

THE ENGINEERING AND MINING JOURNAL AND



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

VOL. LXI.

MAY 9.

NO. 19.

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

Subscriptions 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 arrears 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. (Cable Address, "ROTHWELL," New York. Use McNeill's or A B C 4th Edition Code.)

Branch Offices: Chicago, Ill., Monadnock Building, Room 737; Denver, Colo., Boston Building, Room 206; London, Eng., E. Walker, Man'g., 20 Bucklersbury, Room 366.

CONTENTS.

Table listing contents with page numbers: Export of Gold (441), Tamarack Election of Directors (441), Treatment of Lead and Zinc Blende Ores (441), Mexican Finances (441), The Rio Tinto Company (442), Nickel Steel (442), Books Received (442), Origin of Nickel Steel (A. D. E. 442), A Hypothetical New Hydraulic Cement (Charles Catlett, A. D. Elbers 442), Is Potassic-Zinc Cyanide a Solvent for Gold or Is Potassic-Auro Cyanide a Solvent for Zinc (E. B. W. 443), On Cemented Open-Hearth or Bessemer Steels (Sergius Kerr, M. E. 443), Abstracts of Official Reports (444), A Topographic Map of Butte, Montana (R. H. Chapman 444), The Cyclotomic Transit (445), The Copper Assay by the Iodide Method (Albert H. Low 446), The Lidgerwood Rapid Unloader (447), Notes on the Hydrometallurgy of Gold and Silver (W. Geo. Waring 447), Eclipse Electric Lamp for Mines (449), Formation of Cyanogen from Ammonia (449), Mineral Resources of Pierce, Idaho (450), Mining Industry in the Argentine Republic (450), Recent Decisions Affecting the Mining Industry (450), Patents Relating to Mining and Metallurgy (450), Notes: Pig Iron Production in Belgium, 443—Sulphide of Zinc in Skio-graphy, 444—Petroleum in Tunis, 447—Electric Treatment of Complex Ores, 449—Economic Australian Gold Mining, 449—Coal in Fran.e, 449—Electric Fusing Sample Furnace, 449—Coal in Germany, 449—Japanese Victory Statue, 450.

\* Illustrated.

Table listing contents with page numbers: Personal (451), Obituaries (451), Societies and Technical Schools (451), Industrial Notes (451), Machinery and Supplies Wanted (452), Mining News (452), United States: Alabama (452), Arizona (452), California (452), Colorado (452), Idaho (453), Illinois (453), Kansas (453), Kentucky (453), Missouri (453), Montana (453), Nevada (454), New Jersey (454), New York (454), Ohio (454), Pennsylvania (454), South Dakota (454), Utah (454), Vermont (454), Virginia (454), Washington (454), Wyoming (454), Foreign: Brazil (455), Br. Columbia (455), Canada (455), China (455), Ecuador (455), Mexico (455), New So. Wales (455), New Zealand (455), Queensland (455), Late News (455), Markets: Coal: New York (456), Buffalo (456), Chicago (456), Pittsburg (456), Shanghai (457), Metals: Iron: Pig Iron Production (457), New York (457), Buffalo (457), Chicago (457), Cleveland (457), Philadelphia (458), Pittsburg (458), Gold & Silver (458), Prices, Statistics, Imports and Exports (458), Foreign and Domestic Coins (459), Copper (459), Tin (459), Lead (459), Spelter (459), Antimony (459), Nickel (459), Platinum (459), Quicksilver (459), Other Metals (459), Chemicals and Minerals: New York (459), Liverpool (460), Valparaiso (460), Meetings (461), Dividends (461), Assessments (461), Mining Stocks: New York (460), Boston (460), Chicago (460), Cleveland (460), Colo. Springs (461), San Francisco (461), London (461), Paris (461), Quotations: Boston (462), Ind. and Coal (462), Colo. Springs (462), New York (462), Pittsburg (462), St. Louis (462), San Francisco (462), Baltimore (462), Miscellaneous (462), London (463), Paris (463), Mexico (463), Valparaiso (463), Shanghai (463), Denver (463), Philadelphia (463), Salt Lake City (463), Aspen (463), Helena (463), Duluth (463), Mining Co's: List of (464), Advt. Index (17), Advt. Rates (18)

Export of Gold.

Since April 4th there have been shipped \$9,500,000 of gold, and, according to present outlook, it is likely that this rate of shipment will continue. Wealthy people, who spend vast sums in their annual visitation to the continent of Europe, are now leaving in crowds by every steamer, and a rough estimate made by those well able to figure on the subject, place the amount that they require for their disposal on the other side at not less than \$100,000,000, so that unless there is some reversal of the ordinary courses of trade, or a sudden conversion and access of confidence on the part of foreign investors, we may look to see the gold reserve very shortly brought down below its old time religiously kept limit of \$100,000,000.

Tamarack Election of Directors.

This company is incorporated under the laws of Michigan which allow cumulative voting. At this election, for instance, Mr. H. C. Southworth, representing 2,150 shares instead of voting for all the directors, voted them cumulatively for himself, thereby giving himself 15,050 votes. A motion was made and was carried, and we hope the spirit of the motion will be carried into effect in the future, namely, that the directors of the company should submit a report to the stockholders once in every 12 months, it of course being understood that such report should contain real information.

Treatment of Lead and Zinc Blende Ores.

In our issue of March 7th we mentioned that the Burnham Syndicate, of London, was introducing a new process of treating zinc lead sulphides, and we commented on the fact that the validity of the patent was open to doubt, owing to the similarity of the process to that of Captain Angell and Mr. Ellershausen. We understand that negotiations are now taking place to satisfy the claims of these gentlemen, and if terms mutually agreeable to both parties can be arrived at litigation on the patent will be obviated. Every effort is being made to test the process thoroughly, and last week a shipload of 3,000 tons of Broken Hill ore was delivered at the works of Fry, Everitt & Co., at Swansea, for the purpose of testing the process on a large scale. As mentioned in our previous article, the process consists of melting the ore with lime, iron oxide and salt cake; this separates the lead and silver, and the zinc goes away with the slag. There is no doubt as to the correctness of the claims of the inventors as regards this reaction, and the only questions to be considered before the process is pronounced a success is the cost of the salt cake at the mines and the fact that the whole of the zinc is lost in the slag.

Mexican Finances.

The Presidential message addressed to the Congress of the Republic of Mexico by President Diaz was a most satisfactory one from the domestic point of view. In spite of the value of silver, the mines show a greater activity than ever before, and agricultural pursuits show results equally satisfactory. Foreign colonization in Mexico has not made great headway in the aggregate, owing to the past attempts having been too much in the hands of speculators, and without any organizing head, but at the same time the few that have succeeded have given ample proof of the possibilities in Mexico in that direction. The finances of the country are in a more satisfactory condition than ever before within the memory of man. In place of the annually recurring deficit, the receipts now exceed the expenditures and leave a surplus of over \$2,000,000 for the first six months of the fiscal year, and this in face of the fact that taxes are being decreased, as for instance, the taxes on the salaries of public officials, which have recently been decreased by 40 per cent. The fall in the price of silver has not been altogether detrimental to the Republic of Mexico. It is perfectly true that the payment of interest abroad on the public debt in gold has been a severe strain and that the price of all imported articles has correspondingly risen with the decrease of the price of silver, but on the other hand it has very largely stimulated native production, not only in the manufacturing line, so as to avoid the high prices paid for the imported manufactured goods, but also in such articles as can be exported and will be paid for in gold abroad. It simply means that for every dollar received for coffee, tobacco, or vanilla exported, nearly two dollars will be available for payment of labor and purchasing of provisions in the country. The country itself being so self-supporting is wonderfully independent of the foreign trade. To a great extent the imports are articles of luxury, or at all events belong to the class of important public works, and do not much affect the ordinary citizen, and throughout the length and breadth of the republic silver will purchase almost the same quantity and quality of native supplies as it did formerly.

## The Rio Tinto Company.

In another column we have given a full abstract of the Rio Tinto Company's report for the past year and our only regret is that, like the Tharsis, the information given in the report is not sufficient. Without hurting the interest of the company in any way the report of this company, in particular, might be made most instructive to both the mining and metallurgical professions, and, incidentally, the cost of the removal of overburden, which has been done on so large a scale at the Rio Tinto mines, would probably afford some information to the Committee in Congress that is now engaged in investigating the probable cost of the Nicaragua Canal. We have no recent figures on this particular point, but we have them of some years back, and we do not suppose that the Rio Tinto Company has retrogressed in the economy of its work. The figures themselves are instructive and it is a great pity the directors of the Rio Tinto Company did not see fit to make them public at the present time.

There is no question whatever that the financial part of the company's affairs is managed most ably. Taking advantage of the money market, the conversion of the 5 per cent. bonds of three different issues into one consolidated 4 per cent. debt, through the assistance of the Messrs. Rothschild, has already resulted in a saving to the company of £64,000 a year, and during the current year this saving will amount to £74,000, which is equal to more than 2½ per cent. on the share capital of the company.

We have always maintained that the Rio Tinto Mining Company was more of a manufacturing concern than a mining. First of all, in consequence of the enormous proved reserves, and second, because the cost of producing and marketing of both the copper and the sulphur was a fixed quantity, any change from which would certainly be in favor of the stockholders. This report throws some fresh light upon the reserves. Within the 23 years of the company's existence 23,000,000 tons have been extracted and yet, by the aid of the diamond drill, the management is satisfied that they still have in sight 135,000,000 tons. Of this quantity it is estimated that 35,000,000 tons consists of low-grade copper, leaving 100,000,000 tons of a grade not lower than the average which has paid the dividends of the past years, so that at the present output of nearly 1,400,000 tons per annum, we may say, safely, that they have still 70 years of life in sight.

## Nickel Steel.

It is somewhat strange to hear nickel-steel termed a new composite metal, yet such is the expression used by one of our English contemporaries. As is shown in our columns of correspondence last week and this the advantages gained by the alloy of steel or iron with nickel have been known and acknowledged by many investigators over a long period of years before the actual use of the alloy was put to practical test.

So far as its adoption as an alloy with steel is concerned, the *Engineering and Mining Journal* was the first technical paper in this country to advocate the trial, based entirely upon the results of Mr. James Riley's tests and experiments carried out in 1888 and 1889 for the benefit and at the request of the Iron and Steel Institute of Great Britain. These results were so striking and so conclusive that we could not fail to see the advantages of the employment of this new alloy for machinery, armor plates, projectiles and other things that required at one time excessive hardness and at another increased tensile strength over ordinary steel. It is no doubt well known to all who have experimented in this line that a certain percentage of nickel added to ordinary soft steel will produce a material that the very highest tempered tool cannot touch, therefore, between this extreme and the minimum whereby an advantage is gained there is a very wide margin of conditions suited to the various requirements.

We have frequently been asked the question why it is that in England and Scotland where the results of Mr. Riley's test were made known so early, and upon the authority of so conservative and experienced a man as the investigator, the process has not been widely adopted, more especially as his conclusions entirely confirmed the reports from, and the results obtained at the works of MM. Schneider et Cie, in France. The answer to this question is two-fold. In the first place when the advantages of alloying nickel with steel was brought forward nickel was much more costly than it is to-day, and as in Great Britain all the iron and steel works since that time have been working upon rather a slim margin of profit they have been unwilling to introduce a novelty which would increase the cost of the material used. In addition to this there is a well-known conservatism among British manufacturers which keeps them back from leading in any field of improvement unless actually compelled to do so by competition. The United States, Germany and France have all recognized the advantages of nickel steel, and have been producing it for armor plate and other purposes in large quantities for the last four or five years, and we are now glad to chronicle the declaration made by Mr. James Riley when meeting the Shipbuilders and Engineers of the West of Scotland Iron and Steel Institute last week, that by the use of this

metal, without any extra expenditure, they could obtain 30 per cent. more efficiency out of their engines and boilers, effecting at the same time very considerable economy in the cost of fuel.

This may be partly owing to the difference between nickel at 50 cents per pound and nickel at 26 cents in large amounts.

## 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.

*Brockunier's Map of the West Virginia Oil Fields.* Wheeling, W. Va.; Samuel Hugh Brockunier.

*Use of Electricity in Coal Mining.* By R. M. Haseltine, Chief Inspector of Mines, Ohio. Columbus, O.; State Printers. Pamphlet; pages 16.

*Commercial Relations of the United States with Foreign Countries During the Years 1894-95. Volume I.* Washington, D. C.; Government Printing Office. Pages 700.

*A Practical Handbook on the Care and Management of Gas Engines.* By G. Lieckfeld. Translated by G. Richmond. New York; Spon & Chamberlain. Pages, 103; illustrated. Price, \$1.

*Review of the World's Commerce: An Introduction to Commercial Relations of the United States with Foreign Countries During the Years 1894-95.* Washington, D. C.; Government Printing Office. Pages 235.

## 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.

## Origin of Nickel Steel.

Sir: As the nickel-steel question appears to have now drifted into the archaeological stage, the following, taken from the Cabinet Cyclopaedia of the *Rev. Dionysius Lardner* (LL. D., F.R.S., L. & E., M.R.I.A., F.R.A.S., F.L.S. F.Z.S., Hon., F.C.P.S., etc., etc.) may be of interest.

Vol. I. Iron and Steel, London, 1831; page, 250.—A few years ago Messrs. Stodard and Faraday made a series of experiments on the alloys of iron and steel at the laboratory of the Royal Institution, the results of which were subsequently published in the *Journal of Arts and Sciences*. From the account referred to it appears, that not only silver, but platinum, rhodium, gold, nickel, copper and even tin, have an affinity for steel, etc.

*Ibidem*, page 262: In the *Repertory of Arts*, Vol. III., there is an account of a process for making meteor steel, which is said to resemble in its superficial substance the wavy appearance of the best Damascus blades. Twenty-four parts of zinc, four of purified nickel, and one of silver, are put into a black lead or other refractory crucible, the surface being covered with charcoal powder, and the cover luted on, and the whole subjected to the heat until it is fused. When melted the mixture is to be poured into cold water, so as to render it brittle, and more easy to pound into small pieces for use.

HOBOKEN, May 4th, 1896.

A. D. E.

## A Hypothetical New Hydraulic Cement.

Sir: In reading the article of A. D. Elbers on "A Hypothetical New Hydraulic Cement" no reference is made to the possible action of magnesia in causing the lime which is burnt from a rock containing a considerable per cent. of that material to be hydraulic. This fact was referred to by Mr. William B. Rogers in his geological reports of Virginia, written some sixty years ago, in the following terms:

"Upon examining the cement rock procured in New York from quarries in high repute and extensively wrought for the manufacture of hydraulic lime, as well as that used in the neighborhood of Louisville, Kentucky, I have found magnesia to be one of their prominent ingredients, existing in them all in such amount as that the carbonate of magnesia to the carbonate of lime is in the proportion of about three to five. A precisely analogous result was obtained with the rock near Shepherdstown in our own State, long celebrated for yielding a valuable hydraulic lime, as well as that of the North River, near Lexington, of which some use has already been made in the public improvements. A series of experiments with limestones similarly constituted as to the two ingredients above-mentioned, and obtained from numerous other points in the valley, as well as in the country beyond it to the west, and even from Loudoun County, has proved them to be endowed with the same faculty of hardening under water, and the trials still in progress with regard to numerous other specimens, shown by analysis to be of similar composition, will, it is confidently believed, be attended with precisely similar results."

I should like to know if later investigations have tended to confirm these observations.

STAUNTON, VA., April 25th.

CHARLES CATLETT.

Sir: The action of magnesia in hydraulic limes and cements may be defined as follows:

1. Magnesian limestone can be converted into hydraulic lime by burning it just hard enough to expel the dioxide of the magnesium carbonate, but not so hard as to expel that of the calcium carbonate, viz., to about 400° C. It makes, however, a rather lean hydraulic mortar, not capable of binding much sand, inasmuch as its contents of calcium carbonate represent about all the ballast that it can carry. The setting of such a mortar—assuming it to be entirely free from accidental constituents that can agglutinate the mass—has to be ascribed to the slight solubility of the calcium carbonate, just as the setting of a purely calcareous lime has to be ascribed to the slight solubility of calcium hydrate; and the hardening under water—or the hydraulicity—of the calcined magnesian lime is due to the circumstance that magnesium hydrate is entirely insoluble in water. In order to illustrate these conditions the behavior of purely calcareous lime has to be more fully considered. Balls of about an inch

and a half in diameter, made by hand from fresh slacked pure lime, can be compacted so thoroughly, by taking off the surplus moisture with blotting paper or with a towel, that they do not crack at all in drying; when such a dried ball is split open, its interior, into which the carbon dioxide of the air has not yet penetrated, will be found so hard that it can scarcely be scratched by the finger nail. This hardness is due to the cohesive attraction of particles of calcium hydrate that have been precipitated from solution by the evaporation of the water of admixture. But when such a dried ball is put into a small stoppered bottle filled with water, then it becomes again as soft as talc, though the amount of the lime that can become dissolved in the bottle is very insignificant, almost as small as the quantity that was precipitated out of solution when the water held in suspense by the balled lime evaporated.

The calcined magnesian lime, on the other hand, becomes *hard* under water, because the insoluble hydrated magnesium oxide expands just sufficiently to enclose and therefore protect the slightly soluble calcium carbonate. Swiftly running water is, however, apt to affect such mortars at first somewhat injuriously, inasmuch as some of the calcium carbonate is apt to be washed away before it can become thoroughly fixed. That magnesium oxide hydrates very slowly may be inferred from the fact that the heat evolved by its hydration amounts only to one-third of that which is set free by slaking calcium oxide.

2. As a constituent of hydraulic cements—either natural or artificial—magnesia has, of course, properties similar to those of calcia. As regards the setting, it might be supposed that the basic magnesium silicates of such natural cements as "Rosendale" and "Louisville" would hydrate more slowly than the basic calcium silicates of Portland cement; but as the former are not burned as hard, the slower hydration of the magnesium oxide of such natural cements is probably offset by the greater density of the Portland, inasmuch as calcium oxide hydrates also very slowly when it is firmly enclosed.

As regards ultimate induration, magnesia has even some theoretical advantages over calcia. Thus it is known that gelatinous formations of hydrated silicates of magnesium cannot become as readily decomposed by carbon dioxide as the gelatinous silicates of lime, because the formation of magnesium carbonate does not set free as much heat as the formation of calcium carbonate. Moreover, it is to be supposed that the crystallizing magnesium silicate particles acquire greater hardness than the crystallizing calcium silicates.

According to F. Stohmann's and Bruno Kerl's edition of "Muspratt's Chemistry" (1894), magnesium silicate can be prepared artificially by precipitating a magnesium salt with a solution of sodium silicate; and the resulting precipitate is said to be a white, gelatinous mass of the composition:  $3 \text{MgO} \cdot \text{SiO}_2 \cdot 5 \text{H}_2\text{O}$ .

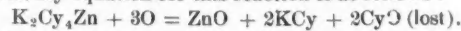
It is, however, pretty certain that magnesium silicates do not form as readily and as copiously, in cement masses that are kept under water, as calcium silicates; hence, the ultimate induration of a hydraulic cement is apt to be greater when the cement is low in magnesia than when it contains a good deal of it. It follows, also, that natural cements that are high in magnesia might possibly be improved by admixing substances that yield readily gelatinous silica to dissolving lime, such as blast furnace slag of singular or approximate silicate constitution that is low in magnesia.

HOBOKEN, N. J., May 5th, 1896.

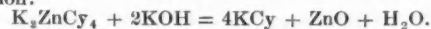
A. D. ELBERS.

potassium cyanide formerly of the zinc potassium cyanide on an equal footing with any free potassium cyanide which might be present in the solution from the zinc boxes.

Again zinc being more readily oxidized, zinc oxide will be continually forming, whether gold is present in the solution or not, as we find it in the zinc boxes, my equation for this reaction is as follows:



This equation and the following will account for some of the loss of cyanogen which has been hitherto unaccounted for, and is such a source of annoyance and expense, as it takes place evidently in the zinc boxes. My next equation is the same as used before, being based on proofs that potassic hydrate does exist in the zinc boxes, and in Mr. Wells' experimental solution when he digests zinc potassic cyanide with potassium cyanide solution.



Mr. Wells took exception to this formula because it did not agree with his theory. However it is not impossible where interchange of metals takes place that the above combinations and the results do occur and I do not think Mr. Wells will refute that, even if it did not agree with his theory.

Mr. Wells says that auro-potassic cyanide is a solvent for zinc, and that zinc potassic cyanide is a solvent for gold, although he adds it does appear paradoxical. In criticising my explanation of the zinc box reaction he admits that the deposition of gold is in all probability due to electro-chemical action, that is to electrolysis, which is all I claimed, hence it is not possible for auro-potassic cyanide to be a solvent for zinc in this connection. Possibly he means that it is a solvent for zinc outside the zinc box, but as I am not aware that conditions could differ, I am at a loss for his proof. In the absence of any proof from Mr. Wells to show how auro-potassic cyanide is a solvent of gold, I will give my views for thinking that it is not. Affinity is the essence of our controversy. Cyanogen has more affinity for gold and potassium than zinc, likewise gold and potassium are more electro-positive than zinc, consequently the energy to overcome this affinity is more than zinc possesses as a chemical reagent. His reasoning would be that potassium must first be released, then gold, so that cyanogen could attack the zinc. In order to do this oxygen must first attack the potassium, and liberate that, then oxidize the gold. As the gold does not oxidize as readily as zinc we strike a serious snag right here which I am unable to get over. Many attempts were made to break affinity existing in that very stable compound auro-potassic cyanide, and not until the electric current with a mercury cathode was used was it accomplished. The affinity for gold and potassium is about equal for cyanogen with the chances slightly in favor of gold.

We can see how stable a compound it is by the way it holds together in the zinc boxes, and when it is used over again and again without passage through the zinc boxes for leaching purposes. If Mr. Wells acknowledges this affinity to exist, and he is too much of a chemist not to, and since he has acknowledged that electro-chemical action has taken place in the zinc boxes, the assertion made that auro-potassic cyanide is a solvent for zinc needs further proof on his part before I can accept it. Mr. Wells' thermo-chemical calculations are interesting, but they do not back up his theory any more than his experiments. Mr. Wells' experiments I do not criticise. They are useful in illustrating my point if his deductions are at variance, and I trust he will continue to experiment with cyanide even if people disagree with him, for more light is needed upon the subject, and those needing it the most are not in a position to experiment.

NEW HAVEN, April 12th.

E. B. W.

#### CEMENTED OPEN-HEARTH OR BESSEMER STEELS.\*

By Sergius Kern, M.E., St. Petersburg.

We cannot certainly venture to say that we were the first to propose the use of open-hearth or Bessemer steels, in the preparation of cemented steel, for the production of special qualities of crucible steel. Anyhow, our short notice on this subject giving some details of our experiments, appeared in the Russian mining paper *Gorny Listok*, No. 14, 1892.

After successful results in our several times interrupted experiments, we expect to have means for considerable experiments on our process of crucible steel method this coming summer, and we give some few notes on the method which in details is entirely new.

Soft open-hearth steel, containing not more than 0.25 per cent. of manganese, phosphorus + sulphur 0.04 per cent. in the form of rolled flat bars ( $1\frac{1}{2}$  in.  $\times$   $\frac{1}{2}$  in.), is sheared into bits,  $1\frac{1}{2}$  in. to 2 in. in length, which are cemented in quantities by using small cementation furnaces. Where heating and puddling furnaces are in constant work, the waste heat of such furnaces may be used in a special way.

The resulting cemented steel containing from 0.85 to 1.15% of carbon, is assorted, and used for the production of special qualities of crucible steel (tools, projectiles, chief parts of ordnance, etc.).

Our process consists in melting such cemented steels, sometimes with a small quantity of wrought iron, and with the additions of certain small quantities of rich silicon iron and chrome ironstone.

The following analysis of a chisel for cold metal working gives an idea of the steel obtained by our process:

	Per cent.
Carbon.....	0.95
Manganese.....	0.30
Phosphorus + sulphur.....	0.04
Chromium.....	0.12
Silicon.....	0.27

The metal, containing little manganese and impurities, hardens evenly without cracking. The double-hardening (*double-trempe*) acts beneficially on this steel.

Pig Iron Production in Belgium.—The output of pig iron in Belgium in March was 68,665 metric tons, a decrease of 8,835 tons as compared with March 1895. For the three months ending March 31st, the production was 201,766 tons, showing a decrease of 21,034 tons as compared with the corresponding period last year.

\* Chem. News.

#### Is Potassic-Zinc Cyanide a Solvent for Gold or Is Potassic-Auro Cyanide a Solvent for Zinc?

Sir: Mr. Wells' reply to my remarks upon the subject as to whether potassic-zinc cyanide is a solvent for gold or not, do not bear out his statement that it is, nor does he yet prove that his experiments were of value to his proof.

My contention is that the interchange of metals which occurred was due to electro-chemical action rather than to solvent action of zinc-potassic cyanide.

In his article of December 21st, 1895, he says, "zinc-potassic cyanide is a solvent of gold, which would at first glance appear paradoxical since it is the reversal of what takes place in the zinc boxes," by which he means to convey the idea that auro-potassic cyanide is a solvent for zinc. He further adds, "Now having shown that zinc-potassic cyanide is a strong solvent for gold, does this indicate that this compound as it occurs in the ordinary cyanide solutions in use at the cyanide works is of any value as a solvent for the process?" "The answer must be *no* for the following reasons: The gold will combine with the cyanogen which it can obtain by the least expenditure of energy, and this will necessarily be the cyanogen of the free potassium cyanide, for it was evident that if it was obtained from the zinc-potassium cyanide, it would first have to decompose the double salt, and when this was done the potassium cyanide set free would have in turn to be broken up into cyanogen and potassic hydrate."

"So long, then, as the solution contains free potassium cyanide the zinc potassic cyanide will not act as a solvent of gold, and since in practice the solutions always *do* contain free cyanide, the solvent power of the double salt will not be available." I stated that under such conditions his experiments did not prove his proposition, because he had not proved that free cyanide was not present. My point was that his zinc potassic cyanide was bound to contain free potassium cyanide before any interchange of metals could occur by electro-chemical action, and to this end I gave my views upon the subject. What I particularly took exception to was that weak solutions coming from the zinc boxes were of no value as a solvent in the process. He ties a string to this, and qualifies it by saying "that these weak solutions always do contain free cyanide." I believe Mr. Wells means by free cyanide KCy and not HCy, which I state because it may mislead some in following the argument, since that expression is used at times to talk of cyanogen rather than potassium cyanide.

Considering now that we have a combination of zinc-potassic cyanide for dissolving gold; before the cyanogen of this compound can attack the gold double oxygenation must take place. My explanation was that electro-chemical action took place to assist in the interchange of metals.

