in close succession, not more than 100 ft. apart, are 10 other seams, three of which are 10, 15 and 30 ft. thick. The total thickness of these 12 seams is 148 ft. of coal as against 32 in Martin Creek area. The immensity of these coal-fields is scarcely known. Many of the seams are first-class coking coals, and others are good gas coal, but none of them, so far as known, are anthracites."

NOVA SCOTIA—CAPE BRETON.

(From An Occasional Correspondent.)

CAPE BRETON COPPER COMPANY.—Efforts are being made by two prominent Boston operators to float the stock of this company in London and Paris. It is said that they met with little success in the last-named city; in London the matter is not decided. This company owns the Coxheath mines, which were described in the *Engineering and Mining Journal* for October 10th, 1891.

ONTARIO—LAKE OF THE WOODS.

TRUMP.—A company composed of C. H. Reynolds, Robert Rea, Patrick Culligan and 15 other business men of Alpena, Mich., have, it is said, purchased the Trump mine near Rat Portage. They will at once develop the property. The reputed purchase price was \$50,000.

ONTARIO—MICHIPICOTEN.

The boundaries of the Michipicoten District, newly set apart, are as follows: On the east side, due north and south, a line passing through the east end of Dog Lake, being at or near the 84th meridian. On the west its coast line is on Lake Superior, extending from Cape Gargantua. This tract includes the whole Huronian area in the basin of Michipicoten River, an area which is roughly computed at 1,500 square miles and embraced in it are a number of granite areas whose mineral-bearing characteristics may deserve the careful attention of explorers.

ONTARIO—PORT ARTHUR.

BADGER.—No. 1 vein, which has been opened up by a 300-ft. shaft and about 2,500 ft. of drifting on six levels, has an average width of 2½ ft. The ore goes \$100 to the ton. No. 2 vein has about the same characteristics as No. 1 vein, and has been developed by a shaft 110 ft. deep and an adit level 600 ft. in length. No. 3 vein, or Porcupine mine, has a shaft 180 ft. deep and two levels of an aggregate length of 1,200 ft. The vein averages about 3 ft. in width. Besides the above there are three veins on the property, on which a small amount of development work has been done. The property is equipped with a good hoisting plant, and a 10-stamp mill, machine and blacksmith shops and about 40 houses.

RABBIT MOUNTAIN.—This mine lies 24 miles from Port Arthur. The vein averages 4 ft., the ore consisting of native silver and argentine, with much blende, and a little iron pyrites, galena and fluorite. It has been proved 800 ft. on the surface by trenches and crosscuts. Since opening in 1882, it has been worked in a spasmodic manner, having changed hands several times. A stamp mill of 15 tons daily capacity stands on the property. It is claimed that the free milling ore averages \$80 per ton. Over 400 ft. of sinking, 800 ft. of drifting and some stoping was done. There are four shafts, the deepest of which is 250 ft., and four drifts, the longest of which is 360 ft. Most of the best ore was taken from the 100-ft. level, or below.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, September 24.

Statement of shipments of anthracite coal (approximated) in tons of 2,240 lbs., for the week ending September 18th, 1897, compared with the corresponding period last year:

	1897.		1896.
	Week.	Year.	Year.
Pennsylvania Railroad.....	96,234	2,418,433	2,528,906

PRODUCTION OF BITUMINOUS COAL in tons of 2,000 lbs. for week ending September 18th, and for years from January 1st, 1897 and 1896.

	1897.		1896.
	Week.	Year.	Year.
Shipped East and North:			
Allegheny, Pa.....	41,699	1,714,091	1,659,558
Barclay, Pa.....	754	31,435	31,457
Beech Creek, Pa.....	169,291	2,673,892	2,071,398
Broad Top, Pa.....	9,024	319,495	255,964
Clearfield, Pa.....	76,126	3,329,919	3,314,900
Cumberland, Md.....	71,463	2,758,959	2,386,469
Kanawha, W. Va.....	*	3,219,254	2,158,246
Phila. & Erie.....	1,788	189,689	55,273
Pocahontas Flat Top.....	*	*	2,421,255
Totals.....	270,145	14,127,737	14,354,511

	1897.		1896.
	Week.	Year.	Year.
Shipped West:			
Monongahela, Pa.....	6,130	767,379	911,498
Pittsburg, Pa.....	42,937	1,363,443	1,367,447
Westmoreland, Pa.....	80,227	1,546,802	1,358,463
Totals.....	129,294	3,677,554	3,637,408

Grand totals..... 399,439 17,805,291 17,991,919
Production of coke on line of Pennsylvania Railroad for the week ending September 18th, 1897, and year from January 1st, 1897, in tons of 2,000 lbs.: Week, 90,351 tons; year, 3,200,206; to corresponding date in 1896, 2,971,163 tons.

* For week ending September 14th. * Returns not received.

Anthracite.

It appears probable that the price of anthracite coal will be advanced on October 1st by at least 25c. The sales of 1896 were about 43,000,000 tons, and the sale of the present year will probably approximate closely to that figure, though the amount handled so far is some 2,000,000 tons less than that at a corresponding season last year. The coal companies consequently expect to get a better price for the coal they sell until the end of the season than for that they have sold during the earlier part of the year, owing to a livelier demand. It is claimed that the restrictions of the output have been so great during the summer that the natural demand will certainly stand a large supply. It is well known that stocks of hard coal now in the dealers' hands are far below what they should be to tide them over the winter.

However, many of the leading men in the coal trade believe that prices should not be raised, that if there is going to be a very lively demand it should be met if possible without any rise in the price, as they foresee an ever-increasing competition on the part of the electric and gas companies, and think the only way to meet it is to keep down the price of hard coal.

Cold weather is stirring matters, though cars are so scarce that it is not likely operators can fill orders. The upper lake trade seems to be in the worst fix, for in addition to the difficulty in getting the coal away from the mines there is even greater difficulty in moving it from the receiving ports.

Strange as the statement may seem, the prosperity of the anthracite trade seems to be indissolubly tied up with the future of the detached house. If you take enough people to fill a big hotel, or tenement house, you can warm them one furnace, that may be fed with a mixture of soft coal and anthracite screenings, while on the other hand should every family have a detached home requiring warming in winter a much larger demand for anthracite must continue. So clearly do some of the larger firms see this that they declare that all interested in the increased use of anthracite should make it a point to support by every means in their power the trolley lines that enable the working man to get out of the confines of the city and to own a home.

Severe as is already the rivalry between anthracite and gas, it has not yet reached the intensity it is likely to reach in the near future. When chestnut coal was cheap as compared with other sizes invention was stimulated, and the base-burning stove, to consume that particular size, was the result. The demand thus caused sent the price of chestnut up until it became as high as stove, something that happened first in the year 1883; and there being then no further reason why it should be exclusively employed in base-burners, these were constructed capable of using advantageously other sizes, and even—though this invention came later—high-class bituminous coals. As the farmer became wealthy he reached out for more luxuries and the nickel-trimmed base burner for the "best room," became as indispensable as the piano or melodion. This made flourishing times for the anthracite operator, but when the farm became less attractive than the city, and men and women began to herd in the flat-house and the tenement, the demand became less satisfactory, until it looks as though the trade might be permanently affected.

We quote prices as follows: Broken, \$4; egg and chestnut, \$4.25; stove, \$4.50 per ton alongside New York.

Bituminous.

The Atlantic soft coal trade is quiet. Stocks of coal on hand, which consumers were induced to lay in during the strike in the Pittsburg and other regions, have not been used up yet, and consequently they are not inclined to order more while such stocks last, especially as there are no further inducements, such as lower prices or lower ocean freights. Indeed, we understand that prices are stronger if anything than they were, without, however, having advanced since our last quotations.

There seems to be no progress to report in the project outlined in the last issue of the *Engineering and Mining Journal* regarding an increase of price by individual understanding between various grades, but from present appearances the chances of its going into effect on or about October 1st seem good—on one or two grades at least. It certainly would seem a shame if something could not be done to raise prices in the soft coal trade, in which the year's small margins will deduct heavily from the profits of the railroads and the coal producers. In too many cases it is probable that the producers have received as profit an amount much less than the commission man receives.

The far East is very quiet. More trade than is usual was closed up on contracts in this territory this year than has ever been the case before, leaving but little trade to be picked up during the remainder of the season. The extremely low prices named at the beginning of the season on contracts, on which the consumer recognized there was little or no margin for further reduction, was the cause of contracts being so heavy.

The Sound business is fair; some coal is going forward both from the lower ports and from the New York Harbor shipping ports on this trade, it being a toss up from which locality it should be shipped as ocean freights from the lower ports are at a figure that makes the delivered coal cost about the same in either case. New York Harbor trade is fairly good, consumers taking a reasonable amount of coal, and it does not seem that they are overstocking themselves, as it is apparently being used up in the regular course of consumption.

All-rail trade is active. Tonnage is keeping up to about the usual amount, though it is thought that it is not quite as regular as usual; but this is, after all, a small matter, as the days of heavy shipments offset those that are light.

Transportation from mines to tide is slow, but yet is an improvement on the condition of affairs last week. Coal generally, it is thought, is now on an average from 24 to 48 hours longer in getting through than it should be, according to the timetable. Car supply is not as good as usual, and embargoes are upon certain points on foreign roads off the main lines.

The coastwise vessel market is normal. Vessels are in fair supply and are seeking business outside the soft coal trade, and moreover are showing themselves able to procure it to a larger extent than was anticipated. This feature is probably the cause of the ocean freight market not having fallen off, as, although in particular cases 5c. has been granted off the current quotations, yet the market is steady at the rates given out.

We quote rates of freight from Philadelphia as follows: To Boston, Salem, Portland and Wareham, 70c.; Providence, New Bedford and Sound, 60c.; Lynn, 75-85c.; Newburyport, 80-85c.; Portsmouth, 75c.; Bath & Bangor, 70-75c.; Dover, 90c. and towages; Saco, 70c. and towages; Gardner, 70c. and towages.

From 5c. to 10c. must be added to these rates for the further lower ports.

Buffalo.

Sept. 23.

(From Our Special Correspondent.)

The anthracite coal situation remains unchanged; business is only moderate at unvaried quotations. The extreme warm weather changed last Monday to cold, with thermometer at 42°; since slightly warmer.

Bituminous coal is fairly active and prices a shade lower. Stocks ample for all demands of manufacturers and vessel owners have no difficulty in obtaining supplies.

Lake freights continue to rule low, with apparently no prospects of an advance yet. The movement is a shade larger the past week than the one preceding it. Many vessels leave daily light for upper lake ports.

Coke in good demand and steady. The shipments of coal westward by lake from this port for the week ending September 18th inclusive aggregated 60,274 net tons, distributed as follows: 19,300 tons to Chicago, 8,850 tons to Milwaukee, 4,800 tons to Duluth, 3,070 tons to Toledo, 4,900 tons to Superior, 1,400 tons to Gladstone, 750 tons to Bay City, 100 tons to Tawas Bay, 2,000 tons to Green Bay, 350 tons to St. Clair, 179 to Pentauquishene, 5,000 to Manitowoc, 3,975 to miscellaneous ports, 1,400 tons to Escanaba and 4,200 tons to Ashland. The rates of freight were 20c. to Chicago, Duluth, Milwaukee, Toledo, Superior, Gladstone, Manitowoc, Escanaba and Ashland; 25c. to Green Bay, St. Clair, Bay City and Sault Ste. Marie, 28c. to Portage; 50c. to Ludington and 40c. to Traverse City. Closing quiet and steady.

Chicago.

Sept. 22.

(From Our Special Correspondent.)

Anthracite.—Hard coal continues to be bought in very small quantity, though the cold weather has increased the sales slightly. There is a little more coal being moved on former contracts and the out-

look appears to be rather better. Dealers are awaiting the advent of cold weather, for it appears that the market's only stimulus can be freezing temperature. There appears to be plenty of hard coal in town, though any sudden demand would undoubtedly decrease the supply to a point wherein a shortage might occur. Prices on hard coal are yet liable to weakness and are, for grate, \$5.35; egg, stove and chestnut, \$5.00.

Bituminous.—Soft coal is not so plentiful as it was a few weeks ago and in consequence prices are firmer. There have been cases where buyers have had to look about the market considerably before being able to gather together the amount of coal that they wanted. General business, however, remains on a par with the previous week, buying continuing in small quantities indicating that consumers are still hesitating about placing their contracts for usual supply of soft coal.

Pittsburg. Sept. 23
(From Our Special Correspondent.)

Coal.—Notwithstanding the strike is reported over there is a good deal of dissatisfaction at many points. There is a large class of people who are never satisfied unless they are engaged in a row of some kind. Some of the operators on the Monongahela are taking an independent position relative to the striking miners. A large operator remarked: "Although there is a good demand from down the river markets, we could not ship if we had the coal, and the Lake demand for coal will soon decrease. We have posted a proposition to our miners, and if they do not care to accept it they can remain idle just as long as they please." The miners at the Scott mines on the Youghiogheny River are holding meetings and have not gone to work yet. The diggers at the O. I. C. mine of W. I. Steen and those of the Mansfield Coke and Coal Company also refuse to go to work at the price fixed.

Alabama coal is driving Pittsburg out of the New Orleans, and Illinois operators have captured the St. Louis, market. Since the Kanawha field has been so well developed, Pittsburg River coal is losing its hold in Cincinnati, and Louisville and Pittsburg operators are compelled to sell at the price coal is mined at. The Illinois operators have been at work on the railroads to decrease the freight rates to St. Paul and Minneapolis, so as to capture that part of the trade now held by Pittsburg, owing to cheap lake transportation. Lake shipments have been resumed. The miners generally seem dissatisfied, and are talking about a further advance January 1st.

Coke.—A coke boom has arrived, and all indications point to a large trade; the active list of ovens now exceeds 12,000 in blast, being a gain of over 3,500 tons. Demand for coke was lively and shipments were away beyond expectations. The week was the liveliest coke trade of the year.

At Greensburg, Pa., the new Bagaley Coke Company's plant, erected by Pittsburg people near Youngstown, fired up 100 ovens. The contractors have just completed 275 ovens; on Tuesday work was begun on 125 more ovens. The company has over 1,000 acres of choice coking land, and is now negotiating for 750 acres adjoining the new works. Orders have been received for firing 60 ovens at Trotter and 200 more by the H. C. Frick Company. At Scottdale the Tip-Top coke plant resumed operations after being idle for three years and will give employment to 150 men.

The week's summary shows 12,001 ovens in blast with 6,651 idle. In the running order of the ovens in blast, 4,851 ovens made six days, 6,665 ovens five days, 249 ovens four days; 186 ovens two days, and 50 ovens, Semet Solvay plant, seven days, an average of 5.33 days. The increase over the preceding week's shipments is 553 cars. The week's shipment from the region run as follows: Shipped to Pittsburg, 3,230 cars; shipped west, 3,230; sent east, 1,150 cars; total, 7,610 cars.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Sept. 24, 1897.

Pig Iron Production and Furnaces in Blast.

Fuel used.	Week ending		From Jan., '96.	From Jan., '97.
	Sept. 25, 1896.	Sept. 24, 1897.		
Anthracite.	31	18,050	22	13,150
Coke.....	55	108,180	118	168,275
Charcoal...	23	6,420	21	4,625
Totals.....	119	132,550	161	186,050
			6,978,679	5,795,376

Developments in the iron trade have been rapid during the past week, and from all quarters there is reported an increase in orders, which warrants the belief that a period of activity has begun. In fact there are signs of a boom, though the wiser heads in the trade rather deprecate anything of the sort, and would prefer to see a more gradual and steady improvement, which is likely to be free from the reaction which certainly follows a booming market.

It is certain that the manufacturers of finished products now see plenty of orders ahead, and that they are buying raw material very liberally. The rush has been for steel billets and they are now selling for \$16 to \$16.50 at Pittsburg, or nearly \$2 more than the price two months ago. The active demand has naturally put up the price of Bessemer pig, and large transactions in iron of that class are

reported, at an increase of 50 or 75c. per ton at Pittsburg and Valley furnaces. Forge pig is also in good demand and large sales are reported. Foundry irons are quieter, and no great gain in prices can be reported. Apparently the foundries have not yet felt the boom, and are waiting for more orders to come in before filling up their stock-yards.

The activity is most marked in the West, the central point being in Pittsburg. The mills in the East are much quieter, though most of them are fairly busy. In Western Pennsylvania it is reported that some of the large concerns have more orders for short delivery than they can handle, and have been obliged to give out work to smaller concerns in order to keep up with their contracts.

A general rise in prices seems pretty sure to come. Increases have been made in a tentative way, since many are still doubtful as to the permanence of the improvement, and prefer to wait developments. In pig iron and steel billets we have already noted the improvement; finished products are still selling at low prices, but the greater cost of raw material will soon compel increases in other departments.

The Southern furnaces continue active and report a large business. A transaction noted this week is a sale of 10,000 tons of Alabama forge pig to a concern in the Mahoning Valley, on a basis of \$6.75 at furnace. This is the first sale of Southern iron in this district for a long time.

The market is still rather uneven, and the improvement is not uniform by any means, but iron men generally are hopeful for the future, and it begets to look as if they had some reason for their confidence.

New York. Sept. 24.

The local iron market continues to improve; orders are increasing and prices tend upwards. The encouraging reports from the West have stimulated business conditions in the East, and at the present there is a satisfactory outlook for the remainder of the year. In several lines higher prices have been asked this week, while in others there is a strong indication that quotations will advance.

Contract work is still small in volume in this city and neighboring towns. The Westfield, Mass., contract for 2,300 tons of cast-iron pipe was awarded to the Warren Foundry and Machine Company. The New Britain, Conn., contract is still pending. The Renova, Pa., contract for 415 tons cast-iron pipe has been awarded to the Jackson & Woodin firm of Berwick, Pa., at \$19.95 per ton.

In bridge work but few contracts can be mentioned. On September 16th bids were opened by the Department of Public Works in this city for the construction of a bridge over the Harlem River, between First and Willis avenues, and the lowest bidder was the firm of Foley & Co., of Philadelphia, who are understood to have received the contract at \$1,026,684. There were 16 bidders in all for this work. Messrs. Thielman & Smith were the lowest bidders, at \$10,096, for constructing a temporary bridge and approaches across the Bronx River, near Westchester avenue. Two small steel bridges on Staten Island have been let to Charles A. Winant at \$1,150 and Philip Wolf & Son at \$1,597. The town of Fulton, N. Y., is asking for bids until September 28th for the construction of a bridge over the Oswego Canal. Bids are also being asked until October 21st for an iron bridge with stone foundation at Toms River, N. J. The Commissioners of the East River Bridge a few days ago opened the bids received for the anchorage of the new structure. For the Brooklyn side the lowest bidder was John T. O'Brien at \$687,621, and for the New York side, Shanley & Ryan at \$716,770.

Much work is looked for in structural material, and architects are understood to be planning several good-sized buildings for New York. It is roughly estimated that this work will consume about 40,000 tons of material.

There has been a large sale of hoops this week, aggregating 5,000 tons; prices not named.