Mr. Wells thoroughly understands that oxygen must be present since he uses Elsner's equation. Zinc he will also acknowledge is less electro-positive than the potassium of the zinc potassic cyanide solution, consequently by expenditure of less energy zinc would be thrown down, leaving

ABSTRACTS OF OFFICIAL REPORTS.

Rio Tinto Company, Limited.

The twenty-third annual report and statement of accounts for the year ending December 31st, 1895, has just been issued.

The principal change that will be noted in the balance sheet is the appearance of the new four per cent. mortgage bonds, which were issued last year in accordance with the powers of the board, and the consequent disappearance of the first, second and third five per cents, all of which have been converted or redeemed. The conversion of the company's mortgage debt was, with the co-operation of Messrs. N. M. Rothschild & Sons, most successfully carried through in July last, and resulted in a net saving to the company of £64,000 during the year 1895. In the year 1896 and following years the saving will be £74,000, which is equal to more than 2½% on the share capital of the company.

The operation of the sinking fund will commence on July 1st, 1896, and the whole of the bonds will be paid off within 3½ years from that date. It will be open to the directors, however, to exercise the option which is reserved to them of paying off the whole or any increased portion of the bonds at any time after June 30th, 1905.

The discount and expenses of the new issue amounted to £197,940 1s. 4d., which has been reduced by £50,500, the amount of the first, second and third 5% mortgage bonds drawn during the year 1895, before the conversion was carried out, and charged to revenue.

The reserve fund has been created by the apportionment of £75,000 from the revenue account of 1894 and invested in the purchase of consols, and your directors propose to add £25,000 to it from the profits of the year now under review, thus bringing up the amount to £100,000. It will be noticed also that a sum of £25,000 has been added to the general depreciation account, while the overburden account has been reduced by £10,000.

After providing for all interest, expenses of administration, income and other taxes, the profit on sales of produce and other items at the credit of revenue account, including the balance brought down from the previous year, amounts to £534,067 12s. 10d., and there has been written off the extension and development account by a fixed charge on pyrites, £17,859 10s. 7d., leaving £516,208 2s. 3d. Out of this has been provided the amount of redemption of the first, second and third 5% mortgages, £50,500, to which is added £25,000 increase of general depreciation account, £10,000 reduction of overburden account, plant gone out of use, leaving a net balance of £411,177.

After distribution of dividends £28,677 is carried forward to credit of 1896.

**Reserves of Ore.**—The system of exploration which the company has all along pursued, and still continues, has enabled their mines' manager to give an estimate of the reserves. The ore extracted during the 23 years of the company's existence has been 23,000,000 tons, and he estimates the quantity now opened up to be not less than 135,000,000, which, at the present rate of output of 1,400,000 tons per annum, represents enough for 97 years' work. Of this quantity it is estimated that 35,000,000 tons consist of ore poor in copper, leaving 100,000,000 tons of a quality not under the average of what has been worked in the past—or, say, 70 years' supply. This does not take into account what may be found in the masses still unexplored.

**Extension and Development Works.**—£17,859 10s. 7d., referred to above, has been charged to the cost of the extraction of pyrites. The balance of this account now stands at £137,468 9s. 7d.

**Overburden.**—The quantity of overburden removed during the year was 596,675 cu. m., and to meet the cost there was, as usual, a fixed sum charged upon each ton of pyrites extracted, which more than covered the actual outlay. The outstanding account has been further reduced by £10,000 debited to revenue, leaving the balance now at £83,196 11s. 8d.

**Pyrites.**—The quantity extracted for the year was: For shipment, 525,195 tons; for local treatment, 847,181 tons; total, 1,372,376 tons; of an average copper content of 2.821%.

The quantity invoiced to consumers in England, Germany, etc., was 518,560 tons, against 485,441 tons in 1894, 469,339 tons in 1893, and 435,758 tons in 1892.

**Copper Production.**—The copper produced in 1895 by treatment at the mines was 20,762 tons, and the copper in the pyrites shipped amounted to 12,223 tons; total 32,985 tons.

**Copper Sales.**—The following quantities were brought to market, viz: refined copper, 20,230 tons; copper in pyrites, 11,065 tons; total, 31,295 tons.

The whole of the stocks of copper at the company's works at Cwm Avon and Grange, consisting of refined copper, copper in process, precipitate and matte (in all 4,716 tons), are carried over at cost price. The reserve heaps now contain 106,164 tons of fine copper, which stand in the company's books at £4 7s. per ton, or 13s. 6d. per ton less than last year.

PYRITES AND COPPER STATISTICS.

	Pyrites extracted.				Pyrites consumed.		
	For shipment.	For local treatment.	Total.	Average copper contents.	Tons.	Average copper contents.	Copper produced at mines. Tons.
1891.....	461,027	972,060	1,436,087	2.649	432,532	{ 2.651 1.309	21,227
1892.....	406,912	985,151	1,402,063	2.819	435,758	{ 2.569 1.465	20,017
1893.....	477,656	854,346	1,332,002	2.996	469,339	{ 2.659 1.544	20,887
1894.....	498,540	888,555	1,387,095	3.027	485,441	{ 2.594 2.988	20,606
1895.....	525,195	847,181	1,372,376	2.821	518,560	{ 2.585 2.986	20,762

**Sulphide of Zinc in Skiography.**—At the Paris Academy of Sciences, Professor Troost has stated that crystals of sulphide of zinc would act just like a Crookes tube for photographing. These crystals can be easily prepared, and are highly phosphorescent. He showed his colleagues a number of Roentgen shadow photographs taken with these crystals as the illuminating power. The time of exposure was, however, longer than with the tube.

A TOPOGRAPHIC MAP OF BUTTE, MONTANA.

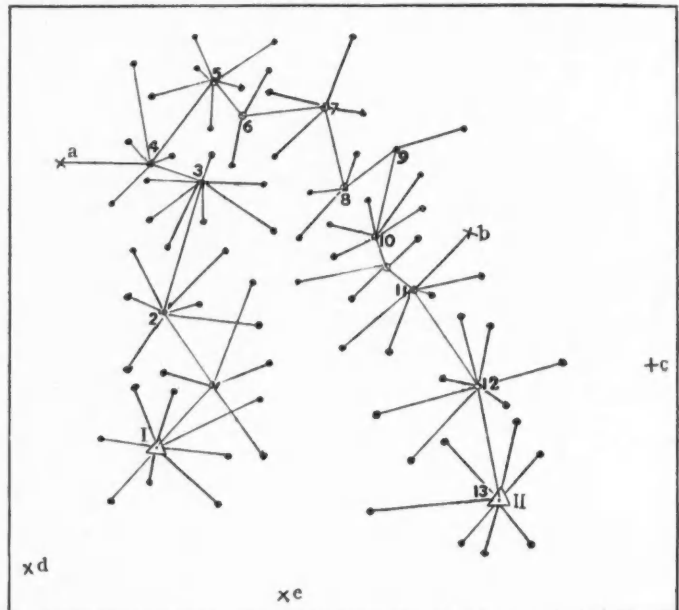
Written for the Engineering and Mining Journal by E. H. Chapman.

The stadia as an instrument of great precision has come in for considerable notice and much more extended use than heretofore. During the past summer I made use of the stadia in preparing a topographic map of part of the Summit Valley Mining District, Montana, for the United States Geological Survey.

The area, a little less than six miles long by four miles wide extended from the vicinity of Rocker and Burlington on the west to the foot of the mountains of the Continental Divide on the east, and includes the city of Butte and towns of Walkerville, Centerville and Meaderville.

The scale of this work was adopted as 1,15,000, 1 inch representing 1,250 ft. which is sufficiently large to show all essential details of topography and "culture." Everything of importance was located, including roads, railroads, tramways, isolated buildings, reservoirs, ditches and many hundred prospect holes.

The survey was made by plane table, resting upon a carefully measured base line from which a graphic triangulation was expanded. The number of triangulation stations occupied was eight. From these eight stations 50 points were intersected. These were such points as could be used for orientation purposes, flagstuffs, hoists, chimneys, telegraph poles, etc., and were determined in elevation as well as position by trigonometric methods. The datum for elevations was a bench mark of the Northern Pacific Railroad. Many points were established by "Y" level from which the trigonometrically determined points were checked. The stadia work was begun at one of the previously located points and carried over the whole area in a network of "setups" and rodpoints. Stadia locations were constantly checked by resection upon the signals primarily located. In prosecuting the stadia work no attempt was made to cut the area into rectangular blocks by running straight lines, and only in a few cases was a line run without a great number of side read-



ings. The effect of this method is to cover the area with a series of locations in approximately circular areas, as shown in the accompanying sketch, on which are indicated triangulation stations, intersections, setups and rodpoints.

- △ Triangulation stations..... (I, and II.)
- × Intersected points..... (a b c d.)
- Setups..... (1 2 3, etc.)
- Stadia rodpoints.

The advantage in this system consists of a saving of time in such areas as have little culture and broad topographic features, fewer locations being necessary, and a corresponding increase in time spent on the portions requiring greater care in mapping.

The rodman was required to mark, by stone pile or peg, such positions as it was expected would be used as future "setups." No topography was sketched except as controlled by rodpoints, and after the determination of the points were made, vertically and horizontally, and platted on the sheet, all sketching of contours was done in the field with the country actually in view. With this method there is no interpolation necessary, as one can see just what is necessary to control any area in which the topography is not completed.

The party consisted of myself and one rodman, both working on foot. There being no timber in the country under survey, no axemen were necessary. A planetable instrument, board 21 × 25 ins., telescopic alidade with stadia wires and graduated vertical arc, 24-in. ruler, was used. The rod, 12.5 ft. long, was divided in foot lengths for all but the top section, which was divided into tenths of a foot, and the divisions painted alternately black and white. The ratio interval of stadia wires was 1-100, and the tenths of a foot therefore represented 10 ft., which was as close as it was necessary to read the rod, since .01 in. is equal to 12½ ft. at the scale adopted.

The following figures are tabulated to be more easily grasped:

Total area: 227 sq. mi., equals 40414 sq. in. of map.	
Triangular stations.....	5
Intersected points.....	50
Setups (stadia work).....	470
Rodpoints ( " " ).....	345
Total.....	3963
"Y" level bench marks.....	95

Locations.

Almost all of the bench marks used were gathered from local engineers, superintendents of mines, city engineer, etc., only the work necessary to reduce them to a common datum being our own. The above figures show that to every square inch of map there are 9.8 located points or 174 to every square mile, and for every 23 square inches there was one leveled bench mark. The total number of days when field work was done was 83; 27 were lost from storm, smoke and spent in collection of data. After completing the planetable survey angles were read between the triangulation stations and the triangles computed. The distances between stations as computed agreed with the planetable distances carefully measured.

My experience with topographic work is quite extensive, and the results of the survey of Butte demonstrate the great economy of the planetable and stadia method with reference to time, accuracy and actual cost, where the scale is sufficiently large to warrant it.

#### THE CYCLOTOMIC TRANSIT.

The evolution of this instrument is due to a constant tendency to create a transit with one spindle, *i. e.*, having but one central cone turning within the leveling head, that shall, at the same time, sacrifice none of the advantages that the so-called compound center possesses.

It goes without saying that the principal advantages of the double spindle lies in the fact that, no matter in what direction the telescope may be pointed, the operator is enabled to make any azimuth of his

its vertical axis, we turn a narrow metal band around the stationary plate which is the same thing.

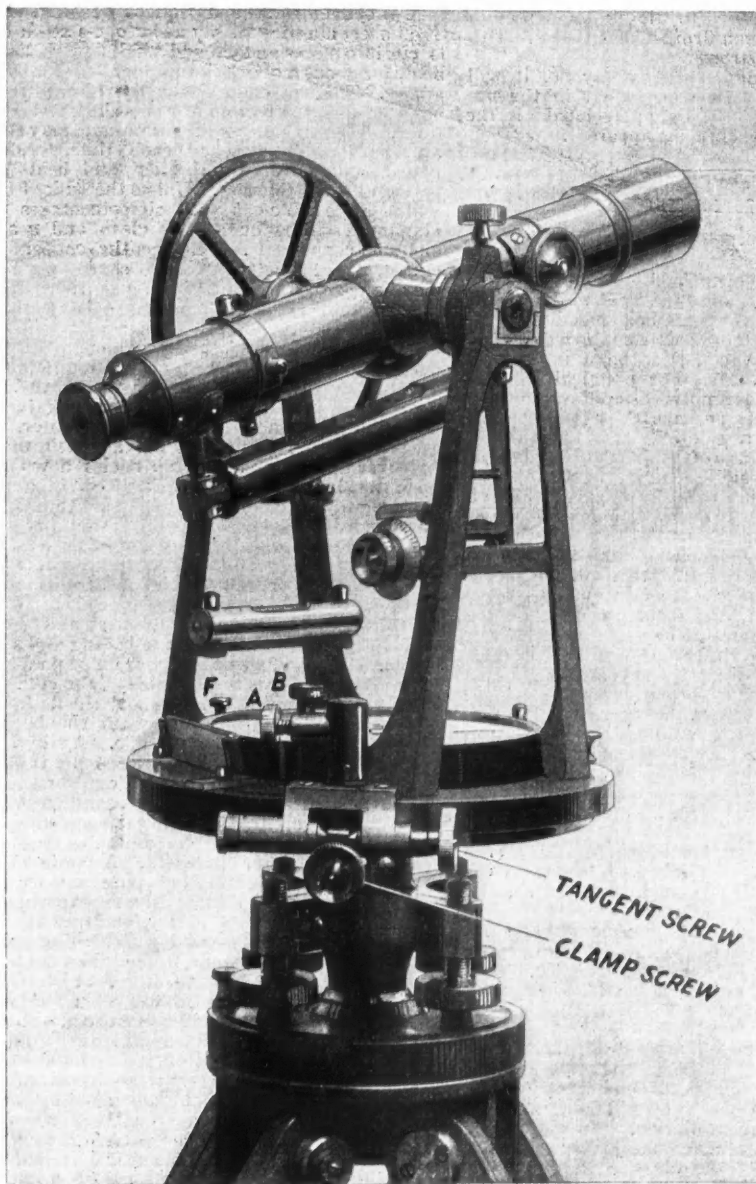
As this band appears to be sliced from the plate, the name Cyclotome has been applied to it, from the Greek words for "ring" or "circle" and "to cut," that is a ring cut or severed as from a disk.

Since the object of the ring is merely to designate the graduated lines upon the plate by corresponding figures, absolute concentricity of the cyclotome is not a matter of importance.

The manipulation of the Cyclotomic Transit is the same as that of any other transit except in the reading of horizontal angles, which is done in the following manner: After the instrument has been set and leveled up in the ordinary way, release the screw B (see the above illustration) by turning it not less than one entire revolution to the left, loosen the clamp screw and turn the instrument on its vertical axis slowly until a tick is heard, which indicates that the zero of the vernier and that the main plate are opposite to each other. Then turn the telescope to object or starting point, clamp the bisect with the tangent screw.

Now move the vernier by means of the screw A to the right or left until its zero coincides with one of the division lines on the main (narrow) plate. Then turn the screw B to the right until it bears firmly on the shoulder. When this is done, the instrument is set, and you are ready to turn off your angle in the ordinary way. If it be desired to set any other azimuth to a telescope pointing, recourse is had to the clamp screw, F.

To enumerate the advantages of the Cyclotomic Transit, we may say the main feature is its single spindle. Its adoption obviates the necessity



CYCLOTOMIC TRANSIT.

graduated plate agree therewith. How this may be done without giving the lower plate an independent motion around the vertical axis of the instrument is the problem to be solved.

The lower plate is the important member that carries the graduated azimuth circle, and if it be made a part of the rigid sub-structure—of the leveling head and base plate—the control of it in reference to known azimuths is apparently lost. If we were enabled, however, to shift the figure series—the nomenclature of the circle—at will, so as we make any one of the graduation lines the zero, the advantage lost by having a rigid lower plate would be regained.

The novelty of the new transit lies in a floating exterior ring placed around the periphery of the lower plate, upon which the figures from 0 to 360 are engraved. These figures are then no longer a fixed part of the circle, but possess that independent rotation which the lower plate had in the case of the double spindle. Instead of turning the whole plate around

of the lower clamp and tangent screws, and simplifies this part of the transit very much. It affords an opportunity to bring the plates closer to the leveling head, thereby lowering the center of gravity of the instrument. It sits directly upon the rigid sub-structure, fitted into it by a thick metal axis and must therefore be very steady. The main graduation, the most vital part of the transit, is fixed for all time. Once properly centered, the chances for eccentricity are reduced to a minimum. The instrument possesses a comparing vernier, opposite the reading vernier, which shows through a circular opening in the plate. By means of the two, used in conjunction, the plate eccentricity may be accurately determined.

What is justly claimed for this instrument as more advantageous than the compound-center transit is included in the following: Greater simplicity; reduction of parts and reduction of weight, with greater steadiness for instruments of the same size; greater solidity of the axis, and

therefore greater rigidity, and the least liability to serious injury through accident; simple mechanism enabling a more rapid setting of the plates to the zero azimuth; avoiding the manufacture of an extra cone and socket, that is, reduction of prominent and costly parts to be made by the artisan, and a reduction, therefore, of the price of the article.

In its optical appointments and constructive details the instrument is up to the standard of a first-class modern transit and surveying instrument; it is a tachymeter, and fitted for any possible expediency of modern engineering and mining work. It has not been the object to replace the compound center instrument with a cheap and inferior substitute, but rather to simplify the required parts and to improve, if possible, the stability and concentricity without losing those features that have thus far made the double center instrument the preferred one for meeting the manifold demand made by the profession upon a universal measuring tool.

The instrument in its present shape was designed in detail by Mr. Adolph Lietz, the original suggestion having been made to him by Mr. Luther Wagoner, civil engineer of San Francisco, who had conceived the application of the floating ring or cyclotome. All rights have been legally secured by the designer, who is also the manufacturer. The instrument is made in San Francisco by The A. Leitz Company in different styles and sizes. In their main and essential parts all styles are alike, but they may vary a little in the arrangement of minor detail. In appearance the instrument does not differ from any standard type except that the bulky apparatus of clamp collar, tongue, spring case and tangent screw below the plates is missing, and that the plates sit a little closer to the base.

The cyclotomic transit is particularly adapted to aluminum construction, by placing a light super structure upon a firm and solid base. This will insure very great steadiness even in a strong wind.

Although extremely simple and readily understood by anyone, it will require a little field practice to make the engineer an expert in the use of the cyclotome, which, like the sliderule, will be appreciated all the more the longer it is used and its advantages become apparent.

#### THE COPPER ASSAY BY THE IODIDE METHOD.\*

By Albert H. Low.

The last edition of Dr. Peters' Modern Copper Smelting contains a description of the writer's modification of the copper assay by the iodide method. The following description of the same method embodies whatever changes have been deemed desirable up to date as the result of almost daily work upon copper ores and products. For the most accurate technical work I prefer it to all other methods. For practical work it exceeds the electrolytic method in accuracy, notwithstanding that the latter, when every precaution is taken, is perhaps theoretically more accurate. The method is to prepare a solution of sodium hyposulphite containing about nineteen grams of the pure crystals to the liter. Standardize as follows: Weigh accurately about 0.200 gram of pure copper foil and place in a flask of about 250 cc capacity. Add five cc. of a mixture of equal volumes of strong nitric acid (1.42 sp. gr.) and water, and thoroughly boil off the red fumes—a very essential point. Now remove from the lamp and add six to seven grams of crystallized zinc acetate, roughly weighed, and about 15 cc. of water. Instead of adding the zinc acetate in this way, a cold saturated solution may be kept on hand and about twenty produced with the color shown by the doubled tubes. The slightest acidity or alkalinity of the citrate is at once shown by difference of tint; the test is very sensitive. The amount of acid or alkali needed to bring it right, can then be easily obtained by adding one-half normal sulphuric acid or ammonia; then by calculating to the 5 cc. taken, the necessary addition to the "stock" solution can be found, and when made the solution re-tested with remainder of the colored water. The operation is very rapidly performed and the results surprisingly exact. Solutions so neutralized, when tested by Huston's method, have always been found exactly correct. The litmus solution should be prepared from the alcohol extracted litmus, as directed by Sutton.

The following method has been in use in my laboratory for over a year and has proved rapid and exact. I have used it only with litmus as the indicator as the tint so obtained is very easily matched, probably corallin or cochineal would do as well.

The method consists in establishing an accurately neutral color for comparison, by superimposing two tubes, one containing acid litmus, and the other alkaline litmus, and looking through both at once. Then comparing this with the diluted citrate solution, colored to the same depth with the same amount of litmus tincture. The details are as follows:

Add pure litmus solution to about 200 cc. of neutral distilled water until it is colored distinctly, but not deeply. Take half of this and dilute further with its own volume of water. Now take three clear 50 cc. "Nessler tubes," fill two of them with the diluted liquid, and the third to the same depth with the stronger solution. To one of the two first add a drop of dilute sulphuric acid, to the other a drop of ammonia. Set these tubes one in front of the other, so that the light passes through both, thus giving a strictly neutral purple color; a little care will enable one to see them almost like one tube against a sheet of white paper in a ground glass. It makes no difference which tube is in front. Now to the liquid in the third tube containing the stronger solution (which is obviously equal in color depth to the double thickness of the first two tubes), add 5 cc. of the citrate solution to be tested, and compare the color cc. taken, the additional 15 cc. of water being then unnecessary. Heat to boiling for a moment and then cool to ordinary temperature, and dilute to a bulk of about 50 cc. Now add about three grams of potassium iodide and shake it about gently until dissolved. Cuprous iodide will be precipitated and iodine liberated according to the following reaction:  $2(\text{Cu}_2\text{O} \cdot 2\text{C}_2\text{H}_3\text{O}_2) + 4\text{KI} = \text{Cu}_2\text{I}_2 + 4(\text{K} \cdot \text{C}_2\text{H}_3\text{O}_2) + 2\text{I}$ . The free iodine colors the mixture brown. Titrate at once with the hyposulphite solution until the brown tinge has become weak and then add sufficient starch liquor to produce a marked blue coloration. Now, continue the titration cautiously until the blue tinge has entirely vanished. When almost at

the end allow a little time after the addition of each drop to avoid passing the point. One cc. of the hyposulphite solution will be found to correspond to about 0.005 gram of copper. In the assaying of ores, etc., when half a gram is taken, 1 cc. of the standard hyposulphite would then equal about 1% copper. The reaction between the hyposulphite and the iodine is:  $2(\text{Na}_2\text{S}_2\text{O}_3) + \text{I}_2 = 2\text{NaI} + \text{Na}_2\text{S}_4\text{O}_6$ . Sodium iodide and tetrathionate are formed. The starch liquor may be made by boiling about half a gram of starch with a little water and diluting with hot water to about 250 cc. It should be used cold and must be prepared frequently for regular work, as it does not keep very well. The hyposulphite solution made of the pure crystals and distilled water appears to be very stable, showing no appreciable variation at the end of a month, when kept under reasonable conditions.

Treat half a gram of the ore in a flask of 250 cc. capacity with 5 or 6 cc. of strong nitric acid and boil gently nearly to dryness. Then add 5 cc. of strong hydrochloric acid and again boil. As soon as the incrustated matter has dissolved add 5 cc. of strong sulphuric acid and heat strongly, best by manipulating the flask in a holder over a small naked flame, until the more volatile acids are expelled and the fumes of the sulphuric acid are coming off freely. Allow to cool and then add 20 cc. of cold water and heat the mixture to boiling to thoroughly dissolve any anhydrous sulphates of iron, etc. Now filter to remove more especially any lead sulphate and receive the filtrate in a beaker about 2½ in. in diameter. Wash the flask and filter with hot water and endeavor to keep the volume of the filtrate down to about 50 or 60 cc. Place in the beaker two pieces of sheet aluminum which, for the sake of convenience in subsequent washing, may be prepared as follows: Stout sheet aluminum, say about one-sixteenth of an inch in thickness, is cut into pieces an inch and a half square, and then the four corners are bent, for about a quarter of an inch, alternately up and down at right angles. This scheme prevents the pieces from lying flat against each other or upon the bottom of the beaker, and their washing is thus facilitated. The same pieces of aluminum may be used repeatedly, as they are but little attacked each time. Add 5 cc. of strong sulphuric acid, cover the beaker and heat to boiling. Boil strongly for about seven minutes. Unless the bulk of the solution is excessive this will be quite sufficient with all percentages of copper. Ordinarily the aluminum will be found to be clean and nearly or quite free from precipitated copper. If, by chance, the copper adheres to any considerable extent, it will usually become loosened by a little additional boiling, or it may be removed by the aid of a glass rod. Transfer the solution back to the original flask, and, by means of a wash bottle of hot water, rinse in also as much of the copper as possible, leaving the aluminum behind. Drain the beaker as completely as possible and temporarily set it aside with the aluminum which may still retain a little copper. Allow the copper in the flask to settle and then decant the liquid through a filter. Again wash the copper similarly two or three times with a little hot water, retaining it as completely as possible in the flask. Finally wash the filter once or twice and endeavor to rinse all metallic particles down into the point. Now pour upon the aluminum in the beaker 5 cc. of a mixture of equal volumes of strong nitric acid (1.42 sp. gr.) and water and warm the beaker gently, but do not heat to boiling, as the aluminum would be thereby unnecessarily attacked. See that any copper present is dissolved and pour the warm solution through the filter last used, thus dissolving any contained particles of copper, and receive the filtrate in the flask containing the main portion of the copper. At this stage do not wash either the aluminum or the filter, but simply remove the flask and set the beaker in its place. Heat the mixture in the flask to boiling and see that all the copper is dissolved. Then add about half a gram of potassium chlorate and again boil for a moment. This is to oxidize any arsenic present to arsenic acid and is a very important point. Remove the flask from the lamp and again place it under the funnel and wash the beaker, aluminium and filter with as little hot water as possible. Again boil sufficiently to remove every trace of red fumes. All the copper is now in the flask as nitrate. Add the zinc acetate and proceed from this point precisely as described with the original nitrate of copper solution in the standardization of the hyposulphite, finally calculating the percentage of copper present from the amount of standard hyposulphite required. One point, however, remains to be further explained. According to the equation previously given, half a gram of pure copper requires 2.62 grams of potassium iodide. While direct experiment shows this to be apparently true, yet it is found that with small percentages of copper, the reaction, when only the theoretical amount of potassium iodide is taken, is slow and in fact does not appear to proceed to completion until during the titration, which is thereby unduly prolonged. It is therefore best to use not less than three grams of potassium iodide in any case. An excess does no harm. Silver does not interfere with the method. Lead and bismuth are without effect, except that by forming yellowish iodides they may mask the end-point before adding starch. Lead is practically removed as sulphate at a previous stage. If bismuth is suspected in any appreciable amount, simply add the starch earlier in the titration. Arsenic when oxidized as described has no influence. The return of the blue tinge in the liquid by long standing after titration is of no significance, but a quick return of the color, which an additional drop or two of the hyposulphite does not permanently destroy, may indicate either an incomplete combination of all the nitric acid with zinc, or a failure to completely boil off the red fumes when dissolving the copper in nitric acid. The assay in such a case is spoiled. This trouble may be avoided by carefully following the directions given and not guessing at strengths or quantities. The amount of zinc acetate recommended is a safe excess. Sodium acetate does not appear to work as satisfactorily.