Our export business continues to expand, and some rather heavy shipments of machinery and like material have been made this week. Germany will receive a quantity of metal-working and drilling and electrical machinery, valued at about \$22,000; Vienna, Austria, \$1,100 worth of metal-working machinery, and Malmo, Sweden, \$2,950 worth of the same kind of machinery. To England we note there were shipments this week of 20 tons of pig iron and 895 kegs of nails. There were also shipped 100 tons of pig iron and 200 casks of hardware, valued at \$3,812, to Adelaide, Australia; \$5,600 worth of steel billets to Antwerp, Belgium; \$1,272 worth of old iron rails and a quantity of scrap iron to Genoa, Italy, and \$2,100 worth of old iron material to Berlin, Germany.

Many inquiries for iron and steel from Japan are in this market. Contracts taken here recently include 6,000 tons of rails and four carloads of track fastenings. Shipments this week to that country consisted of \$9,300 worth of steel rails, \$3,740 worth of railroad material and 302 kegs of spikes. The large contract for bars and plates, aggregating about 900,000 lbs., will, we understand, be closed between October 15th and November 1st.

Some satisfactory orders are said to have been closed for street railway supplies for electric lines in Madrid and Barcelona, Spain; Dublin, Ireland, and in other places. Bids are being made on six 800-H. P. tandem compound engines for the last-named place, Brill trucks and five 750-H. P. Allis

engines have already been purchased for Madrid and Barcelona. Contracts have also been taken for 160 electrical motors and five 50-Kw. generators. It is claimed that about \$1,500,000 will be expended. A delegation of engineers and tramway officials are visiting this country for the above mentioned purpose. The party consists of A. Dickinson, consulting engineer for the Madrid and Barcelona roads; George Fleet, joint managing director, and Walter Rutherford, manager of the electrical traction department of Dick, Kerr & Co., London, and William Anderson, manager of the Dublin Tramway Company.

The Central and South American States have made small purchases of hardware and nails this week. Among the other shipments from New York there were \$2,500 worth of railroad material to Callac and a quantity of locomotive material to Colon. Mexico will receive a quantity of railroad material and \$3,700 worth of iron pipe, and also an engine of about 600-H. P. for electrical purposes which has already been contracted for. Orders were also recently taken for four 600-H. P. engines for Buenos Aires, to be used in electrical work. A few days ago there was an inquiry in the New York market for from 5,000 to 6,000 tons of steel rails to go to the Argentine Republic, but as there were no specifications the inquiry was returned for further particulars. Mining machinery has been ordered for Peru this week. Ocean freight rates are still high, and in some instances vessel owners will not charter goods at even the present figures.

Pig Iron.—The business here is looking up much better than for some time past, and orders are more numerous. In Southern iron there continues a scarcity of some grades, and a report from Birmingham states that furnacemen there are purchasing warrant iron in order to make deliveries for immediate wants. The Eastern Pennsylvania furnaces also report a discounting stock, and it is intimated that prices will soon be advanced at this end. Quotations are: Northern No. 1 X Foundry, \$11.50@12 per ton; No. 2 X foundry, \$10.75@11; No. 2 plain, \$10.50@10.75; gray forge, \$10.25@10.50; Southern No. 1 Foundry, \$11@11.25 per ton; No. 2 foundry, \$10.50@10.75; No. 1 soft, \$11@11.25; No. 2 soft, \$10.75@11; gray forge, \$10@10.25; Basic, \$10.50@10.75. All prices are for tidewater delivery.

Cast Iron Pipe.—Orders are small, and prices unchanged.

Spiegeleisen and Ferro-Manganese.—Quotations are: Spiegeleisen, 20%, \$19@19.50; ferro-manganese, 80% domestic, \$45 50@46, delivered at buyer's mill.

Steel Billets and Rods.—This market continues fairly active. Quotations are \$17.50@18 for billets at tidewater and \$22@22.50 for rods at mill.

Merchant Iron and Steel.—The trade in merchant material continues steady, and a few changes are noted in prices. Quotations are: Common bar, 1@1.05c.; refined, 1.10@1.15c.; soft steel bars, 1.15@1.20c.; steel hoops, 1.30@1.35c.; steel axles, 1.40@1.60c.; tire steel, 1.05@1.10c.; spring steel, 1.35@1.40c.; links and pins, 1.50@1.60c.; cotton ties, 58c. per bd. at mill.

Plates.—Business is improving. We quote for universal mill plates 1.17½@1.20c. For steel plates prices are: Tank, 1.17½@1.20c.; boiler shell, 1.25@1.30c.; flange, 1.35@1.40c.; firebox, 1.60@1.75c., and 2.25@2.50c. for locomotive firebox, according to quality. Charcoal iron plates are 2.25c. for shell, 2.75c. for flange and 3.25c. for firebox. Rivets are 2.25@2.50c. for iron and 1.75@1.85c. for steel. Prices are for tidewater delivery in large quantities.

Structural Iron and Steel.—This market continues unchanged, and the orders taken are principally for small lots. We quote for angles, 1.15@1.20c.; tees, 1.25@1.35c.; channels, 1.15@1.25c. The price of beams, New York delivery, is 1.15c. for ordinary sizes, 1.20c. for 20-in., and 1.25c. for 24-in., carload lots.

Steel Rails and Rail Fastenings.—Business is better. Quotations for steel rails are \$19@20 per ton for standard sections and \$23 for girder rails. Lighter rails are figured on by reliable concerns as follows: 16-lb., 20-lb., 25-lb., 30-lb. and 35-lb., \$22; 40-lb. and 45-lb., \$20 f. o. b. mill.

Tidewater quotations for rail fastenings are: Angle bars, 1.05@1.10c.; spikes, 1.40@1.50c.; bolts, 1.75@1.85c.; square nuts, 1.80@1.85c.; hexagon nuts, 1.90@1.95c.

Wrought-Iron Pipe.—Business continues fair at unchanged prices.

Nails.—Wire nails continue in active demand, but sales are lessened in volume, owing to the high prices which rule. Carload lots are quoted at \$1.45 @ \$1.50 f. o. b. mill and \$1.56 on dock at New York. Smaller quantities from store are quoted at \$1.65. Cut nails are in fair demand at unchanged prices. Base quotations for carload lots are \$1.33 delivered at New York; \$1.31 at Philadelphia; \$1.35 at Boston; \$1.30 at Baltimore; \$1.33 at Albany, and \$1.27½ at Buffalo. Small lots at New York are quoted at \$1.43@1.45 from store.

Old Material.—The market is increasing in activity, and prices generally are firmer. Sales reported are: 200 tons of yard scrap at about \$10.75 per ton, delivered to vessel at New York; 800 tons railroad scrap at \$12@12.50 per ton, delivered at buyer's mill; 1,500 tons steel tee rails at \$9.50 per ton, delivered f. o. b. cars at Jersey City; 500 to 700 tons steel street rails at about \$10 per ton, same delivery, and 2,000 tons street rails, side and center bearing,

Sales are also reported from the Central West of about 2,000 tons of old iron rails at \$13.50@14 per ton, delivered at buyer's mill.

Buffalo. Sept. 22.
(Special Report of Rogers, Brown & Co.)

Local furnaces report having booked heavy tonnage in this vicinity and farther east, which has naturally caused a firmer feeling. The noticeable scarcity of some grades of Southern iron has been the means of additional orders being placed for soft iron with those furnaces who can furnish early shipment. The general market is strong and firm for all kinds of pig iron. The prices mentioned below are minimum and apparently those below which no furnace is willing to go. We quote below on the cash f. o. b. cars Buffalo: No. 1 strong foundry coke iron, Lake Superior ore, \$11.25; No. 2 strong foundry coke iron, Lake Superior ore, \$10.75; Ohio strong softener No. 1, \$11.40; Ohio strong softener No. 2, \$10.90; Jackson County silvery, No. 1, \$11.75; Southern soft No. 1, \$11.75; Southern soft No. 2, \$11.25; Niagara malleable, \$10.50.

Chicago. Sept. 22.
(From Our Special Correspondent.)

Pig Iron.—The demand for pig iron has fallen off somewhat, sales having been quite numerous, but in quantities not so large as during the past few weeks. Higher prices and the fact that the furnaces are about filled up with orders has prevented any very large business being transacted. There has been a great deal of iron bought during the month of September, the buying having been distributed quite evenly between both the Northern and Southern furnaces. Foundries show that business is greatly improved with them, for they are calling for iron faster than contracts required. They are also in the market for supplies beyond their contracts because of the rapid increase of their business. Prices are holding firm at the advanced schedule, and it looks quite probable that no further increase will be made at the present time: Lake Superior charcoal, \$13@13.25; local coke foundry No. 1, \$11@11.50; No. 2, \$10.50@11; No. 3, \$10.25@10.50; local Scotch foundry No. 1, \$11.50@12; No. 2, \$11@11.50; No. 3, \$10.50@11; Southern coke, No. 1, \$11@11.25; No. 2, \$10.50@10.75; No. 3, \$10.25@10.50; Southern No. 1, soft, \$11@11.25; No. 2 soft, \$10.50@10.75; Southern silveries, \$10.60@10.75; Jackson County silveries, \$12.50@14.50; Ohio strong softeners, \$12@12.25; Alabama car wheel, \$15.50@16; Malleable Bessemer, \$10.75@11; Coke Bessemer, \$11.50@12.

Bar Iron.—Business has fallen off somewhat during the past week, though several fair-sized contracts were placed. The car works are still buying large quantities of bar iron and indications point to their continuing to do so. Prices are firm, and are: Common iron, 1'10@1'15c.; guaranteed, 1'20@1'25c.

Steel Rails.—There remains a good demand for both the heavier and lighter sections of rails. The local mills are pretty well filled up for the balance of this year, but they continue to book orders. Indications are that some of the prominent railroads will place large contracts for rails in a short time. Rails are still quoted \$19@21 Chicago.

Billets and Rods.—There are plenty of inquiries for both billets and rods, but the local mills are so filled with orders that it is quite impossible to obtain either for early delivery. Prices on both keep on increasing and now are: Billets, \$17.50@18; rods, \$24.

Structural Material.—Business continues fairly active in both bridge and building shapes. A few small railroad bridges have been let during the week. There is now considerable bidding being done on the Drainage Canal work, where a number of bridges will be constructed. Prices in structural material are firm and are: Beams and channels, 1'15@1'20c.; angles, 1'10@1'15c.; tees, 1'30@1'40c.; plates, 1'10@1'15c.

Cleveland. Sept. 22.
(From Our Special Correspondent.)

Iron Ore.—The transactions in ores during the past week have been lighter than for several weeks. However, there has been some business done, but no large sales have been reported. The market is firm, and in several instances the ore companies have been asking slight advances over the prices fixed at the beginning of the season, to make good the advanced lake freight rates. The lake freight rates quoted two weeks ago still obtain: 55c. from Escanaba, 60c. from Marquette and 70c. from the head of the lakes. Following are the ore quotations: Specular and magnetic ores, Bessemer quality, \$3@3.75; specular and magnetic ores, non-Bessemer quality, \$2.50@2.75; hematite ores, Bessemer quality, \$2.50@3; hematite ores, non-Bessemer quality, \$2@2.50.

Pig Iron.—Much activity has been apparent on the market during the past week. In fact, there seems to be a resumption of business in pig iron. On account of the increased demand for many of the varieties, the quotations have advanced. They follow: Lake Superior charcoal, \$13.25; Bessemer, \$10.50@10.75; No. 1, strong foundry, \$10.75@11; No. 2, \$10.25@10.50; No. 1, Ohio Scotch, \$11.15; No. 2, \$10.65; gray forge, \$9@9.25.

Philadelphia. Sept. 21.
(From our Special Correspondent.)

Pig Iron.—Influences in Western markets have had more to do with the strong tone and upward tendency of our market than local influences. A

large amount of pig-iron business has been done this week, and we look for another good week. The advances made do not appear in the quotations, except for forge, so we have to accept these advances on faith. Higher prices are certainly being asked, but the anxiety to sell and keep in the swim leads sellers to weaken when it comes to the point. One or two big sales of basic iron have been made. Forge brings up the rear. Foundry is quite active. Bessemer is firm. Buyers are feeling their way. Quotations are: No. 1 X Foundry, \$12@12.50; No. 2 X foundry, \$11@11.50; No. 2 plain, \$10.75@11; ordinary forge, \$10@10.25; standard, \$10.50; Bessemer, \$12.50.

Steel Billets.—A sudden but not unexpected jump occurred in prices. Work in mills where billets are worked up has rather suddenly increased. The sudden and heavy demand in the West has precipitated heavy buying here. The price asked is \$18.75. To-day \$18.25 was refused, and mill agents have refused in two or three cases to negotiate for deliveries for 1898 until further advised by their principals. There is talk of \$19 being the price for next year's deliveries.

Merchant Bar.—While all mills and stores are selling a good deal more iron there are no advances in prices worth noting. Country mills have shared this week in the general activity, but there is surprisingly sharp competition, which enables buyers to get refined iron at 1'10 and probably lower, though in a small way more is paid.

Sheets.—The sheet iron makers now feel perfectly safe in piling up stock for the winter. The mills are booking a great deal of quick-delivery orders at quite remunerative prices.

Pipes and Tubes.—Business at the mills has improved, particularly for boiler tubes, and prices all around are a trifle better than two weeks ago for quick deliveries. There is less willingness to take late deliveries at low rates. Altogether the pipe situation is decidedly improved.

Merchant Steel.—A sharp increase in retail sales since Monday has been reported, and prices are quite firm. Shop work calling for merchant steel is crowding in at a lively rate.

Plate and Tank.—Manufacturers want the fact to be understood that there is a great deal of business within reach, and that they are not particularly anxious to take it on buyers' terms. Be this as it may, the plate mill people are doing an excellent business and have a right to look for large winter orders. Buyers and contractors are more anxious to place winter business, but they hang back when asked to pay more. Boiler shops are having a good run of work and this is reflected in mill orders. Tank is 1'15c.; Universals, 1'20c.; flange, 1'30c.; firebox, 1'50c.

Structural Material.—A steady run of rather small orders is reported this week at full prices. Angles are 1'20c.; beams and channels 1'25c.

Steel Rails.—Small orders are coming in faster and prices are firm.

Old Rails.—Old rails are a trifle higher and as they advance more of them sell. Brokers report good prospects for large sales soon. Old steel rails are \$11.

Scrap.—Scrap is disappearing faster than at any time this year. All kinds are being taken, and generally at good prices, though any attempt to make a positive advance would send buyers elsewhere. Most yardmen feel it is better to let stuff go now than there is a chance. Some railroad scrap brought \$12 this week; machinery cast \$10; heavy steel scrap, \$11; old iron axles will bring \$13@13.50; car-wheels, \$9.50.

Pittsburg. Sept. 23.
(From Our Special Correspondent.)

The volume of the transactions in iron and steel products continues large. Prices remain firm, with a further advance. Reports from the West and South are exceedingly strong, with large transactions and a higher range of values. Consumers seem to realize the fact that they have a large amount of orders booked for work to be delivered the present year, with about three months to complete the same. The steel trade is improving just as it should—not too fast, as that would be injurious; but prices and demands are far better than they have been during the past year. The improvement is especially noticeable in the increased orders for finished material which are coming from all quarters. The big coal strike may have been instrumental in causing the advance in prices, but in the main the demand for finished material has been the tonic, increasing the price. The prospects for a busy fall and winter season are good. Tin-plate has been a beneficiary by the turn in the tide and prices have advanced.

New mills at various points are in contemplation and every mill in the country seems to be doing double time. Pipe mills have a greater percentage of orders than any other branches of trade, and although the price has been advanced still orders continue to drift in. The pipe mills have been the first to share part of their gains with the workmen; the movement is expected to become general. For steel billets the market is firm and advancing; sales last week were 10,000 tons at \$16; one sale at \$16.15. These are the highest prices obtained since April 10th. The present advance on pig iron and blooms will start all the idle plants in the country. The weekly output has increased to 122,450 tons. Muck bar is firm, advancing; sales

4,600 tons. Wire nails continue firm with active demand; a further advance has been made, and the mills are all busy. Steel rails are firmer and are now held at \$19 cash at mills, which are all busy on previous contracts. Sheet bars are in active demand with a firm market; sales \$17.50@18.50 at makers' mill.

Old rails are scarce, with a good demand, and prices continue to advance; the same may be said of all kinds of scrap material.

Latest.—The market for iron and steel products is very firm at a further advance all round. Steel billets advanced with sales at \$16@16.50, the highest price for many months. Bessemer pig at Pittsburgh is \$10.65, with \$11 asked and sales large. Valley Bessemer is \$10@10.25 and advancing. Steel wire rods advanced to \$23.50@24. Sheet bars advanced to \$18.25@18.50. Producers are now masters of the situation all along the line. The hoop-iron manufacturers held a meeting on Tuesday night and advanced hoop iron \$3 a ton. Mill iron and foundry pig have further advanced 50c to 75c a ton. We could name iron brokers that 10 days ago were large sellers, but are now in the market as buyers.

COKE SMELTED, LAKE AND NATIVE ORE.		SKELP IRON.	
Tons.	Cash.	Tons.	Cash.
10,000 Bess., O., J., P.	\$10.65	2,000 Shred, S. O., P.	\$1.35 4m.
10,000 Bess., S., J., Val.	10.15	500 Sheared, Pitts.	1.35 4m.
8,000 Bess., O., J., P.	10.25	500 W. G., Pitts.	1.20 4m.
8,000 Bess., N., F., P.	10.65	500 N. G., Pitts.	1.20 4m.
5,000 Bess., S., O., Val.	9.95	SKELP STEEL.	
5,000 Bess., O., J., Val.	9.85	1,000 W. G., Pitts.	1.00 4m.
5,000 Bess., O., N., Val.	10.00	1,000 N. G., Pitts.	1.00 4m.
4,000 Mill I., S., Pitts.	9.25	850 Sheared, Pitts.	1.10 4m.
4,000 Bess., O., Val.	9.95	SHEET STEEL.	
3,000 B., O., N., D., V.	9.95	2,000 Delivered, Pitts.	\$18.25
3,000 Mill I., O., J., P.	9.40	800 Delivered, Pitts.	18.50
3,000 Bess., S., Val.	9.00	800 Delivered, Pitts.	18.50
3,000 Mill I., O., N., P.	9.65	STEEL WIRE-RODS.	
3,000 Bess., O., Val.	9.90	2,500 Delivered, Pitts.	\$23.00
3,000 Bess., N., Val.	9.85	1,000 Delivered, Pitts.	23.50
2,000 Mill I., O., Pitts.	9.15	BLOOMS, BILLETS, BAR ENDS.	
2,000 Bess., J., F., V.	9.85	1,000 Billet ends, Pitts.	\$10.75
2,000 Mill I., O., Pitts.	9.50	OLD RAILS.	
2,000 Bess., O., Val.	9.75	1,000 I. R., gr., Pitts.	\$14.50
2,000 Mill I., D., Pitts.	9.50	500 I. R., gr., Pitts.	15.00
2,000 Mill I., D., Pitts.	9.50	450 I. R., gr., Pitts.	14.75
500 No. 2 F., P.	10.50	SCRAP MATERIAL.	
500 Mill I., spec., P.	9.30	1,000 No. 1 W. S., gr., P.	\$12.00
500 Bess., this yr., V.	10.40	350 W. T., gr., Pitts.	6.75
500 Mill I., p., Pitts.	9.50	300 No. 1 W. S., net, P.	12.00
500 Mill I., p., Pitts.	9.50	250 No. 1 W. S., net, P.	12.00
500 Mill I., p., Pitts.	9.50	200 C. B., gr., Pitts.	5.75
BLOOMS, BILLETS, SLABS.			
5,000 Bill., O., J., mill.	16.25	CHARCOAL.	
5,000 Bill., N., D., mill.	16.50	500 No. 2 L. Sup., P.	\$14.00
3,000 Bill., O., J., mill.	15.00	100 No. 4 F., Pitts.	13.70
2,000 Bill., O., J., mill.	16.25	75 Cold Blast, Pitts.	21.50
1,500 Bill., O., J., mill.	16.00	50 Cold Blast, Pitts.	21.00
1,000 Bill., S., J., mill.	16.15	50 Warm Blast, P.	20.00
1,000 Bill., S., J., mill.	16.15	50 No. 2 F., Pitts.	15.00

METAL MARKET.

NEW YORK, Friday Evening, September 24, 1897.
Gold and Silver.

Price of Silver per Ounce Troy.

September.	St. Ex.	London Pence.	N. Y. Cts.	Value of sil. in \$1.	September.	St. Ex.	London Pence.	N. Y. Cts.	Value of sil. in \$1.
18	4.85	261	57	.443	22	4.84	27	58	.453
20	4.85	271	59	.458	23	4.84	26	56	.439
21	4.84	274	59	.458	24	4.84	26	57	.441

Silver has shown some marked fluctuations during the week. It rose to 27 $\frac{1}{2}$ d. on Monday, but on Wednesday began to fall off, receding to 26 $\frac{1}{2}$ d., with a very slight recovery to-day. The movement seems to have been largely speculative in its nature.

The United States Assay Office in New York reports the total receipts of silver at 275,000 oz. for the week.

Gold and Silver Exports and Imports

At all United States ports, August, 1897, and years from January 1st, 1897 and 1896:

	Coin and bullion.		In ores.		Total excess, Exp. or Imp.
	Exports.	Imports.	Exports.	Imports.	
GOLD					
Aug.	\$1,983,588	\$4,374,175	...	\$341,125	I. \$2,744,712
1897.	32,446,711	8,783,320	...	3,104,065	E. 29,667,374
1896.	56,813,796	30,729,726	...	81,606	E. 24,983,355
SILVER					
Aug.	5,313,277	1,491,752	...	1,363,457	E. 2,248,068
1897.	37,913,151	6,924,653	...	259,350	E. 17,375,845
1896.	40,940,931	7,712,959	...	393,932	E. 21,619,077

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

Gold and Silver Exports and Imports, New York.
For the week ending September 24th, 1897, and for years from January 1st, 1897, 1896, 1895, 1894:

Period	Gold.		Silver.		Total Excess, Exp. or Imp.
	Exports.	Imports.	Exports.	Imports.	
We'k	\$31,715	\$52,610	\$93,580	\$93,568	E. \$544,202
1897.	28,101,786	4,271,329	28,973,461	1,659,383	E. 51,114,315
1896	40,386,818	45,996,478	28,982,562	2,108,922	E. 21,265,412
1895	57,665,833	25,904,339	29,809,919	1,379,817	E. 60,191,656
1894	82,434,600	14,429,089	26,894,369	1,265,322	E. 93,544,558

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

FINANCIAL NOTES OF THE WEEK.

A sharp reaction in stocks, altogether speculative and temporary in its nature, occurred this week but has not affected the general condition of business. This appears to be still improving, perhaps somewhat unevenly, but with marked advances in most quarters. The amount of bank clearings is increasing very considerably; the deposits and loans of the New York banks have reached very high figures, and railroad traffic is showing a large increase. The resumption of work in factories is becoming general and the volume of trade is larger than at any time since 1892. The settlement of the coal strike has had a favorable effect in the West, and very little is now heard of labor trouble anywhere.

The beginning of gold imports has come somewhat sooner than was expected. It is announced this week that a total of \$2,500,000 has been taken in Europe for New York account, and will reach this side early in October. Of this gold, \$1,000,000 comes from England, \$1,000,000 from France and \$500,000 from Italy. In addition to this the mail steamer arriving at San Francisco this week brought \$4,000,000 gold from Australia. This gold comes on London orders, and is largely in payment for wheat.

The currency commission appointed by the Indianapolis convention met in Washington this week, nine out of the 11 members being present. Ex Senator Edmunds, of Vermont, is chairman. The meetings are to be private for the present. The members will probably consult with the Secretary of the Treasury on their work.

The bankers who are members of the London Clearing House have made an emphatic protest against the intimation of the Bank of England that in certain contingencies a part of its reserve might be held in silver.

The Bank of England this week raised the official discount rate from 2% to 2½%; and a further increase is expected shortly.

The statement of the United States Treasury, on Thursday, September 23d, shows balances in excess of outstanding certificates as below, comparison being made with the statement for the corresponding date last week:

	Sept. 16.	Sept. 23.	Changes.
Gold	\$146,051,133	\$146,745,175	I. \$694,045
Silver	17,731,783	15,191,509	D. 2,540,275
Legal tenders	37,628,903	35,263,271	D. 2,365,632
Treasury notes, etc.	76,573,812	24,103,381	D. 52,470,431

Totals \$27,955,536 \$221,309,138 D. \$5,676,398
Treasury deposits with national banks amounted to \$17,172,715, a decrease of \$204,717 during the week.

The following table shows the specie holdings of the leading banks of the world at the latest dates covered by their reports. The amounts are reduced to dollars and comparison is made with the holdings at the corresponding dates last year:

Banks.	1896.		1897.	
	Gold.	Silver.	Gold.	Silver.
N. Y. Assn.	\$53,435,300	\$91,804,200	\$53,435,300	\$91,804,200
England	245,777,345	173,185,359	245,777,345	173,185,359
France	398,921,021	\$249,059,728	406,430,310	\$244,341,600
Germany	222,700,000	210,600,000	222,700,000	210,600,000
Austro-Hun.	145,115,000	61,320,000	149,528,000	62,609,500
Netherlands	13,165,000	34,490,000	13,165,000	34,475,000
Belgium	21,535,000	20,535,000	21,348,200	22,618,000
Spain	62,605,000	52,570,000	45,135,000	53,440,000
Italy	61,315,000	10,920,000	62,595,000	13,470,000
Russia	441,820,000	495,165,000	441,820,000	495,165,000

The return for the Associated Banks of New York is of date September 18th; the Bank of Italy, July 30th; the Bank of Russia, August 8-20th; the Bank of England, the Bank of France, September 23d; the others are of date September 4th. The New York banks do not report silver separately, but the specie carried is chiefly gold coin. The Bank of England and the Bank of Russia report gold only. The Imperial Bank of Germany and the Belgian National Bank do not report gold and silver separately.

Shipments of silver from London to the East for the year up to September 2d are reported by Messrs. Pixley & Abell's circular as below:

	1896.	1897.	Changes.
India	\$2,674,278	\$3,777,970	I. \$1,103,692
China	574,413	199,226	D. 375,187
The Straits	545,686	249,867	D. 295,819
Totals	\$3,794,377	\$4,227,063	I. \$432,686

Arrivals for the week this year were £172,000 in bar silver and £40,000 in Mexican dollars from New York; also £27,000 in bar silver from the West Indies; a total of £239,000. Shipments to the week were £165,750 in bar silver to India, £47,024 in Mexican dollars to China, and £37,156 to the Straits; a total of £249,930.

The statement of the New York banks—including the 66 banks represented in the Clearing House—for the week ending September 18th gives the following totals, comparison being made with the corresponding weeks in 1896 and 1895:

	1895.	1896.	1897.
Loans and discounts	\$517,242,900	\$451,893,300	\$579,313,700
Deposits	558,461,400	445,376,100	635,958,500
Circulation	13,000,500	19,221,100	14,602,700
Reserve:			
Specie	61,970,600	53,435,300	91,804,200
Legal tenders	100,034,000	68,513,100	87,580,600
Total reserve	\$162,004,600	\$121,948,400	\$179,384,800
Legal requirement	137,116,101	111,494,025	158,939,425
Surplus reserve	\$24,888,500	\$10,454,375	\$20,445,375

Changes for the week this year were increases of \$620,500 in circulation and \$2,669,900 in loans and discounts, decreases of \$6,191,400 in deposits, \$319,500 in specie, \$7,972,000 in legal tenders, and \$6,773,450 in surplus reserve.

The foreign merchandise trade of Great Britain for the eight months ending August 31st is given by the Board of Trade returns as below:

	1896.	1897.
Imports	\$283,316,666	\$294,755,179
Exports	199,061,838	199,716,823
Excess, imports	\$84,254,828	\$95,038,356

The increase this year in imports was £11,438,513, or 4.1%; in exports, £654,985, or 0.3%. The gold and silver movement for the eight months was as follows:

	Imports.	Exports.	Excess.
1897	\$22,139,113	\$18,401,339	Imp. \$3,737,774
1896	18,474,054	13,702,423	Imp. 4,771,631
SILVER:			
1897	11,665,526	12,799,336	Exo. 1,133,810
1896	9,577,855	9,411,923	Imp. 166,232

The increase in imports of silver was more than balanced by the exports, which were very large this year.

Indian exchange continues quiet with little change. No council bills were sold this week. There have been some shipments of gold to India, and the remittances of silver are reported large.

Prices of Foreign Coins.

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

	Bid.	Asked.
Mexican dollars	33½¢	34¢
Peruvian sole and Chilean pesos	39½¢	40¢
Victoria sovereigns	4.85	4.90
Twenty francs	3.85	3.90
Twenty marks	4.74	4.80
Spanish 25 pesetas	4.78	4.85

Other Metals.

Copper.—The firmness in the copper market continues, and most producers are quite independent, being well sold out for several weeks ahead. The demand from Europe has of late not been quite so good, but, under the circumstances, this has made no impression on holders here. The mills appear to be fairly well stocked with orders, and the prospects for an active business all winter through are good. Quotations show hardly any change, and we quote Lake 11½¢@11¾¢; electrolytic in cakes, wire bars or ingots, 11¢@11¼¢; cathodes, 10½¢@10¾¢, and casting copper, 10¾¢.

The market in London has been quiet, and prices for the speculative sorts have eased off somewhat, the decline being about 5s. for the week. The closing quotations are £19 5s. @ £19 7s. 6d for spot and £19 12s. 6d. @ £19 15s. for three months prompt. For refined and manufactured sorts we quote: English tough, £51 15s. @ £52; best selected, £52 10s. @ £53; strong sheets, £58 10s. @ £58 15s.; India sheets, £57; yellow metal, 5d.

A very large business was done in copper shares in Boston during the present week, and the prices at which some of the stocks were dealt in are the highest on record.

Imports of copper into Great Britain for the eight months ending August 31st included 48,313 tons of ore, a decrease of 8,481 tons; 61,149 tons of matte and precipitate, an increase of 290 tons; and 41,975 tons fine copper, an increase of 3,021 tons. Of these imports, 1,391 tons of ore, 9,916 tons of matte and 21,629 tons of fine copper were from the United States.

Tin.—A lively business has been doing, and the large arrivals which have come in and which are expected during the next few days have not made any impression on the market, as it is known that the bulk of the tin will be at once transhipped. We still quote Straits 13½¢@13¾¢ for spot and September, and 13 7/8¢@13 5/8¢ for future delivery.

The London market opened on Monday at an advance of about 10s., but the lower quotations established for silver made themselves felt and prices receded slowly, closing at £61 12s. 6d. @ £61 15s. for spot and £62 5s. @ £62 7s. 6d. for three months. Exports of tin from the Straits Settlements for the

seven months ending July 31st were, in tons of 2,240 lbs.:

	1895.	1896.	1897.
To United States	4,411	9,045	10,107
To Europe	22,589	7,945	13,087
To China	1,219	2,132	829
To India	1,096	1,412	919
Totals	29,316	30,537	24,872

The total this year shows a large decrease from 1896, but there was an increase in shipments to the United States.

Lead.—After a quiet period of about three weeks business has again become quite active. During all this time there was no lack of efforts to depress prices, but, producers showing themselves very independent, the decline was rather insignificant, especially when the great rise in August is considered. Business has been done at 432½¢, and the market closes strong. In St. Louis fairly large quantities have changed hands, desilverized selling at 215¢, and common at 4¼¢.

The foreign market has been rather unsettled, and early this week some business took place in London at £13 5s. After that a very good demand set in and values advanced sharply to £13 12s. 6d. @ £13 15s. for Spanish lead and £13 17s. 6d. for English.

St. Louis Lead Market.—The John Wahl Commission Company telegraphs us as follows: Lead is firm but quiet. Latest sales were on a basis of 4½ for common, and 5 17/8¢@4 20¢ for refined. Neither buyers nor sellers are making any strenuous efforts to trade.

Spelter.—The demand was fairly good, but was freely met by holders, and in spite of the volume of business values are somewhat lower, and we have to quote for prime Western 4c. St. Louis and 4 20¢. New York.

In London good ordinaries are quoted £17 15s. and specials £17 17s. 6d.

Imports of spelter into Great Britain for the eight months ending August 31st were 46,269 tons, a decrease of 1,153 tons from last year.

Antimony.—Prices are unchanged at 7½¢@8c. for Cookson's; 7½¢@7¾¢ for Hallett's; 7¼¢ for Japanese, and 7¼¢ for U. S. Star.

Nickel.—There has been little business, but no change in prices can be reported. We quote for ton

Imports and Exports of Metals.

Port.	Week, Sept. 16.		Year, 1897.	
	Expts.	Impts.	Expts.	Impts.
*New York.				
Aluminum, boxes			2,618	
Antimony ore, short tons				1,324
" regulus, casks				471
Brass, old, short tons			506	160
Copper, fine, long tons	81,175	58	31,977	5,721
" ore, long tons				4,312
" matte			5,558	271
" sulphate			4,826	
Ferro-chrome				5
Ferro-manganese	165		2,956	52
Iron ore				9
" old			52	
" pipe			185	
" pig, bar, rod			408	10,563
" pyrites				5,570
Lead, antimonial				100
" bullion	394	956	25,813	53,674
Manganese ore				4,413
Nails			407	
Nickel			25	1,019
Rails, old				8,365
Spiegeleisen				15,355
Steel billets, rods	282	689	15,670	15,330
Tin			575	1,194
" dross			7	141
" and black plates, boxes			9,730	261,671
Zinc				2,170
" dross			7	342
†Baltimore.				
Brass scrap, long tons			9	
Chrome ore			11	5,511
Copper, fine			1,145	29,683
" sulphate			40	1,719
Ferro-manganese				231
Ferro-silicon				281
Iron ore			6,821	201,567
" pig, bar, etc.				2,284
" pipe			65	105
Lead				120
Manganese			3,700	11,950
Rails, steel				3,009
Spiegeleisen				1,208
Steel			117	3,525
wire, bundles				11,333
Tin, long tons				770
" and black plates, boxes				19,497
Zinc, long tons				63
" dross				129
‡Philadelphia.				
Antimony, casks				2,712
Chrome ore				300
Copper ore, long tons				10,794
Ferro-manganese				48
Iron ore				149,852
" pig			50	50
" pyrites				4,550
Manganese ore			2,500	85,589
Tin			25	573
" and black plates, boxes				45,907

*New York Metal Exchange returns. †From our Special Correspondent. ‡Week ending Sept. 16. §Week ending Sept. 23.

lots 33 3/4 @ 36c. per lb., and for smaller orders 35 1/4 @ 38c. London prices are 14 @ 16d. per lb., according to size of order. The London price is about on a parity with New York, allowing for the duty of 6c. per lb.

Platinum.—Prices are firm at \$14 @ \$15 per oz. New York. The London quotation is 55s. @ 56s. per oz.

For chemical ware, best hammered metal, Messrs. Elmer & Amend, New York, furnish the following quotations, the prices given being respectively for orders of over 250 grams, for orders of over 100 grams and less than 250 grams, and for orders of less than 100 grams: Crucibles and dishes, 54c., 55c. and 56c. per gram. Wire and foil are 52c., 53c. and 54c. per gram.

Quicksilver.—The New York price continues at \$7.50 per flask. The London price is £6 15s., with the same figure quoted from second hands.

The Minor Metals.—Quotations are given below for New York delivery:

Aluminum: No. 1, 98% ingots, 37 @ 42c.	Bismuth, 99 1/2% lb.	\$1.50 @ \$1.80
No. 2, 94% " " 31 @ 34c.	Phosphorus, 99 1/2% lb.	50 @ 55c.
Ingots, scrap, " " 30c.	Tungsten lb.	70c.
Rolled sheets, " " 46c. up	Tungstic acid lb.	45c.
Alum.—Nickel, " " 35 @ 40c.	Ferro-tungsten, 6%	60c.

Variations in price depend chiefly on the size of the order.

Average Monthly Price of Metals

In New York, for the years 1897 and 1896; in cents per pound.

Month.	COPPER.		TIN.		LEAD.		SPELTER.	
	1897.	1896.	1897.	1896.	1897.	1896.	1897.	1896.
Jan.	11.75	9.87	13.44	13.02	3.04	3.08	3.91	3.75
Feb.	11.92	10.64	13.59	13.44	3.28	3.19	4.02	4.03
March	11.80	11.03	13.43	13.30	3.41	3.14	4.12	4.20
April	11.48	10.98	13.31	13.34	3.32	3.07	4.13	4.07
May	11.03	11.15	13.44	13.51	3.26	3.03	4.21	3.98
June	11.11	11.67	13.77	13.59	3.33	3.03	4.21	4.10
July	11.11	11.40	13.89	13.63	3.72	2.96	4.32	3.97
August ..	11.16	10.98	13.80	13.49	3.84	2.73	4.26	3.76
Sept. ....	.....	10.66	.....	13.15	.....	2.77	.....	3.60
October ..	.....	10.66	.....	12.94	.....	2.80	.....	3.72
Nov. ....	.....	11.23	.....	13.09	.....	2.96	.....	3.99
Dec. ....	.....	11.28	.....	12.96	.....	3.04	.....	4.14
Year	10.88	.....	13.29	.....	2.98	.....	3.94	.....

CHEMICALS AND MINERALS.

(For current prices of chemicals, minerals and rare elements see page 390.)

New York. Sept. 21.

Heavy Chemicals.—The volume of business has increased and prices show little change this week. Bleaching powder is moving in quantities or contracts and new orders are being booked for 1898 delivery. Caustic soda is active in a jobbing way. Chlorate of potash is being inquired for but few sales can be recorded. There is a scarcity of sal soda on spot owing to the continued warm weather, and it is possible that the price of this article will be advanced in a week or so owing to the limited supply. Quotations are as follows: Caustic soda, \$2 @ \$2.25 per 100 lbs. for 70 @ 76% on 60% basis. Alkali, domestic, 58%, 60c. for 50-ton lots and over, and 70 @ 80c. for smaller quantities; 48%, \$1 @ \$1.20 for jobbing lots. Foreign, 72 1/2 @ 77 1/2 c. Carbonated soda ash, 90 @ 95c. per 100 lbs., for 58% basis of 48%. Bleaching powder prime brands, \$1.85 @ \$2.00; Continental F brand, \$1.85 @ \$1.90; other brands, \$1.70 @ \$2 per 100 lbs. Bicarb. soda, English, 1.75 @ 2c. per lb.; American, bulk, \$1.50 @ \$3.50 per 100 lbs., according to brand. Sal-soda, English, 75 @ 80c. per 100 lbs.; American, 5 @ 70c. per 100 lbs. Chlorate of potash, \$9.50 @ \$11 per 100 lbs.