For the assay of alloys, etc., the necessary modifications of the foregoing scheme are obvious.

The foregoing scheme directs the use of 5 cc. of dilute nitric acid for dissolving the copper previous to titration and prescribes six to seven grams or about 20 cc. of a saturated solution of zinc acetate as a safe excess of neutralizing agent. It is obvious that if most of the nitric acid be boiled away the amount of zinc salt necessary is greatly reduced. In such a case, however, it is perhaps best, for safety's sake, not to use less than one-half the prescribed quantity. Half the zinc salt may thus be saved at the expense of a little more time. This is the ordinary practice in my own laboratory.

\* Journal American Chemical Society.

## THE LIDGERWOOD RAPID UNLOADER.

Many of our readers are much interested in the most economical methods of handling dirt, gravel, sand, ballast or stone, and occasionally low grade ore or furnace waste on a large scale.

In railroad construction as recently exemplified on the line of the Delaware & Hudson Canal Company, with a steam shovel a train of 17 flat cars were loaded by steam shovel in about an hour and a half.

Each car contains about 20 cu. yds. of material; side boards are used so as to allow this amount of material to be loaded without dropping off the edges. Steel aprons are put on the cars, covering the space between same. The brakes are set on the side of the car. As each is filled a locomotive pushes a train of empties by the shovel until all are filled.

The machine is a special compound-gear hoisting engine, which was especially designed for this work. The engine has double 10 x 12-in. cylinders, and is capable of exerting a direct pull on the cable of 25 tons and drawing in the same at a speed of 125 ft. per minute. The drum is 42 in. in diameter and is usually grooved for 1½-in. cable. The shipping weight of the complete machine is now about 26,500 lbs., the drums and other parts having been greatly strengthened in order to meet the requirements of very severe usage.

The cable is wound on the drum when not in use. As soon as the cars are loaded the locomotive usually takes the train to a siding to await orders, and while there the cable is unwound from the drum, the end being made fast to the plow at the opposite end of the train. The method is as follows: The engineer reverses the rapid unloader, thereby unwinding the cable; two men on the ground take the end of this cable and chain it to one of the ties; then the locomotive draws the train backward,

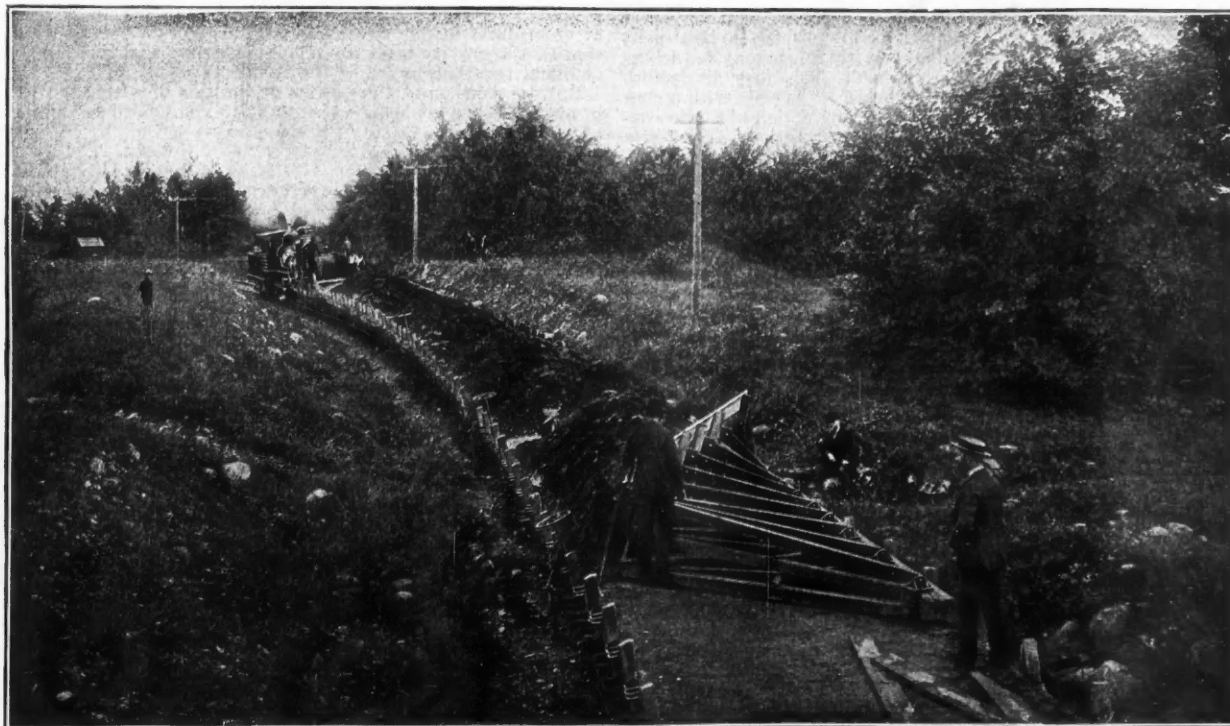
## NOTES ON THE HYDROMETALLURGY OF GOLD AND SILVER.

By W. Geo. Waring.

The wet methods for extracting gold and silver have gradually attained an importance that is undeniable, though exaggerated by political writers who, through ignorance of the real facts of mining and metallurgy, fear an excessive production of these metals. The actual advances of the present day do not consist in the discovery of new processes, promising to extract more than the assay value, or to cheapen the cost to less than the expense of crushing the ore; but they do consist in improvements in manipulation of the old and well-founded methods so as to gain a certain economy, if it be only of the value of a few cents per ton of ore.

As the limit of economical extraction is thus gradually approximated, however, the field for further improvements grows wider, deeper research is required, more minute problems are to be attacked, and the success of establishments employing the highest business ability and technical skill encourages other works that have hitherto been satisfied with less economical results.

I have in mind a particular plant, situated in one of the most prosperous silver mining regions in Mexico,\* which plant has grown up from a small beginning 10 years ago as a custom mill, until it is now reducing about 100 tons daily of ores, mostly purchased, and in competition with the large central smelting works at Monterey, El Paso and San Luis Potosi. The freight rates being merely nominal, this leaching establishment is profitably handling all ores offered, at a charge for treatment not exceeding \$8 gold per ton. Yet this same enterprise started with a mill



LIDGERWOOD PLOW IN OPERATION.

thereby drawing out the cable the length of the train. When sufficient rope has been drawn out it is thrown on to the cars and made fast to the plow.

A better method than this is a simple cheap boom and mast standing by the side of the track, the end of the boom being suspended over the center of the cars. It is apparent that if the cable is unwound by having the hook end attached to this boom, it will fall directly on top of the loaded cars where wanted. Steam for operation of the drum is taken direct from the locomotive boiler by what is called the "bagpipe" connection.

An account of the greater capacity permissible, with the rapid unloader, extra large plows may be used. The illustration shows a plow with its face 48 in. high, it being heightened by a 10-in. plank. This photograph was taken because of the convenience of a point at which the operator could set his camera, and does not illustrate the place where the material was actually unloaded. It would, of course, be unnatural in filling a cut. Where the curve is as indicated in this view, the cable hugs the dirt so that no snatch-blocks are required.

The entire act of stringing the cable, fastening to plow, the train running a mile to point of dumping, the plowing off of the load, and the returning to the point of starting requires about 20 minutes. This is by actual test that has been repeated many times on the Delaware & Hudson Canal Company's railroad. This is of material consequence to a road operating on a single track.

Petroleum in Tunis.—French papers publish a statement credited to *l'Echo d'Oran* reporting the discovery of oil deposits near Ain-Zeft, at the foot of the Dhara Mountains, in Tunis. A well drilled on the American system struck oil at a depth of 1,500 ft., and yields about 50 barrels a day. It is a heavy oil giving only a small percentage of illuminating oil and a high proportion of paraffin, etc.

that had been previously a complete failure, and in a camp filled with wrecks of other failures in the same line; among them several extensive leaching plants, with Stetefeldt and mechanical furnaces, besides a number of "patent process" establishments. Of that earlier era nothing survived except one or two large amalgamation patios, and a few small smelters, which lingered until a year or so ago.

A recent chemical investigation at these works, having for its object to determine the influence of minute traces of rare elements in the ores upon the roasting and leaching processes, served to emphasize the idea of my first paragraph, and at the same time to show how little is generally known about some facts in hydrometallurgy that ought to be better understood.

The so-called "going back" of the chlorination of chloridized ores is one of these facts. A proper understanding of the causes of this phenomenon throws much light upon many of the mysteries of leaching, and helps to explain many perplexing little irregularities that so often occur, as well as to remedy them most effectually. Some of the most valuable contributions to hydrometallurgy of recent years, such as the Russell process, and the use of hypochlorites and cyanides in gold extraction, would doubtless find more extended application were the chemistry of leaching roasted ores better understood.

Consider the complex conditions which accompany the preliminary preparation of a simple silver ore for leaching with "hypo." An ore containing only such common elements as silica, lime, iron or manganese, lead, zinc, sulphur and perhaps antimony, which has been roasted with say 10% of salt.

When charged into the leaching vats it may be quite warm or even hot. It may contain from 2 to 8% of undecomposed NaCl, along with other soluble chlorides such as CaCl<sub>2</sub>, also MnCl<sub>2</sub>, anhydrous ferric salts (rarely ferrous salts, though such may result during leaching by mutual decomposition); undecomposed ZnS, Sb<sub>2</sub>S<sub>3</sub>, etc., may be present in

\* The Hidalgo Works, of Minas Nuevas, near Parral, Chih.

small amount, or in considerable quantity if the ore is liable to ball up or agglomerate in roasting so as to prevent thorough oxidation, CaO may also be present, as well as various sulphates, etc.

When water is admitted into a vat full of chloridized ore, the alkaline chlorides begin at once to dissolve, making a brine which increases in density and temperature as it passes through the ore, and at the same time increases in capacity to dissolve AgCl, PbSO<sub>4</sub>, etc.

That AgCl in solution is readily decomposed by ZnS, Sb<sub>2</sub>S<sub>3</sub> and many other sulphides is well known; and under the conditions stated some AgCl must inevitably be precipitated as Ag<sub>2</sub>S, and so lost. Reducing agents, such as FeSO<sub>4</sub>, Na<sub>2</sub>SO<sub>3</sub>, and others that reduce silver sulphate, fluoride, etc., are quite without action upon AgCl in briny solution—a fact that is not well known, but minor reactions can and do take place between some reducing agents and ferric and perhaps other metallic salts, and between the CaO and the reduced metallic salts that cause eventual reduction of AgCl. Thus ferrous or manganous hydrate may be produced, both of which decompose AgCl, the former very energetically, resulting in ferric hydrate and chloride, and metallic silver. Manganous hydrate, which is of very common occurrence, in leaching, acts more slowly, an hour or even more of contact with a hot saturated saline solution of AgCl being required to completely precipitate all the silver as Ag.

These important reactions are very evidently not generally known, and I doubt if they have ever been mentioned in the literature of metallurgy, although frequent references have been made to the injurious effects of alkaline solutions in leaching. Of course the last named reactions can take place only in neutral or alkaline solutions. They can be very easily demonstrated by heating strong solution of common salt containing AgCl with the hydroxides named. The action of mineral sulphides, even in coarse grains, can be similarly exhibited.

It is evident, therefore, that a silver ore may have been roasted with salt in such a way that 95% or more of the silver may have been converted into AgCl, and yet yield only 80%, or even as low as 30% to treatment with hypo. The laboratory chlorination test therefore may fail to exhibit the actual degree of chlorination obtained. This may be demonstrated in particular instances by digesting the assay sample with a considerable amount of water (so as to avoid the production of a brine capable of dissolving traces of the AgCl) with a very little of some ferric salt, so as to neutralize the CaO, and filtering off the solution before treating with hypo. The aqueous solution may be neutral, or it may be slightly acidulated, and hot, and contain a little free chlorine, as will be the case if the ferric salt has been prepared with copperas and calcium hypochlorite. The results will frequently, and especially upon calcareous ores, considerably exceed the highest extraction possible with hypo or cupreous hyposulphite, thus showing that some of the advantages attributed to the action of the latter salt may be due to reactions quite different from those claimed for it.

My attention was first called to the injurious reactions caused by the presence of alkali in wash water leaching in 1896, when it was discovered quite accidentally at Lake Valley, N. Mex., during a test of the Russell process, a preliminary washing of the roasted ore with water containing copper sulphate gave better final results than did the use of cupreous hyposulphite in the hypo leaching, and I believe that such use of copper salts was incorporated in Mr. Russell's additional patent applications.

In the same year, at Silver City, with a similar ore, I observed that ferric salts yielded similar results. The ores carried considerable manganese and lime, and the increased extraction was due to simple neutralization of alkali, preventing the formation of manganous hydrate.

Ferric sulphate or chloride is more efficacious than cupric sulphate in such a case, because the latter salt often contains ferrous sulphate, giving rise to the very dangerous ferrous hydrate, the most deleterious substance that has been met with, to my knowledge, in silver leaching, next to some raw minerals unoxidized by roasting. Fortunately, however, the finely divided precipitated metallic silver can be re-chloridized readily in the ore by a weak solution of clear hypochlorite of lime.

The sulphide of silver thrown down in the wash water leaching does not yield so readily. It is here that the Russell process offers a partial remedy. But it seems to be only partial. Is part of the sulphide converted into an insoluble allotropic modification, that it fails to dissolve completely, or is its composition changed into an insoluble sulpho salt? The most perfect remedy yet discovered for injurious sulphide reactions is to perfect the roasting, to which I shall refer further on.

The use of ferric salts in neutralizing wash water has the advantage of not introducing copper into the sulphides, and thus making them difficult to refine. Where the use of cupreous hyposulphite is necessary in the final leaching, I imagine that much of the difficulty arising from the presence of so much copper in the sulphide product might be obviated by a judicious employment of ferric chloride in connection with the cupreous salt. The solution is easily made from copperas by adding to it the requisite amount of sulphuric acid and then running in clear bleaching powder solution to slight excess. It can only be successfully applied by sprinkling on the cooling floor before the ore is charged into the vats. If applied upon the surface of the ore in the vats, the advancing portions of the fluid will have been deprived of the salt before it is sufficiently saline to take up much AgCl.

The procedure will vary, of course, with circumstances. In one instance in which this method had only about two months' trial in New Mexico, having been interrupted by the rapid fall in the price of silver, remarkably economical results were obtained by using the strongly saline wash water repeatedly, after precipitation and oxidation,\* to wet down the roasted ore upon the cooling floor. The completely saturated portions were led into evaporating basins to recover the salts, which were considered to be more effective for chloridizing purposes than ordinary NaCl, on account of containing much Na<sub>2</sub>SO<sub>4</sub> and ZnSO<sub>4</sub>. The ores contained a notable amount of gold, all of which, with much the greater part of the silver, was recovered from the first wash water, the remaining silver being extracted with hypo.

The refining of wash water sulphides often presents difficulties on account of the presence of an excess of copper. This embarrassment has been overcome in various ways. One case in particular is interesting, not because of any particular trouble in refining, but because of the collateral

\* In this case the copper was thrown down by scrap iron, and the solution oxidized by bleaching powder solution.

object in view which was to economize the hypo, expensive because of the remote locality, in the Sierra Madre of Sonora. The ore contained about 0.5% only of copper. I recommended the following plan:

The first outflow of wash water, containing all the soluble copper and all the silver dissolved by the brine, is conducted into a special tank, about half filling it. When the hypo solution first appears the first dilute portions are also conducted into the same tank, also the dilute tail hypo from a finished leaching vat, that is, the portion that usually goes to waste after the main part of the stock solution in the tailings has been displaced by the final wash water. The amount is regulated so as not to completely precipitate the copper. The silver and copper are thus thrown down from the wash water as insoluble hyposulphites, and the precipitate after draining is thrown upon the surface of an ore vat, in which the hypo leaching is nearly finished. Additional hypo dissolves the silver and copper, the former going through the ore to be precipitated with the regular sulphides, while the copper is reprecipitated upon the surface of the ore as sulphide by the action of the finely divided sulphides that usually coat the surface during the hypo leaching.

The results in this instance are, that there is no waste of hypo, the sulphide product is extremely pure, never assaying less than 60% silver, and consequently refined without roasting, by simple fusion upon a lead base, with just enough litharge to oxidize the sulphur. The operation is extremely simple and easy. Incidentally also the tailings are remarkably clean, in fact it would seem that the essential reaction of the Russell process may occur, although the procedure is quite different, and the object sought being quite the reverse of that actually obtained in the Russell procedure, namely, the production of pure sulphides free from copper.

With regard to roasting furnaces, I have already mentioned the necessity for perfect roasting; and to obtain this the furnace must be adapted to the ore. There is no ore that cannot be successfully roasted or chloridized in one or another of the several types of furnace in use, that is, the gravity type, the revolving cylindrical type, the hand or mechanical reverberatories, or the muffle type.

But the solution of the important question of what type to use should in every case be made by a thoroughly experienced metallurgist, instead of being left, as is usually the case, to be settled by the simple advice of an advocate of some particular style of furnace. The arguments generally adduced to prove the advantages of certain mechanical conditions peculiar to any furnace cut no figure whatever in comparison with the importance of the chemical conditions required in the roasted ore. No one who does not understand the nature and importance of these conditions and how they are produced, is competent to advise in so important a matter.

It would seem almost superfluous to write so insistently upon this subject, in view of the many standing monuments of folly to be seen in every large mining district in the shape of furnaces of almost every type that have failed to accomplish what they were built for. They speak volumes more than I could write. Readers of the *Engineering and Mining Journal* are familiar with instances that have been cited in its pages of vast losses and expenditures and experiments with the right kind of furnaces in the wrong places.

Ores balling up in revolving furnaces and enclosing undecomposed sulphide of zinc, etc., in fusible CaCl or CaF, leady ores matting in gravity furnaces, and in other types undesirable chemical combinations being produced like oxychloride of zinc, which sets or cements the roasted ore into solid rock the minute water touches it, are familiar examples, yet none of these or any other horrible disasters need occur if the proper method of roasting be adopted.

Muffle furnaces, of proper construction, using the regenerative principle, are admirably adapted to use in many cases where ores containing gold and silver along with copper or zinc, and perhaps other metals, are to be leached for the extraction of both gold and silver and one or more of the other metals after a single roasting. I only refer specially to the muffle type because it is so little known in this country and because an erroneous idea as to the fuel economy of this type has been current in metallurgical literature. The muffle furnace cannot take the place of the revolving cylinder for many purposes and it lacks as yet one very desirable feature, a mechanical finishing hearth, or, at least, some system of mechanical ruffling, to make it very generally useful. But it is a mistaken notion that the regenerative muffle furnace is more expensive to fire than other furnaces. My experience has been quite the reverse. Such a furnace built at Silver City, N. M., with a hearth area 16 x 40 ft., roasted from 12 to 25 tons daily in 1879 of ores and concentrates containing 10 to 30% sulphur, the hearth being almost uniformly at about 500° C., while the escaping products of combustion rarely reached above the temperature of boiling water. The volatile products from the muffle hearth were condensed in coke towers, after passing through a long flue, and the acid liquors used to leach out copper, etc., from the roasted ore.

A matter of importance connected with roasting is the degree of resistance afforded by various-sized quartzose particles to the disintegrating influences at work in the roasting process. This question has an important bearing upon volatilization, as the following test will show:

A silver ore in Northern Sonora—antimonial sulphide, free from copper, in quartz gangue, when reduced to the size usually called "16 mesh," and roasted with 10% of salt, showed no considerable loss by volatilization, the leaching extraction being 96.4%, and 3.4% remaining in the tailings. When reduced to 30 mesh size, however, with the same treatment the volatilization loss was 11%, the extraction being 86.3%, with 2.7% left in the tailings. At 45 mesh the volatilization loss had increased to 42%, the amount remaining in the tailings being constant at 2.7%.

The limit of resistance to disintegration should be ascertained by experimental roasting and treatment with strong acids and other solvents, and then the furnace work should be brought up to the highest percentage that can be extracted by such tests, instead of allowing poor furnace work to set the limit of efficiency in gold and silver extraction, or to determine the crushing size of the ore.

Much is yet to be learned about roasting methods, through analyses of furnace fumes and gases, and the time has come when leaching and chlorination works should find out what is going on in smoke. The importance of such investigations was long ago recognized in the iron industry, and they are of relatively greater importance in the metallurgy of the precious metals, as Eggleston and others have suggested.



## ECLIPSE ELECTRIC LAMP FOR MINES.

For many years inventors have been striving to construct a portable electric lamp for mining and other purposes. The great difficulty to be overcome so as to bring the lamp within the range of practical utility, has been the question of weight, as the desirability of a light portable electric lamp has been recognized long since by the Eclipse Electric Lamp Company, of Buffalo, N. Y., it has now after several years of constant and costly experimental work produced a lamp that seems to meet all requirements. The lamp is small, light in weight, simple in construction, easy to operate and not liable to get out of order with ordinarily fair treatment.

The Eclipse lamps are designed as miners', bicycle, carriage and wagon lights, and for any other purpose where a portable light is required. They can be operated by a child as easily as by a grown person, and the light cannot be jolted out or blown out. The light, it is stated, is projected from the lamp for 75 or 100 ft., and is always strong while in use.

The case contains a primary battery, which generates the current for the incandescence of the lamp. The battery is very easily recharged, and at a surprisingly small cost. Charges of Eclipse Electric Sand are supplied in small tin boxes and the operation of pouring the contents into the battery is a very simple matter. The lamps as a rule will burn



CHARGING.



REMOVING ZINC.

through an entire season, while new ones can be had at a low cost. The lamps are especially made for this battery.

Two sizes of Eclipse lamps are manufactured—No. 2 and No. 3. The No. 2 lamp is intended for bicycle use, and is 3½ in. in width, 3 in. deep, 4 in. high, and weighs 16 ounces. The No. 3 lamp is designed for miners' carriages, wagons, watchmen and for general portable use. It is 4½ in. wide, 3½ deep, 5 in. high, and weighs 26 ounces.

**Electric Treatment of Complex Ores.**—The *Zeit. f. Elektrochem.*, November 5th, contains a very long article by Mr. Lorenz, in which he describes a method for obtaining lead and zinc from ores containing both of them; as the wet processes have not been successful, he electrolyzes the fused salts and separates the two metals by a single process; as salts he uses the chlorides. The *Elektrochem. Zeit.* for November publishes the illustrations, accompanied by a description from a German patent of Lorenz, for such a process. There is no doubt that this process is the same, and due to the same author, as that in the paper referred to above.

**Economical Australian Gold Mining.**—The Occidental Gold Mining Company, Cobar, (N. S. W.), keeps itself going on ore of exceedingly low grade. During the half-year ended February 15th, 3,635 tons of stone were mined and crushed for yield of 561 oz. of gold, valued at £2,267 15s. 8d., equal to 3 dwt. and a fraction, or 12s. 6d. per ton. Owing to the dryness of the season the battery lost two months' crushing; but the tanks have been enlarged, and the company have now the best water supply in the district. The Occidental Company have made and distributed profits on 3 dwt. ore, the mine being one of the most economically managed concerns in the colony; but the margin is so small as to constitute a handicap to progressive work. With increased battery power—the goal the directors are always aiming at but never seem able to reach—an improvement could be effected even upon the present small expenses, and the divisible profit would be a regular and not an intermittent occurrence. Occidental scrip is listed by the Sydney Exchange, and has business at about 1s. 8d.

**Coal in France.**—Coal of great thickness and excellent quality has been found, but not by means of the borehole, at Gravelines, near the Channel coast, midway between Calais and Dunkerque; and the circumstances of the find are thus related by the *Echo du Nord*: "The borehole, which had reached a depth of nearly 400 m. (218½ fathoms), was still in measures that showed no favorable results, so that it was decided to stop the work and pull down the sheds put up near the hole. The men had given a few strokes with the pickaxe at a depth of 3 or 4 meters, when the attention of the engineer in charge of the works was arrested by certain indications. He ordered the excavation to be deepened, and two hours later, at a depth of 6 m., coal was found. Working was continued for the rest of the day and all the following night for widening out the excavation, when a boring was quickly started revealing the existence of an almost horizontal seam 8 m. (26 ft.) thick. The coal is reported to be equal to the best in the Pas-de-Calais, containing 40% of volatile matters; and, as the seam is so near the surface, it can be worked opencast."

## FORMATION OF CYANOGEN FROM AMMONIA.

The occurrence of cyanide of potassium in blast-furnaces was first, in 1837, observed by Thomas Clark on the Clyde. The crusts and efflorescences forming about the tuyeres, especially after scouring, consisted of nearly equal parts of cyanide and of potash. The observation was soon confirmed from other parts, but no adequate explanation of the occurrence has been given. The investigation which Dr. E. Bergmann has started, in conjunction with Dr. Bueb, on the instigation of Professor Bunte, does not settle the question whether or not the cyanogen in such cases is really derived from the free nitrogen of the atmosphere. But the experiments have a high practical interest. Dr. Bueb has not yet published his researches; Dr. Bergmann gives a detailed account of his share of the work in *Schilling's Journal für Gasbeleuchtung*. The study concerns the action of ammonia, diluted or not with illuminating gas or Dowson gas, on glowing charcoal. From a reservoir, provided with a gas-meter, the gas passed through the bottle in which the ammonia was generated. The dried gases then entered a china tube, filled with charcoal, which was heated up to 1,180° C. in a Fletcher gas stove; an aspirator was joined to the other end. The temperature was ascertained by means of Princeps' alloys. At 800° only 4% of the nitrogen supplied as ammonia was converted into cyanogen; at 1,000° 24%.