Acids.—Business is fairly active in the various acids, and prices are unchanged. In regard to the export trade in July at the different ports in the United States we note a decrease in value of \$1,441 as compared with 1896. However this is fully made up by the total exports for the seven months of 1897, which show an increase of \$14,154 over the corresponding period last year. A still further increase is looked for during the remainder of the year. Much of our exports of acids are for South America. Quotations are per 100 lbs. in New York and vicinity, in lots of 50 carboys or over as follows: Acetic acid, commercial No. 8 (in barrels), \$1.40 @ \$1.50; in carboys, \$1.50 @ \$1.65; redistilled, 28% in bbls., \$1.70 @ \$1.80; in carboys, \$1.90 @ \$2.05. Muriatic acid, 18°, 75 @ 85c.; 20°, 85 @ 95c.; \$1.15 @ \$1.25, according to make and quantity. Nitric acid, 36°, \$3.50 @ \$4.40; 40°, \$4 @ \$4.50; 42°, \$4.50 @ \$5.50. Oxalic acid, 7 ex-dock and 7.25 ex-store. Mixed acids, according to mixture. Sulphuric acid, 70 @ 85c. in carload lots, 10 @ 15c. higher for small quantities. Chamber acid, 50°, \$6 @ \$6.50 per ton at factory. Blue vitriol, \$3.62 1/2 @ 3.75, according to grade and order.

Brimstone.—This market is depressed owing to the heavy arrivals of sulphur. This condition will doubtless continue for a time at least, as there are many steamers with cargoes on their way to this port. The stocks in Sicily are very large. We note two arrivals this week, the *Nymphaea* with about 1,600 tons and the *Anarylli* with 2,000 tons. Sales here have been made below the price quoted abroad. For best unmixed seconds for shipment \$20.50 is asked; \$19.50 for thirds. On spot \$20 is quoted for seconds and \$19 for thirds.

Fertilizing Chemicals.—The manufacturers are buying in a fairly large way. The demand is especially good for sulphate of ammonia, dried

blood, tankage and fish scrap and an improvement is looked for in all the leading ammoniates. Shipments of potash salts are mainly on contracts already taken; new business is at a minimum.

Sulphate of ammonia, gas liquor, \$2.22 1/2 @ \$2.25; bone, \$2.10 @ 2.15 per 100 lbs. Dried blood, high grade Western, \$1.90 per unit New York; \$1.55 @ \$1.60 per unit f. o. b. Chicago. Azotine, \$2.05 basis New York. Concentrated phosphate (30% available phosphoric acid), 57 1/2 c. per unit. Acid phosphate, 13% @ 15%, av. P₂O₅, 54 @ 65c. per unit at sellers' works in bulk. Dissolved bone black, 17% @ 18% P₂O₅, 80c. per unit. Acidulated fish scrap, \$9.50 @ \$10, and dried scrap \$18.50 @ \$19 f. o. b. fish factory. Tankage, high grade, \$16.50 @ \$17 per ton, f. o. b. Chicago; concentrated tankage, \$1.55 per unit, f. o. b. Chicago; New York \$21; low grade, \$13 @ \$13.50. Bone tankage, \$19 @ \$20; ground bone, \$21 @ \$23. Bonemeal, \$19.50 @ \$22.50.

Sulphate of Potash: 90%, New York and Boston, \$1.90 1/4; Philadelphia, Baltimore and Norfolk, \$2.01; Southern ports, \$2.03.

Double Manure-Salt: Quotations for 48 @ 49%, less than 2 1/2% chlorate, are 1.01 @ 1.01 1/2 c., to arrive, and 1.02 @ 1.03c. on spot; basis of 48%. High grade, 90 @ 98% sulphate of potash, 1.90 1/2 @ 2.00 c. to arrive; basis of 90%. In bulk 24 @ 36%, 56 1/2 @ 37 1/2 c. per unit phosphate acid.

Muriate of Potash: We quote: New York and Boston, 1.75 @ 1.78c. Philadelphia and Norfolk, 1.76 @ 1.79 1/2 c.; Charleston, Savannah, Wilmington and New Orleans, for 80 @ 85% basis of 80%, 1.78 1/2 @ 1.81c. in lots of 50 tons and upward.

Kainit.—Invoice weights, as taken at port of shipment, per ton of 2,240 lbs., testing 12.4% actual potash, equivalent to 23% sulphate of potash, \$8.80 @ \$8.90.

Nitrate of Soda.—Conditions are unchanged in the Coast and European markets, and the demand in this country continues dull, with \$1.67 1/2 quoted for spot and \$1.65 for arrivals. The visible supply in Europe on September 1st is given by the Permanent Nitrate Committee as 75,000 tons less than for the corresponding month in 1896. The deliveries for August were 5,000 tons less than a year ago. The estimated shipments for September for Europe are cabled as 2,200,000 Spanish quintals, against the approximated loadings of 1,500,000 quintals on October 1st. The sailings for the United States in September are estimated at 150,000 quintals.

NOTES OF THE WEEK.

Shipments of Florida phosphate rock during August were distributed as follows:

	Domestic Tons.	Foreign Tons.
Pennsylvania.....	.....	11,817
Funta Gorda.....	3,996	6,776
Tampa.....	4,493	9,967
Savannah.....	.....	1,200
Totals.....	8,489	29,790

The exports of fertilizers from Savannah, Ga., during the year ending August 31st, 1897, amounted to 96,919 tons against 70,000 tons last year.

The Bureau of Statistics reports the following imports into the United States for the periods mentioned:

Articles.	July.		Seven Months.	
	1896.	1897.	1896.	1897.
Caustic soda... lbs.	3,328,776	4,678,018	26,155,760	46,153,907
Nitrate " .. tons	5,745	8,139	76,666	46,907
Sal " .. lbs.	1,366,922	819,512	8,304,095	10,884,448
Soda ash..... "	7,649,308	4,317,662	113,91,866	101,352,023
Other soda salts ..	308,989	89,923	3,688,913	1,776,125
Chlorate potash ..	369,227	708,659	3,303,548	4,968,389
Muriate " .. "	7,238,454	2,300,374	44,369,837	40,666,187
Sulphur, crude " "	1,924,176	1,614,105	11,088,932	10,345,410
Other potash.....	2,427,719	923,904	15,269,300	13,008,833
Bleaching p'd'r "	6,638,267	6,720,638	59,128,988	58,994,162
Brimstone..... tons	3,266	14,673	84,799	81,021
Fertilizers..... value	\$56,218	\$50,863	\$306,228	\$510,532

The increased imports noted this year in some of the articles enumerated above were made principally in anticipation of heavier duties in the new tariff.

Copperas has advanced 10c., and is now quoted at 57 1/2 c. for carload lots and 67 1/2 c. for smaller quantities. This increase in price is understood to have been caused by an agreement among the principal manufacturers. Among these concerns are the Cleveland Rolling Mill Company, of Ohio, and the Ferric Chemical and Color Works, of Worcester, Mass. Efforts are being made to advance the price of copperas to the basis of 75c. per 100 lbs. for large lots.

Charleston, S. C. Sept. 21.

(From Our Special Correspondent.)

The shipments of phosphate rock from this port for the month of August were as follows, comparison being made with the corresponding period one and two years ago:

	1895.	1896.	1897.
Crude rock (2,210 lbs.).....	16,894	12,124	1,447
Ground rock (2,000 lbs.).....	543	.....	.....

There is a decrease of 4,677 in the shipments of crude rock this year as compared with 1896, and the exports of ground rock have ceased.

Liverpool. Sept. 15.

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

Although spot business in heavy chemicals is not

quite so active this week, there is a fair trade passing and there is a good inquiry from consumers for their 1898 requirements.

Soda ash is selling to a fair extent and makers appear to be well sold for the balance of this year. Quotations vary according to export market, and range for tierces may be called about as follows: Leblanc ash, 48%, £4 5s @ £4 10s.; 58%, £4 10s. @ £4 15s. per ton, net cash. Ammonia ash, 48%, £3 7s. 6d. @ £4 5s.; 58%, £3 12s. 6d. @ £4 5s. per ton, net cash. Bags are 5s. per ton under price for tierces. Special quotations for American orders. Soda crystals are unchanged and selling at from £2 7s. 6d. @ £2 17s. 6d. per ton, less 5% for barrels, according to market, and 7s. less for bags. Special quotations for American business.

Caustic soda is not quite so brisk, the recent advance having checked business to some extent, but the market is firm. We quote spot range as follows: 60%, £6 5s. @ £6 10s.; 70%, £7 5s. @ £7 10s.; 74%, £8 5s. @ £8 10s.; 76%, £8 15s. @ £9 per ton, net cash. Bleaching powder is quiet, but unbarred makes are scarce, and £6 12s. 6d. @ £6 17s. 6d. per ton, net cash, is range for hardwood packages as to destination. Chlorate of potash is quoted at 3 1/2 d. per pound, while bids of a shade less have been refused. Bicarb. soda is selling at £6 15s. per ton, less 2 1/2 % for the finest quality in 1-cwt. kegs, with usual allowances for larger packages.

Sulphate of ammonia is in demand, and as there is little offering, prices have advanced, holders now quoting £8 7s. 6d. @ £8 10s. per ton, less 2 1/2 % for good gray, 24 @ 25% in double bags, f. o. b. here as to quality.

Nitrate of soda is in moderate demand, at £7 15s. @ £7 17s. 6d. per ton, less 2 1/2 % for double bags f. o. b. here as to quality and quantity.

Carb. ammonia, lump, 2 1/2 d. @ 3d. per pound; powdered, 3d. @ 3 1/2 d. per pound, less 2 1/2 %.

MINING STOCKS.

Complete quotations will be found on pages 386, 387 and 388 of mining stocks listed and dealt in at:

Aspen.	Helena.	London.
Baltimore.	Los Angeles.	Mexico.
Boston.	New York.	Paris.
Cleveland.	Philadelphia.	Roseland.
Colo. Springs.	Pittsburg.	Shanghai.
Denver.	Salt Lake.	Valparaiso.
	San Francisco.	

New York. Sept. 24.

The local mining stock market has not been as active as last week and prices show a number of fluctuations. On the Consolidated Stock and Petroleum Exchange the Comstocks ruled lower in price and the California stocks were dull. The Colorado stocks were only moderately active on that board, but on the Mining Exchange dealing in them was more satisfactory.

New members have recently been added to the Mining Exchange, the list including William Cross, Louis N. Lake, W. C. Cuthbert, F. W. F. Barlow, Bryce Gray and Charles T. Hesser. The application for membership received from W. G. Hillman has not yet been passed upon.

The annual meeting of the Exchange will be held on October 5th at 12 o'clock, noon, at 38 to 40 New street, New York City.

Boston. Sept. 23.

(From Our Special Correspondent.)

The copper share market this week has been very active and at times excited. There has been a good demand for stocks, and prices show a marked advance in all the list. Butte & Boston has been the leader with heavy dealings, the stock selling up to \$31 1/2, the highest price for several weeks, with later reaction to \$27 1/2 and partial recovery to \$29 1/2. The transactions ran up to nearly 100,000 shares. Centennial was second in point of activity, and scored an advance from \$23 to \$25. In the reaction it touched \$19 1/2, but recovered to \$23 1/2 to day. Sales about 25,000 shares. Old Dominion was also taken hold of and advanced from \$23 to \$29, reacted to \$24, but recovered to \$28 and closed at \$27 1/2. Wolverine was strong, and found ready buyers; opening at \$16, it sold up to \$18 1/2, fell back to \$17, and closed steady at \$18. Osceola opened at \$40 1/2, sold up to \$42, declined to \$38, but rallied later and sold at the opening price again to-day. Kearsarge and Franklin were both in good demand, the former selling up to \$23 1/2, then off to \$21, and closing at \$23 1/2; the latter touched \$24 in the upward movement, reacted to \$20 1/2 and closed at \$23 1/2. Atlantic opened at \$26, advanced to \$27 1/2, and closed at the opening price.

Boston & Montana was fairly active and sold at \$15 1/2; later it touched \$148, and closed at \$149 1/2. Calumet & Hecla again broke the record, selling at \$495, and at one time \$500 was bid for it without bringing out the stock. Later it went off to \$475, and to-day two shares were sold at \$480. Quincy and Tamarack were both strong; the former sold up to \$121 and closed at \$120, while the latter, after selling at \$140, touched \$144 and closed at \$142. Tamarack, Jr., was only steady at \$19 @ \$20, with later sales at \$19 1/2. There is a prospect of consolidation of this mine with the Osceola. Tecumseh, under an order to buy at market, was forced up from \$3 1/2 to \$5 1/2. The order filled, it declined and sold at \$4. Arnold was made active and sold up from \$4 1/2 to \$5, but was off later to \$4 1/2. Allouez opened at 75c. and advanced to \$1 1/4, and held there. A sale of Humbolt was quoted at 50c. Copper Falls appeared to-day, the first time for many months. The last recorded sale, if memory serves, was \$7; to-day 400 shares were sold at \$3 1/2.

The gold stocks have not been very prominent this week. Gold Coins sold at \$3 3/4 @ \$3. Pioneer advanced from \$6 1/2 to \$7, and closed 1/2 lower. Santa Ysabel was steady at \$17 1/2 to \$17 1/2. Merced, after selling at \$8, advanced to \$9 1/2 to-day and closed 3/4 less. Boston & Cripple Creek advanced 5c @ 15c.

3 p. m.—After the noon hour the market was heavy and prices generally lower. Butte & Boston declined to \$28 1/4; Old Dominion to \$27; Kearsarge to \$22 1/4. Boston & Montana was steady at \$149 1/2; Merced declined to \$9; Centennial to \$22 1/2; Osceola to \$40; Tamarack to \$14 1/2; Franklin to \$23. Atlantic advanced to \$26 3/4, and Copper Falls to \$4 1/2.

Cleveland. Sept. 22.
(From Our Special Correspondent.)

There has been an advance in the value of Minnesota stock offered for sale on the Cleveland market. Last week the buyers offered \$58 and the owners demanded \$58. This week the buyers offer \$58 and the owners want \$60. Lake Superior is somewhat stronger this week than last, the investors offering a slight advance over their figures of last week. Some sales are reported by the brokers, but the market, as a whole, has been rather quiet.

Los Angeles, Cal. Sept. 18.
(From Our Special Correspondent.)

The market on the Exchange this week was dull and featureless, prices holding at about the close of last week owing to the two legal holidays, Labor Day and Admission Day. The companies are showing up splendidly regarding the amount of work done, and the Exchange has adopted the system of requiring monthly reports from all listed stocks: any company failing to hand in this report being immediately stricken from the calling list. So far all companies, with one or two exceptions, have handed in their reports. The Old Dominion Company was traded in in the pit on Thursday's call for the first time, and it looks as if it were going to be a very active stock. The capitalization is 500,000 shares, and the stock is placed on the Exchange at 2c. per share. It has already advanced to 2 1/2c. The company has already filed its listing papers and will be put among the listed stocks in the next few days. Mohawk Acton comes under the same category but has been traded in for a longer period. This stock will probably advance in the near future. It has already gone up 1/4c. It is stocked for 1,000,000 shares and the property is situated near Acton.

Salt Lake City. Sept. 18.
(From Our Special Correspondent.)

Mining share transactions remain of small moment, though there is a slight improvement in the level of prices. Outside orders still fail to put in an appearance, but brokers report more inquiries than for several months, indicating better trading soon. The upward movement and strength of lead, so far, have not brought forth the favorable influence counted on in the lead-silvers; even less than appeared on the surface a week ago. In a measure this is to be attributed to the uncertainty of silver. The partial recovery from the lowest mark of 5 1/2c. per ounce has not brought any confidence of permanency, and mine owners prefer to follow a waiting policy. However, the almost certainty of the lead advance continuing means a greater share of prosperity for Utah, more men at work underground and the reopening of closed mines, in short an easier money market, as the production of lead-silver ores increases. Already, in anticipation, this exerts a beneficial influence on the mining stock market and business generally.

Ajax shows no movement in the stock this week. Anchor continues firm; the advance in lead being a helping hand. Silver King, with its vast stores of lead, shows the greatest strength. Daly and Daly West are about unchanged. Ontario is a shade firmer. There is an intimation of resumption of operations by December.

Mammoth is a shade firmer with better accounts at hand from the mill. Lower Mammoth is a new active stock, on account of the recent important find of carbonate ore which is well holding out. It sold this week at 70c.; a month ago it could be had for 25c. Swansea and South Swansea are in better form. Four Aces has some shipping ore, which has made a little demand for the shares. Bullion-Beck and Centennial-Eureka are firmer. Horn Silver is offered at \$1, without a bid.

Over 5,000 shares of Geyser Marion sold early in the week at \$1.17 1/2 @ \$1.22 1/2, closing strong to-day at these figures. Mercur was offered lower than last week, without any apparent cause. Northern Light is weaker, selling at 6c. this morning. Sacramento is unchanged. East Golden Gate goes begging at 1c. without sales.

Dexter has again moved up. In other shares there is no change of note.

San Francisco. Sept. 18.
(From Our Special Correspondent.)

The market opened rather quietly this week, and buying decreased considerably, the public having apparently dropped out for the present. This gave an opportunity to the small operators and there was a general raid which left prices lower and irregular. The volume of business was not large, and the changes were on small transactions chiefly.

Toward the end of the week there was an improvement, and at the close the general market was fairly active and had a firm tone. A few of the Gold Hill and south end stocks were higher. The Comstocks sold or were quoted at the following prices: Alpha, 22 @ 24c.; Alta, 20c.; Andes, 26 @ 25c.;

Belcher, 45 @ 44c.; Best & Belcher, 82c.; Bullion, 15c.; Caledonia, 85c.; Challenge, 52c.; Chollar, 70c.; Consolidated California & Virginia, \$1.65 @ \$1.70; Confidence, \$1.35; Consolidated Imperial, 4c.; Consolidated New York, 5c.; Crown Point, 45c.; Exchequer, 7c.; Gould & Curry, 68c.; Hale & Norcross, \$1.15 @ \$1.20; Julia, 4c.; Justice, 25 @ 24c.; Kentuck Consolidated, 8c.; Mexican, 62c.; North Gould & Curry, 21c.; Occidental Consolidated, \$2.25; Ophir, \$1.10 @ \$1.15; Overman, 37 @ 38c.; Potosi, 43 @ 44c.; Savage, 58c.; Segregated Belcher, 15c.; Scorpion, 6c.; Sierra Nevada, \$1.10; Silver Hill, 4 @ 5c.; St. Louis, 14 @ 18c.; Union Consolidated, 65c.; Utah, 28c.; Yellow Jacket, 53c. For Standard Consolidated \$1.90 was asked. For Eureka Consolidated 20c. was bid.