When illuminating gas was admixed, 60% could be gained at the highest temperature applied, 1,180°. Of the remaining 40% of the ammonia, 20% were recovered as ammonia, and 20% decomposed into nitrogen and hydrogen. The coal gas acts either simply as a diluent—and the experiments prove that a concentrated current of ammonia is not profitable—or it may be decomposed according to the formula  $C_2 + 2 NH_3 = 2 CNH + 2 H_2$ . If the latter be the case, gas containing higher hydrocarbons should prove more effective; the addition of pentane was found useless, however, if not deleterious. There is a third possibility,  $CO + NH_3 = CNH + H_2O$ . This reaction would be important for Dowson gas. When working simply according to this formula, that is, without using charcoal, a little cyanogen was, indeed, formed, but the quantity was very slight. The experiments were made with about six grammes of ammonia; 40 or 50 liters of the other gases lasted from one to three hours. The following is a summary of the results: Hydrocyanic acid, and not cyanide of ammonia, is formed when ammonia is passed over glowing charcoal; by-products are nitrogen and hydrogen, never methane. The addition of coal gas increases the yield of cyanogen, and keeps down the splitting up of ammonia into its constituents. Hydrocarbons of higher molecular weight seem to prevent the decomposition of the ammonia, becoming themselves decomposed, and their admixture is hence not advisable. Carbonic oxide behaves like coal gas, but it favors the splitting up of ammonia; the same applies to Dowson gas. These gases act as diluents; the diluted ammonia is not so easily split up as the concentrated ammonia. The current should not be too rapid. The temperature depends upon the nature of the gases added; on the whole, a temperature of 1,100° gives the best results. A certain percentage of ammonia always escapes unattacked. This percentage increases in the presence of hydrocarbons of higher molecular weight. Dr. Bergmann does not discuss the practical bearing of these researches.—*Engineering*.

**Electric Fusing Sample Furnace.**—A brief illustrated description of a small electric furnace for fusing samples, and another for continuous operation, are described and illustrated in the *Elektrochem. Zeit.* for November. They are used in an installation in Germany for separating gold and silver.

**Coal in Germany.**—The Paruchowitz borehole, near Rybnick, in Silesia which attained a depth of 2004.34 m. (nearly 1,096 fathoms) when the rod broke, has passed through eighty-three carboniferous strata, the total expense having amounted to £3,760. The 384 thermometrical observations that were made showed a very irregular increase of temperature with depth, the average being 1° C. (1.8° Fahr.) for every 34.14 m. (111 feet). Large superficial deposits of a bituminous substance varying between coal and shale in the neighborhood of Bitterfeld, in the Elbe district, afford a fuel of too low value to bear any cost of carriage. For utilizing this fuel on the spot, however, electro-chemical works with a force of 3,000 H. P. have been started for the production of chlorine, caustic potash and carbide of calcium (which serves for making acetylene), sodium and other substances obtained by the electric furnace.

## MINERAL RESOURCES OF PIERCE, IDAHO.

Pierce Mining District is situated in the foot hills of the Bitter-Root Mountains, at an altitude of 3,500 ft. above sea level; its former history is well known to most miners on the Pacific slope and to quite a number of mining men east of the "Rockies." It was discovered in the fall of 1859, and the years of 1860-62 found the camp with a population of 10,000-12,000 men, all engaged in placer mining; but for last 10 years (previous to 1893), there has not been over 600 men at work in mining, and most of that number Chinese. Much has been said and written concerning Pierce City, but its vast resources of gold have rarely been exaggerated or even fairly set forth.

It is only within the last five years that a true conception of its resources could be formed, as previous to that time there was no attempt at quartz mining. The indications all point to but one theory, viz., that the gold originally found in the placer, was deposited from the quartz ledges; all the ledges so far discovered have been found in the old placer workings, in many instances, all placer operations stopped when they got up to the ledge. Another circumstance observable, would convince the most skeptical that the gold is local, and that is, that all the different gulches and creek-beds, carry gold of a different fineness, value of the placer gold ranging from \$11.50 to \$18.50 per ounce. The formation is granite intersected by porphyry dikes. There are at present three quartz mills in operation in the camp, running on ore ranging in value from \$15 to \$39 per ton. There are also a number of quartz prospects, on which mills are to be put during the coming season. Among the producing properties the Idaho mine and the Bond are the principal. The Idaho is a 2½ to 3-ft. vein of free-milling gold ore ranging in value from \$15 to \$39 per ton. The Bond is a 12-in. vein of free-milling ore, average value about \$50 per ton. Among the properties on which mills will be erected this summer are the Bole group; this group consists of six claims and is owned by Dr. H. H. Bole. Last year he sold the property for \$30,000, and received the first payment of over \$3,000, but for some reason unknown the deal was not consummated. In the placer mines there are a large force of men employed as there are 10 big hydraulic companies in operation and hundreds of small companies. It is impossible to draw any arbitrary lines defining the gold belt, but some conception of its size may be formed from observing the area, which has been worked for placer, and which covers an extent of territory 40 to 50 miles long by 25 to 30 miles wide. It is safe to say, were the same amount of capital invested in this camp, that there is in some of the Colorado camps, equally large returns could be had from the same. The ore in this district is strictly gold-bearing; some copper has been found on the Oro Grande, but whether there is sufficient quantity to pay remains to be determined. The gold ore near the surface is free, but in depth it is invariably associated with iron pyrites. Pierce City is connected by wagon road, with Kendrick, on the Northern Pacific Railway, distant about 60 miles.

## MINING INDUSTRY IN THE ARGENTINE REPUBLIC.

The latest consular reports just issued on this subject do not give an encouraging account of the situation. In some instances expensive works have been erected and a large amount of money invested, but the output and its value remains at a very low figure. The latest complete returns for one year were for 1894, but for the first nine months of 1895 the value of the exports corresponded almost to the same period of 1894. It is stated that not one of the gold or silver mines of the country has so far paid its expenses, but extensive improvements are reported on the head waters of the Chubut River, in Patagonia, where at least two companies are now working, there are also promising reports from other districts. The reason attributed for this failure to secure favorable exploitation of the mineral wealth of the Republic by a writer in the *Nacion* of Buenos Ayres, is that it has been impossible, more especially in recent years, to secure the investment of sufficient capital to develop the industry properly. In the absence of reduction works, it is pointed out that several companies are unable to ship their ore, which would be considered fair grade under other conditions, in consequence of high freights and the fall in the value of silver. Various companies are nevertheless working silver and copper, sometimes accompanied by gold and galena, and owing to the rise in value of copper more attention is being paid to these mines. He states that at the present time, owing to the scarcity of pack mules in the province of Rioja, the rich and important mines of the district of Famatia cannot be worked as actively as they might until the railroad is completed to a certain point not far from the mining district, when it would be easy to take up all the machinery necessary to create activity in that rich district. At the present moment, owing to the enthusiasm for gold mines in Europe, development is being contemplated and two more syndicates are now being formed for the purpose of exploiting mines in the provinces of San Juan and Mendoza. One or more companies are also being formed for the purpose of working the gold mines of Cordoba. Various applications are being made to the mining department asking for claims of quartz mining in the district of Neuquen, which are to be worked with Chilean capital by persons who have mining interests and experience in Chile.

The metals and minerals exported are classed as auriferous sand, copper in bars, tin ore, copper, silver, lead, lead ore, silver "pena," gold and silver in regulus, the largest value being in silver and the next in copper.

The returns for the first nine months of 1895 are not given in detail, the whole of the mineral products being classed together, with the result that for the nine months of 1894 there was exported the value of \$243,019, and in the same period of 1895 \$251,134, thus showing a slight gain over the preceding year.

**Japanese Victory Statue.**—The Japanese, in order to celebrate their victories, are going to erect a gigantic statue of Buddha. The height will be 120 ft. The metal will be supplied from the ordnance captured in the late war. The monument will cost about 1,000,000 yen, about \$550,000, and is to be erected at Kioto.

## RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

Specially Reported for the Engineering and Mining Journal.

**INJURY OF EMPLOYEE BY MULE IN MINE.**—An employee of a coal and iron mining company lost his foot while leading a mule attached to a coal car in one of the underground corridors of the mine. He claimed that the mule was vicious to the knowledge of the company and that he was negligently and carelessly assigned to lead the mule in the business of drawing coal from the place where it was mined to the shaft, that he was ignorant of its vicious disposition, and on the day in question it became ugly, bit at him, struck at him with the forefeet, broke away, got loose, and in endeavoring to control the animal his lamp went out, and caught his foot in the switch, and one of the wheels of the car passed over it, smashing it and requiring amputation. The evidence of knowledge on the part of the mining company was denied. The superintendent of the company testified that its witnesses, who were brought from a foreign state, did not discuss the facts, while witness admitted that he talked them over with the superintendent during the journey, and when asked if they all on the train agreed that the mule was one of the best, answered: "If we did, I would not tell you." Some other matters to which they testified were rather improbable. The court on appeal held that the evidence justified a verdict against the mining company.—*Szuchy vs. Hillside Coal and Iron Company* (37 New York State Reporter, 457), Supreme Court of Appeals Division, Second Department, New York.

**APPORTIONING INTERESTS IN MINING CLAIM.**—The owners of a certain mining claim and the owners of sundry adjacent claims, between whom and the owners of the first claim there had been disputes as to their respective rights in certain locations, organized a mining company, and conveyed to it their various rights in the disputed locations. One-half of the stock was assigned to the owners of the first claim. The other half was placed in trust for the owners of the other claims, who could not agree upon a division of the stock, with an understanding that account should be taken of the ore from the several locations, and the proceeds, after deducting one-half for the owners of the first claim, should be paid to the grantors of the several claims. Subsequently, in a suit brought by third parties against the assumed owners on a mine on one of the disputed claims, it was adjudged that an interest in the location belonged to such third parties. The court held that in the absence of some of the parties interested in the stock of said mining company, held in trust, the court could not, in such suit, apportion the stock so held, and direct a transfer of the shares, but that the most that could be done was to adjudge that the assumed owners of the disputed mine should transfer a proportion of such interest as they had in such stock to the parties found to have an interest in the location.—*Wheeler vs. Billings* (72 Federal Reporter, 301), United States Circuit Court of Appeals.

**ILLEGAL COMBINATIONS.**—A statute denouncing as void and prohibiting the enforcement at law or in equity of every contract whereby a combination of capital, skill, or arts is formed to create or carry out restrictions in "trade," or prevent competition in the sale or purchase of "commodities," renders void a lease by a coal company of a saloon on its property, in which the lessor covenants not to permit the sale of liquor to any one else on its lands, and to issue to its employees check in payment of wages, and to redeem all checks which the lessee might take in payment for liquors in consideration of the payment as rent of two-thirds of the profits of the business.—*Texas & Pacific Coal Company vs. Lawson* (34 Southwestern Reporter, 919), Supreme Court of Texas.

**ASSIGNMENT OF LEASE OF COAL MINE.**—A lease of a coal mine obligated the lessor not to lease to any other party any coal land to be operated during the life of the lease, and prevented the lessee from dividing his time or attention with any other mine, for the reason that the rent depended upon the number of bushels mined. The lessee assigned his interests in the lease, and the assignees sought to restrain him from operating another mine, on the ground that he was still bound by the original lease. The Supreme Court of Iowa holds that no right to insist on the obligation between the lessor and lessee was transferred to the assignees, but that they acquired only such rights as their assignor had under the lease, and were bound in his stead by the obligations. An assignment of a lease of a coal mine, with the good will of the trade, does not carry with it an obligation that the assignor will not again engage in the same business in the vicinity.—*Fidlay vs. Carson* (66 Northwestern Reporter, 759).

## PATENTS RELATING TO MINING AND METALLURGY.

United States.

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

WEEK ENDING APRIL 28TH, 1896.

- 558,978. **ORE-CONCENTRATOR.** John W. Nesmith, Denver, Colo. Assignor, by mesne assignments, to the Colorado Iron Works Company, same place. Filed October 21st, 1895. Combination of a belt-drum adapted to turn with the belt and to reciprocate longitudinally of its axis, a crank rigidly attached to the shaft of the drum, a driving-wheel and a vibrating arm between the crank and driving-wheel, the arm forming a rigid connection between the parts in the rotation thereof.
- 558,994. **ROCK AND COAL DRILL OR AUGER.** John T. Snyder, Luzerne, Pa. Filed June 25th, 1895. Combination of a central stem or core, cutters mounted at the front end thereof, and a pair of spirally-twisted blades or flanges arranged on the stem or core at diametrically opposite points, one of the blades or flanges extending to the extreme front end of the body of the auger and the other blade or flange terminating short of the front extremity of the other blade to provide an intervening clearing space at the rear of the cutters.
- 559,272. **COAL CRUSHER.** Samuel Evans and Francis J. Morgan, Elkhorn, W. Va. Filed November 22d, 1895. Combination of a cutting roll, the crushing roll being provided on its periphery with transverse diamond-pointed ribs, and the cutting roll being formed with ratchet ribs the ribs standing at an angle to the axis of their rolls and in opposite directions relatively to each other, and a table formed with segmental sides adjacent to the peripheries of rolls, the side next to the crushing roll being formed with transverse ratchet-shaped ribs, and the side adjacent to the cutting roll formed with transverse diamond-pointed ribs.

## PERSONAL.

MR. K. TAKEDA has been appointed chief engineer of the Omori mine at Omori-Kozan in Japan.

MR. LOUIS D. RICKETTS, mining engineer, has returned to Silverton, Colo., to resume his professional duties there.

MR. WILLIAM POWELL, for nearly 30 years superintendent of the Upper Lehigh anthracite coal mines, has resigned his position.

DR. F. SCHNIEWIND, chemist of the Otto-Hoffman Coke and Chemical Company, with offices in Pittsburgh, Pa., will sail for Europe shortly.

MR. E. S. THURSTON, mining engineer, has gone to Mexico to examine a large mining property, in behalf of prominent New York capitalists.

MR. GEORGE W. MAYNARD, consulting, mining and metallurgical engineer, has removed his New York office from 31 Nassau street to 20 Nassau street, rooms 49 and 50.

MR. SPENCER MILLER, engineer of the cableway department of the Lidgerwood Manufacturing Company, New York City, has returned from a four months' visit to Europe much improved in health.

MR. JULIAN KENNEDY, of Pittsburgh, Pa., the well-known engineer, will sail in a few days for Russia to consult with capitalists at St. Petersburg concerning the erection of two steel plants near that city.

MR. WILBUR C. KNIGHT, professor of mining and geology, at the University of Wyoming, Laramie, has gone to the Seminoe mountains in that State, to make a report on the gold properties of the Pennsylvania Company in that section.

## OBITUARY.

FERDINAND DEBARDELEBEN died at Bessemer, Ala., on April 14, after a brief illness, aged 29 years. He held an important position with the Tennessee Coal, Iron and Railway Company.

J. D. SAMPSON, secretary of the Christmas Gold Mining Company, in the Cripple Creek district, died at Denver, Colo., on April 30th. He went to Cripple Creek from Norway, Mich., about two months ago.

CORNELIUS S. BUSHNELL, a well-known inventor and railway constructor, died from heart failure on May 6th, in New York City, aged 68 years. He was one of the builders of the Shore Line Railroad and the Union Pacific. He was also associated with Ericsson in the construction of the *Monitor*.

ROBERT H. CAMPBELL died in Denver, Colo., on April 30th, aged 40 years. He was one of the prominent men of Gilpin County, Colo., and was president and the chief mover in the narrow gauge railroad, which connects all the prominent mines with the mills and depot. He was also largely interested in the sampling works, in the Frontenac mine, and at one time owned the Denver & Central City mine. About six months ago he went to Cripple Creek and was largely interested in some promising mines and also in business blocks in that city.

JOHN THOMAS NORTH, widely known as the "Nitrate King," died suddenly in London, England, on May 5th, aged 54 years. At the age of 23 he went to the west coast of South America, where he worked as a mechanic and as a surveyor for some years. In 1881 the province of Tarapaca, with its nitrate beds, passed into the hands of Chile at the close of the war with Peru, and North secured from Chile a concession of nitrate lands, paying therefor only a small price. Immense works were erected, and in a few years the Chilean nitrate industry was of great importance and Colonel North was a millionaire. He was also the owner of a colliery in Wales and of cement works in Belgium.

## SOCIETIES AND TECHNICAL SCHOOLS.

WESTERN SOCIETY OF ENGINEERS.—A regular meeting of the society was held in Chicago, Ill., on May 6th. A paper was read by Mr. Geo. E. Thomas on "Foundations."

WESTERN FOUNDRYMEN'S ASSOCIATION.—At the April meeting in Chicago, Mr. A. Sorge, Jr., reported that the Committee on Permanent Headquarters had been unable to make satisfactory arrangements, and on his recommendation the committee was discharged with thanks. The Phoenix Iron Works of Cleveland, O., was elected a member of the association. Nominations for officers for the ensuing year were then made. Topical question No. 5, which is as follows, was then read for discussion: "Are foundries generally noticing an irregularity in the grading of foundry pig iron? If so, does this irregularity exist more generally in Northern than in Southern irons? Does it apply to both charcoal and coke irons, and, in your opinion, is any of the difficulty traceable to an extreme desire on the part of furnaces to supply their Bessemer pig iron trade at the expense of their foundry trade?" The secretary read a number of letters on this question, and it was taken up verbally by the members present. The general opinion seemed to be that there is more care in grading iron than formerly.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—The Engineers' Society held its first meeting at the new quarters at Pittsburgh on April 28th, W. G. Wilkins, the president, occupied the chair. William Metcalf addressed the society on the changes and development in engineering during the last 30 years. He described the advantages of power, machinery and the reduction in expenses resulting from its introduction, and he pointed out the improvements in transportation and communication during the past quarter of a century. A resolution was adopted returning thanks to Allegheny councils for the free use of the Carnegie Library which the society enjoyed during the past two years. Also a series of resolutions pertaining to the new charter proposed for the city, the principal one to the effect that the Director of Public Works should be an engineer of established professional and administrative ability, and that in the opinion of the society it will be improbable to obtain such a director by direct vote of the people, as contemplated in the new charter, and further that the salary proposed, namely, \$4,000 per annum, is entirely inadequate to secure the services of an engineer of the desired ability.

## INDUSTRIAL NOTES.

The National Lead Company has purchased property in Allegheny, Pa., 48 x 227 ft. in size, on which it will enlarge its plant.

The Carbondale Fuel Company, of Des Moines, Ia., contemplates electric mining machinery, including a 160-H. P. engine to turn the 10-kilowatt generator.

The Copper Casting Company has succeeded the Chicago Hard Copper Company, and will manufacture copper castings rendered free of blow holes by special process.

The Richmond Standard Spike and Iron Company, of Richmond, Va., has resumed operations at its mill at Iron Gate, Va., after an idleness of nearly two years.

The Pennsylvania Steel Refining Company, of Philadelphia, Pa., is to erect a steel plant at Greensburg, Pa. Later the company expects to add an open-hearth plant.

The Elwood (Ind.) Tin Plate Company has transferred all its properties, patents, contracts, etc., to the American Tin Plate Company, with general offices in Cincinnati, O.

The Clifton furnaces at Ironaton, Ala., will be repaired and put in blast. Crellin & Nalls, of the Birmingham Boiler Works, have just made a \$20,000 contract for repairing these.

The large pipe foundry at Radnor, Va., has been sold by M. C. Armour, receiver, to representatives of the stockholders for \$85,000. A new company will be organized to carry on the works.

The Witte Iron Works Company has been incorporated at Kansas City, Mo., with a capital stock of \$25,000. The stock is owned by E. H. and Ida C. Witte, George A. Denze and Delmar B. Lincoln.

The New York City office of the well-known firm of Fraser & Chalmers has removed from 2 Wall street, where they had been established for so many years, to the Union Trust Building, 80 Broadway.

Owing to depression in the iron trade, the Thomas Iron Company will blow out its Hellertown (Pa.) furnace as soon as the material on hand is consumed. About 1,400 tons of pig iron are stacked on the wharf.

The Gardie Fuel Gas Syndicate of Western Pennsylvania will soon build a plant near Pittsburgh with a capacity of 1,000,000 cu. ft. of fuel gas per day. A similar company has been formed in Philadelphia, covering Eastern Pennsylvania.

The Iroquois Furnace, located at South Chicago, went out of blast last week for relining. After it is sufficiently cooled to permit of work, double shift of men will be put to work. The manager reports that the furnace will probably blow in about June 15th.

H. K. Porter & Co., of Pittsburgh, Pa., have received a second order from the Rock Hill Stone Storage Company, of New York City, for a locomotive for use at the company's quarries at Rocky Hill, N. J. The cylinders of the locomotive will be 9 x 14 in.

Mr. E. L. Corthell, engineer of the Southern Bridge and Railway Company, has announced that work will commence soon on the construction of the big bridge across the Mississippi River at New Orleans, for which the preparatory work has been completed.

The Westburg Boiler Company, of Urbana, Ill., has made a contract with the Springfield Boiler and Manufacturing Company, for the manufacture of boilers on a large scale. The officers are A. J. Westburg, president, W. T. Caldwell, treasurer, and F. L. Bills, secretary.

The Greensboro (N. C.) Furnace Company has raised the working capital for its mines and furnace, and awaits action on certain railroad freight rate concessions which it is expected to obtain. When these are secured the mines will be worked and the iron furnace put in blast.

Stein & Boerick, Limited, of Philadelphia, lately closed contracts for a complete coal washing plant for the Jamison Coal Company, of Greensburg, Pa., capacity 300 tons, and for remodeling a 300-ton lignite briquette plant for the Texas Briquette and Coal Company, of San Antonio, Tex.

Wilkins & Davison, of Pittsburgh, Pa., are preparing plans for a steel head frame at the Morewood plant of the Southwest Connellsville Coke Company, also for an extension of the Steubenville, O., water-works system, which contemplate the laying of a considerable quantity of additional mains.

The rolling mill of the East Chicago Iron and Steel Company, at East Chicago, Ind., resumed work May 1st. The mill will run night and day, giving employment to 500 men. Township Trustee Robert Ross has again been installed as superintendent. The works are operating in full in all departments.

The Sloss Iron and Steel Company is repairing its No. 4 furnace at North Birmingham, Ala., and making some substantial improvements in the plant. It will require about 60 days to complete the work, which is virtually a rebuilding of the furnace. Furnace No. 3 continues in steady operation, and good results are being obtained.

The North Bend (O.) Coal and Coke Company will soon resume the manufacture of coke. The ovens have been closed since last May, owing to a permanent injunction being placed upon them in a suit by Col. D. W. McClung against the company. Negotiations that have been going on for some time were completed recently and the property belonging to Colonel McClung was purchased by the Coal and Coke Company.

The annual meeting of the stockholders of the Joseph Dixon Crucible Company was held at Jersey City, N. J., recently. The old board, consisting of Edward F. C. Young, John A. Walker, Daniel T. Hoag, Richard Butler, William Murray, Alexander T. McGill and Jerome D. Gillet, were re-elected. President E. F. C. Young, Vice-President and Treasurer John A. Walker and Secretary George E. Long were re-elected. Joseph D. Bedle was also re-elected as counsel.

The Hall Steam Pump Company, of Allegheny, Pa., has just shipped a 16 x 18 x 14 air compressor to be placed in the Lebanon, Pa., water works to pump water from artesian wells. Other shipments include a 14 x 14 x 18 air compressor for the Edgar Thomson Steel Works, Braddock, Pa., and an 18 x 20 x 24 compressor for Spang, Chalfant & Co., Etna. The company is building a 20,000-gallon pump for the American Water-Works Guarantee Company, to be installed at Kokomo, Ind., and is building a 14 x 14 x 18 air compressor for the Walkers Mills Quarry Company, for operating rock drills.

The Schoen Pressed Steel Company, recently organized in Pittsburgh, with a capital stock of \$1,000,000, composed of New York, Philadelphia, Chicago, and Pittsburgh capitalists. The new concern has purchased the plant of the Schoen Manufacturing Company, situated in the lower part of Allegheny; also of all the patents relating to the manufacture of pressed steel specialties owned by the latter concern, including some valuable patents for the manufacture of pressed steel truck frames owned by Charles T. Schoen. In addition to these purchases the Schoen Pressed Steel Company has bought 5 1/2 acres of land adjoining the present plant of the Schoen Machine Company in Allegheny, extending from the line of the Pittsburgh, Fort Wayne & Chicago Railway to the Ohio River front. The capacity of the plant will be largely increased by the new company.

The Lidgerwood Manufacturing Company, of New York, has acquired all the American rights under the patents of the Temperley transporter, which will immediately be placed upon the market by the company. The transporter is a hoisting and conveying device employing a suspended beam as a trackway. The chief points in its favor are simplicity in operation, low cost and extreme flexibility. About 300 transporters have already been made and the device has therefore passed through its experimental stage. The British Admiralty have adopted the Temperley transporter for coaling battleships, having recently purchased nearly 100 of them. Mr. Spencer Miller, engineer of the cableway department of the Lidgerwood Company, has secured a contract in Paris from the new Panama Canal Co. for seven cableways, which were shipped April 30th to Panama.

A new company, the Universal Construction Company, incorporated, has taken a lease of what is known as the North Works of the Illinois Steel Company, located in Chicago. The stock of the company is held by Eastern as well as local men. It is the purpose of the company to develop the manufacture of structural steel and special shapes for the bridge building, railroad and contracting trades. Fred. Heron, general manager and one of the directors, has been long associated with the Homestead Works in Pittsburgh, and with the Phoenix Iron Company, at Phoenixville, Pa. The secretary of the company, Edward Haupt, has also been for some years with the Phoenix Iron Company. During the last three years the Illinois Steel Company has given little time to the structural business, and has deemed it preferable to lease the plant to a respon-

sible corporation. The plant is rapidly being put in order, and the managers expect to have it in operation by June. In the meantime the fitting shop is being operated on material purchased. Mr. W. R. Stirling is president of the new company, and is also first vice-president of the Illinois Steel Company.

#### 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.

##### ALABAMA.

###### ST. CLAIR COUNTY.

RAGLAND COAL AND COKE COMPANY.—This company is to increase its output from 100 tons to 250 tons daily.

###### TALLADEGA COUNTY.

TENNESSEE COAL, IRON AND RAILWAY COMPANY.—This company has purchased 400 acres of iron ore lands near Childersburg, and will develop them at once, taking out from 200 to 400 tons daily.

###### WALKER COUNTY.

CORONA COAL AND COKE COMPANY.—This company has recently equipped its mines with a complete plant of coal cutting, drilling and electric haulage machinery, which was supplied by the Jeffrey Manufacturing Company, of Cleveland, O.

##### ALASKA.

BALD EAGLE.—Ten men have been constantly at work all winter on this property. A tunnel 5 x 7 ft. has been driven into the mountain a distance of 1,400 ft., and it is estimated that a further drive of 900 ft. will tap the ledge at a depth of 500 ft. An air compressor is being installed about a mile above the mill, from which two Burleighs will be operated in the new tunnel. Power to drive the compressor will be obtained from a small creek which flows into the main creek, the latter furnishing the motive power to operate the mill. Thirty-five men are employed at present and the mill will probably be dropping stamps soon, but the air compressor will not be in operation until about June 1st.

READY BULLION.—The incline shaft being sunk on this mine is down 50 ft. from the floor of the tunnel. The drive is being made on the vein. No trouble is experienced with water, although the breast of the shaft is a number of feet under the channel.