The mining companies filed sworn statements this week showing their financial condition on September 1st, 1897. The following companies report having had cash on hand: Andes, \$512; Alta, \$108; Alpha Consolidated, \$6,716; Best & Belcher, \$9,114; Bullion, \$4,501; Caledonia, \$1,230; Challenge Consolidated, \$2,155; Consolidated Imperial, \$1,346; Confidence, \$1,885; Consolidated California & Virginia, \$8,092; Crown Point, \$9,184; Consolidated New York, \$180; Exchequer, \$1,259; Gould & Curry, \$5,054; Julia Consolidated, \$819; Mexican, \$4,657; Occidental Consolidated, \$5,388; Ophir, \$15,651; Overman, \$4,889; Segregated Belcher, \$292; Standard Consolidated, \$33,384; Syndicate, \$907; Union Consolidated, \$8,624; Utah Consolidated, \$2,727.

The following companies report an indebtedness: Belcher, \$4,209; Chollar, due bank \$10,000, less \$576 cash on hand; Hale & Norcross, \$4,375; Lady Washington, \$2,181; Potosi, due bank \$4,000, less \$925 cash on hand; Savage, due bank \$6,500, less \$831 cash on hand; Sierra Nevada, due bank \$2,500, less \$924 cash on hand; Silver King, \$381.

The Selby Mining Company, of El Dorado County, has levied an assessment of 5c. per share, delinquent October 20th.

The Eureka Consolidated Drift Mining Company, of Placer County, has levied an assessment of 3c. per share, delinquent October 16th.

The National Consolidated Mining Company, of Shasta County, has levied an assessment of 10c. per share, delinquent October 16th.

The Rogers Mining Company, of Flowery district, Storey County, Nevada, has levied an assessment of \$1 per share, delinquent October 18th.

London. Sept. 15.
(From Our Special Correspondent.)

The South African section has been roused out of lethargy by an unexpectedly high output of the Rand for August. The figures were 259,603 oz., an increase of 8,076 oz. over the previous highest in June last. Until the announcement came the market generally expected a much lower return, so that the advance had a considerably stimulating effect. On looking through the individual returns two quite new producers are to be found—Crown Deep and Rietfontein A. These produced 5,496 oz. and 5,031 oz. respectively, so that the advance is fully accounted for. In addition to this, it is observable that Glencairn has once more become a substantial producer, the figures for August being 5,593 oz., as against 1,549 oz. in July. Another event that has had a stimulating effect has been the semi-official announcement that the proposed mining concessions are about to be granted, but until this granting actually takes place the British public does not seem disposed to believe it.

There is a very strong upward tendency in Chartered at present. A syndicate of the principal professional holders is taking the market in hand and they have already got the shares up to £4. They are, of course, working off their own shares that they are tired of holding, though their names don't appear on the transfers. They are mostly brokers who have a high class of rich men as clients.

The West Australian section has been fairly active, firstly on account of the good returns for August from many of the mines, and secondly on account of the new discovery of gold-bearing quartz at Great Boulder. Of the producers Great Boulder and Lake View Consols keep ahead of the rest, the figures for August being 7,262 oz. and 5,442 oz. respectively.

The Indian section has been strong, chiefly on interested buyers of Mysore, the price of which has been forced up to £5 10s. per 10s. share. On the other hand, Coromandels have had a setback owing to an accident at the mines.

The American section is dull again. Klondike ceases to attract attention at the moment, but several promoters have companies ready and they will appeal to the public shortly for funds to start expeditions early next season. It is surprising how much ignorance is shown as to the location of Klondike even by the promoters themselves. They imagine it is in British Columbia, and this confusion is all to the detriment of the reputation of the latter province as a mining country.

A Dr. Severance, of Spokane, is circularizing investors in this country with the object of selling them shares in the Kemp Komar Copper Mining Company. It would be interesting to English readers if you could tell them who Dr. Severance is and where his mine is situated.

The Klondike craze still shows itself occasionally. Last week a company called "The Klondike Gold Reef Exploration Company, Limited," was advertised with a capital of £100,000 to send W. E. Dowlen, who used to be in the employ of the British Columbia Survey Department, to Klondike. The English directors do not appear to be gentlemen who have managed mining operations before.

The local directors are Messrs. I. Earle, D. W. Higgins and J. Wilson, all of Victoria, B. C.

Paris. Sept. 12.

(From Our Special Correspondent.)

The mining stock market has been active in many directions, but without special incident. The strongest speculation has been in the metallurgical shares, which are still higher than before, and in the Russian group. The South African market has not received much attention.

I hear that a copper property in Nova Scotia has been offered to parties here, but the price asked was considered too high, and the negotiation came to nothing. You may probably know the property, which is, I believe, an old one, though it has never been much worked. It is called the Coxheath mine.

The movement of gold and silver in France for the seven months ending July 31st are given by the returns of the Ministry of Commerce as below:

	Imports, francs.	Exports, francs.	Excess, francs.
GOLD:			
1897.....	161,635,258	34,035,751	Imp. 126,999,507
1896.....	128,970,858	79,018,986	Imp. 49,951,872
SILVER:			
1897.....	111,947,678	93,345,377	Imp. 18,597,301
1896.....	110,317,234	54,297,768	Imp. 66,019,466

Imports of copper, bronze and nickel coins, taken at their face or coin value, amounted to 54,900 fr., against 63,000 fr. in 1896; exports of such coins were 2,401,200 fr., against 216,900 fr. last year.

Some discontent is expressed at the increase in the price of bread, which has followed the rise in wheat. The government will be asked to modify the duties on grain, at least for the time. It is not likely that this will be done, and the workman will have to pay.

After all, some one must suffer in these affairs, and why not the townsman? The farmer has lost for years, according to his own account; and even now he is not satisfied—he never is. AZOTE.

Rossland, B. C. Sept. 15.
(From Our Special Correspondent.)

The first two weeks of the present month showed a marked improvement in the mining outlook. The sale of Velvet group on Sophie mountain, of which Sir Charles Tupper is the head, and the probable sale of other properties in the same neighborhood to English parties, has given marked activity to the mining business in that neighborhood. There are several properties in that section, which is only a few miles from Rossland, that are known to possess an unusually good surface showing and a separate camp there is now a probability in the near future.

The sale of the Josie to an English syndicate for a fair sum is again reported, and in connection with the report is the assertion that the sale is likely to be compulsory.

The visit here this week of a section of the British Association for the Advancement of Sciences created some interest. The party was headed by Dr. G. M. Dawson, of Ottawa, and it included a number of scientific men whose names are familiar in the mining world. The party remained but a few hours, and had only time to visit the principal mines of the district, which are situated in the immediate vicinity of Rossland. The Trail Creek smelter was also visited.

Dr. Dawson while here exhibited a proof copy of the geological survey made last year by Mr. R. G. McConnell, Dominion geologist. This map is intended to show the volcanic area, circumscribed by the horseshoe-shaped belt of mineral veins which have been more or less followed by the system of prospecting and locating which has prevailed in this camp. The party, previous to leaving, held an informal reception, and freely conversed about what they had seen during their visit.

MISCELLANEOUS DIVIDENDS.

The Cambria Iron Company, dividend of 2%, payable October 1st.

Westmoreland Coal Company, dividend of 3%, payable October 1st.

LATE NEWS.

[BY TELEGRAPH.]

(From our Special Correspondent.)

DENVER, COLO., September 24.—The Committee on Revision of Mining Laws, appointed at the recent meeting of the International Gold Mining Congress, met in Denver yesterday and to-day and agreed provisionally upon a report recommending radical changes in the present mining laws as affecting the public domain. The committee consists of a member from each of the mining States and territories west of the Missouri River.

The views so long contended for by Dr. Raymond and W. S. Keyes, of California, the member from that State, who was present, have been largely incorporated in the report. It was decided that the report should not be published until it has been submitted to all the members of the committee who were not present at this meeting, and their views collated. These will be presented to the next and probably the final meeting of the committee, which will be called by the chairman, Charles J. Moore, of Cripple Creek, Colo. All communications on the subject from parties who desire to be heard should be sent to Mr. Moore, to be presented to the next full meeting of the committee.

STOCK QUOTATIONS.

NEW YORK.

Table of stock quotations for New York, listing companies like Alamo, Anaconda, and others with columns for location, par value, and dates from Sept. 18 to Sept. 24.

BOSTON, MASS.

Table of stock quotations for Boston, Mass., listing companies like Aetna, Alouez, and others with columns for location, par value, and dates from Sept. 17 to Sept. 23.

Official quotations Boston Stock Exchange. Bid and ask quotations. Total sales, \$1,883.

BALTIMORE, MD.

Week ending Sept. 23.

Table of stock quotations for Baltimore, Md., listing companies like Atlantic Coal and Big Vein Coal with columns for location, par value, bid, and ask.

Official quotations Baltimore Stock Exchange.

CLEVELAND O.

Table of stock quotations for Cleveland, O., listing companies like Aurora and Cleveland-Cliffs with columns for par value, bid, ask, and date.

From our special correspondent.

ASPEN, COLO.

Sept. 17.

Table of stock quotations for Aspen, Colo., listing companies like Agnes C and Alta Argent with columns for location, capitalization, par value, bid, and ask.

COLORADO SPRINGS, COLO.

Table of stock quotations for Colorado Springs, Colo., listing companies like Alamo and Anaconda with columns for par value, bid, ask, and date.

Official quotations Colo. Springs Mining Stock Association. Total shares sold, listed, 497,060; unlisted, 149,300.

COAL AND INDUSTRIAL STOCKS.

Table of coal and industrial stocks, listing companies like American Coal and Col. Fuel & L. with columns for par value and dates.

Official quotations. New York Stock Exchange, mining, 1,31 shares; other stocks, 64,063 shares; Consolidated Stock and Petroleum Exchange, mining, 34,900 shares; Mining Exchange, 2,830 shares. Total shares sold, 3,9,663. Bid and ask quotations. 1 Ex-div.

PHILADELPHIA, PA.

Table of stock quotations for Philadelphia, Pa., listing companies like Cambria Iron and Choc. & G. C. with columns for location, par value, bid, and ask.

Official quotations Philadelphia Stock Exchange. Bid and ask quotations. Total sales, 1,132.

PITTSBURG, PA.

Table of stock quotations for Pittsburgh, Pa., listing companies like Allegheny and Carbonium with columns for location, par value, bid, and ask.

Official quotations Pittsburgh Stock Exchange.

STOCK QUOTATIONS.

DENVER, COLO.

Table of stock quotations for Denver, Colorado, listing various companies and their share prices across multiple dates from Sept. 13 to Sept. 18.

LOS ANGELES, CAL.

Table of stock quotations for Los Angeles, California, listing various companies and their share prices across multiple dates from Sept. 6 to Sept. 11.

Official quotations, Los Angeles Mining and Stock Exchange. * Bid and ask quotations. † Holiday. Total sales, 144,900 shares.

SALT LAKE CITY, UTAH.

Table of stock quotations for Salt Lake City, Utah, listing various companies and their share prices across multiple dates from Sept. 13 to Sept. 18.

* From Our Special Correspondent. † Utah companies. ‡ Mines in Venderbilt, Cal. § Mines in Tuscarora, Nev.

ROSSLAND, BRITISH COLUMBIA.

Table of stock quotations for Rossland, British Columbia, listing various companies and their share prices across multiple dates from Sept. 13 to Sept. 14.

* From Our Special Correspondent.

HELENA MONT.

Table of stock quotations for Helena, Montana, listing various companies and their share prices across multiple dates from Sept. 13 to Sept. 16.

* Special Report of Samuel K. Davis. Total shares sold, 2,000.

SAN FRANCISCO, CAL.

Table of stock quotations for San Francisco, California, listing various companies and their share prices across multiple dates from Sept. 13 to Sept. 23.

* Official telegraphic quotations, San Francisco Stock Exchange.

MEXICO.

Table of stock quotations for Mexico, listing various companies and their share prices across multiple dates from Sept. 7 to Sept. 10.

NOTE.—In most of the older Mexican mining companies the shares have no fixed par value. The capital is formed of a certain number of shares, the total value not being named. Many newer companies have a nominal par value, usually \$50 or \$100. Prices are in Mexican dollars.

STOCK QUOTATIONS.

LONDON. Sept. 10. Table with columns: NAME OF COMPANY, Country, Authorized capital, Par value, Last dividend, Quotations (Buyers, Sellers).

PARIS. Week ending Sept. 9. Table with columns: NAME OF COMPANY, Country, Product, Capital Stock, Par value, Div. last year, Prices (Op'ning, Closing).

VALPARAISO, CHILE. Aug. 11. Table with columns: NAME OF COMPANY, Location, Capital paid, Sh. Val. paid up, Last dividend, Prices (Bids, Asked, Last sale).

SHANGHAI, CHINA. Aug. 20. Table with columns: NAME OF COMPANY, Country, No. of shares, Value, Last dividend, Price.

Dividend pending. Ex-dividend. Rights pending. Ex-rights.

DIVIDENDS. Table with columns: NAME OF COMPANY, Current Dividends, Paid since Jan. 1, 1897, Total to date.

ASSESSMENTS. Table with columns: NAME OF COMPANY, Location, No., Dinq., Sale, Am.

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

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

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

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. ‡ Dividends on the consolidation in August, 1884, the California had paid \$31,320,000 in dividends and the Cons. Virginia \$42,390,000. § Dividends paid since consolidation. ¶ Bode, Bulwer and Mono transferred to Standard Cons., January, 1897. * Dividends have not been paid in several years.

This table is corrected up to September 1. Correspondents are requested to forward changes or additions so as to reach us before the end of each month.

RARE ELEMENTS, CHEMICALS AND MINERALS—CURRENT PRICES.

NOTE.—This table is revised up to September 14th. Readers of the ENGINEERING AND MINING JOURNAL are requested to report any corrections needed, or to suggest additions which they may consider advisable.

CHEMICALS AND MINERALS.

These quotations are for wholesale lots in New York unless otherwise specified, and are generally subject to the usual trade discounts.

Table listing various chemicals and minerals such as Abrasives, Acids, Alcohol, Alum, Ammonia, Ammonium, Antimony, Argols, Arsenic, Asphaltum, Barium, Barytes, Bauxite, Benzole, Bismuth, Bitumen, Bone Ash, Borax, Bromine, Cadmium, Calcium, etc., with their respective prices.

Table listing various minerals and chemicals such as Calcium, Cement, Ceresine, Charcoal, Clay, China, Chlorine, Chrome Ore, Cobalt, Copper, Fuller's Earth, Gypsum, Iodine, Iron, Kaolin, Lead, Lime, Magnesia, Manganese, Marble, Mercury, etc., with their respective prices.

Table listing various minerals and chemicals such as Mercury, Mineral Wool, Nickel, Oils, Mineral, Ozokerite, Paints and Colors, etc., with their respective prices.

Table listing various rare elements and chemicals such as Potassium, Sodium, Strontium, Tellurium, Thallium, Tin, Uranium, Vanadium, Zirconium, etc., with their respective prices.

THE RARE ELEMENTS.

Prices given are at makers' works in Germany, unless otherwise noted.

Table listing rare elements such as Argon, Barium, Beryllium, Boron, Calcium, Cerium, Chromium, Cobalt, Didymium, Erbium, Gallium, Germanium, Glucinum, Helium, Indium, Iridium, Lanthanum, Lithium, Molybdenum, Niobium, Osmium, Rhodium, Rubidium, Rutherfordium, Selenium, Silicon, Strontium, Tantalum, Thallium, Thorium, Titanium, Uranium, Vanadium, Wolfram, Yttrium, Zirconium, etc., with their respective prices.

ALPHABETICAL INDEX TO ADVERTISERS.

(-) Indicates every other week or monthly advertisements.

Table with columns A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, Y, Z. Each column lists advertiser names and their corresponding page numbers. Includes entries like 'Denver Fire Clay Co', 'Raymond Lead Co', 'Taylor Iron & Steel Co', etc.

A COMPOUND THAT YOU WANT.

THE A. B. C. ALKALI WATER PURIFIER

The Very Best of All Compounds for Boiler Treatment.



We are after the Mine Trade. Engineers write us. Send along a gallon jug of your feed water, expressage prepaid. We examine and report on same. Our analysis is guaranteed. Our compound is a pure chemical, and we make it to fit every emergency. Our trade with the mines is growing fast.

THE J. H. PARSONS CHEMICAL COMPANY, 1511-13-15 MASONIC TEMPLE, CHICAGO, ILL.

Advertisement for The Harrington & King Perforating Co. Chicago. Features an illustration of a large eagle with spread wings perched on a globe. Text includes: 'METALS PERFORATED AS REQUIRED. FOR MINING SCREENS OF ALL KINDS. STANDARD SIZES PERFORATED TIN AND BRASS ALWAYS IN STOCK.'

THE DENVER REPUBLICAN.

The Largest and Best Daily Paper in Colorado. The latest mining news from all Colorado mining camps, including Cripple Creek and Leadville. Subscription price, 65 cents per month. \$7.50 PER YEAR.

Address: DENVER REPUBLICAN, Denver, Colorado.

ELECTRICITY IN MINING

By TIMOTHY W. SPRAGUE.

The Generation of Electricity Direct from Coal—The Jacques Process—Use of Storage Batteries in Connection with Light and Power Stations—The Niagara Falls Power Transmission Installation—Use of the Multiphase Alternating Current in Power Transmission—Present Status of Electric Power Transmission in the World—The Power Transmission Plant of the Pioneer Electric Company, Utah—Improvements in Electric Locomotives for Underground Haulage—The Economy of Electric Haulage in Coal Mines—New Installations of Coal Cutting Machinery—Danger from the Use of High Voltage in Underground Circuits—Danger to Employees from Underground Locomotives—Increased Speed in Underground Circuits—Electric Percussion Drills—Electric Rotary Drills—Data of the Use of Rotary Drills in Several Pennsylvania Coal Mines—Electric Pumping and Hoisting Machinery—The Electric Hoisting Engine of the Free Silver Mines, Colorado—A Large Electric Mine Installation for South Africa—Central Stations for Electric Mining Operations—Patent Decisions on Electric Mining Machines in 1896

Part of Contents of Mineral Industry, Vol. V. See Page 7. PRICE \$5.00.

THE SCIENTIFIC PUBLISHING CO., 253 Broadway, New York.

LONDON, ENG., 20 Bucklersbury. Birmingham, Ala. Chicago, Ill. Denver, Colo. Salt Lake City, Utah. San Francisco, Cal.

DON'T ORDER MINING SCREEN

Advertisement for The Tyler Wire Works Co. featuring two images of wire mesh. Text includes: 'Unless You Get THE TYLER Double Crimped. THE ONLY MAKE'.

With the wires thoroughly crimped both ways. "We have originated," others have imitated.

THE W. S. TYLER WIRE WORKS CO., CLEVELAND, O., U. S. A.

Advertisement for The Tyler Wire Works Co. featuring two images of wire mesh. Text includes: 'MANUFACTURERS OF Extra Heavy Iron, Steel, Brass, Copper and Phosphor Bronze WIRE CLOTH. Write us direct for information. Colorado concerns will find a stock of our screens at Hendrie & Bolthoff Mfg. Co., DENVER, COLO. Main Offices and Works of THE W. S. TYLER WIRE WORKS CO. corner St. Clair Street and C. & P. R. R. Crossing, Cleveland, Ohio.'

Advertisement for Cyanide Bleaching Powder. Text includes: 'CYANIDE BLEACHING POWDER. MINERS' CHEMICALS. FUERST BROS. & CO., 2 Stone St. New York. VOLLMER AND BEATON, Lead Burners and Chemical Plumbers. Practical experience in the erection of Acid Chambers, Glover and Gay Lussac Towers, and all lead work in connection with Chemical Works, Copper Works, Smelting Works, Chlorination Works, etc. Twenty years' experience. JOHN VOLLMER, 18 Oregon St., Roxbury, Mass. D. A. BEATON, Box 84, Woburn, Mass.'

THE MINERAL INDUSTRY, VOL. V. "We cannot congratulate your company too highly on the success you have achieved in the issue of this work. The information contained therein is of the very highest value." CASTNER & CURRAN, Philadelphia, Pa.

Advertisement for Zeitschrift für Praktische Geologie. Text includes: 'ZEITSCHRIFT FÜR PRAKTIISCHE GEOLOGIE mit besonderer Berücksichtigung der Lagerstättenkunde. In Verbindung mit einer Reihe namhafter Fachmänner des In- und Auslandes herausgegeben von Max Krahnmann. Monatlich ein Heft von etwa 40 Seiten mit Uebersichtskarten, Profiltafeln u. s. w. Preis des Jahrgangs von 12 Heften M. 18- Probhefte und Prospekte stehen auf Verlangen gern zur Verfügung. Verlag von Julius Springer in Berlin N. Monbijouplatz 3.'

Advertisement for Timely Books on Gold and Silver Mining. List of books and prices: 'The Miners' Pocketbook. By C. G. W. Lock. A reference book for Miners, Geologists, Assayers, Metallurgists, etc. Flexible leather \$5.00. Practical Gold Mining. By C. G. W. Lock. A comprehensive treatise on the Origin and Occurrence of Gold-Bearing Gravels, Rocks and Ores and the Methods by which Gold is Extracted. 800 pages, 8 plates, 300 engravings. Cloth \$15.00. The Prospectors' Hand-book. By J. W. Anderson. A Guide for the Prospector and Seeker of Metal-Bearing and other valuable Minerals. Cloth, illustrated. 1.50. A Practical Treatise on Hydraulic Mining in California. By A. J. Bowie. Cloth, illustrated with tables and plates \$5.00. Getting Gold. By J. C. F. Johnson. 1.50. Wilson's Guide to the Yukon Gold Fields. Illustrated. .75. The Gold Fields of the Klondyke and the Wonders of Alaska. By Ernest Ingersoll and Henry W. Elliott. Tells all about the mines—how they were discovered—how they are worked—what fields are yet unexplored—the vast extent and possibilities of the gold region—how to get there—what is required to go—the climate of the region, also the other vast riches of Alaska, splendidly illustrated with a magnificent colored map. Cloth 1.50. A Practical Guide for Prospectors, Explorers and Miners, and for all interested in the development of metallic and other mineral deposits. Illustrated in colors by C. W. Moore. Cloth. 4.75. Gold Chlorination, Recent Improvements. By John E. Rothwell. In Vol. I of the Mineral Industry. 2.50. Present Development of the Barrel Chlorination Process. By John E. Rothwell. In Vol. V of Mineral Industry. 5.00. The Prospector's Field-Book and Guide in the Search for and the Easy Determination of Ores and Other Useful Minerals. By H. S. Osborn. Illustrated by 55 engravings. Third edition; revised and enlarged. Cloth. 1.60. Scientific Publishing Company, 253 BROADWAY, NEW YORK.'

CLASSIFIED LIST OF ADVERTISERS.

Air Compressors and Rock Drills.
 American Diamond Rock Drill Co.
 Bullock, M. C. Mfg. Co.
 Burleigh Rock Drill Co.
 Clayton Air Compressor Works.
 Colorado Iron Wks. Co.
 Lagersoll-Sergeant Drill Co.
 (See Diamond Drills.)

Amalgamators.
 Bucyrus Steam Shovel & Dredge Co.
 Colorado Iron Works Co.
 Fraser & Chalmers.
 Gates & Chalmers.

Amalgam Plates.
 Western Plating and Mfg. Co.

Anti-Friction Metals.
 Besly, Chas. H. & Co.
 Chester Steel Cast. Co.
 Illinois Sm. & Ref. Co.

Architects and Builders.
 Berlin Iron Bridge Co.
 Follock, Wm. B. & Co.

Assays and Chemists' Supplies.
 Alnsworth, Wm. McCandless Chemical Laboratory.
 Baker & Adamson. Penn. Sm. & Ref. Wks.
 Becker, Christian. Penna. Salt Mfg. Co.
 Bullock & Crenshaw. Roessler & Hasslacher Chemical Co.
 Chur, Walter. Sargent & Co., E. H.
 Denver Fire Clay Co. Solvay Process Co.
 Fair & Amend. Stand'd Fire Brick Co.
 Fair Drug Supply Co. Taylor, John, & Co.
 Fuert Bros. & Co. Troemner, Henry.
 Henry Bell Chem. Co. Western Chemical Co.

Attorneys, Corporation.
 Curdie, Smith.
 McColl & Hamilton.

Babbit's Metal.
 Besly, Chas. H. & Co.
 Illinois Sm. & Ref. Co.

Bankers and Brokers.
 Anslay & Co. Handy & Harman.
 Beaman, Wm. & Co. Redburg, Eric.
 Bonbright, W. F. & Co. Peery & Lowe.
 Bruning, E. N. Smith, C. H. & Co.
 Dabney & Parker. State Trust Co.
 Magowick & Co. C. L. Timmis & Clapp.
 Grant, E. & C.

Belting.
 Detroit Sprocket Chain Co.
 Hendrie & Bothoff Mfg. Co.
 Jeffrey Mfg Co.
 Link Belt Machinery Co.
 New York Belting & Packing Co., Ltd.
 West Lacing.

Blasting Caps.
 Metallic Cap Mfg. Co.

Blasting Batteries, Caps and Fuse.
 Climax Fuse Co. Macbeth, James & Co.
 Lea, J. H. & Co. Metallic Cap Mfg. Co.

Boiler, Compounding.
 Pearson Drug & Chemical Co.
 Parsons, J. H., Chemical Co.

Bolters.
 Colorado Iron Wks. Co. Billin, Chas. E. & Co.
 Denver Eng. Wks. Co. Wks., Ltd. Philadelph. & N. Y.
 Fairbanks, Morse & Co. Madison Iron Works.
 Fraser & Chalmers. Stillwell-Bierce &
 Pollock, Wm. B. & Co. Smith-Valle Co.
 (See Machinery.)

Brass Cloth.
 Besly, Chas. H. & Co.

Brick Machinery.
 Proese, E. H. & Co.

Bridges.
 Berlin Iron Bridge Co.
 Gillette-Herzog Mfg Co.
 (See Machinery.)

Brimestone Apparatus.
 White, Edw. F.
 (Carbon)
 New York Diamond Drill Co.
 Lexow, Theodor.
 Chain and Link Belting (See Belting.)

Chemical Engineers.
 Chembar, R. & Son.
 Penn. Salt Mfg. Co.
 McCandless Chemical Laboratory.
 Roessler & Hasslacher Chemical Co.
 Sargent & Co., E. H.
 Solvay Process Co.
 Western Chemical Co.

Chemicals.
 Baker & Adamson.
 Bullock & Crenshaw.
 Fair & Amend.
 Fair Drug Supply Co.
 Fuert Bros. & Co.
 Henry Bell Chem. Co.
 Chemical Plumbers.
 Volmer & Beaton.

Coal.
 Herwind-White Coal Mfg. Co.
 Potts, F. A., & Co.
 Stickney, Conyngham & Co.
 Ward & Olyphant.
 Coal Cutters. (See Machinery.)
 Ingersoll-Sergeant Drill Co.
 Jeffrey Mfg. Co.
 Link Belt Machinery Co.

Coal Washing Machinery.
 Cuninghame & Co.
 Jeffrey Mfg. Co.

Compressed Air Shop Tools.
 Clayton Air Compressor Works.

Compressors.
 Clayton Air Compressor Works.
 Ingersoll-Sergeant Drill Co.
 Laddaw-Dunn-Gordon Co.
 Norwalk Iron Works Co.
 Rand Drill Co.

Concentrators, Crushers, Pulverizers, Separators, Etc.
 Allis, Edw. P.
 Bradley Pulverizer Co.
 Colorado Iron Works Co.
 Denver Eng. Works Co.
 Fraser & Chalmers.
 Frue Vanner Concentrator.
 Gates Iron Works.
 Healey & Bothoff Mfg. Co.
 Krupp, F.
 Link Belt Machinery Co.
 McQuilly, R.
 Raymond Bros. Impact Pulv. Co.
 Stedman Foundry & Mach. Co.
 Surman, J. L. & Co.
 Waterhouse-Swenson Co.
 (See Machinery.)

Contractors.
 Conveying Belts.
 Robins Conveying Belt Co.

Copper Dealers and Producers.
 American Metal Co.
 Arizona Copper Co.
 Atlantic Mining Co.
 Balbach & Ref. Co.
 Baltimore Cop. Wks.
 Bath, E. & Son.
 Bridgeport Copper Co.

Canadian Copper Co.
 Cooper Green Mfg. Co.
 Detroit Cop'r Mfg. Co.
 Cerrugated Iron
 Berlin Iron Bridge Co.
 Crucibles, Graphite, Etc.
 Baker & Co. Standard Fire Brick Co.
 Denver Fire Clay Co.
 Dixon, Jos. Crucible Co.
 Garden City Sand Co.
 Cyanide.
 Fuert Bros. & Co.
 Roessler & Hasslacher Chemical Co.
 Cyanide Potash.
 Fuert Bros. & Co.
 Gas Light & Coke Co.
 Roessler & Hasslacher Chem. Co.
 Schoellkopf, Hartford & MacLagan.
 Williams Mfg. Co.

Diamonds.
 Lexow, Theodor.
 Diamond Drills.
 American Diamond Rock Drill Co.
 Bullock Mfg. Co., M.C.
 Lexow, Theodor.
 Sullivan Machinery Co.
 (See Air Compressors and Rock Drills.)

Draughtmen.
 Young, Wm. R.

Drawing Materials.
 Altmeyer Theo. & Son
 Besly, Chas. H. & Co.
 Huff & Berger.
 Gurley, W. & L. E.
 Keuffel & Esser Co.
 (See Engineering Instruments.)

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

Dryers.
 Brown, Horace F. Denver Eng. Wks. Co.
 Cummert & Son Co. Dunbar, R., & Son.

Dump Cars.
 Colorado Iron Wks. Co. Hunt Co., C. W.
 Denver Eng. Works Co. Fairbanks, Morse & Co.
 Frue & Bothoff Fraser & Chalmers.
 Mfg. Co. Truax Mfg. Co.

Educational Institutions.
 Arizona School of Mining.
 Chicago School of Assaying.
 Columbia University.
 Columbian University.
 International Correspondence School.
 Lehigh University.
 Mass. Inst. of Technology.
 Michigan Mining School.
 Royal Mining Academy.
 University of Arizona.

Electrical Batteries.
 Macbeth, James, & Co.

Electrical Machinery and Supplies.
 Besly, Chas. H. & Co. Okonite Co., Ltd.
 Chicago Edison Co. Repauno Chem. Co.
 Denver Eng. Wks. Co. Westinghouse Elec. Mfg. Co.
 Jeffrey Mfg. Co. Weston Electrical Instrument Co.
 Link Belt Mach. Co.

Elevators, Conveyors and Hoisting Machines.
 Brown Holist. & Conv. Hunt, C. W., Co.
 Mach. Co. Jeffrey Mfg. Co.
 Caldwell, H. W. & Co. Lambert Hoisting Engine Co.
 California Wire Wks. Link Belt Mach. Co.
 Cooper, Hewitt & Co. Nelsonville Foundry & Machine Co.
 Colorado Iron Wks. Co. Robert's Mfg. Co.
 Denver Eng. Wks. Co. Vulcan Iron Works.
 Detroit Sprocket Chain Co.
 Fraser & Chalmers.
 (See Wire Rope Tramway and Machinery.)

Knery Wheels.
 Besly, Chas. H. & Co.
 New York Belting & Packing Co. Ltd.

Engines, Gas, Steam, Metallurgists
 See Directory Pages 4, 5 and 6.

Engineers' Instruments and Supplies.
 Altmeyer, T. & Son.
 Brandis, F. E. Sons & Co.
 Huff & Berger.
 Bullock & Crenshaw
 Gauth & Co.
 Gurley, W. & L. E.
 Engines.
 Bullock, M. C. Mfg. Co. Risdon Iron Works.
 Colorado Iron Wks. Co. Stillwell-Bierce &
 Fairbanks, Morse & Co. Smith-Valle Co.
 Fraser & Chalmers. Tod, William & Co.
 Lambert Hoisting Engine Co. Union Iron Works.
 Lidgerwood Mfg. Co. Union Gas Engine Co.
 Philadelphia Eng. Mach. Co. Webster, Camp & Lane
 Works, Ltd. (See Machinery.)

Excavators.
 Bucyrus Steam Shovel & Dredge Co.
 Martin Steam Shovel Co.
 Vulcan Iron Works.

Fire-Brick and Clay.
 Chur, Walter.
 Denver Fire Clay Co.
 Standard Fire Brick Co.

Fuortsparr.
 Fuert Bros. & Co.

Furnaces.
 Billin, Chas. E. & Co. Hoskins, Wm.
 Brown, Horace F. Moore, S. L., & Son Co.
 Denver Fire Clay Co. Pollock, Wm. B. & Co.
 Sargent & Co., E. H.
 (See Machinery.)

Fuses.
 Ingersoll-Sergeant Drill Co.
 Macbeth & Co.

Gas Engines.
 Hercules Gas Engine Works
 Union Gas Engine Co.

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

Gauges, Recording, Etc.
 Bristol Co.

Gear Drives.
 Besly, Chas. H. & Co. Denver Eng. Wks. Co.
 Chester Steel Cast. Co. Fraser & Chalmers.
 (See Machinery.)

Grease, Graphite, Etc.
 Besly, Chas. H. & Co. Fuert Bros. & Co.
 Dixon, Jos. Mfg. Co.

Heavy Machinery.
 Colorado Iron Works Co.
 Denver Eng. Works Co.
 Fraser & Chalmers.

Hose & Rubber, Etc.
 New York Belting & Packing Co. Ltd.

Injectors.
 Jenkins Bros.
 Lunkenheimer Co.

Insulated Wires and Cables.
 Okonite Co., Ltd.

Insurance Companies.
 Hartford Steam Boiler Inspect'n and Ins. Co.
 Mutual Life Insurance Co.
 Iron Ore.
 Spanish-American Iron Co.

Lead Burners.
 Volmer & Beaton.

Lead Linings for Chlorination Tubs.
 Raymond Lead Co.

Link Belting. (See Belting)
 Link Belt Machinery Co.

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

Lubricators.
 Detroit Lubricator Co.
 Lunkenheimer Co.

Machinery.
Dealers in Mining, Milling and Other Machinery
 Allis, Edw. P. & Co.
 American Diamond Rock Drill Co.
 Bacon, E. C.
 Besly, Chas. H. & Co.
 Billin, Chas. E. & Co.
 Blake, T. A.
 Bradley Pulverizer Co.
 Bullock, M. C. Mfg. Co.
 Caldwell, H. W. & Co.
 Colorado Iron Works Co.
 Cuninghame & Co.
 Denver Eng. Wks. Co.
 Fairbanks, Morse & Co.
 Fraser & Chalmers.
 Gates Iron Works.
 Gillette-Herzog Mfg. Co.
 Hammond, Mfg. Co.
 Hendrie & Bothoff Mfg. Co.
 Hodge, C. J.
 Ingersoll-Sergeant Drill Co.
 Jeffrey Mfg. Co.
 Jessop, W. & Sons, Ltd.
 Lambert Hoisting Engine Co.
 Lidgerwood Mfg. Co.
 Krupp, F.
 McCully, R.
 Mecklenburg Ir. Wks. Mine & Smelter Supply Co.
 Managense Steel.
 Taylor Iron & Steel Co.

Metal Dealers.
 American Metal Co.
 Am. Zinc-Lead Co.
 Baker & Co.
 Bath, Henry & Son.
 Besly, Chas. H. & Co.
 Bridgeport Copper Co.
 Elliott's Metal Co., Ltd.
 Eureka Co.
 James & Shakspeare.
 Johnson, Matthey & Co.
 Lambert's Wharf Co.
 Lawson Bros.
 Lehigh Smelting Co.
 James & Shakspeare.
 Johnson, Matthey & Co.
 Lambert's Wharf Co.
 Lawson Bros.
 Lehigh Smelting Co.

Mathiessen & Hegeler Zinc Co.
 Montana Ore Purchasing Co.
 Orford Copper Co.
 Pass, C., & Son, Ltd.
 Phelps, Dodge & Co.
 Picher Lead Co.
 Raymond Lead Co.
 Spanish-American Iron Co.
 Stern, Julius & Co.
 Tod, William & Co.
 Vivian, Younger & Bond.

Metallurgical Works and Ore Purchasers' Processes.
 Amer. Zinc Lead Co.
 Baker & Co.
 Balbach Sm. & Ref. Co.
 Baltimore Copper Wks.
 Bridgeport Copper Co.
 Canadian Copper Co.
 Colorado Iron Wks. Co.
 Con. Kas. City S. & R. Co.
 Denver Eng. Wks. Co.
 Elliott's Metal Co., Ltd.
 Eureka Co.
 James & Shakspeare.
 Johnson, Matthey & Co.
 Lambert's Wharf Co.
 Lawson Bros.
 Lehigh Smelting Co.
 Mathiessen & Hegeler Zinc Co.
 Montana Ore Purchasing Co.
 Orford Copper Co.
 Pass, C., & Son, Ltd.
 Phelps, Dodge & Co.
 Picher Lead Co.
 Raymond Lead Co.
 Spanish-American Iron Co.
 Stern, Julius & Co.
 Tod, William & Co.
 Vivian, Younger & Bond.

Mine Cars.
 Colorado Iron Works Co.
 Denver Eng. Wks. Co.
 Fairbanks, Morse & Co.
 Hendrie & Bothoff Mfg. Co.
 Hunt, C. W., Co.
 Nelsonville Foundry & Machine Co.
 (See Machinery.)

Mine, Mill and Smelters' Supplies.
 Cuninghame & Co.
 Fairbanks, Morse & Co.
 Denver Eng. Wks. Co.
 Gates Iron Works.
 Roessler & Hasslacher Chemical Co.
 (See Machinery.)

Mining and Land Concessions.
 American Dev. & Mfg. Detroit Copper Mfg. Co.
 Co. Eureka Co.
 Atlantic Mfg. Co. Isabella Gold Mfg. Co.
 Arizona Copper Co. Smuggler-Union Mfg. Co.
 Copper Queen Con. Mfg. Co.
 Nickel.
 Canadian Copper Co.
 Orford Copper Co.

Ore Cars.
 Colorado Iron Works Co.
 Gillette & Herzog.