##### ARIZONA.

###### YAVAPAI COUNTY.

CHERRY CREEK DISTRICT.—C. E. Donaldson has resigned as superintendent of the Etta mine in Cherry Creek district, and with George Watson has taken a bond on the Cross Cut, Nazareth, Supply, Black Chief and White Chief mines, which are extensions of the Etta. The claims are owned by Munds, Campbell and Olden, and Messrs. Donaldson and Watson propose to proceed at once to the development of them, and have in fact a force of men at work already on them. They expect to have a mill in operation soon treating the ore.

COLOSSUS.—Vanderbilt & Sattes are at work developing this mine, which is an extension of the Blue Dick, and have exposed a 14-ft. body of low-grade silver ore.

LAST CHANCE MINING COMPANY.—This company is still sinking the shaft. The company is also running a drift from the 250-ft. level. The ore so far has been improving with depth.

UNITED VERDE COPPER COMPANY.—The new reverberatory furnace, which this company is putting in, is nearing completion. The new smokestack, 100 ft. high and 5 ft. in diameter, has been raised to a horizontal position.

##### CALIFORNIA.

###### AMADOR COUNTY.

(From Our Special Correspondent.)

ONEIDA.—The new shaft at this mine, two miles north of Jackson, is down 150 ft. There are 18 men employed in sinking. They are passing through comparatively soft ground.

###### CALAVERAS COUNTY.

(From Our Special Correspondent.)

CENTRAL HILL.—This drift mine, located one-half mile west of Murphy's, is being worked night and day with a force of 14 men. During the last two months they have been piping. From a partial clean-up of 50 ft. of flume after a month's piping \$1,600 was realized without counting the bedrock cleaning.

GWIN.—The shaft at this mine, three miles west of Mokelumne Hill, is now down about 1,200 ft., and they are still sinking at the rate of 12 to 15 ft. per

day. The water flow has increased to 14,000 gals. per day.

###### EL DORADO COUNTY.

(From Our Special Correspondent.)

IDLEWILD.—At this mine, on the Mother Lode 1½ miles east of Greenwood, work is progressing rapidly. About 65 men are employed and the mills are running at full capacity.

###### FRESNO COUNTY.

(From Our Special Correspondent.)

NOB HILL.—This mine, located in Auberry Valley, has tunnels and drifts to a depth of 300 ft. The vein is 10 inches wide and is reported to yield about \$30 per ton. There are 8 men employed and a 5-stamp mill is running.

###### MONO COUNTY.

STANDARD CONSOLIDATED MINING COMPANY.—Fire broke out last week in the 300-ft. level of this company's mine. At last reports the flames were still beyond control.

###### NEVADA COUNTY.

(From Our Special Correspondent.)

ELECTRIC POWER COMPANY.—This company proposes to work the river bottom of the South Yuba, between the dam and the power house, a distance of about three miles.

###### PLACER COUNTY.

(From Our Special Correspondent.)

PIONEER.—This mine, known as the Pioneer and Lynn, located in the Towles district, two miles west of Damascus, comprises 11 locations 1,500 x 600 ft. each on several different veins. The Boston Company, which now owns the property, is extending the lower tunnel to tap the ledge 500 ft. below the present working tunnel. A large air compressor, hoisting works and other machinery await transportation from the railroad as soon as the roads are passable.

###### RIVERSIDE COUNTY.

(From Our Special Correspondent.)

CINCINNATI BELLE.—The main shaft is down 65 ft. and a drift has been run south 105 ft. on the vein, which is from 1½ to 4½ ft. in width. Another shaft has been started 200 ft. south of the other shaft which will be sunk 250 ft. The ore yields from \$12 to \$35 per ton.

###### SAN BERNARDINO COUNTY.

(From Our Special Correspondent.)

EAGLE CLIFF.—At this mine, in the McHaney district, east of Banner, at a depth of 75 ft., a 20-in. vein of rich ore has been struck. The company has sunk 15 ft. into the body of ore, which widens out with depth.

###### SHASTA COUNTY.

(From Our Special Correspondent.)

FORBES.—This group of mines, comprising eight claims, near Newton, has been purchased by Schmitt & Rahn, who are making arrangements to erect a milling plant. They have plenty of timber and water. The ledges are large and well defined.

###### SIERRA COUNTY.

YOUNG AMERICA.—This mine was sold by the Sheriff last week to satisfy a claim of \$11,000 by a local powder company. The property was knocked down to S. M. Green, of Milwaukee, Wis., for \$13,100. Work will be resumed on the mine immediately. C. Holbrook, a mining engineer of San Francisco, has been placed in charge. The Young America has yielded considerable gold in the past. The property consists of 4 contiguous patented claims, mills, machinery, boarding house, tools, water rights, dams and about 150,000 tons of tailings.

###### TRINITY COUNTY.

(From Our Special Correspondent.)

BUNKER HILL.—This mine, near Lowden Ranch, has been sold to Harrison & Kolman, of San Francisco, for \$8,000. A mill is to be erected at once.

###### TUOLUMNE COUNTY.

GRANT GOLD MINE.—Mr. Geo. J. Smith, superintendent of this mine, reports, April 25th: "Since my letter of April 18th, Tunnel No. 3 has advanced 4 ft. in quartz, making a total length of 153 ft. The face of the tunnel is in quartz, the quality of which is improving. The water is increasing and is coming in from face."

##### COLORADO.

###### BOULDER COUNTY.

GOLDEN EAGLE.—This mine is located at Salina and the ore is said to be rich in silvanite, tellurium, etc. A strike was made recently in the breast of the tunnel, now in 400 ft. and 125 ft. from the surface.

(From Our Special Correspondent.)

AUGUSTA.—A good strike is reported this week, specimens on exhibition showing abundant free gold. The shaft is down 50 ft., and is operated by George Lytle.

GOLDEN EAGLE.—J. N. Williams has made a good strike on this property, silvanite and tellurium predominating. The ore is found in the tunnel, 125 ft. deep and 400 ft. from the adit. The vein is 2 ft. wide.

GREY EAGLE.—J. C. McShane, the owner, is now in Boulder, and has completed arrangements to begin work at once on the Grey Eagle and Little Alice. George Mitchell has been appointed superintendent.

KILTON.—President Kilton, of the Kilton Reduction Company, has gone East to make final preparations for putting in a chlorination process in connection with his new sampler. The process will be conducted upon a small scale at first, and will be increased in capacity as occasion demands.

LOVELAND.—A good strike is reported from this property, which is owned and operated by A. P. Alkire, Thos. Johnson and Dr. Sutherland, of Loveland, Colo. The strike was made 4 ft. from grass roots, and specimens show considerable free gold. A peculiar feature of the discovery is that the property is surrounded by several rich silver mines, none of which have ever produced gold in noticeable quantities. Excitement is at fever heat, and prospectors have been flocking to the locality in large numbers. The ore runs high in gold.

NELLIE BLY.—The new roaster to be used at the mill has arrived and will be ready for use in a few days. It is 11 ft. long, 6 ft. in diameter and weighs 35,000 lbs. It was manufactured by the Pueblo Iron Works.

NEW RAILROAD.—A narrow gauge railroad is soon to be built connecting Boulder with Ward, 16 miles to the westward. Surveying commenced on May 2d, and the work of grading will be pushed rapidly. The old grade of the Denver, Greeley & Salt Lake Railroad, from Boulder to Sunset, has been secured, and will be partially utilized in the construction of the new road. Only portions of the bed, however, can be used, as the flood which destroyed the road two years ago practically destroyed the roadbed. It is understood that an independent company is being formed to begin the construction at once of a large reduction works at Boulder to receive the ore from Ward. Mr. George M. Fletcher, of New York City, is said to be one of the promoters of the enterprise. The new railroad connection will be of great importance to Ward and Boulder, placing the former in close connection with Denver through the Gulf road.

ROSE.—The vein of high-grade ore has extended and lines the entire bottom of the shaft. Samples were sent to Boulder this week running high in gold.

ROSE & CHIEF.—This well-known property was sold on April 27th to a syndicate of Colorado and Omaha capitalists, who propose to develop it extensively during the summer. New machinery will be put in and other necessary improvements made. The price paid was \$50,000 cash. Recent assays made by the new company gave a little more than 8½ oz. gold per ton.

ROYAL ROSE.—Blakeman & Wilson have struck a vein of quartz 16 in. wide, which gives very satisfactory mill returns.

SNOWFLAKE.—The litigation pending in the district court at Boulder, has been settled in favor of the estate of the late Ross Howard, establishing the superiority of the claim for surface rights of the Snowflake against the Agnes lode. The contested claims arose over a dispute concerning prior location.

###### EL PASO COUNTY—CRIPPLE CREEK DISTRICT.

(From Our Special Correspondent.)

ALLIANCE MINING COMPANY.—This company, of Alliance, O., has patented 14 out of 20 claims owned and located on the southeast slope of Big Bull Mountain. A shaft has been sunk vertically 95 ft., on which a steam hoist is being erected, the object being to sink 100 ft. and crosscut to the vein, which in a shaft 55 ft. deep was 5 ft. wide, and assayed, according to the superintendent, \$12.40 per ton. The company has been at work three years.

CALEDONIA.—This shaft has been sunk on the incline 270 ft. The vein is left standing on the west. Wherever the vein has been pricked it shows telluride of gold.

COLUMBINE-VICTOR.—This tunnel commences on the south slope of Squaw Mountain and has been driven in a southeasterly course 800 ft. and intersected three veins, one of which is being actively worked. The main tunnel is being driven by electric drills which work satisfactorily. The electrician in charge, Mr. Nicker, states that the expense is one-third less than with ordinary rock drills. The ventilation is secured by a fan driven by electricity. The rock is of hard medium-grained syenite. The drill has been at work 20 days.

CRESSON MINING COMPANY.—This is a company with headquarters at Chicago, with a Mr. Eugene Harbuckle as the moving spirit, owning 30 acres of patented ground in Arequa Gulch and on Bull and Raven Hills. The work is mainly confined at present to the Raven Hill side of the gulch. A tunnel was driven over 200 ft. to the side line of the Moose claim, but without striking pay ore. A winze is now being sunk below the tunnel, the present depth being 65 ft. The vein here is very pockety and the pockets are too small to be of commercial value.

ESTELLINE.—On Independence Hill, south of Battle Mountain, this mine has a shaft sunk 95 ft. The present contract calls for 60 ft. more and at the depth of 155 ft. the vein will be thoroughly prospected. The property is being worked under lease and bond.

LAFAYETTE.—This is a fractional claim situated between the Lucky Guss and the Ruby, and has 94 ft. in length on the vein. The shaft has been sunk 315 ft. and levels extended to the boundaries at the 315, 235, 175 and 100 ft. Almost all the vein has been stoped out above the 175 ft., and the vein is now

being stoped above the 315 ft. The shipping ore averages from \$70 to \$200 per ton, with occasionally rich sacks of ore netting \$1 per lb.

**LUCKY GUSS.**—The management is driving a crosscut east from their bottom level 330 ft. deep, the object being to intersect the Orpha May vein, which has a slight dip to the west, the Lucky Guss vein having a dip of 83° to the east. The shaft is being retimbered the whole distance. A new steam hoist will shortly be erected.

**NEW MOON-ANCHORS.**—This property, on Gold Hill, is shipping 10 tons of ore a day. The shaft is now 385 ft. deep and gives employment to 45 men.

**STAR OF BETHLEHEM.**—This property, on Bull Hill, about 300 ft. south of the Pharmacist, has made two shipments recently. The property is worked under lease by Mr. Ernest Gray and associates, who this week erected a steam hoist on the 80-ft. shaft. The property bids fair to do well.

**ST. PAUL TUNNEL.**—The tunnel has penetrated Mineral Hill from the north 330 ft. and in the breast of the tunnel, which is granite, several seams of iron pyrites having a course of northwestern and southeastern may be seen. The development on the talc vein shows much improvement, and the vein is now being saved.

**WISHBONE MINING COMPANY.**—The Faithful claim, owned by this company, of Denver, and situated on the north slope of Mineral Hill, has sunk a shaft 95 ft. in the granite, it being the intention to sink 100 ft., and then try to find the vein. All the work here is of the best.

#### GILPIN COUNTY.

(From Our Special Correspondent.)

**GOLD COIN MINES COMPANY.**—A good second-hand Worthington pump has been received for the Hidden Treasure shaft, which will raise the water from the lowest level with a single lift. The water just now is rising rapidly in the shaft, but there is good reason to hope that this pump will handle it satisfactorily and so prevent the best ore ground from being flooded out, as has been the case each spring and summer for the last two years. In the meantime the crosscut from the Kansas workings is being pushed on with air drills and is making good progress.

**GUNNELL.**—Unusually large shipments are being made from this mine, the ore being piled up outside the mill. It is, however, unlikely that this exceptional output is intended to continue, as no arrangements are being made to reopen the other mill under the same ownership. It is rumored here that the Gunnell will shortly cease pumping.

**SLEEPY HOLLOW.**—Eight suits, each for \$5,000 damages, have been commenced against this company by the representatives of the men who were killed last August, when the water broke in from the Americas.

**WHITING.**—The work of cleaning and retimbering the shaft at this mine is progressing satisfactorily, the present depth being 400 ft., with probably 30 ft. more to clear before reaching the bottom.

#### LAKE COUNTY.

(From Our Special Correspondent.)

**BIG FOUR.**—The workings show very well, and ore has been opened in the three levels. Shipments are regular, averaging from 25 to 35 tons a day of the average value of \$30 to \$35 per ton.

**BIG SIX MINING COMPANY.**—Shipments from a good body of ore being opened up in the Nettie Morgan are made regularly. The directors of the company did not meet last month, but will call a meeting very soon at which time a small dividend will be declared.

**CLEVELAND MINING COMPANY.**—The big plant of machinery is in place and everything ready to sink the new shaft. At a depth of 95 ft. a streak of lead ore 10 in. wide was encountered, and will be followed down. This streak assays 58 oz. in silver, 53% lead and 1/4 oz. gold.

**DORIS.**—Arrangements are under way for the resumption of work on this property, which has been operated extensively for a number of years, but so far has not proved a bonanza.

**FOREST QUEEN.**—This property is located on the very summit of Breece Hill and is being extensively operated. The shaft has already attained a depth of 560 ft.

**HERMAN AND HUGH.**—These two claims and other ground, including altogether about 30 acres, were leased to local people this week. This ground is excellently located between the Ibez group and the New Year. A new shaft has been started on the Herman and is to be sunk 350 ft.

**LEADVILLE ORE OUTPUT.**—The output for the month of April was fully 40,000 tons, which is quite an increase over the same period last year.

**LITTLE SUGAR LOAF MINE.**—In this property, located in the Sugar Loaf District, a rich find of gold ore was made this week. The vein is 12 to 14 in., but the Jay streak is very small.

**LOUISE.**—Lessees are drifting to catch the ore chute of the Big Four. While prospecting some fine ore has been opened up, assaying from 6 to 10 oz. gold, but the find is only a small one.

**MAB MINING COMPANY.**—This company, just organized, will inaugurate an important enterprise at once. The company is after the rich ore chute of the Mahala, and will sink a new shaft about 400 ft. south of the Mahala drifts. The shaft will be sunk 900 ft., and the company has leased the Big Chief

and Castle View claims upon which to operate. The Mab Company is capitalized at \$1,000,000. S. D. Nicholson is president; W. F. Page, vice-president; J. W. Newell, secretary and treasurer. These, with Maurice Starne and R. J. Donnen, are the board of directors.

**WILLIAM WALLACE.**—New lessees have just secured this property, and will thoroughly explore the ground for the rich ore chute of this section. The William Wallace is now down 600 ft., but will be sunk to the second contact, a further distance of 200 to 300 ft.

**WOLFTONE.**—As the old lease expires at an early day but little new exploration work is being carried on. Thirty tons a day of good sulphide ore are being shipped. The pumping at the Wolftone costs \$5,000 a month.

#### IDAHO.

##### ADA COUNTY.

**KINCANNON.**—A strike has been made in this mine near Murray, a property belonging to the Granite Mining Company, that promises well. It is a 2 ft. ledge.

##### BLAINE COUNTY.

**STAR.**—A shaft is to be sunk 300 or 400 ft. in this mine. The company already has 20 men at work on an ore body that is yielding rich rock.

##### CUSTER COUNTY.

**LUCKY BOY MINING COMPANY.**—Superintendent Stanton, of this company's property, reports that work on the property will be resumed on May 20th, and that it will then continue steadily throughout the summer, the Miners' Union permitting. Mr. Stanton says the only other mine now working in the camp is the Black, whose mill is dropping 10 stamps, with satisfactory results. The camp, since the closing down of the Lucky Boy, which was employing 120 miners, says Superintendent Stanton, is practically deserted.

##### ELMORE COUNTY.

**GOLDEN KING MINING AND MILLING COMPANY.**—Articles of incorporation of this company were filed at Salt Lake City last week by Dan Reber, of Mountain Home, Idaho; W. H. Dodge, W. S. McCornick, F. B. Cook, F. W. Hanson, W. M. Rash and James Glendenning, of Salt Lake City. The capital stock has been placed at \$1,000,000, divided into shares of the nominal value of \$4 each. The company will operate in the Dixie mining district, owning the Riverview, the Benicia, the Golden King, the Meadow, the Sunday, the Monday, the Tuesday and the Gold Queen claims, all patented; the Dyke, the North, the South, the Red Bird and the Slope claims, unpatented, all located in that district. The officers are: W. H. Dodge, president; Dan Reber, vice-president; F. B. Cook, secretary, and W. S. McCornick, treasurer, who with the balance of the incorporators constitute the board of directors.

##### LEMHI COUNTY.

**YELLOW JACKET.**—It is announced that a company of New York capitalists has been organized which has purchased this property for a heavy sum.

##### OWYHEE COUNTY.

**SUNLIGHT.**—This mine, between Idaho City and Boise City, has been sold for \$6,000. Eight men were put to work recently, and the force will be increased as soon as the mine is sufficiently opened to give room for them.

#### ILLINOIS.

Northern Illinois coal operators and delegates representing the miners met at Joliet last week to fix the mining prices for the year beginning May 1st, 1896. The old scale for mining coal and for day labor was considered satisfactory and will be in force the ensuing year.

#### KANSAS.

##### CHEROKEE COUNTY.

(From Our Special Correspondent.)

**CRANE, THOMAS & Co.**—On the Cornwall lease Crane, Thomas & Co. are drifting at 95 ft. on a good run of lead ore in open black ground, and are producing over 20,000 lbs. of lead weekly.

**JOHN HENRY.**—On the Battlefield lease, at the John Henry shaft, they are drifting at 113 ft. on a large face of zinc ore in hard ground, and are producing 125 tons of rough ore and 10 tons of free ore weekly.

**MAGGIE MURPHY.**—On the Shelbina lease the Maggie Murphy Company has built a large steam plant which is equipped with a 35-H. P. engine for running the pumps, a 40-H. P. engine to run the plant, and 80-H. P. boiler that furnishes steam power for the two engines, and two Freeman steam hoisters, a 16-in. crusher, a screen, three sets of rolls, a Cooley four-cell roughing and a six-cell cleaning jig. The company is hoisting dirt from two shafts 90 ft. deep, and are producing 8 tons of jack and 8,000 lbs. of lead ore, each 10-hour shift. This week they are sinking their pump shaft deeper for more water.

**SOUTH SIDE MINING AND MANUFACTURING COMPANY.**—This company owns 160 acres of land adjoining Galena, on the south and east of which it is at present operating on 80 acres divided into 72 mining lots. This land produced large quantities of lead and zinc until about three years ago, when the water rose and drove the miners out of the lower ground. Ore is found on this lease from 30 ft. to 145 ft. in hard ground with the ore dissemi-

nated through it. There are 13 pumps running now on the lease and there will be three more by May 15th. The ground has never been worked thoroughly for zinc ore, but large quantities of lead ore have been taken out of the upper ground and now the company is developing large bodies of lead below the 100-ft. level. The company has leased several lots each to Pickett & Co., Foster & Co., Chas. Frye & Co., and M. R. Lively & Co., with an agreement that each firm is to sink a shaft 150 ft. and put in pumps to drain the ground and also erect steam concentrating plants as soon as the amount of ore produced warrants it. Pickett & Co. have built a \$3,500 concentrating plant and put in a pump and are drifting at 95 ft. on a run of lead ore in soft ground, and they cut this drift to drain a body of water found at that depth. They have a large body of zinc ore at 119 ft. in hard ground and are making good outputs from dirt taken out in sinking and drifting. Foster & Co. are sinking in pay dirt and are down 116 ft. They have had pay lead dirt from 99 to 116 ft. They turned in 5,000 lbs. of lead while sinking and have a face of lead ore that will make over 30,000 lbs. a week. C. O. Frye & Co. are operating four lots on the South Side land. They have one pump running and easily beat the water in another shaft with a steam hoister. They are drifting at 70 ft. on a 9 x 30 ft. face of lead and steel jack in open black ground, with a good cap rock of flint. They have just about water enough to clean their ore, and have put up two hand jigs with which they will haul the dirt at present. Last week they turned in 150 tons of crush ore, 8 tons of free ore and 12,000 lbs. of lead ore.

#### KENTUCKY.

##### LEE COUNTY.

**BEATTYVILLE COAL COMPANY.**—The entire mining plant and equipment of this company was sold by the sheriff last week on a distress warrant in favor of the Kentucky Improvement Company, of Louisville, for \$1,560, the improvement company being the purchaser. A new company will be formed to operate the mines, on which \$20,000 have been spent for improvements.

#### MISSOURI.

**PURCELL & NYE.**—On the Thomas & Hackney lease Purcell & Nye are putting up a steam hoist to handle the water and hoist the dirt. They are at a depth of 145 ft. and have a good face of zinc ore to drift on as soon as they get the water out. In sinking their shaft they went through a good run of lead in open ground.

**BIG EIGHT.**—On the Joplin Prospecting Company's lease the Big Eight Company is drifting at 146 ft. on a 12 x 15 ft. face of zinc ore in hard ground and is taking out large quantities of crush ore. This week they took out more free ore than any week previous and sold 22 tons of zinc ore besides the crush ore.

**McGEE & CANNON.**—On the Get There lease McGee & Cannon are drifting at 155 ft. on a 9 x 50-ft. face of lead and jack in hard ground and are turning in 40,000 lbs. of lead and 20 tons of zinc ore each week.

#### JASPER COUNTY.

(From Our Special Correspondent.)

**JOPLIN ORE MARKET.**—The top price for zinc ore was \$23 per ton, but very few carloads sold at that price and the average was less than \$20 per ton. There was an increase of about 720,000 lbs. of zinc over last week's sales. The price paid for lead ore was \$16 per 1,000 lbs. with 50c. added for hauling and the shipment of lead ore was 185,000 lbs. less than last week. The turnin from the different camps was as follows: Joplin, zinc, 1,505,770 lbs.; lead, 189,010 lbs.; value \$18,915; Webb City, zinc, 739,850 lbs.; lead, 40,880 lbs.; value \$8,086; Carterville, zinc, 842,780 lbs.; lead, 330,320 lbs.; value \$13,765; Oronogo lead, 1,910 lbs.; value \$28; Stott City zinc, 76,370 lbs.; value \$800; Zincite zinc, 12,730 lbs.; value \$140. District totals, zinc, 5,417,700 lbs.; lead, 882,220 lbs.; value \$67,014.

**GROUNDS & IRWIN.**—This firm is sinking a pump shaft on the west 40 acres of the lease on a drill hole, in which they drilled through 70 ft. of hard flint ground and at from 112 to 150 ft. went through rich zinc ore in open flat ground. These 40 acres of their lease have never been prospected before and several companies are sinking prospect shafts on it. Halton & Raymond are sinking on a drill hole, in which they struck pay dirt at 134 ft., and have their shaft down 80 ft. Prince Brothers have a shaft down 60 ft. Hume & Patton are sinking on a drill hole, in which they struck pay dirt at 125 ft., and have their shaft down 75 ft. Col. W. T. McGehee is sinking a shaft on a drill hole, in which he struck a body of zinc ore at 127 ft. and has his shaft down 112 ft. and will soon be hoisting pay dirt. Mesplay & Hollingsworth are sinking on a drill hole, in which they struck pay dirt at 140 ft., and have their shaft down 40 ft.

#### MONTANA.

##### MADISON COUNTY.

**CLIPPER.**—There are 15 men now working on this mine, which is developing well under the superintendency of W. W. Morse. He will start up the stamp mill at Pony within a very short time to treat the ores taken from this mine. The mill is 2 1/2 miles from the mine and will be run by water power.

**LAST CHANCE.**—Manager Prouse is working six men on this mine. They are extracting from a 16-ft. breast of ore in the upper tunnel, which is said to

run as high as \$25 to the ton in gold, while in the lower tunnel they are just cutting into the ore chute and are getting returns of from \$14 to \$18.

## PARK COUNTY.

ALTOONA.—Ninety-four flasks of quicksilver were shipped recently from this mine, at Cinnabar, to San Francisco, by Coffin & Garvin.

## NEVADA.

## STOREY COUNTY—COMSTOCK LODE.

OCCIDENTAL CONSOLIDATED MINING COMPANY.—In a report of the improved condition of this company's property the Virginia City *Chronicle* says: "The west crosscut on the 750 level, which is cutting across the ledge at the point of the recent strike of rich gold ore, has not yet reached the footwall, although it is steadily pressing to the westward. The crosscut is out 25 ft., and the management think it will have to run 25 ft. further before the footwall will be uncovered, and the ledge is estimated to be 50 ft. wide at this point. A hundred feet above, at the point where the strike was made, the ore lay flat against the footwall; at the point on this level where the strike was made it began, to the contrary, inside the hanging wall. The crosscut on the 750 level is passing through rock of a mixed character at present—bunches of rich ore mingled with quartz. The quantity of pay ore uncovered already is considerable, and has increased the productive value of the mine materially. The ore being uncovered will open the Occidental mill and keep it going for some time. As the mill lies next to the mine transportation is cheap, and the ore can be extracted and milled for about \$5 per ton. The mill will probably start to work in May. It has 20 stamps and can handle 50 tons of ore a day.

## NEW JERSEY.

## WARREN COUNTY.

PITTSBURG TERRA COTTA LUMBER COMPANY.—This company, says the *Dover Iron Era* has purchased 200 acres of land belonging to the Simanton and Schamp farms, near Port Murray, on which it will erect a large manufacturing plant at a cost of \$125,000. The Delaware, Lackawanna & Western Railroad has built a half-mile switch, and as the clay is especially good for the purpose desired, the company will try to get the plant in operation early in July. The first product will go to finish the Cable building in New York City, a 22-story structure for which the company has a contract.

## NEW YORK.

## ESSEX COUNTY.

SHERMAN & COMPANY.—There were 700 men thrown out of work May 1st, by a strike of the employees in Sherman & Co's iron mines, whose demand for an increase of 40c. a day was refused. The mines were shut down.

## OHIO.

## WOOD COUNTY.

FOSTORIA OIL AND GAS COMPANY.—This company has struck a rich lay on the G. W. Stout farm, in section 34, Perry township, by the completion of a well that produced seven tanks in the first 24 hours, making it the largest well completed in the State for some time.

## PENNSYLVANIA.

## ANTHRACITE COAL.

CHAMBERLAIN COAL COMPANY.—The corporate rights and franchises of this company were sold last week to W. W. Watson, of Scranton. Dr. James M. Rice has leased the property and this week commenced operating the plant. The colliery is situated below St. Clair, and will give employment to between 300 and 400 men and boys. It has been idle several months.

LEHIGH COAL AND NAVIGATION COMPANY.—All the collieries throughout the Panther Creek Valley owned and operated by this company worked six days this week.

LEHIGH VALLEY COAL COMPANY.—An electric plant is being installed for this company which will consist of one General Electric 150-kw. 550 volt generator to furnish current to a duplex double acting mine pump manufactured by the well known firm the Jeanesville Iron Works, and one 100-H. P. Lidewood friction cone clutch single drum hoist. Both of these machines will be set about 6,000 ft. from the generator in the center of a long slope in the main coal seam. The circuit to the hoist and pump will be carried about 5,300 ft. above ground on a pole line and will then pass down a vertical bore hole 350 ft. deep. This part of the line will consist of an iron armored cable and will be suspended solely by the iron armor. The pump will have a capacity of 600 gals. per minute.

NORTH ASHLAND COLLIERY.—This colliery, which gives employment to about 800 men and boys, last week shut down for repairs. The colliery will undergo extensive repairs both in the breaker and the mines, which will take several weeks to complete.

SCHUYLKILL COAL EXCHANGE.—The following collieries, drawn to return prices of coal sold in April to determine the rate of wages to be paid, make the following returns: West Shenandoah, \$2.55; Draper, \$2.46; Reliance, \$2.31; Bast, \$2.50; Lawrence, \$2.75. The average of these rates is \$2.49, and the rate of wages to be paid for last half of April and first half of May, 1896, is the \$2.50 basis.

## SOUTH DAKOTA.

(From Our Special Correspondent.)

GEOLOGICAL SURVEY.—It is probable that an effort will be made this summer to secure an official State geological survey upon the mineral deposits of the Black Hills. If the necessary funds can be assured an expedition will probably take the field immediately upon the close of the present session of the State School of mines.

## CUSTER COUNTY.

ASPEN.—The work of sinking on this mine, west of Custer, is being continued, and the ore is said to be improving in both quantity and quality with depth.

## LAWRENCE COUNTY.

SILVER KING.—An 8-ft. chute of ore that assays \$18 and \$20 has been uncovered in this mine, says the *Deadwood Pioneer*. A tunnel has been run in 54 ft. to intersect a seam of ore that crops out solid at the surface. These seams parallel each other for a distance of 60 ft. and ore is traced through the surface over 3,000 ft. At the point where the ore body is encountered it dips off toward the east at an angle of about 45°. The ore found in these workings has the appearance of mother porphyry. In other portions of the ground extensive development work has been done and large bodies of ore shown up, but most of this is not, however, of a sufficient grade to warrant the owners in shipping at present.

## UTAH.

## JUAB COUNTY.

BUCKEYE MINING COMPANY.—This company held its annual stockholders' meeting recently at Salt Lake City. The following officers and directors were elected: John Beck, president; R. J. Taylor, vice president; James Pengree, treasurer; W. J. Beattie, secretary, and J. W. Green. The property of the company is located in Tintic district. The mine is developed by a 300-ft. shaft, a drift on the 200-ft. level being in a good body of first and second-class ore. There is also a steam hoist on the ground.

GODIVA.—Development work at the Godiva is being vigorously pushed. The winze from the tunnel level is now down 150 ft., the vein widens and the ore increases in value both in silver and gold as greater depth is attained. An ore bin with chute connections, having a capacity of about 200 tons, is being built. The survey is completed and the work will begin at once upon the wagon road up the mountain's side to where the permanent hoisting machinery will be located and the main working shaft started.

GREAT EASTERN.—A strong vein of mineralized quartz is reported to have been struck in the south drift of the Great Eastern tunnel. This drift is being run at right angles with the general course of the tunnel and is now in some 10 ft. It will be pushed ahead and the ground in that direction further explored.

NORTH STAR.—This property, at Eureka, is showing up some large bodies of milling ore and the owners are considering the matter of putting in a combination mill for the treatment of their output. Regular shipments are being made of their high-grade product.

NORWAY.—The winze from the 65-ft. level in the old shaft on the Norway is now down 30 ft., and the quartz being cut shows improvement, manganese, iron and copper appearing in considerable quantities, says the *Tintic Democrat*. The latest assays give returns of 23 oz. in silver, a fraction over \$5 in gold and 10 to 15% copper. In the new shaft the developments are proving satisfactory, and moderate grade ore carrying silver, gold and copper in values sufficient to make a profitable milling proposition is reported to be exposed in several places in the lower workings.

PAXMAN MINING COMPANY.—Within a few days work will be resumed on the property of this company, located at Eureka, near the Colorado Chief mine. The shaft in the Paxman is down 400 ft., and it is proposed to sink it another 100 ft., and then drift for the ore body.

## SALT LAKE COUNTY.

BINGHAM COPPER COMPANY.—This company shipped between 70 and 80 tons of ore from the Nast mine last week.

GERMANIA SMELTING COMPANY.—A small copper plant was blown in by this company on April 20th, and now these furnaces can handle all the copper ore and matte that the country can supply for some time to come.

MARKHAM.—The mill is about to start up again on Northern Light ores. The mine has 150 tons of ore in the bins and will be operated to keep the mill running on 50 tons of ore per day. According to the *Bingham Bulletin*, it is now in good shape for production.

NAST.—Samples of ore from the new body encountered in a drift from the tunnel level in this mine at Bingham will probably yield as much as 60% lead and are heavily impregnated with pyrites of copper, with streaks of the gray cutting through it which denote the presence of silver. Shipment from the new ore body will begin as soon as it is possible to reach the bins with teams.

## TOOELE COUNTY.

EAST GOLDEN GATE MINING COMPANY.—Advices from this company's property at Mercur state that on May 1st, at a depth of 210 ft. in the shaft, the lime-capping was encountered, and that in it was

found the cinnabar that, in the Mercur, Golden Gate, Marion, Geyser and others, has been associated with values better than the average.

## UTAH COUNTY.

BIG FOUR CONSOLIDATED MINING AND MILLING COMPANY.—This company recently filed articles of incorporation. The capital stock is placed at 250,000 shares of the par value of \$1 each. Fifty thousand shares have been set apart as treasury stock. William E. Racker is president, Edwin A. Goodwin, vice-president; Samuel I. Goodwin, secretary and treasurer of the company, and these, with Mosiah Evans and Robert Fox form the board of directors. The principal place of business of the company is Lehi. The property of the company consists of The Anchor, Hiteman, Dice Box and Goodwin mining claims. All situated in the Tintic mining district.

SPANISH FORK COAL MINES.—Erastus Simpson, Jen P. Simpson and J. M. Bellows have located a coal claim in Wheat Grass Hollow, Spanish Fork Canyon, about a mile north of the Rio Grande Western main track. The vein has been uncovered in two places, and it is shown to be about 3 ft. thick and 10 ft. wide. It is a bituminous coal, of a light quality and burns to a white ash. The samples tested are said to be coal of good quality.

## VERMONT.

## CALEDONIA COUNTY.

RYEGATE GRANITE COMPANY.—This company has been formed by the consolidation of the Ryegate Granite Works and the Blue Mountain Granite Works. The office is at South Ryegate, and the officers are: President, H. W. Bailey, of Newbury; vice-president, Alexander Cochran, of Groton. Directors, M. H. Gibson, of Ryegate, Alexander Dunnett, of St. Johnsbury; treasurer, Nelson Bailey, of Wells River.

## ORANGE COUNTY.

ELY.—It is announced that this old copper mine has been sold to Boston people for a sum said to be about \$250,000.

## VIRGINIA.

## LEE COUNTY.

CUMBERLAND COAL COMPANY.—This company is erecting a number of new coke ovens of the most modern kind at Douglas.

## WASHINGTON.

## KING COUNTY.

AMERICAN COAL COMPANY.—Mr. C. W. Thompson, receiver of the American Coal Company, has petitioned Judge Langley for authority to wind up the affairs of this company. The receiver reported that it is now running at a loss. It cannot be made to pay, the receiver says, without the expenditure of large sums of money, and he therefore recommends that the equities of the company be sold. The company is operating under a lease from the Northern Pacific Railroad, and does not own any realty in fee simple. It has a fair set of bunkers, eight mining cars, two mules, an entry 700 ft. long, a small blacksmith outfit and a quantity of T rails. There are seven rooms opened up, six of which have been operated for a long time, so that the coal remaining is near the surface and is so broken up as to be unmerchantable. An air shaft has been extended from No. 7, and the coal cannot be removed until another air shaft is provided. No. 8 contains the only merchantable coal in the mine, and the coal as mined has a large per cent. of dirt in it. Judge Langley granted the petition and gave leave to the receiver to sell the property May 1st.

## PIERCE COUNTY.

OAK HILL MINING COMPANY.—This company has recently been organized by F. O. Chezum, B. F. Bringolf and J. D. Caughran. Capital stock \$100,000. Principal office Tacoma.

## SNOHOMISH COUNTY.

EVERETT MINING EXCHANGE.—This exchange has been organized with these officers: President, W. R. Stockbridge; Vice-President, E. C. Bronson; Secretary, F. J. Call; Treasurer, F. A. White. The incorporators are the above officers, H. D. Cooley and G. W. Cornwall. Articles of incorporation have already been filed. The object of the organization is to procure money to develop mines and claims and advertise them for sale, keep a register of all locations for sale and to assist such owners as wish more capital to develop their properties. The exchange will establish correspondence with all the mining centers of the United States, will solicit capital in the Eastern cities of the United States and Europe, will furnish reliable experts to examine mines and report on same, will make assays of ores and keep records of the same and furnish the public needful information in mining as a legitimate business. A dozen or more applications for membership are already on file, says the *Everett News*. The price of membership in the exchange has been fixed for the present at the nominal sum of \$5.

## WYOMING.

## ALBANY COUNTY.

AMERICAN GOLD AND COPPER MINING COMPANY.—Articles of incorporation of this company were filed with the Secretary of State at Laramie Wyo., recently. The capital stock of the company is 5,000,000 shares of \$1 each, of which 4,000,000 shares of stock are preferred treasury stock to be used for the development of the properties owned by the company in Albany and Laramie Counties; also for the purpose of purchasing new mining proper-

ties, etc. The principal office of the company will be at 170 Madison street, Chicago, Ill., with a branch office at Laramie, Wyo. The company will commence operations by running a tunnel on the Ray Boy, Copper Queen and McKinley lode, and in sinking a 200 ft. shaft on the Helen and Prince of Wales lodes.

**UNITED STATES GOLD MINING AND MILLING COMPANY.**—This company filed articles of incorporation recently. The capital stock is \$1,500,000; principal office at Laramie. The property is situated in Albany and Carbon counties. The incorporators are Messrs. Charles B. Maxwell, George F. Morgan and Stockton Smith.

(From Our Special Correspondent.)

**ALBANY PLACER COMPANY.**—On April 23rd inst. this company sent its foreman and several men to commence work on the mine. The company expect a run of five months and good returns.

**CROESUS.**—A tunnel on this property is run in 35 ft. and will be driven with all haste to the vein, which is estimated to be about 100 ft. further in. The ore of the Croesus is chiefly copper glance carrying some values in gold and silver.

#### LARAMIE COUNTY.

(From Our Special Correspondent.)

**NEW GOLD PLACERS.**—For the last week there has been considerable excitement in the vicinity of the Blue Grass Company near the line between Laramie and Albany counties. Absolute statements as to the value of the ground have not been made public, but sufficient showing has been made to cause some of the leading citizens of Laramie County to organize a company and to request State Engineer Meade to investigate the ground with a view of taking out a big ditch.

#### SWEETWATER COUNTY.

(From Our Special Correspondent.)

**GREEN RIVER SODA WELL.**—The discovery of a carbonate of soda water rich in soda has caused quite a stir in the West. The water of the well has been analyzed at the University of Wyoming, and found to contain 23 1/4% of sal soda. This soda is 92% pure. A company is now erecting vats for the evaporation, and is starting to develop the enterprise in a systematic manner. There are many natural advantages for the manufacture of soda compounds at Green River.

### FOREIGN MINING NEWS.

#### BRAZIL.

**FARIA GOLD MINING COMPANY.**—This company has been organized in London to buy and work the Faria gold mine, in the province of Minas Geraes. The capital stock is \$300,000, out of which the sum of \$180,000 is paid for the property, leaving \$120,000 as working capital. The mine has been worked by a French company, which reported an average yield of about 0.25 oz. gold per ton from ores near the surface, worked in a small way.

**OURO PRETO GOLD MINING COMPANY.**—This company's report for the month of March shows that from the Raposos mine there were 280 tons of ore worked, producing 37 oz. of gold, an average of 0.13 oz. per ton. From the Passagem mine 4,011 tons worked produced 1,561 oz., an average of 0.39 oz. per ton. The total output for the month was 1,598 oz. gold.

#### BRITISH COLUMBIA.

**CARIBOO.**—The two pioneer companies, the Cariboo and the Horsefly Hydraulic Mining companies, will commence operations as soon as the weather will permit. It will probably be 1897 before the mines are in condition to have anything like the output which the management anticipate they will have.

**HALL MINES, LIMITED.**—Mr. H. E. Croasdale, commercial manager of these mines, was at Rossland recently making arrangements for the purchase of ore. He succeeded in making a deal with the owners of the Cliff for a 30-ton trial shipment. If the ores prove satisfactory, the Hall mines smelter at Nelson will use about 50 tons of it a week. The smelter will again be blown in early this week.

#### CANADA.

##### BRITISH COLUMBIA.

##### SLOCAN DISTRICT.

**NORTHERN BELLE GROUP.**—Patrick Clark of Spokane, has taken a 30-day option on properties situated on Jackson's Basin for the purpose of making an examination. At the end of that time should the examination prove satisfactory they will be bonded for \$60,000 and the first payment made. The group consists of the Northern Belle and three other claims, about four miles from Bell's camp, on the Kaslo-Slocan railway. The original locator and present owner is Robert Jackson. There is a 30-ft. vein of concentrating ore. About 1,000 tons of ore have been shipped from the mine, 350 tons of which was shipped during the past winter. The claims were located in 1891, the same time as the Noble Five and other properties were located.

(From Our Special Correspondent.)

Much snow has fallen of late in the Trail Creek country, retarding development work and more or less suspending traffic.

**GEORGIA.**—This mine, situated on Columbia Mountain, was recently bonded to a Victoria syndicate for \$25,000. It will be under the management of Joseph L. Warren, of Spokane.

working to recover the buried. Thirty-seven men have been recovered dead and the others fatally hurt.

#### NEW SOUTH WALES.

**FIFIELD PLATINUM MINES.**—At the platinum mines, Fifield, according to the latest advices from Sydney, between 7,000 and 8,000 loads of washdirt were stacked during the dry weather. This quantity is estimated to contain from 3,000 oz. to 4,000 oz. of platinum, as well as a quantity of gold. Quite recently 500 loads were put through the puddling machines. All the lots yielded up to expectations, one lot reaching £2 5s. per load.

#### NEW ZEALAND.

**KAPAI-VERMONT.**—For the month of March the Kapaivermont crushed 308 tons of ore, which yielded, under direct cyanide treatment, 400 oz. of smelted gold. There is a movement afoot to transfer the management of the company from Sydney to Auckland, and furthermore the mine is under offer in London.

#### QUEENSLAND.

**MOUNT MORGAN GOLD MINING COMPANY.**—The secretary of this company gives the following list of all shafts now in use by the company, together with the depth from the original summit of the mountain as datum, and the depths from the present surface. In many instances the shafts went up to the original surface; but removal of ore has reduced the height. The depths are as they appear at present. The depths (in feet) given first are those from the present surface; the others those from the original summit: Crown shaft from 140 ft. bench, 1,547, 1,597; Sugarloaf shaft from surface, 1,016, 1,312; Lady Norman shaft from bench 157 level, 157, 315; No. 2 shaft from bench 196 level, 55, 252; No. 3 shaft from No. 5 tunnel, 130, 314; No. 4 shaft from No. 5 tunnel, 130, 314; No. 5 shaft from bench 125 ft. level, 189, 314; No. 6 shaft from bench 125 ft. level, 189, 314; No. 7 shaft from surface, 322, 450; No. 8 shaft from bench 158 ft. level, 156, 314; No. 9 shaft from bench 196 level, 117, 314; No. 10 shaft from bench 196 level, 117, 314; No. 11 shaft from bench 125 ft. level, 189, 314; No. 12 shaft from surface, 176, 314; No. 14 shaft from bench 125 ft. level, 189, 314; No. 16 from surface, 101, 285; Grass-tree shaft from Grass-tree workings, 354, 668; Linda Winze from Linda workings, 75, 525; shaft to Linda tunnel from surface, 152, 450; Lady Brassey shaft, 190, 341; shaft to No. 1 tunnel north end, 111, 285; shaft to No. 1 tunnel from 132 ft. bench, 153, 285.

**MOUNT MORGAN GOLD MINING COMPANY.**—This company treated 6,713 tons of ore in March, yielding 12,050 oz. of gold.

#### LATE NEWS.

**MR. PERCY L. FEARN,** of Olcott, Fearn & Peele, mining engineers, of New York City, has just returned from a professional trip to the South.

The Alaska Treadwell Gold Mining Company reports the clean-up for the month of April as follows: Period since last return, 31 days; bullion shipment, \$46,897; ore milled, 22,114 tons; sulphurets treated, 347 tons, of bullion there came from sulphurets \$14,759; gross expenses for the period were \$27,463.

The output of the Quincy Mining Company, of Michigan, for April was 20 1/4 tons of mineral, against 840 1/4 tons in March and 800 tons in April, 1895.

Articles of reincorporation of the Kearsarge Mining Company were filed this week with the county clerk at Houghton, Mich. The reincorporation is for 30 years from September 17th, 1896. The Pewabic and other mines were lost to former owners because of failure of the corporations to renew their lease of life at expiration of 30 years.

The Boston & Montana Consolidated Copper and Silver Mining Company, of Great Falls, Mont., is erecting a new electrical power house in connection with its large mining plant. The Berlin Iron Bridge Company, of East Berlin, Conn., has the contract for furnishing the steel work. The building will be absolutely fireproof and the covering will be lined with the Berlin Company's patent anti-condensation roof lining, a material which has proved itself to be very efficient for lining on engine and dynamo room roofs.

The directors of Tamarack Mining Company were re-elected at Boston, Mass., on May 7th, by 44,870 shares, with the exception of Director Lewisohn, who received 100 less. There were voted 2,150 shares under the minority law of Michigan, cumulatively for H. C. Southworth. Under this law any shares of stock may, instead of voting for all the directors, multiply the number of shares by the number of directors, and throw all of these votes for one person. This gives Mr. H. C. Southworth 15,050 votes, which he cast for himself. Charles M. Cabot, representing an interest of 100 shares, made a motion, which was carried, that the directors of the company should submit a report to stockholders once in every twelve months.

#### MINNESOTA.

(From Our Special Correspondent.)

Ore shipments are very brisk from both Duluth and Two Harbors, and now aggregate over 100,000 tons. The season rate has been made \$1, and \$1.05

**ROSSLAND-TRAIL CREEK RAILWAY.**—This narrow gauge ore road is now almost continuous. Much heavy machinery which has been ordered cannot be put in place until after the completion of this road.

**WAR EAGLE MINING COMPANY.**—This company continues to ship small quantities of high-grade ore via Northport. On April 8th this company declared a dividend of 5c. per share, amounting to \$25,000, and making a total of \$157,500 paid in dividends since the company began work. This company has purchased \$20,000 worth of machinery, and expended \$50,000 on 2,000 ft. of tunnel. There is now a working shift of 25 men in the mine, but as soon as the new machinery is in place this number will probably be increased.

#### ONTARIO.

**OIL DISCOVERIES.**—It is reported that there is some excitement at Verona, on the Kingston & Pembroke Railway, over the fact that the Standard Oil Company's men are said to have struck oil at High Falls, near that village, where they have been boring for some time. Oil was reached at a depth of about 1,200 ft. It is said that there is considerable oil land in the district, but the company has secured possession of the greater part of it. Arrangements have been made to sink wells at Sharbot Lake and other places in the locality.

**PELEE ISLAND OIL WELLS.**—While boring for gas on Pelee Island recently the laborers struck a flowing oil well at a depth of 800 ft. Oil spouted 35 ft. into the air. The well was quickly capped. The oil is said to test 40% specific gravity.

#### CHINA.

**MINING AT TONGSHAN.**—The mining industry in Tongshan and the neighborhood has for many years been a very important one, says the *Peking and Tientsin Times*, the operations of the Chinese Engineering and Mining Company affording work to many thousands and considerable emolument to not a few. Fears were entertained some time ago that the supply of the well-known No. 5 seam coal might fail, and the company for two years past has been prospecting with a view to discovering a new source of supply. The directors were the more disposed to exploring work as the great extent of the present workings make it an expensive matter to bring the coal to the surface; moreover, the extension of railways in China and the development of commerce will very largely augment the demand for coal of a good quality. Acting under the advice of Mr. C. W. Kinder, civil engineer, the company has sunk several trial shafts, with varying success. The second shaft bids fair to develop another good mine. It is situated to the north of the spur which unites the Hsi-shan with the Tongshan (the two well-known hills, the volcanic upheaval which produced these hills effectually separating any coal deposit in that direction from the existing workings. Strata were found at a depth of 25 ft. and a seam of coal at 38 ft. Another shaft was then started at the same place with a view to reaching the No. 5 seam direct; here strata were found consisting of hard fireclay with ironstone at a depth of 28 ft. This shaft was sunk at a speed without precedent in China, 31 ft. being excavated through clay and sand in five days. The strata at this shaft have not been proved, but there are many indications to show that this is a valuable find.

Blasting operations are carried on with ordinary blasting powder and safety fuse; the shaft is lined with native straw to a thickness of 12 in. all round, the straw being patted into ropes 4 in. thick. Ventilation is obtained by the hand fan. Dips into the coal seam have been commenced and the coal becomes thicker as the work proceeds. The stratum is vertical or nearly so; drift-crossing measures are in progress to find and prove other seams. The work is being carried on under the oversight of Mr. J. Pringle, assisted by native and Cantonese foremen whose great advancement in the knowledge of mining may be understood from the fact that in the Tongshan mine, at the present time, only two foreigners are employed in addition to the viewer; the whole of the actual work being carried out by natives and Cantonese under their supervision.

#### ECUADOR.

**ESMERALDAS MINING COMPANY.**—This company has been organized to operate mines in Ecuador. Its capital is \$100,000, divided into 10,000 shares of \$10 each, and all have been taken. Clarence E. Dougherty, of Guayaquil, Ecuador, 5,000 shares; Susan S. Francklyn, New York, and Samuel D. Gage, New York, 2,639; Frank S. Ketchum, New York, 669; Charles G. Francklyn, New York, and Samuel D. Houston, Elizabeth, one share each.

#### MEXICO.

**SANTA EULALIA.**—The latest report of the accident at these mines, near Chihuahua, April 23d, is to the effect that 85 men were working in the mines when it caved in, burying alive 67 of the men, all of whom were Mexicans. Contracts were let recently to Mexican miners and laborers to take ore from the old workings at so much a ton. In their eagerness to secure large quantities of ore with the least labor these men tore down the ore pillars which supported the roof of the mine. They also cut away masses of ore that had been left between the chambers. Thus weakened the ground gave away and almost instantly 67 of the men at work under ground were cut off from escape. Governor Thumada is on the ground with a large force of men

to November, which is a decided victory for the ore men, who now have the long end of the combination, holding so great an interest in vessels as they do, one company at Cleveland managing not less than 50,000 tons of shipping.

**IRON—MESABI RANGE.**

(From Our Special Correspondent.)

**BIWABIK BESSEMER COMPANY.**—Two shovels are now loading ore night and day at this mine, and sending out about 200 cars per day. This number will be largely increased soon.

**LONGYEAR & BENNETT.**—This firm, at explorations carried on in the western part of the range, has struck another valuable ore deposit in sections 28 and 29 58-20. They are down over 210 ft. in ore in section 28, and to a lesser depth in 29.

**MINNESOTA IRON COMPANY.**—This company has secured an option on the properties of the Pennsylvania Company, in 20, 58-19, and will explore there at once. There is known to be some ore on the property. The Minnesota is already shipping by steam shovel from the Canton mine. A steam shovel will be put at work on the Fayal in a few days.

**IRON—VERMILLION RANGE.**

(From Our Special Correspondent.)

**CHANDLER IRON COMPANY.**—Steam shovels are now at work in the stock piles of this mine, and loading and shipping is going on very fast.

**LOCKART CLAIM.**—M. Vail, of Ely, who now owns the Lockart property, close to Ely and south of town, has commenced sinking for ore, and the indications are that it will be found in abundance. This claim was one of the most hotly contested ever filed in the Duluth land office, which is saying a good deal. It has been in the courts for about 12 years. It adjoins the Chandler mine.

**SEMER.**—A new mine is likely to be started in the same township as the mines of the Minnesota County at Soudan, where John Semer has bought the Sheridan interests in the old Sheridan homestead, five miles from Tower. The land was at one time leased to Macomber & Shannon, who explored till it they found a vein of high grade hard Bessemer ore 37 ft. wide, and more than 180 ft. deep, the drill breaking at that point. As the discovery was made during the height of the Mesaba boom it was abandoned after this discovery and has been idle since. The Duluth & Iron Range road at that time surveyed a line to the property. Mr. Semer will carry on some operations this summer, but does not expect to get out any ore for a year or more.

**WHITESIDES EXPLORATIONS.**—Test pitting is being carried on vigorously on the Whitesides property south of Ely, where indications of ore were some time ago discovered. It is hoped to open a mine of considerable value there.