Ore Hoisters.
 Brown, Horace F.
 Colorado Iron Works Co.
 Cummert, F. J., & Sons Co.
 Dunbar, R., & Son.

Ore Feeding Works.
 Colorado Iron Wks. Co.
 Hunt, F. E.
 Montana Ore Purchasing Co.
 Ing. Co.
 Ledoux & Co.

Packing and Pipe Coverings.
 Brandt, Randolph.
 Jenkins Bros.
 Robertson, J. L., & Son.
 (See Machinery.)

Perforated Metals.
 Altmeyer, T. Perf. Metal Co.
 Frascino, King Perforating Co.
 Harrington & King Perforating Co.

Peroxide of Sodium.
 Roessler & Hasslacher Chemical Co.

Phosphor-Bronze.
 Phosphor-Bronze Smelting Co.

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

Pipes.
 Billin, Chas. E. & Co.
 Fairbanks, Morse & Co.
 Fuert Bros. & Co.
 Weycock, A., & Sons.

Platinum.
 Baker & Co.
 Johnson, Matthey & Co.
 Plumbago (See Graphite.)

Powder.
 Atlantic Dynamite Co.
 Ingersoll-Sergeant Drill Co.

Fertilizers.
 American Fertilizer.
 American Fertilizer.
 Armstrong, F. J., & Stand.
 British Columbia Mining Record.
 Denver Republican.
 El Mino Mexico.
 Indian Engineering.

Pumps.
 Billin, Chas. E. & Co.
 Cameron, A. S., Steam Pump Works.
 Clayton Air Com. Wks.
 Denver Eng. Wks. Co.
 Fairbanks, Morse & Co.
 Pyrites.
 Fuert Bros. & Co.

Quarrying Machines.
 Ingersoll-Sergeant Drill Co.
 Rand Drill Co.
 Sullivan Machinery Co.
 Quicksilver.
 Eureka Co.

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

Railroad Supplies and Equipment.
 Hunt, C. W., Co.
 Porter, H. K., & Co.
 Robinson & Orr.

Regulators, Hammer, Heat, Etc.
 Eddy Valve Co.
 Jenkins Bros.

Rock Drills. (See Air Compressors.)

Rolling.
 Berlin Iron Bridge Co.
 Phelps, Dodge & Co.

Rubber Goods.
 New York Belting & Packing Co., Lt.
 Scapes.
 Fairbanks, Morse & Co.
 Sorensen.
 Altmeyer, R. Perf. Metal Co.
 Colorado Iron Works Co.
 Denver Eng. Wks. Co.
 Fraser & Chalmers.
 Gates Iron Works.
 Harrington & King Perforating Co.
 Link Belt Machinery Co.
 Ludlow-Saylor Wire Co. (See Machinery)
 Tyler, W. S., Wire Works Co.

Second Hand Machinery.
 McArthur Bros. Robinson & Orr.
 Robertson, J. L. & Son.
 Scales and Dies. Crescent Steel Co.
 Chester Steel Cast. Co. Denver Eng. Wks. Co.
 Corum steel works. Fraser & Chalmers.
 Colorado Iron Wks. Co. Gates Iron Works.
 Hodge, C. J.

Shevels (Steam).
 Bucyrus Steam Shovel Co.
 Marion Steam Shovel Co.

Smelting and Refining Works.
 Balbach S. & Ref. Co. Orford Copper Co.
 Baltimore Cop'r Wks. Penna. Salt Mfg. Co.
 Bridgeport Copper Co. Penn. Smelting and Refining Works.
 Con. Kas. City S. & R. Co. Photo Bronz Smelting Co.
 Elliott's Metal Co., Ltd. State Ore Smelting Co.
 Gillette-Herzog Mfg Co.
 Ing. Co. Orford Copper Co.
 Spanish-American Iron Co.
 Stern, Julius & Co.
 Tod, William & Co.
 Vivian, Younger & Bond.
 Russell Process Co.
 Waterhouse-Swenson Co.

Steel Balls, Castings, Rolls, Drill Steel.
 Bethlehem Iron Co. Crescent Steel Co.
 Chester Steel Cast. Co. Taylor Iron & Steel Co.
 Chroms Steel Works. Pollock, Wm. B. & Co.
 Jessop Wm. & Son Robinson & Orr.
 Ltd. Taylor Iron & Steel Co.
 Dealers. (See Metal Dealers.)

Sulphur Apparatus.
 White, Edward F.

Tanks.
 Billin, Chas. E. & Co. Colorado Iron Works Co.
 Denver Eng. Wks. Co.
 Fairbanks, Morse & Co.
 Gates Iron Works.
 Williams Mfg. Co.

Telegraph Wires and Cables.
 Okonite Co., Ltd.

Teels.
 Besly, Chas. H. & Co.
 Pratt & Whitney Co.

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

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

Turbine Water-Wheels.
 American Impulse Wheel Co.
 Loeffel, Jas. & Co.
 Pelton Water Wheel Co.
 Stillwell-Bierce & Smith Valle Co.

Valves.
 Eddy Valve Co.
 Fairbanks, Morse & Co.
 Jencks Bros.
 Lunkenheimer Co.
 Powell, Wm., Co.

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

Voltmeters.
 Weston Electrical Instrument Co.

Waste Water-Wheels.
 New York Belting and Packing Co., Ltd

Water-Wheels.
 American Impulse Wheel Co.
 Loeffel, James, & Co.
 Pelton Water Wheel Co.
 Stillwell-Bierce & Smith-Valle Co.

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

Wharfage.
 Lambert's Wharfage Co.

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

Wire Cloth.
 Atchison, R. Perf. Metal Co.
 Harrington & King Perforating Co.
 Tyler, W. S., Wire Works Co.

Windmills.
 Fairbanks, Morse & Co.

Wire Ropes & Wire.
 Besly, Chas. H. & Co. Phelps, Dodge & Co.
 Broderick & Bascom E. B'ling, J. A. Sons & O.
 Rope Co. Ropeway Syndicate
 California Wire Wks. Ropeway Syndicate
 Cooper Hewitt & Co. Trenton Iron Co.
 Hunt, C. W., Co.
 Wire Rope Tramway.
 Brown Holist. & Conv. Roebing, J. A., Son
 & Co. & Co.
 California Wire Wks. Ropeway Syndicate
 Colorado Iron Works Co. Steel.
 Denver Eng. Wks. Co. Roberts Mfg. Co.
 Fraser & Chalmers. Vulcan Iron Works
 & Co.

Wood Water Pipe.
 Weycock, A. & Son

POSITIONS VACANT

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.

1538 WANTED—MINING SUPERINTENDENT for coal mines. Must be energetic, reliable, good manager of men and have practical knowledge of the most economic methods and management. Address giving references and stating experience and salary expected, WEST VIRGINIA, ENGINEERING AND MINING JOURNAL.

1539 WANTED—MAN OF LARGE EXPERIENCE in fine concentration of lead-iron ores carrying gold and silver, with rolls, trommels, jigs and vanners. Must also be thoroughly conversant with stamps and amalgamating plates. To a competent man entire charge of property in the Southwest, making seven tons daily, will be given. Must furnish gilded references. Address CONCENTRATION, ENGINEERING AND MINING JOURNAL.

1540 WANTED—A BRIGHT, ACTIVE young man who has had experience with mathematical instruments, architects' and engineers' supplies and drawing instruments, to take charge of that department in a large store in Seattle, Wash. Position vacant and salary fair. Address KLONDYKE, ENGINEERING AND MINING JOURNAL.

1541 WANTED—CONTRACTOR'S FOREMAN on work within 100 miles of New York. One thoroughly experienced and familiar with all the latest methods of working rock drills, blasting and using steam shovels and railroad track work. Send copy of references and state salary required. Address H., ENGINEERING AND MINING JOURNAL.

1542 WANTED—STEAM DRILL REPAIR man to take charge of all repairs on fifteen Sergeant drills. Send copy of references and state salary wanted. Address D., ENGINEERING AND MINING JOURNAL.

1543 WANTED—ASSAYER, RAPID AND exact, with about four or five years' experience, a young man preferred, to go at once to British Guiana. Address, with references, etc., E. E. L., ENGINEERING AND MINING JOURNAL.

1544 MEN WANTED FOR BRITISH Guiana, familiar with diamond drills. Address, stating experience and references, X. Y., ENGINEERING AND MINING JOURNAL.

1545 WANTED—SUPERINTENDENT FOR Sulphuric Acid Works. Give particulars. Address ACID, ENGINEERING AND MINING JOURNAL.

1546 WANTED—CHEMIST AND METAL- lurgist with special experience in working zinc ores, as well as erection and management of plant for that purpose. State previous experience. Address ZINC, ENGINEERING AND MINING JOURNAL.

1547 WANTED—A THOROUGHLY COM- petent mining engineer, who has had experience in Alaska, and desires to join an exploring expedition that will start for the Yukon on March 1st, 1897. Address ALASKA, ENGINEERING AND MINING JOURNAL.

1548 THERE IS A VACANCY ON THE staff of the ENGINEERING AND MINING JOURNAL. Applicants should have had experience in mining and in editorial work. Address EDITOR, ENGINEERING AND MINING JOURNAL.

1549 WANTED—A COMPETENT ENGI- neer to take charge of the construction of a railroad, where a permanent situation may be secured, if references, work and business connections are satisfactory. Address RAILROAD AND MINE, ENGINEERING AND MINING JOURNAL.

SITUATIONS WANTED.

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

A MINING ENGINEER, AGE 26, DESIRES position; has energy, executive ability, experience in management and direction of large forces of men and familiar with business methods. Thorough assayer, chemist and bookkeeper. Address THOROUGH, ENGINEERING AND MINING JOURNAL. No. 18,094, Nov. 6.

A MAN, 27 YEARS OLD, WITH TECH- nical education, previously assistant chemist at a large smelter and now with a consulting engineer, desires a position in the fall with a milling, smelting or refining company. Good references. Address C. D., ENGINEERING AND MINING JOURNAL. No. 18,067, Oct. 9.

CHEMIST AND ASSAYER, WITH TECH- nical education, extensive business experience, formerly chemist for a large smelter, desires position with a mining, milling or smelting company. Speaks Spanish. Best references. Address M. R. K., ENGINEERING AND MINING JOURNAL. No. 18,098, Oct. 9.

GRADUATE IN MINING FROM A TECH- nical school desires position of some kind; 22 years of age; strong and robust; not afraid of work; begin on low salary. Address H. W., ENGINEERING AND MINING JOURNAL. No. 18,105, Oct. 2.

MINING ENGINEER, 30 YEARS OF AGE, nine years' experience with gold and silver mining companies of the West, desires a responsible position with any reliable parties. Experienced both in quartz and gravel mining. Good references from all former employers. Address B., ENGINEERING AND MINING JOURNAL. No. 18,095, Oct. 2.

A MINING ENGINEER, ENERGETIC, TECH- nical education, experienced in the management of men, 10 years' practice in charge of mines, desires position as manager or superintendent; speaks Spanish; excellent references. Address FILON, ENGINEERING AND MINING JOURNAL. No. 18,097, Nov. 6.

SUPERINTENDENT OF CHEMICAL works, manufacturing sulphuric, nitric, mixed acids, hydrochloric and minor products. Is desirous of change; first-class references. Address MODERN, ENGINEERING AND MINING JOURNAL. No. 18,087, Oct. 2.

MINING ENGINEER, ALSO COMPETENT Chemist, desires position as superintendent, engineer or ore buyer. Satisfactory references furnished. Address MONTANA, ENGINEERING AND MINING JOURNAL. No. 18,099, Oct. 2.

ASSISTANT SUPERINTENDENT OF HY- draulic Gold Mines, with first-class references and long practical experience, will shortly be open to engagement. Address T., ENGINEERING AND MINING JOURNAL. No. 18,103, Oct. 16.

WANTED BY MAN OF EDUCATION AND 12 years' experience, age 35, the management of a mining or milling property. Can furnish exceptional credentials. Address W., 548 Equitable Building, Denver, Colo. No. 18,104, Oct. 16.

A MINING ENGINEER, FAMILIAR WITH mining, able to develop and work a mine, desires position with prospecting party. References given. Address P. H., ENGINEERING AND MINING JOURNAL. No. 18,098, Oct. 16.

A YOUNG MECHANICAL ENGINEER, graduate of Cornell University, having been variously employed as mechanical draughtsman, book-keeper, mine engineer and assayer near Seattle, Wash., for the past seven years, would like a position with some works or mechanical or mining engineer or the agency for some Eastern concern in the Northwest. Good references. Address A. R., ENGINEERING AND MINING JOURNAL. No. 18,106, Oct. 2.

WANTED—POSITION AS MANAGER OR Superintendent by a mining and metallurgical engineer with technical education and 16 years' experience in Colorado. Specialty—Fine concentration. Highest references. Address G. S. A., ENGINEERING AND MINING JOURNAL. No. 18,107, Oct. 23.

MINING ENGINEER, HAVING OVER 20 years' experience in gold and silver mines, and proficient in the Spanish language, desires employment as manager, or would be willing to examine and report on mining properties in any part of the world; is a good surveyor and assayer; member of the American Institute of Mining Engineers; excellent references and testimonials. Address MINING ENGINEER, 37 Seventh Avenue, New York City. No. 18,100, Oct. 2.

A THOROUGHLY PRACTICAL MINING Engineer of varied experience in the Western States, desires the management of an operative mine; perfectly familiar with concentration, cyanide, chlorination and the treatment of free and complex ores. Resigning present position owing to mine changing hands. Good surveyor and assayer, and fully competent to take full charge as resident manager or superintendent; excellent references. Address, in the first instance, CAPABLE, ENGINEERING AND MINING JOURNAL. No. 18,101, Oct. 2.

MANAGER OR MINE SUPERINTENDENT of extended experience, just returned after two years of successful operating in Central America, desires position with a strong company, either in prospect development or in established mining. Is a good organizer and fully posted as to details in mining both in the Northern countries and in the tropics. Best of testimonials and references. Address EXPERIENCED, ENGINEERING AND MINING JOURNAL. No. 18,108, Nov. 20.

\$7,800 GIVEN AWAY TO PERSONS making the greatest number of words out of the phrase "Patent Attorney Wedgerburn." For full particulars write the National Recorder, Washington, D. C., for sample copy containing same.

CONTRACTS OPEN.

WATER SUPPLY FROM WELLS.—Sealed proposals will be received by the City of Lebanon, Pa., for the development and furnishing of a guaranteed additional water supply of at least 1,000,000 gallons of pure soft water daily. The same to be furnished by means of wells bored or drilled in the vicinity of its present water supply, or from springs in said vicinity, which do not at present flow into the city's dams. Said bids will be received until Monday, October 18th, 1897, at 7 o'clock, p. m. Each bid must be accompanied by certified check for \$500 to insure the entering into contract upon being notified of the acceptance of the bid. The city reserves the right to reject any and all bids. Full specifications can be had by addressing CITY CLERK, Lebanon, Pa.

SEWERS.—Sealed proposals will be received by the Board of Sewer Commissioners of the City of Chillicothe, Ohio, at their office in said city, until 12 o'clock noon, on Monday, October 4th, 1897, for furnishing the necessary labor and materials for the improvement of Sewer District Number One (1) of said city by constructing main, sub main, and lateral sewers in said district. Each bid must be accompanied by a certified check for \$500, payable to the order of the Treasurer of the City of Chillicothe, as a guarantee of the good faith of the bidder, that if the bid is accepted, a contract will be entered into and the performance of it properly assured. Bidders are required to use the printed forms which will be furnished on application. Notice is hereby given to bidders that a clause will be required to be inserted in the contract providing that only residents of Chillicothe shall be employed as laborers in the work of constructing said sewers. The Board reserves the right to reject any or all bids.

DAM AND RESERVOIR.—Sealed proposals for building an intake dam and gate house and a distributing reservoir will be received by the Water Commissioners at the Town Hall, Westfield, Mass., until 12 o'clock noon, October 27th, 1897. Each bid must be accompanied by a certified check for five hundred dollars (\$500) payable to the Board of Water Commissioners of the town of Westfield, as a guarantee of good faith, in the usual manner. Plans can be seen and blank forms of specifications, contract and proposals obtained at the office of Town Engineer, Town Hall, Westfield, Mass. The Water Commissioners reserve the right to reject any and all bids.

LOCKS.—U. S. Engineers Office, Custom House, Cincinnati, O.—Sealed proposals for building locks numbered two, three, four and five, Ohio River, will be received here until 2 p. m. October 26th, 1897, and then publicly opened. Information furnished on application to MR. WILLIAM MARTIN, Davis Island Dam (P. O. Box 670, Pittsburg, Pa.) or to W. H. HEUER, Maj. Engrs.

(Continued on Page 21.)

THE ENGINEERING AND MINING JOURNAL

ADVERTISING RATES.
(NONPAREIL MEASUREMENT.)

Lines.	Inches.	Regular Edition 1 time.	Once Month 4 times.	Three Months 13 times.	Six Months 26 times.	Nine Months 39 times.	Twelve Months 52 times.
6	3/4	\$2	\$5	\$12	\$20	\$28	\$4
9	3/4	6	16	36	64	84	11
12	1	3	8	20	35	47	60
15	1 1/4	4	9	24	42	57	73
18	1 1/2	4	11	29	50	68	87
21	1 3/4	5	12	33	58	78	100
24	2	5	14	38	66	89	112
27	2 1/4	6	16	42	72	98	125
30	2 1/2	7	17	46	79	108	137
33	2 3/4	7	19	50	86	117	149
36	3	8	20	54	93	126	161
39	3 1/4	9	21	58	99	135	172
42	3 1/2	9	23	61	106	143	183
45	3 3/4	10	25	65	112	151	194
48	4	10	26	68	118	160	204
51	4 1/4	11	28	75	129	175	224
54	4 1/2	12	30	81	141	190	243
57	4 3/4	13	32	87	151	205	261
60	5	14	35	93	161	219	279
63	5 1/4	15	37	99	171	232	296
66	5 1/2	16	39	105	181	242	313
69	5 3/4	17	41	109	190	258	329
72	6	17	43	115	200	271	346
75	6 1/4	18	45	121	209	284	362
78	6 1/2	19	47	126	216	296	378
81	6 3/4	20	49	132	228	309	394
84	7	20	51	137	238	322	411
87	7 1/4	21	53	143	248	336	428
90	7 1/2	22	55	149	258	349	446
93	7 3/4	23	57	154	268	363	464
96	8	24	59	160	278	377	482
99	8 1/4	25	61	166	288	391	501
102	8 1/2	26	63	171	298	405	520
105	8 3/4	27	65	177	308	419	539
108	9	28	67	182	318	433	558
111	9 1/4	29	69	188	328	447	577
114	9 1/2	30	71	193	338	461	596
117	9 3/4	31	73	200	348	475	615
120	10	32	75	205	358	489	634
123	10 1/4	33	77	211	368	503	654
126	10 1/2	34	79	216	378	517	674
129	10 3/4	35	81	222	388	531	694
132	11	36	83	228	398	545	714
135	11 1/4	37	85	233	408	559	734
138	11 1/2	38	87	239	418	573	754
141	11 3/4	39	89	244	428	587	774
144	12	40	91	250	438	601	794

ADVERTISING RATES IN £ s. d.

	PER INSERTION.		
	Series of 13	Series of 26	Series of 52
HALF-INCH	£ s. d. 0 3 9	£ s. d. 0 3 3	£ s. d. 0 2 9
ONE INCH	0 6 6	0 5 9	0 4 9
TWO INCHES	0 12 0	0 10 6	0 9 0
THREE INCHES	0 17 0	0 14 9	0 13 0
FOUR INCHES	1 1 6	0 18 9	0 16 3
QUARTER-PAGE	1 18 6	1 13 0	1 8 9
HALF-PAGE	3 9 0	2 19 0	2 10 0
ONE PAGE	6 9 0	5 12 0	4 17 6

SPECIAL POSITIONS.

Front page, double regular rates. Back outside page, 80 per cent. above regular rates. Page facing editorials, 50 per cent. above regular rates. Page facing market reports, 25 per cent. above rates. Inside front cover, 50 per cent. above regular rates. Inside back cover, 25 per cent. above regular rates.

LANDS AND MINES FOR SALE.

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

**KLONDIKE IN MISSOURI.
LEAD MINES.**

For particulars on gilt-edge properties for sale or lease
Address **E. HEDBURG, M. E.,**
Joplin, Mo.

FOR SALE or LEASE.

A Patented Gold Mine near Junction Creek, La Plata
County, Colo. About 340 feet of work on tunnels and
shafts. Shows good ore. Lowest mill run \$29.50 per
ton. Needs reduction works. Can be had for about
one-tenth of price for similar property in a "boomed"
district. For particulars address

GARBANATI & HICKS, Lawyers,
Durango, Colo.

MINING PROPERTY

FOR SALE.

All the property, real and personal, of the

Lac La Belle Mining Company

SITUATED IN KEWEENAW COUNTY, MICH.

Embracing 3,655 acres on the mineral range, 18,768
acres in fee, 1,98 acres surface only, making 20,756 acres
south of mineral range, with the hardwood still stand-
ing, together with seven miles of railroad to stamp
mill at Lac La Belle, with outlet thence to Lake Supe-
rior. Plant at the mine and Lake all in good order and
ready for operation. Inquire for further particulars
from

W. R. VIVIAN, Supt.,
Delaware Mine P. O.,
Keweenaw Co., Mich.

SLATE PROPERTY.

The advertiser has had placed in his hands for sale
one of the most valuable slate bearing properties in
Canada, comprising an area of 1,144 acres, through the
entire length of which there exists a well defined slate
band of about 1,000 feet in width, which has been thor-
oughly examined and favorably reported upon by com-
petent mining engineers. The position of the property
is most advantageously situated, being both in
proximity to unfailing water power and railroad ship-
ping facilities. It is distant from Montreal 73 miles
from Quebec 96 miles, and from Portland 220 miles
Further information furnished on application to

Mr. W. M. SMAILL,
P. O. Box 177, Montreal, Canada.

DIVIDENDS.

ISABELLA GOLD MINING COMPANY.
COLORADO SPRINGS, COLO., June 10, 1897.

DIVIDEND NO. 11.
A dividend of ONE-HALF CENT PER SHARE
(\$11.250) has been declared, payable June 25th, 1897, to
stockholders of record June 15th, 1897.
The stock transfer books will be closed June 15th,
1897, at 3 o'clock p. m., and will be reopened on the
morning of June 26th, 1897.

PERCY HAGERMAN,
Vice-President and Treasurer.

**THE FORTUNA GOLD MINING AND MILL-
ING COMPANY** has just declared its thirteenth
consecutive monthly dividend of TEN CENTS a share,
payable at the company's office, 66 Broadway. Books
close September 28th, and open October 1st, 1897.
B. L. HARDING, Secretary.

SAMPLE COPIES OF

THE ENGINEERING AND MINING JOURNAL
SENT FREE ON APPLICATION.

SMUGGLER-UNION MINING CO.,

804 Boston Building, Denver Colo.
Mines at Telluride, San Miguel Co., Colorado.

DIRECTORS:
J. A. Porter, President; Richard Pearce, V. Pres.;
James B. Grant, A. Eilers, Wm. A. Bell,
Wm. D. Bishop, Jr.,
A. H. Fowler, Sec'y & Treas.

**MACHINERY AND SUPPLIES
FOR SALE.**

MACHINERY

FOR SALE—CHEAP FOR CASH.

Hoisting Engines, Air Compressors, Rock Drills,
Rock Crushers, Dump Cars, Channelling Machines,
Steam Pumps, Steam Shovels, Light Locomotives,
etc., all in good condition.

WILLIS SHAW,
506 N. Y. Life Building, CHICAGO.

FOR SALE.

One 50-ton Silver-Lead Water Jacket Furnace, Boiler,
Engine, Blower, Rock Breaker, Scales, Shafting, Pul-
leys, Belting, Tools and all fittings and fixtures com-
plete and new, built by Fraser & Chalmers; also one
16" x 42" Hamilton Corliss Engine; one 12" x 20" double
cylinder Hoisting Engine. Will be delivered f. o. b.
W. E. DAME, Cerrillos, N. Mex.

MISCELLANEOUS WANTS.

SECOND-HAND RAILS.

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

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

WANTED TO LEASE TAILING DUMPS

At mill, steam or water power. State full particulars.
TAILINGS,
ENGINEERING AND MINING JOURNAL.

JULIUS STERN & CO., NURENBERG, GERMANY,
METAL MERCHANTS,

Want Agency for Pig Lead, Copper and Aluminium.
References: Ladenburg, Thalmann & Co., New York.

**THE
MINERAL
INDUSTRY.**

**Its Statistics,
Technology
and Trade**

**in the United States
and other Countries**

VOL. V.

Edited by

RICHARD P. ROTHWELL.

Extremely valuable technical articles, especially
prepared for this work by eminent authorities, give
the most recent progress in each department of mining
metallurgy and chemical industry, including the best
methods of production, the uses and properties of
nearly all the minerals and metals.

The universal opinion of the highest authorities
throughout the world is that this great Encyclopedia of
the Mineral Industry is the most complete, most
accurate and in all respects the most valuable con-
tribution ever made to this department of human
knowledge.

For Further Particulars See Page 2.
PRICE \$5.00.

SCIENTIFIC PUBLISHING CO.
253 Broadway, New York.

**CHARLES J. HODGE, LAKE SUPERIOR IRON WORKS,
HOUGHTON, MICH.**
General Builders of Mining Machinery.

Hodge Patent Iron Jig.
Capacity, 20 to 30 tons daily.
The most compact jig made.

Hodge Standard Stamp Shoes and Dies.
Awarded First World's Fair Prize.
There are none superior.

THE AMERICAN EXPLORATION COMPANY

32 LIBERTY STREET, NEW YORK CITY.

S. H. STEELE, Sec'y and Treas.

S. H. STEELE, Sec'y and Treas.

Reliable Examinations and Reports Made on All Kinds of Mining Properties

Address correspondence to **W. H. NICHOLS, JR.,** Managing Director.

CONTRACTS OPEN.

Continued from Page 20.

WATER-WORKS AND ELECTRIC LIGHT

Plants.—Sealed proposals for constructing a system of
water-works will be received by the Commissioners of
Public Works of the town of Union, S. C., until four
o'clock p. m., the twelfth day (12) day of October, 1897,
and opened immediately thereafter. Also at the same
time and place sealed proposals will be received by
said Commissioners for constructing an electric light-
ing plant. Each bid must have certified check for five
hundred dollars as per specifications. The Commis-
sioners reserve the right to reject any or all bids.
Specifications and further information furnished on
application to the Chairman.

ENGINE HOUSES, Etc.—

On Thursday, Octo-
ber 7th, the Hanover Construction Company will let
contracts at its office in Tuscaloosa, Alabama, for the
building and structure over about 200 miles of main
track between Columbus, Mississippi, and Montgomery,
Alabama. The structures to be let on the day men-
tioned will include the following buildings, to-wit:
Sixteen depot buildings for way stations; 1 passenger
depot building for Tuscaloosa; 1 freight depot building
for "uscaloosa; 1 freight depot building for Mont-
gomery. For Tuscaloosa: One engine house; 1 sand
house; 1 oil house; 1 coal bin. For Montgomery: One
engine house; 1 shop building; 1 sand house; 1 oil
house. Twenty sets of section houses with tool house
for each. The placing of nine water stations, consist-
ing of tanks, pumping engines with oilers, etc.

WATER - WORKS AND ELECTRIC LIGHT

Plants.—Sealed proposals for constructing a system of
water-works will be received by the Commissioners of
Public Works of the town of Union, S. C., until four
o'clock p. m., the twelfth (12th) day of October, 1897,
and opened immediately thereafter. Also at the same
time and place sealed proposals will be received by
said Commissioners for constructing an electric lighting
plant. Each bid must have certified check for five
hundred dollars as per specifications. The Commis-
sioners reserve the right to reject any or all bids.
Specifications and further information furnished on
application to the Chairman.

BRIDGE.—

Sealed proposals will be received at
the office of the City Clerk by the City of Rockford,
Ill., until 2 p. m., on October 11th, 1897, for the con-
struction and erection of a plate girder bridge over
Kottus Creek, at Seminary street, all to be made accord-
ing to the plans and specifications on file in the office
of the City Engineer. Proposals must be accompanied
by a certified check on some responsible bank for
\$100 and payable to the order of the City of Rockford.
The city reserves the right to reject any or all bids.
Companies or firms bidding will give the individual as
well as the names of the firm, with their address.

SEWERS.—

Sealed proposals will be received at
the office of the Board of Sewerage Commissioners,
Adams Building, Quincy, Mass., until 7:30 o'clock p. m.,
of Thursday, October 7th, 1897, for two separate con-
tracts, as follows: No. 1.—Contract for building sec-
tion two of the Quincy sewerage system; about 1,655 ft.
of 24-in. by 36-in., and 22-in. by 33-in. brick sewer and
about 1,050 ft. of 24-in. pipe sewer. No. 2.—Contract
for building section three of the Quincy sewerage sys-
tem; about 3,500 ft. of 24 in. by 36-in. brick sewer. Plans
may be seen and forms of proposal, contract and specifi-
cations obtained at the office of the Sewerage Com-
missioners. The printed forms must be used in making
proposals. The Commissioners reserve the right to re-
ject any or all proposals or to accept the proposals they
deem best for the city.

DREDGING—U. S. Engineer Office, 905½ East

Main St., Richmond, Va. Sealed proposals for deep-
ening and widening channel of James River, Va., and for
constructing, repairing and revetment of windams will
be received here until 12 m., October 27th, 1897, and
publicly opened. Information furnished on application
here to H. D. Whitcomb. **CHAS. J. ALLEN, Lt. Col.
Engrs.**

STEEL BRIDGE.—

Sealed bids or estimates for
the construction of a steel highway bridge, 16-foot span
on the Rockaway Road, near Locust Avenue, in the
Town of Jamaica, will be received by the Board of
Supervisors of Queens County, at a meeting to be held
at the Court House, Long Island City, on Tuesday, the
5th day of October, 1897, at 12 o'clock noon, at which
time and place the bids will be publicly opened and
the contract awarded as soon as practicable thereafter.
The right is reserved to reject any or all of the bids.
The amount of deposit required is \$200. Amount of
bond, \$2,000. For specifications, drawings, etc., apply
to the office of the County Engineer, Jamaica, N. Y.

FRED. F. HUNT,

ANALYST AND ASSAYER.

77 Pine St., New York,
Weighing, Sampling and Assaying of Ores, Mattes,
Lead Bullion and all Mineral Products.

STUDENTS

Instruction in Assaying, Chemistry and
Mineralogy for Business Men.
SIMONDS & WAINWRIGHT,
CHEMICAL & MINING ENGINEERS & ANALYSTS.
Laboratories, 20 Platt St. (cor. of Gold), New York.
Assays, Analyses, Experimental Research and Consultation.

NICKEL

GRAIN—for Anodes, German-
Silver and Steel.

THE CANADIAN COPPER CO.,
201 Perry-Payne Bldg., Cleveland, O.

LAMBERT'S WHARFAGE CO.,

Prince of Wales Dock, SWANSEA.
Ores, Mattes, Regulus and Bars Received and
Prepared for Market.
Copper, Lead, Tin, Spelter and Pig Iron Received
Weighed and Sampled and Warrants
issued against same.
N. B.—Warrants are on the Accepted List of the London
Metal Exchange.
Regular lines of Steamers from America, Europe, etc.
Consign Goods to Lambert's Cranes,
Prince of Wales Dock, Swansea.

THE MINERAL INDUSTRY, VOL. V.

"As usual we find it full of interest and
appreciate its great value to all persons in-
terested in this important field of research.
It gives a vast amount of information, care-
fully arranged for easy reference."

E. H. SARGENT & COMPANY,
Chicago, Ill.

THE AMERICAN METAL CO.

LIMITED,
80 Wall Street (P. O. Box 957), NEW YORK.
Security Building, ST. LOUIS, MO.
COPPER, COPPER ORES AND MATTES, TIN, LEAD,
SPELTER, ANTIMONY, NICKEL, ALUMINUM.
ADVANCES MADE ON CONSIGNMENTS.
Agents for Henry R. Merton & Co., London, Birmingham
Manchester and Glasgow; Metallgesellschaft, Frankfurt-on-
Main; Williams, Foster & Co., Ltd., Swansea, Eng.; Societe
le Nickel, Paris, France; Balbach Smelting & Refining Co.,
Newark, N. J.

The Orford Copper Co., COPPER AND NICKEL.

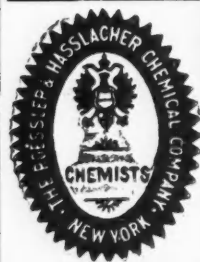
Copper Ore, Matte or Bullion purchased. Advances
made on consignments for refining and sale.
Specialty made of Silver-bearing Ores and
Matte and Nickel Ores and Matte.
Sell INGOT AND CAKE COPPER and Wire
Bars, Malleable Nickel, Shot, Ingots,
Bars, Sheets, Wire. Best quality for Anodes, Ger-
man Silver and Nickel-Steel.
President, ROBERT M. THOMPSON.
Office: 37 and 39 Wall Street, New York.

THE BRIDGEPORT COPPER CO.

BRIDGEPORT, CONN.
Refiners of Copper. . . .
Argentiferous Material treated
on favorable terms.
Advances Made on Consignments . . .

W. F. ROBERTSON,

27 THAMES ST., Cor. Greenwich St., NEW YORK,
Mining Engineer,
Metallurgist and Assayer
Ores, Mattes, Lead Bullion, and all Furnace
Products Sampled and Assayed.



CYANIDE

PEROXIDE OF
SODIUM
And all other Mining Chemi-
cals.

The Roessler & Hasslacher
Chemical Co.,
100 WILLIAM ST., NEW YORK

Trade Mark.

LEWISOHN BROTHERS,

P. O. Box 1247. 81 and 83 FULTON STREET, NEW YORK.
Advances made on Copper, Matte and Ores.
Agents for the following Mining Companies: Boston & Montana C. C. & S. Mining Co.
Old Dominion Copper Mining & Smelting Co.; Arizona Copper Co., Ltd.; Tamarack
Mining Co.; Osceola Consolidated Mining Co.; Butte & Boston Mining Co.; Kearsarge
Mining Co.; Tamarack Junior Mining Co.

FIRST QUALITY IN ALL LINES.

STEAM { ENGINES, HOISTS, PUMPS, BOILERS. } GASOLINE { ENGINES, HOISTS, PUMPING PLANTS. }

FAIRBANKS STANDARD SCALES.

Mining and Dump Cars, Patent Pressed Steel Wheels,
Windmills, Tanks, Pipe, Valves, Etc.

FAIRBANKS, MORSE & CO.,

Chicago, St. Paul, Minneapolis, St. Louis, Kansas City, Denver,
Omaha, Indianapolis, Louisville, Cincinnati, Cleveland,
San Francisco, Los Angeles, Portland, Ore.

Diamond Pointed Core Drills

Take out SOLID core to any required depth. Unequaled for Accuracy, Durability, Efficiency and Economy.
For twenty-six years these drills have led all competitors, and embody many new and VALUABLE
improvements not possessed by other drills.

They are the ONLY MACHINES that will indicate INSTANTLY and ACCURATELY the EXACT THICKNESS of EACH and EVERY STRATUM OF
ROCK while the drill is running, thus enabling the operator to save a much GREATER PERCENTAGE OF CORE than can be saved by any
other drill. They are the only machines capable of giving a RELIABLE record of the THICKNESS of EVERY STRATUM PASSED through in boring.
We carry IN STOCK drills of VARIOUS SIZES capable of boring holes from 200 to 5,000 FEET in depth. Before contracting or purchasing
send for catalogue and terms for drilling holes by contract. We also build a large line of Mining, Hoisting and Underground Haulage Machinery.

Write for what you want to

THE M. C. BULLOCK MAN'F'G CO., 1170 Lake St., CHICAGO, U. S. A.

LEDOUX & CO.,

9 Cliff Street, New York.
Assayers and Engineers.

ORES, BARS, BULLION AND ALL FURNACE
PRODUCTS SAMPLED AND ASSAYED.
Public Ore Yards and Sampling Works.
ADVANCES OBTAINED ON CONSIGNMENTS. PRINCIPAL
BANKS AND METAL BUYERS ACCEPT OUR
CERTIFICATES AS FINAL.

ASSAYERS BY APPOINTMENT TO NEW
YORK METAL EXCHANGE.

RICKETTS & BANKS,

104 JOHN ST., NEW YORK.

ORES TESTED.

Complete Ore Milling and Testing Works
for making practical working tests of ores to determine
the Best Method of Treatment. Milling, Metal-
lurgical and Chemical Processes investigated.

ASSAYS AND ANALYSES.

Assayers by appointment to New York Metal Exchange.

JAMES & SHAKSPEARE,

ENGLAND.

1 Metal Exchange Buildings, London, E. C.,
AND

17 Irwell Chambers West, Liverpool, Eng.

METALS, MATTES AND MINERALS.

Cable Address, METALLURGY, LONDON.
Use A B C, Bedford McNeill, or Lieber's Code.

HENRY BATH & SON,

London, Liverpool and Swansea,
BROKERS.

All Description of

Metals, Mattes, Etc.

Warehouses, Liverpool and Swansea.
Warrants issued under their Special Act of
Parliament.

NITRATE OF SODA.

Cable Address: - BATHOTA, LONDON.

VIVIAN, YOUNGER & BOND,

117 Leadenhall St., London E. C.

Copper, Tin, Lead, Spelter, Antimony, Silver
Bullion and all kinds of metals.

Best terms for Copper Mattes, Lead and Silver
Ores, Silver-Lead Bullion, Etc., Etc.

Tinplates, Galvanized Iron, Railway Material,
Etc., Etc.

Cable Address: "BOND," London.

Telegraph Codes Used: Bedford McNeill's
A B C 4th Edition, Moreing & Neal's.

BALTIMORE

COPPER SMELTING AND ROLLING COMPANY
(The Baltimore Copper Works)

Office: KEYSER BUILDING,
BALTIMORE, MD.

Ingot Copper. Sheet Copper.