**COAL TRADE REVIEW.**

**NEW YORK, Friday Evening, May 8.**

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

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

	1896.		1895.
	Week.	Year.	Year.
Pennsylvania Railroad.....	67,833	1,178,926	1,315,286
<b>Shipped East and North:</b>			
Allegheny, Pa.....	43,543	835,278	619,718
Barclay, Pa.....	1,468	18,302	.....
Beech Creek, Pa.....	53,388	1,099,950	1,054,344
Broad Top, Pa.....	7,371	159,758	115,580
Clearfield, Pa.....	77,635	1,682,192	2,612,176
Cumberland, Md.....	58,584	838,003	850,757
Kanawha, W. Va.....	123,958	1,430,562	.....
Phila. & Erie.....	4,604	22,501	35,422
Poconong Flat Top.....	180,858	1,303,211	1,210,776
<b>Totals.....</b>	<b>451,309</b>	<b>7,409,757</b>	<b>6,498,773</b>

† Week ending April 25th.

	1896.		1895.
	Week.	Year.	Year.
<b>Shipped West:</b>			
Monongahela, Pa.....	19,603	331,136	274,175
Pittsburg, Pa.....	35,369	676,563	764,963
Westmoreland, Pa.....	38,271	703,147	832,812
<b>Totals.....</b>	<b>93,243</b>	<b>1,710,846</b>	<b>1,871,950</b>
<b>Grand totals.....</b>	<b>544,552</b>	<b>9,120,603</b>	<b>8,370,723</b>

Production of coke on line of Pennsylvania Railroad for the week ending May 2d, 1896, and year from January 1st, 1896, in tons of 2,000 lbs.: Week, 82,206 tons; year, 1,579,637; to corresponding date in 1895, 1,964,355 tons.

**Anthracite.**

The anthracite coal trade shows but little change from last week, and the business now doing is principally of a hand-to-mouth nature.

There have been rumors of bidding on new orders at the May schedule prices, but of course nothing of any consequence has been done, or will be done, at these figures for some time to come. The advance in the circular will make dealers try the "shopping" tactics of the past, and the true strength of the market will be tested.

The advance was decided upon to show buyers that although there is no "combination" among anthracite producers, the companies are determined to avoid the disastrous experience of last

year. Next month and in July, inducements in the shape of lower prices will be held out to buyers to lead them to purchase stocks ahead. During the past two years buyers hereabouts have successfully followed a system of buying as little as was compatible with safety and it is now simply a question of whether buyers have become convinced of the stability of the trade and act accordingly.

If the sales agents can resist temptations to cut during the next two months as they have during the past two they will be able to make a good showing during the closing months of the year with relative ease. Judging from their own assertions they will not do any "shading," but they have not been put to a real test yet.

The customary Eastern business is being done in the smaller sizes of coal. The Western trade shows but little change. There is some stocking up in the Western market, but not many orders will be received from there for the smaller sizes of coal until the stocks on hand have been disposed of. These orders cannot be expected for some time yet.

The May "circular" is: Stove, \$4; egg and chestnut, \$3.75, and broken, \$3.50.

**NOTES OF THE WEEK.**

The foreclosure decree of the Philadelphia & Reading was signed on May 1st by Judge Acheson. This covers both the Railroad and the Coal and Iron Company properties. Judge Acheson also filed an opinion overruling the objection of Joseph E. Smaltz and others, income mortgage bondholders and stockholders, to the form of the decree. The only change in the decree was the insertion of figures which could not be placed in it until the date of the decree was fixed. These figures were inserted in the space which had been left blank in the following paragraph: "Ordered, adjudged and decreed that the defendant, the Philadelphia & Reading Railroad Company, pay or cause to be paid, within 20 days after the entry of this decree, to the Pennsylvania Company for insurances on lives and granting annuities, as trustee in the aforesaid general mortgage, or into the registry of this court, for the use and benefit of the holders of said bonds and fractional scrip issued under said general mortgage and the coupons for interest thereon, the sum of \$4,986,920.40, with interest thereon from the date of this decree to the date of payment. In case the said amount shall be paid, as herein decreed, then any of the parties hereto may apply to this court for such further relief and for such further directions as may be just and equitable."

The sale is to be at public auction on a day and at an hour to be fixed by the trustee, of which three months' notice by publication must be given. Every bidder will be required to deposit the sum of \$400,000 as a guarantee of good faith and an additional \$300,000 in the event of the acceptance of the bid. Provision is, of course, made in the decree for the disposition of the proceeds of the sale, beginning with the payment of all costs and following with the cancellation of receivers' certificates, payment of general mortgage interest and payment of general mortgage principal if the amount realized be sufficient.

**Bituminous.**

The market for soft coal is quiet. Sellers and buyers are waiting for new developments, and the condition of trade in general is helping the buyers to a considerable extent. The stocks of fuel usually put in before an advance in prices and the quiet business generally reported by manufacturers have limited the requirements for coal at the present time. Shipments are still being made upon old contracts, some of which will run until June 15th, but there are many that will be closed by May 15th. It has been a bad practice among coal producers of making contracts to run after the period named by the main line railroads for the closing of the year's through line rates, thus throwing the loss in case of an advance in freight upon the coal producer when deliveries are made after the railroad rates have been increased. Of late years when railroad rates have been declining steadily and the price of coal has accordingly fallen, the consumer has always found that his season's wants did not call for much coal at the old figures, but now that there is an advance in the price of coal the reverse is done. Most of the mines are running on reduced time, but a few are running on full time, and could apparently use more coal than they are getting. These tonnages generally indicate just who have old contracts still running and who have not.

The far East continues to take the greater part of the coal now going forward, with New York Harbor second, and Sound ports next. The slight inquiry for South American business continues, and a few shipments are being made.

There is nothing new to report in all-rail trade, a fair business being done in this line.

The "combination" is holding its own. It is reported that some of the rumors concerning one of the larger contracts, which was said to have been filled at lower figures than those of the combination, are true to a certain extent. It is also claimed that the parties who made these prices would be glad now to be clear of them, as they promise to lead to losses.

Transportation from mines to tide is slow on most of the main line roads, and stocks at the shipping ports and en route are small. The car supply is good, but the demand is light. In the eastwise vessel market vessels are not in as good supply as

they were. One or two of the coal coasters have been wrecked during the week, taking them out of the market. Norfolk and Newport News are having large fleets waiting for coal to arrive, and it is said that vessels arriving at either of these ports will have to wait 10 days or two weeks for cargoes.

We quote current rates of freight as follows from Philadelphia: To Boston, Salem and Portsmouth, 65c.; Providence, New Bedford and other Sound ports, 55@60c.; Wareham, 80c.; Lynn, 75c.; Newburyport, 75c.; Dover, \$1.10 and towage; Saco, 90c. and towage; Bath, 65c.; Gardiner, 65@70c. and towage; Bangor, 65@70c. Norfolk and Newport News, 5@10c. above these rates.

The Association prices remain as follows: f. o. b. Philadelphia, Norfolk and Newport News, \$2.35; Baltimore, \$2.28; New York Harbor shipping ports, \$2.8; alongside, New York Harbor, \$3. There is a 20c. differential in favor of Clearfield and Beech Creek coals.

**Buffalo, N. Y.**

May 7.

(From Our Special Correspondent.)

The anthracite coal trade is very dull locally, also for nearby and for distant points. Prices are unchanged. Dealers do not look for any immediate improvement and buyers anticipate a reduction in quotations.

The bituminous coal trade is also very quiet at unchanged figures. Consumers have adopted the hand to mouth policy, not laying in any stocks for future use as a rule. Manufacturing establishments are busy but collections are not easy.

Lake shipments of coal have not been thus far very voluminous. Vessels as a rule leave light as they are anxious to secure the high rates of freight prevailing for carrying grain from Duluth, etc.

The new Erie coal trestle is about completed with all modern improvements. The dock is 1,400 ft. long on Buffalo River. The trestle 1,050 ft., with 88 pockets, some 35 and others 40 ft. wide.

On opening of navigation there were 100,000 net tons of soft coal at Duluth, West Superior, Bayfield and Ashland, and only 50,000 net tons of anthracite coal.

The amount of iron ore on docks at Buffalo on May 1st was only 16,317 gross tons.

A severe storm last Saturday stirred up the ice at this end of Lake Erie and favorable winds since sent it down Niagara River in large fields. There is still some ice on the lake but it does no harm to navigation.

Mr. William S. Pittman and Mr. Edgar T. Brinker became members of the firm of Messrs. Brinker & Jones on May 1st. The former has been with the firm for 10 years, and the latter is a son of Captain Brinker. There is no change in the firm name.

The shipments of coal thus far this season have been light, only 35,900 net tons were reported from April 26th to May 2d inclusive, distributed as follows: 4,900 tons to Chicago, 15,750 tons to Milwaukee, 4,400 tons to Duluth, 3,600 tons to Toledo, 1,350 tons to Racine, 3,800 tons to Superior, 1,000 tons to Port Arthur, 500 tons to Bay City, and 500 tons to Saginaw. The rates of freight were 25c. to Bay City, Superior, Duluth and Toledo; 40c. to Chicago, Milwaukee, Port Arthur and Saginaw, and 45c. to Racine and Kenosha. Closing firm.

**Chicago.**

May 6.

(From our Special Correspondent.)

**Anthracite.**—There has been no improvement in the anthracite coal trade at this center during the past week. The weather has been warm and the general business light, both combining to produce a week of but little comfort to the coal dealers. Circular prices have been set for May at \$5 for grate or broken coal, and \$5.25 for domestic sizes. It is now firmly established that the tonnage of coal carried over the winter is in the neighborhood of 200,000 tons, and with the present shipments by rail and lake anthracite coal will soon be in plentiful supply here. The conditions are not such as to command steady prices.

**Bituminous.**—Bituminous coal has sold in but small lots during the week, and there is no inclination on the part of heavy consumers to come into the market for anything but for temporary wants. There is the usual spring gossip concerning strikes in the soft coal fields.

**Pittsburg.**

May 7.

(From Our Special Correspondent.)

**Coal.**—Shipments since our last have been limited on account of the low stage of water; a small rise early in the week enabled parties with light barges loaded to send out a small run. A large number of empties arrived from below and were forwarded to the pools insuring more work for the miners. The amount of coal ready for shipment will reach about 9,000,000 bushels and is increasing daily. The railroad coal trade, which at this time of the year depends largely upon lake shipments, is not in a condition to satisfy the majority of the operations. While the mines operated directly by lake shippers are running full time, those mines which sell their product to the former are but partly active, for no coal has been bought so far. The competition of the Chesapeake & Ohio and other railroads with Pittsburg river coal in the Cincinnati market is not disturbing Pittsburg river shippers to any visible extent.

The famous coal lands of the late Anthony I. Schulte, at Bridgeville, have been transferred to George Z. Hosack and John F. Hosack and a company organized under the name of the Bridgeville Coal Company. The whole transfer, including the



coal under the Lesmett farm, involves the sum of \$75,000.

A company will erect a small block of ovens at Smock's to test the coal there, and if it turns out a satisfactory article they will engage extensively in this line. The coal is the eastern outcrop of the river coal, which is softer than the coal lying along the river, and resembles the Connellsville coal in many respects.

**Connellsville Coke.**—The trade shows signs of improvement, both productions and shipments increasing. Orders have been given to put 100 ovens at the Merrell Coke Works, which have been closed down for some time, into operation at once. W. J. Rainey is breaking ground at Mount Braddock for the erection of 500 new ovens, 300 of which are to be completed by September 1. It is now generally believed that the bottom has been reached and that future changes will be for the better, but just how soon these changes will come is a hard question to answer; so long as the iron and steel business does not improve there is no chance for much change in the coke trade. Summary for the week shows 11,648 ovens in blast with 6,299 idle. The McClure Company added 24 ovens to the active list. The production for the week estimated at 112,107 tons, as against 118,845 tons the week previous. In the running order, 4,595 ovens made six days, and 7,053 ovens five days, an average of 5.30 days, as against 5.29 days the week previous. The shipments from the region amounted to 6,849, as against 6,822 the week previous; increase 27 cars.

The shipments were as follows: To Pittsburg, 2,156 cars; to points East, 1,027 cars; to points west of Pittsburg, 3,666. April production, 454,625 tons; shipments, 496,909 tons. Prices are unchanged.

Pittsburg capitalists will operate on the South west Branch, under the name of the Bessemer Coke Company. The incorporators are: Wallace H. Rowe, Joshua W. Rhodes, William G. Humphreys, Robert L. Martin and Humphreys, Stewart & Co. The company will operate in Unity Township, Westmoreland County. The incorporators have secured valuable coal lands amounting to several hundred acres. The capital stock is \$100,000.

**Shanghai, China.** April 10.  
(Special Report of Wheelock & Co.)

**Coal.**—A fair business has been done in Japan coal, which is firmer than at the time of our last report and an advance may be looked for as freight rates are higher. Cardiff was in good demand and some sales took place this week at 10<sup>25</sup> taels, the market closing strong, with 10<sup>50</sup> taels asked by holders. American anthracite has continued very dull, no inquiry whatever being reported. While there have been no arrivals of Sydney Wollongong during the past fortnight, deliveries have been unusually heavy and quotations ruled steady. Quotations are as follows for ton lots: American Anthracite, 9<sup>00</sup> taels; Australian Wollongong, 9<sup>00</sup> taels; Welsh Cardiff, 10<sup>50</sup> taels. Japan coals are quoted as follows: Takashima, lump, 5<sup>75</sup> taels, and small, 4<sup>50</sup> taels; Namazuta, lump, 4<sup>25</sup> taels, and dust, 3<sup>75</sup> taels. Other Japan coals are held at 3<sup>00</sup> to 3<sup>25</sup> taels.

**Kerosene Oil.**—Transactions that have taken place lately have been for actual requirements and prices advanced to 1<sup>72</sup> taels per case, declining slightly to 1<sup>69</sup> taels for Devoe's. Russian, in cases, changed hands at 1<sup>65</sup> taels. Recent arrivals bring stocks up to 240,000 cases American and the equivalent of 235,000 cases Russian. We quote as follows per case: American, Devoe's, 1<sup>69</sup><sup>1</sup>/<sub>2</sub> taels; Russian, Batoum, 1<sup>62</sup><sup>1</sup>/<sub>2</sub> taels; Batoum, bulk, 1<sup>55</sup><sup>1</sup>/<sub>2</sub> taels.

**IRON MARKET REVIEW.**

NEW YORK, Friday Evening, May 8, 1896.

**Pig Iron Production and Furnaces in Blast.**

Fuel used.	Week ending		From		From	
	May 10, 1895.	May 8, 1896.	Jan., '95.	Jan., '96.	Tons.	Tons.
Anthracite.	34	20,097	44	20,250	391,647	558,848
Coke....	119	132,360	139	170,370	2,590,724	3,138,249
Charcoal...	18	3,859	13	5,200	80,389	95,040
Totals ...	171	156,316	196	195,820	3,62,800	3,793,137

The iron market continues unquestionably dull and quiet; the demand for finished products is not as active as had been hoped for, and consequently the buying of raw material is daily becoming more limited. The fact is that buyers are growing very cautious; makers of staple articles have about reached the limit beyond which they do not care to accumulate stocks, while there is a general complaint of the absence of new orders. The new economic theory that buying will be stimulated by putting up quotations, and that high prices will increase the general purchasing power, has not got into complete working order yet.

The steel combine is reported to be negotiating for the control of several of the plants which are not included in the agreement. Most of these negotiations will probably succeed, and a start will then be given to the business of building new plants. The pool is now waiting quietly until the old contracts and the stocks of billets on hand are worked off by the brokers and middlemen.

The latest combination has been formed by the bolt makers, who held a meeting this week at Anderson, Ind., 43 firms being represented. A pool organization was completed and arrangements made to regulate prices.

The trade so far this year has been unusually free from labor troubles; but the announcement is made in several quarters of probable reductions in wages. These will hardly be submitted to without protest.

**NOTES OF THE WEEK.**

The Sharon Iron Works at Sharon, Pa., have arranged to add 25 more Semet-Solway coke ovens to the plant of 50 which they have nearly completed.

The Butler & Pittsburg Railroad Company has been organized, the Carnegie interest holding five-sixths of the capital stock of \$3,000,000. The line will run from the Edgar Thomson Steel Works at Braddock to Butler, where it connects with the Pittsburg, Shenango & Lake Erie Railroad; that road extends from Butler, about 100 miles to Conneaut Harbor, on Lake Erie. It will be a very convenient line for hauling iron to Pittsburg.

The property of the Pennsylvania Steel Company, which went into the hands of receivers on April 21st, 1893, was transferred by the Reorganization Committee to the security holders at the annual meeting of the stockholders in Philadelphia, May 4th. The reassignment of the property and the transactions of the necessary legal requirements will occupy some time, and it is not likely that formal possession will be taken for some weeks. The following directors, who were recommended by the Reorganization Committee, were elected: E. C. Felton, Harrisburg; L. S. Bent, Philadelphia; E. B. Morris, Philadelphia; F. W. Hunnewell, Boston; John Cassels, Washington; Alfred Earnshaw, George Wood, C. Stuart Patterson and E. R. Dick, Philadelphia. E. C. Felton, who is the present general manager of the company, will be elected president and general manager.

The bids for the armor-plates for the new battleships *Kearsarge* and *Kentucky*, which were opened at the Navy Department this week, were very close together, the total of the Carnegie Steel Company's bid being \$3,140,640, while that of the Bethlehem Iron Company amounted to \$3,142,465. The variations in items were not large; for 15 in. and 17-in. Harveyed plates, for instance, the prices are \$575.40 and \$582.90 per ton; for 10-in. Harveyed plates \$515.40 and \$520.40; for plain 7-in plates \$525 and \$535. The bids are, on an average, about \$50 per ton below any previous ones for the same class of plates.

**New York.** May 8.

The local iron trade is quiet, and shows very much the same character as the general market. The only active section is in structural material, where present demand and inquiry for the future point to a good business through the season. Outside of this there is no special demand and very little doing. The small orders which make up a great deal of the business here are not coming in freely, and sellers are getting a little anxious.

**Pig Iron.**—No large sales can be reported this week. Prices are nominally unchanged, but there is no trouble in getting good iron at 25c. or so below quotations. There is some talk of a general reduction in Southern iron, but this is objected to by the Tennessee Company and some others. The eastern furnacemen have held another meeting, but failed to come to an agreement.

We quote for Northern iron as follows: No. 1 foundry, \$12.75@13.25; No. 2, foundry, \$12@12.50; grav. forge, \$11.25@11.75. For Southern irons we quote: No. 1 foundry, \$11.75@12.25; No. 2 foundry, \$11.25@11.75; No. 1 soft, \$11.50@11.75; No. 2 soft, \$11@11.50; forge, \$10@10.50. All prices are for tide-water delivery.

**Cast Iron Pipe.**—The East River Gas Company has contracted for a large lot of pipe, but terms are not made public. The Warren Foundry and McNeal divided the contract. Some small orders will be placed next week.

**Spiegeleisen and Ferro-Manganese.**—No new business is noted, and quotations are nominal at \$19.50@20.50 for imported spiegeleisen and \$47@47.50 for ferro.

**Steel Billets and Rods.**—A few sales of billets are reported by brokers below the pool price, which is \$21.75 per ton for New York delivery. Rods are quoted nominally \$27@27.50, with only a few small sales.

**Merchant Iron and Steel.**—Small sales make up the markets with no change in prices. There is talk of an advance in bars, but it would hardly be politic just now. We quote for common bars, 1<sup>15</sup>@1<sup>25</sup>; refined bars, 1<sup>25</sup>@1<sup>50</sup>; soft steel bars, 1<sup>35</sup>@1<sup>45</sup>. Other quotations are: Steel hoops, 1<sup>50</sup>@1<sup>60</sup>; steel axes, 1<sup>65</sup>@1<sup>80</sup>; links and pins, 1<sup>65</sup>@1<sup>75</sup>; tire steel, 1<sup>85</sup>@2c.; spring steel, 2<sup>05</sup>@2<sup>20</sup>. Open hearth machinery steel is 1<sup>45</sup>@1<sup>60</sup>.

**Plates.**—Demand is a shade better, and prices are unchanged. We quote for universal mill plates, 1<sup>45</sup>@1<sup>55</sup>. Other quotations are: Tank, 1<sup>45</sup>@1<sup>55</sup>; boiler shell, 1<sup>55</sup>@1<sup>65</sup>; good flange, 1<sup>80</sup>@1<sup>90</sup>; firebox, 2<sup>10</sup>@2<sup>30</sup>. Charcoal iron plates are 2<sup>25</sup>c. for shell, 2<sup>75</sup>c. for flange, and 3<sup>25</sup>c. for firebox. Rivets are 3@3<sup>25</sup>c. for best iron and 2<sup>15</sup>@2<sup>25</sup>c. for steel.

**Structural Iron and Steel.**—Business continues good and contracts for several large buildings in New York and one in Brooklyn are under consideration. Prices show no material change. We quote

for angles, 1<sup>45</sup>@1<sup>55</sup>c.; channels, 1<sup>60</sup>@1<sup>75</sup>c.; tees, 1<sup>65</sup>@1<sup>75</sup>c.; beams (up to 15-in.), 1<sup>65</sup>@1<sup>75</sup>c. for large lots and 1<sup>90</sup>@2<sup>10</sup>c. for small orders.

**Steel Rails and Rail Fastenings.**—More business is reported than for some time past, new contracts including 12,000 tons for the Grand Trunk, 5,000 tons for a New England line, and 3,000 tons for a New Jersey company. Several orders for street rails are on the market. Steel rails are quoted at \$23.75 per ton at tidewater for standard sections; girder rails at \$29@32 at tidewater.

Rail fastenings are quiet. Fish and angle-plates, 1<sup>25</sup>@1<sup>35</sup>c.; spikes, 1<sup>65</sup>@1<sup>70</sup>c.; bolts, 1<sup>90</sup>@2<sup>05</sup>c. for square nuts, and 2<sup>05</sup>@2<sup>15</sup>c. for hexagon nuts.

**Scrap Iron.**—The demand is light, but prices are steady, and there is not much good scrap offering. We quote \$10.50@12 per ton for good machinery scrap; \$9.50@10.50 for ordinary foundry, and \$6.50@7.50 for stove-plate and mixed.

**Buffalo, N. Y.** May 6.

(Special Report of Rogers, Brown & Co.)

The week just passed has shown considerable activity in Lake Superior charcoal iron, and several good sized orders have been placed by the large consumers for their season's requirements of that class of iron. These sales have been followed by an advance of 50c. per ton made by the leading Lake Superior charcoal furnace. Outside of charcoal iron, however, the market has been quiet and uneventful. Foundries are fairly busy, and those running on specialties are quite full of work. We quote on cash basis f. o. b. cars Buffalo as follows: No. 1 foundry, strong coke iron, Lake Superior ore, \$13.50; No. 2 foundry, strong coke iron, Lake Superior ore, \$13; Ohio strong softener No. 1, \$13.50; Ohio strong softener No. 2, \$13; Jackson County silvery No. 1, \$15.50; Southern soft No. 1, \$12.40; Southern soft No. 2, \$11.90; Hanging Rock charcoal, \$18; Lake Superior charcoal, \$14.50.

**Chicago.** May 6.

(From Our Special Correspondent.)

This has been another quiet week in the iron trade of Chicago, sales of both Northern and Southern pig iron having fallen off from the aggregate of last week. Structural material, steel rails and billets are in very small demand. There is an apparent desire on the part of consumers in nearly all the lines to put off contracting until prices are fully determined on.

**Pig Iron.**—The tonnage of the week will foot up about 4,000 tons Northern iron, and about half that amount in Southern iron. Prices in Northern iron are being well held, though the Southern product appears to have little strength. The largest sale reported was for 500 tons, and the majority of sales were merely in carload to 100-ton lots. Consumers, it is understood, are awaiting reduction in prices that many say are bound to come. It is not believed that the higher prices will hold, though there is a firm effort on the part of the furnaces to uphold them. We quote: Lake Superior charcoal, \$13.50@14; local coke foundry No. 1, \$12.50@13; local coke foundry No. 2, \$12@12.50; local coke foundry No. 3, \$11@12; Southern coke, No. 1, \$12.10@12.35; Southern coke, No. 2, \$11.60@11.85; Southern coke, No. 3, \$11.10@11.60; Southern, No. 1, soft \$11.60@11.85; Southern No. 2, soft, \$11.35@11.60; Jackson County silveries, \$14.50@16; Ohio strong softeners, \$15@15.50; Alabama car-wheel, \$16.85@17.35.

**Structural Material.**—A few small bridge contracts were let during the week and there has been a small demand for building material. Inquiry is light. Prices are as follows: Beams and channels, 1<sup>65</sup>@1<sup>70</sup>c.; angles, 1<sup>45</sup>@1<sup>50</sup>c.; plates, 1<sup>50</sup>@1<sup>55</sup>c.; tees, 1<sup>65</sup>@1<sup>70</sup>c. Small lots from stock are quoted 1/4c. to 1/2c. higher.

**Bar Iron.**—There has been some small demand for bars from the implement trade. Business is, however, rather light with prices on common iron 1<sup>35</sup>c.

**Steel Rails.**—A few thousand tons have been booked during the week, the market not having improved over the preceding week. Inquiries are fairly good. Rails are quoted \$29 and up according to specification.

**Billets and Rods.**—A few thousand tons have been sold. Rods aggregated sales of 7,000 tons. Billets are quoted \$21.25 and rods \$29.50@30.50.

**Old Rails and Wheels.**—Business in both lines is small. Old iron rails are quoted \$14.50@15. Old wheels are \$13.50.

**Cleveland, O.** May 7.

(From Our Special Correspondent.)

**Iron Ore.**—Sales have been moderate this week, few in number and small in amount, perhaps several hundred thousand tons in the aggregate. It has been the custom for the smaller furnacemen to delay purchases until the heavy weights take the initiative and the large makers for some reason are delaying action. As noted two weeks ago the Illinois Steel Company has contracted for about one-half its material, but the Carnegie interests are not yet in evidence. With the new furnaces that are under construction at Duquesne, Pa., the Carnegie people will need about 3,000,000 tons of ore per year. The Biwabik and other mines in which they are interested will, it is estimated, yield them about 700,000 tons this year. Aside from this supply it cannot be learned that they have purchased more than 50,000 tons of ore, a special low phosphorus grade. This interest has enough ore on hand, it is said, to keep its furnaces in blast up to the close of June. The ore men therefore still have unsold a very large proportion of their estimated output for the present season.

During the past week the shippers have contracted for enough lake tonnage to bring down 1,500,000 tons of ore, principally from the head of the lakes. They have secured this tonnage on a basis of \$1.05 per ton from Duluth for the full season. Some season charters have also been made from Marquette at 95c, and a little from Escanaba at 70c. Wild charter rates from Escanaba have advanced from 60c. to 70c. during the week; Marquette is strong at 85c., and Duluth is firm at \$1.

The association Bessemer prices are firmly held at \$4 for standards. The non-Bessemer are quiet but firm at \$2.75 for standard hematites.

**Pig Iron.**—Buyers in this market are rare, but the makers of iron seem to regard the situation with equanimity. Rightly or wrongly they have a conviction that there will be an abundance of orders later on and the faiths that is in them is causing a different policy from that of a year ago. Then they reached out and seized every order in sight at almost any price, in order to keep their furnaces in operation. Now they prefer to shut down rather than engage in a scramble for business with no profit in it. Bessemer pig is held nominally at \$13.25; Northern strong, No. 1, is quoted \$12.50@12.75; No. 2, \$12@12.25; Ohio Scotch, No. 1, \$12.25; No. 2, \$11.75.

**Philadelphia.** May 8.  
(From Our Special Correspondent.)

**Pig Iron.**—About the only point deserving of remark this week is the cut in Southern iron in this market. After all, very little of it has been taken. It is not for lower prices our people are waiting, but for better business conditions. One or two concerns made every possible effort to place large blocks of iron for summer delivery. Shaded quotations on certain home brands were quietly made today. Buyers are very watchful, apparently anticipating some sudden development. Fair No. 1 iron is to be had at \$12.50, and No. 2 for \$12. Good forge iron is offered at \$11.

**Steel Billets.**—The price to-day is \$21 from middlemen, who control the situation at present. Opinions of the future of the market are mere guesses.

**Merchant Bar.**—Business has been earnestly solicited on a basis of 1-20 delivered, and 1-25 for steel bars. The stores are doing fairly well, but the mill orders are unimportant.

**Merchant Steel.**—All kinds are in moderate demand, at modest margins. Carriage and wagon requirements have been fair.

**Sheet Iron.**—This is the best branch of the iron trade at present, but the large orders are taken at cut rates. The mills must be kept going regardless of margins. The prices range from 1-80 to 2-80 for best quality. Galvanized continues to meet with favor, and some large orders have been placed.

**Pipes and Tubes.**—There are no new developments. The mills all have more or less business on hand. Shop and engine work is on the increase, and much new business is promised.

**Plate and Tank.**—Parties who have the control of considerable plate iron work, said this week they were in no haste to place orders as they had several months' time before them. Manufacturers are bidding for some of this work, and as soon as contractors and owners are agreed, there will be some large orders placed. There are opportunities for securing a great deal of business. A lot of 500 tons for bridge work was placed. Tank is 1-50; shell, 1-60; flange, 1-65; firebox, 1-80.

**Structural Material.**—A large amount of business is to be given out soon, but those who control it say current quotations do not suit. Angles, 1-50; beams, 1-60@1-90.

**Steel Rails.**—The only interest felt in rails is confined to girders.

**Old Rails.**—Quotations are \$14.50@15.  
**Scrap.**—The large buyers whose business is always sought after are not caring whether they buy at this time or not, and yardmen evidently do not care to make business by shading quotations.

**Pittsburg.** May 7.  
(From Our Special Correspondent.)

**Raw Iron and Steel.**—Business during the last week developed moderate improvement in some directions, although there was no conspicuous activity in any particular department. In the iron trade the feature of interest was the recent purchase of Lake ore by leading Western purchasers, who are said to have covered their season's requirements and to have secured practical control of the supply of low phosphorus ores. There has been no noteworthy activity in the iron market, and although the numerous combinations of producers are making efforts to advance prices there is considerable competition, which gives occasional advantage to buyers of the various forms of product.

The iron and steel trade is rather weaker than it was a week ago. Producers continue to make demonstrations of their determination to hold up prices notwithstanding the fact of the heavy purchases of ore at the combination price; this movement, like the formation of the steel billet pool, has not stimulated buyers. Whatever be the reason, consumers do not seem to want iron and steel just now, and they cannot be induced to take it by movements that look like higher prices.

**Pig Iron.**—Southern furnaces are offering iron at a low figure and some Northern producers are also seeking a market, so that quotations have been disturbed and irregular for some days past; the result is prices are altogether nominal. On May 1st Carnegie's new furnace at Duquesne started up, the

capacity being 1,000 tons per day, which is equal to three or four of the old-fashioned ones. October 1st another one will be fired up of equal capacity. The Youngstown people are up in arms against the steel billet dicker, the belief being pretty general that the deal has been consummated. Some of the stockholders will either sell or sue. Several iron firms in the Valley are figuring on the erection of several open-hearth plants. One at Sharon will have a capacity of several hundred tons per day, and one at Niles will also be large enough to supply the wants of Falcon Mills at that place.

**The Latest.**—The iron market is demoralized, prices are weak and uncertain; Bessemer pig at Pittsburg, \$12.65@13.25. In steel billets small sales show \$19.50@20.25 at Pittsburg. Other articles are nominal, with scarcely any demand.

COKE SMELTED, LAKE AND NATIVE ORE.		Tons.		Cath.		
2,500 Bessemer, May and June, Pitts.	\$13.10	2,000 Bessemer, May and June, Pitts.	13.20	2,000 Bessemer, May and June, Pitts.	13.00	
1,000 Bessemer, May and June, Pitts.	12.65	1,000 Bessemer, May and June, Pitts.	12.75	1,000 Gray Forge, May and June, Pitts.	11.10	
1,000 Gray Forge, May and June, Pitts.	11.10	1,000 Gray Forge, June, Valley	10.35	500 Bessemer, May, Valley	12.00	
500 Gray Forge, May, Pitts	11.15	500 Gray Forge, May, Valley	10.25	325 No. 2 Foundry, May and June, Pitts	12.50	
300 Gray Forge, spot, Valley	10.55	156 No. 1 Foundry, spot, Pitts.	13.25	100 No. 2 Foundry, prompt, Pitts.	12.25	
100 No. 2 Foundry, prompt, Pitts.	12.25	100 No. 2 Foundry, prompt, Pitts.	12.50	50 No. 1 Silvery, prompt, Pitts.	14.50	
50 No. 3 Foundry, prompt, Pitts.	12.00	50 No. 1 Foundry, spot, Pitts	13.25	CHARCOAL.		
100 No. 2 Foundry, Pitts.		\$16.30	50 Cold Blast, Pitts.	23.50	50 Lake Superior, Pitts.	17.25
50 No. 2 Foundry, Pitts.		16.25	25 No. 3 Foundry, Pitts.	16.25	BLOOMS, BILLETS AND SLABS AT MILL.	
1,000 Billets, May, at mill.		\$19.65	1,000 Billets, May and June, at mill.	20.00	1,000 Billets, May and June, at mill.	19.75
900 Billets, May and June, at mill.		20.25	800 Billets, May and June, at mill.	19.60	800 Billets, May and June, at mill.	20.50
700 Billets, May and June, at mill.		20.50	Tons.			
700 Billets, May and June, at mill.		19.90	500 Billets, May at mill		20.60	
500 Billets, spot, at mill		19.50	SKELP IRON.			
9-0 Sheared, Pitts.		\$1.50 4 m.	800 Wide grooved, Pitts.		1.30 4 m.	
500 Narrow grooved, Pitts		1.34 4 m.	SKELP STEEL.			
2,000 Wide grooved, May and June, Pitts.		\$1 15 4 m.	950 Sheared, Pitts.		1.40 4 m.	
500 Wide grooved, Pitts		1.20 4 m.	300 Narrow grooved, Pitts		1.20 4 m.	
2,000 Neutral, May and June, Pitts.		\$21.00	MUCK BAR.			
700 Neutral, Pitts.		21.50	SPELTER.			
100 Prime, Pitts.		\$3.97 1/2	STEEL WIRE RODS.			
1,000 5-gauge, May and June		\$28.00	SHEET BARS.			
1,000 Delivered, Pitts.		\$22 50	BLOOMS, BILLETS AND BAR ENDS.			
1,100 Blooms and billet ends		\$14.75	OLD RAILS, IRON AND STEEL.			
500 Steel rails, Pittsburg		\$13.80	500 Steel rails, Pittsburg		14.00	
500 Iron rails, Valley		16.50	500 Iron rails, Valley		17.00	
200 Iron rails, Valley		16.75	500 Wro't scrap, net.		13.50	
500 Wro't trimmings net.		8.00	200 No. 1 Wro't scrip net		13.75	
200 Cast scrap, gross.		10.75	200 Cast bearings, g'ss.		7.50	
100 Old car wheels gross.		12.00				

**METAL MARKET.**

NEW YORK, Friday Evening, May 8, 1896.  
**Gold and Silver.**  
**Prices of Silver per Ounce Troy.**

May.	St. Ex.	London Pence.	N. Y. Cts.	Value of sil. in \$.	May.	St. Ex.	London Pence.	N. Y. Cts.	Value of sil. in \$.
2	4 88 3/4	31 1/2	68	526	6	4 88 3/4	31 1/2	68 1/2	527
4	4 88 3/4	31 1/2	68	526	7	4 88 3/4	31	67 1/2	525
5	4 88 3/4	31 1/2	68	526	8	4 88 3/4	31	67 1/2	525

The market has been quiet for silver. Under the influence of slight decline in China and East India exchanges, silver has receded slightly in price, but the decline has checked sales and any effort to purchase liberally must result in an advance over present quotations.

The United States Assay Office in New York reports the total receipts of silver at 93,000 oz. for the week.

**Gold and Silver Exports and Imports.**

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

	Specie and bullion.		In ores.		Total excess, Exp. or Imp.
	Exports.	Imports.	Exports.	Imports.	
<b>GOLD</b>					
Mar.	\$384,080	\$677,733	\$17,940	\$78,883	E. \$354,596
1896.	13,134,306	22,647,762	74,893	357,903	E. 9,753,466
1895.	30,621,116	14,109,920	284,557	258,356	E. 16,537,397
<b>SILV.</b>					
Mar.	5,014,726	1,353,526	67,568	1,257,875	E. 2,470,893
1896.	15,280,344	3,823,190	539,444	4,053,081	E. 7,943,617
1895.	10,618,379	1,606,156		2,876,302	E. 6,135,918

These figures are furnished by the Bureau of Statistics of the Treasury Department and include the exports and imports at all United States ports.

**Gold and Silver Exports and Imports, New York**

For the week ending May 8th, 1896, and for years from January 1st, 1896, 1895, 1894, 1893 and 1892:

We'k	Gold.		Silver.		Total Excess, Exp. or Imp.
	Exports.	Imports.	Exports.	Imports.	
1896	\$4,406,009	\$21,045	\$429,650	\$36,334	E. \$4,778,271
1896	18,337,637	16,821,653	13,452,625	674,609	E. 14,193,910
1895.	32,227,511	17,499,316	11,352,019	493,531	E. 25,586,682
1894.	27,900,661	6,872,139	14,819,546	564,715	E. 35,273,356
1893.	52,246,616	5,649,499	11,325,632	973,273	E. 56,978,466
1892.	23,532,893	6,017,839	9,406,681	521,384	E. 26,499,751

Of the exports of gold this week, \$1,350,000 went to Germany and the balance to the West Indies; all the silver went to London. The specie imported came chiefly from South America.

**Average Monthly Price of Silver**

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

Month.	1896.		1895.		1894.	
	Lon-don. Pence.	New York. Cents.	Lon-don. Pence.	New York. Cents.	Lon-don. Pence.	New York. Cents.
January.	30 69	67 13	27 56	59 69	30 81	66 63
February..	31 01	67 67	27 47	59 90	29 18	63 43
March....	31 34	68 40	28 33	61 98	27 28	59 49
April.....	31 10	67 92	30 39	66 61	28 95	62 92

**FINANCIAL NOTES OF THE WEEK.**

The feature of the week has been the heavy export of gold, amounting, as we are informed at the Sub Treasury this afternoon, to \$5,850,000, nor is this all, as the officials there and the leading bankers we regret are under the impression that the withdrawals next week will be upon a large scale. Some attempt has been made to explain away these shipments as the results of special orders for Russia, but so far as we can ascertain special orders for Russia cut a very little figure in the situation. The situation is complex in that there is apparently a triangular exchange movement between New York, Paris and London, and looking at the situation from a rational point of view, the present reflux of gold is no more or less than the exchange results from the trade situation of the day.

The rate of interest on New York City bonds for more than \$4,000,000 being raised to 3 1/2% attracted many bidders both foreign and domestic, with the result that the whole of the issue of varying dates of maturity was taken by a New York banking house at about 104 1/2%.

The one disturbing element in the money market at present is the progress of the McKinley "boom" as bankers consider that the success of his candidacy would not be reassuring, as he has evidently shirked declaring himself for sound money unreservedly. In fact, he is looked upon as straddling the fence.

The statement of the United States Treasury on Thursday, May 7th, shows balances in excess of outstanding certificates as below, comparison being made with the corresponding day of last week:

	April 30.	May 7.	Changes.
Gold	\$125,498,509	\$121,580,755	D. \$3,907,754
Silver	23,209,627	23,946,534	L. 736,907
Legal tenders	76,607,611	79,014,373	L. 2,406,762
Treasury notes, etc.	31,427,398	31,757,987	L. 330,589

Totals	\$2,674,245	\$256,309,669	D. 432,576
Govt. bank dep.	26,814,611	25,727,312	D. 1,087,299

Total United States Treasury notes issued under act of July 14th, 1890, in general circulation and in the Treasury, \$133,069,280. Against these are held in the Treasury 12,297,847 coined standard silver dollars, and the silver bullion purchased at a cost of \$120,297,847, making a total of \$132,595,694.

The following statement from the Bureau of the Mint shows the coinage executed at the mint of the United States during the month of April, 1896:

Denominations.	Pieces.	Value.
Double eagles	75,000	\$1,500,000
Total gold	75,000	\$1,500,000
Half dollars	1,500,000	750,000
Quarter dollars	3,000,000	750,000
Dimes	240,000	240,000
Total silver	2,660,000	\$1,330,000
Five cent	94,000	4,700
One cent	3,597,000	35,970
Total minor	3,691,000	\$40,670
Total coinage	6,372,000	\$3,371,670

The coinage of gold was the smallest reported for a considerable time past.

Imports of specie at San Francisco by water for

March and for the three months ending March 31st, were as follows:

	March.	Three Mos.
Mexico.....	\$198,763	\$688,553
British Columbia.....	9,365	43,589
Central America.....	43,011	43,011
Miscellaneous.....	1,822	2,335
<b>Total.....</b>	<b>\$252,961</b>	<b>\$877,488</b>
In 1895.....	161,360	469,965

The descriptions embraced in the total for the three months were:

Gold bullion.....	\$156,047
Gold coin.....	19,176
Silver bullion.....	333,833
Silver coin.....	168,432
<b>Total.....</b>	<b>\$877,488</b>

This shows a total of \$175,223 in gold and \$502,265 in silver.

The statement of the New York banks—including the 6 banks represented in the Clearing House—for the week ending May 2d, gives the following totals, comparisons being made with the corresponding weeks in 1895 and 1894:

	1894.	1895.	1896.
Loans and discounts.....	\$165,162,100	\$184,912,400	\$470,663,500
Deposits.....	578,694,200	526,998,100	495,004,100
Circulation.....	10,115,500	13,197,900	14,370,700
Specie.....	100,082,100	69,728,200	59,324,000
Legal tenders.....	127,397,000	89,254,900	87,371,300
<b>Total reserve.....</b>	<b>\$227,481,700</b>	<b>\$158,983,100</b>	<b>\$146,695,300</b>
Legal requirement.....	144,673,550	141,777,025	127,251,025
<b>Surplus reserve.....</b>	<b>\$82,807,150</b>	<b>\$17,206,075</b>	<b>\$19,443,275</b>

Changes for the week this year were increases of \$3,380,800 in loans; \$7,691,600 in deposits; \$53,300 in circulation; \$321,400 in specie; \$3,867,100 in legal tender, and \$2,205,000 in surplus reserve.

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:

	Gold.	Silver.	Total.
<b>Asso. Banks of New York</b>			
1895.....	\$59,324,000	69,728,200	129,052,200
1896.....	235,619,300	235,619,300	471,238,600
<b>Bank of England</b>			
1895.....	184,640,250	184,640,250	369,280,500
1896.....	392,377,900	249,558,900	641,936,800
<b>Bank of France</b>			
1895.....	410,720,166	247,691,218	658,411,384
1896.....	224,190,000	224,190,000	448,380,000
<b>Imp. Bank of Germany</b>			
1895.....	134,800,000	63,973,000	198,773,000
1896.....	92,850,000	67,929,000	160,779,000
<b>Netherlands Bank</b>			
1895.....	13,135,000	34,797,000	47,932,000
1896.....	21,430,000	35,203,000	56,633,000
<b>Belgian National Bank</b>			
1895.....	19,594,000	23,888,000	43,482,000
1896.....	41,866,000	53,764,000	95,630,000
<b>Bank of Spain</b>			
1895.....	40,021,000	62,272,000	102,293,000
1896.....	62,455,000	10,535,000	72,990,000
<b>Bank of Italy</b>			
1895.....	60,050,000	11,220,000	71,270,000
1896.....	390,625,000	45,370,000	435,995,000
<b>Imp. Bank of Russia</b>			
1895.....	274,075,000	53,530,000	327,605,000

The return for the Associated Banks of New York is of date May 2d; all the others are of date May 7th, except the Bank of Italy, which is dated March 31st, and the Bank of Russia, whose return is dated March 16th-28th. The New York banks do not report silver separately, but the specie carried is chiefly gold coin. The Bank of England reports its gold only, not considering silver at all. The Imperial Bank of Germany and the Belgian National Bank do not report gold and silver separately.

On March 14th, the date of its latest report, the Bank of Japan had outstanding 153,809,663 yen in circulating notes, of which 8,171,504 yen were held in the Imperial Treasury. The Bank's reserve amounted to 51,799,405 yen, of which 31,609,800 yen were in gold and 23,189,605 yen in silver. The metallic reserve was thus 35% of the circulation. The gold yen is equal to \$1 very nearly.

Shipments of silver from London to the East for the year up to April 23d are reported by Messrs. Pixley & Abell's circular as below:

	1895.	1896.	Changes.
India.....	\$1,346,330	\$1,455,298	I. \$108,968
China.....	1,034,893	427,450	D. 607,443
The Straits.....	247,205	222,882	D. 24,323
<b>Totals.....</b>	<b>\$2,628,428</b>	<b>\$2,105,630</b>	<b>D. \$522,798</b>

Arrivals for the week this year were £183,000 in bar silver from New York, \$45,000 from Chile, and £13,000 from Australia; a total of £241,000. Shipments for the week were £20,000 in bar silver to Bombay, and £4,000 in Mexican dollars to Hong Kong; a total of £24,000.

The demand for Indian Exchange has been large and all of the 60 lakhs of council bills offered in London were taken. The price was a fraction higher, the average being 14½d. per rupee. The demand for exchange was strongly stimulated by a sharp rise in rupee paper in London, followed by heavy buying in Calcutta and Bombay. The dollar and tael exchanges are quiet.

**Domestic and Foreign Coins.**

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

	Bid	Asked
Mexican dollars.....	\$0.53½	\$0.54½
Peruvian soles and Chilean pesos.....	.47½	.48½
Victoria sovereigns.....	4.88	4.92
Twenty francs.....	3.88	3.92
Twenty marks.....	4.75	4.80
Spanish 25 pesetas.....	4.78	4.85

**Other Metals.**

**Copper.**—The better feeling which we reported last week has made further progress and a decidedly better inquiry has been noticeable, both for export and home trade. A considerable business might have been done if producers had shown the same willingness to meet the market, but that has so far not been the case. It has transpired that some Lake ingot copper, for immediate delivery has been sold at 10½c., but at this price no large quantities are obtainable and the larger companies still hold firmly at 11c., which price has been realized for distant delivery. Electrolytic copper is still somewhat irregular, cakes, wirebars and ingots being quoted 10½c. and cathodes 10½c., while casting copper is lifeless at 10c.

Exports continue to be heavy, and the different refiners report that they cannot turn out the copper fast enough. A large business has again been done in London with speculative sorts, which are again somewhat higher, and close £45 7s. 6d. @ £45 10s. for spot and £45 12s. 6d. @ £45 17s. 6d. for three months prompt. There is a very good demand for fine copper, and we quote: English tough, £49 @ £49 5s.; best selected, £50 @ £50 5s.; strong sheets, £56; India sheets, £53; yellow metal, 4½d.

Rumors have again been current to the effect that the option given to the Exploration Company in London for the second quarter of Anaconda shares has been exercised, but authoritatively it is denied. The prevailing idea is that the negotiation is based on \$5 or £7 per share.

**Chilean Copper Market.**—Messrs. Jackson Bros. write us as follows from Valparaiso under date of March 28th: Owing to recent fluctuations in European quotations, the market here has been quiet, transactions during the past fortnight having been reduced to 10 tons. Quotations are as follows per metric quintal: Bar copper, \$55.38 (Chilean f. o. b.); regulus, 50%, \$23.62 f. o. b.; ore, 10%, \$3.09 f. o. b.

**Tin.**—The demand has been very active, and a large and satisfactory business has been done with consumers. Prices, however, show hardly any fluctuation, and we quote 13½d for spot and May, and 13½c. June to September.

The price for spot in London advanced early in the week to £59 15s., but has again given way, closing at £59 7s. 6d. @ £59 10s. for spot, and May, £60 @ £60 2s. 6d. for three months prompt.

The tin statistics for April, as compiled by the New York Metal Exchange, show total shipments for the month of 3,750 tons from the Straits and 350 tons from Australia. The deliveries for the month were: London, 1,480 tons; Holland, 1,474 tons; United States (excluding Pacific ports), 1,700 tons; total, 4,654 tons. The stocks on hand at the close of the month were as follows, in tons of 2,240 lbs.:

	Store.	Afloat.	Total.
London.....	16,823	2,619	19,442
Holland, Banca and Billiton.....	4,300	1,200	5,500
Holland, Straits.....	938	573	1,511
U. S., ex. Pacific ports.....	2,178	2,185	4,363
<b>Totals.....</b>	<b>24,239</b>	<b>6,577</b>	<b>30,816</b>

The total stock above given on May 1st shows a decrease of 1,003 tons over that reported on April 1st.

Lead has continued in good demand, and there is no quotable change in price, which is 3.02½ @ 3.05c. New York and 2½c. St. Louis. The offerings have been much lighter than during the preceding fortnight.

In London the tendency has been flat, and Spanish lead is quoted £11 @ £11 2s. 6d. with English lead 5s. higher.

**St. Louis Lead Market.**—The John Wahl Commission Company telegraphs us as follows: Lead is firm, but quiet at 2½ for argentiferous and 2 7/8 for chemical and ordinary. Missouri demand rather light.

**Spelter** continues dull and irregular at about 4c., the business doing being more or less of a retail character.

In strong contrast with our market has been the advance tendency in Europe, where a very large demand exists, especially for galvanizing purposes, and early in the week prices for good ordinaries advanced to £16 17s. 6d. in London, and the closing prices to-day are £16 15s. for ordinaries and £16 17s. 6d. for specials.

**Antimony** is lifeless.

**Nickel.**—Demand is moderate and prices are unchanged. We quote 35½ @ 38c. per lb. for small orders, and 34 @ 35c. for ton lots. The London price is 13½ @ 15d. per lb.

**Platinum.**—Prices are steady and unchanged and we quote \$13 @ \$14.50 per oz. New York London quotations are 49 @ 51s. per oz.

For chemical ware, best hammered metal, Messrs. Eimer & Amend, New York, furnish the following quotation, the prices given being respectively for orders of over 250 grams; for orders of over 100 grams and less than 250 grams, and for orders of less than 100 grams: Crucibles and dishes, 48c. 49c.

and 50c. per gram. Wire and foil are 45c., 46c. and 47c. per gram. The current retail price for crucibles is 60c. per gram.

**Quicksilver.**—Quotations continue \$37.50 per flask, New York. The London price is £6 15s. per flask, with £6 13s. 9d. quoted from second hands.

**Imports and Exports of Metals.**

New York.*	Week, Apr. 30.		Year, 1896.	
	Expts.	Impts.	Expts.	Impts.
Aluminum.....				
Antimony ore.....				1,706
" regulus, casks.....				694
Brass, old.....	4		35	59
Copper, fine.....	1,111	120	26,219	1,158
" matte.....	1,132		6,132	11
" ore.....				
" sulphate.....	236		3,075	
Iron ore.....		2,500		2,560
" pigs, bars.....				
" rods.....		115		12,022
Iron pyrites.....				2,275
" sulphate.....				1,700
Ferro-manganese.....				948
Ferro-silicon.....				75
Manganese ore.....				1,090
Spiegeleisen.....		407		14,451
Lead ore.....	1			
" pigs and bars.....	11,161	1,271	14,595	13,636
Magnolia metal.....	2		2	
Nickel.....	49		272	
Steel, billets, rods.....		219		10,367
Tin.....	27	205	215	4,592
Tin and black plates, boxes.....			30	351,146
Zinc (spelter).....			308	87

\* Metal Exchange Reports. † Week ending May 7.

Baltimore.**	Week, Apr. 31.		Year, 1896.	
	Exp.	Imp.	Exp.	Imp.
Bismuth metal, bales, cases.....				26
Chrome ore.....		1854		4,294
Copper ore, long tons.....	1420		10,463	
" matte.....			500	
" sulphate.....	1119		1,521	
Iron ore.....		5,367		165,125
" pigs, bars.....				
" ingots, blooms.....				1,373
Iron oxide.....				300
" pyrites, long tons.....				5,069
Ferro-manganese.....				
" nese.....		107		1,357
Ferro-silicon.....		12		70
Lead.....	1251		451	
Limestone.....				2,743
Manganese ore.....				3,673
Spiegeleisen.....				338
Steel.....				10
Steel wire, bundles.....				2,202
Tin, long tons.....	139		92	
Tin and black plates, boxes.....				81,336
Zinc (spelter) long tons.....				117

\*\* From our special correspondent. † Week ending May 7.

Philadelphia.††	Imports.	
	Week, May 1.	Year, 1896.
Antimony, casks.....		67
Copper ore, long tons.....	2,831	7,131
Ferro-Manganese, long tons.....	160	250
Ferro Silicon.....	60	60
Iron ore, long tons.....	5,150	83,530
" pig.....		350
" and steel scrap, long tons.....		618
Manganese ore, long tons.....		2,224
Spiegeleisen.....		77
Tin.....		265
Tin and black plates, boxes.....		18,229

†† From our special correspondent.

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

Aluminum:	
No. 1, 98% pure rolling ingots, per lb.....	50 @ 55c.
No. 1, " ingots for re-melting, per lb.....	48 @ 53c.
No. 2, 91% pure, ".....	38 @ 42c.
Ingots from scrap, per lb.....	35 @ 40c.
Aluminum-nickel casting metal, per lb.....	40 @ 45c.
Bismuth, per lb.....	\$1.30 @ \$1.75
Phosphorus, per lb.....	50 @ 55c.
Platinum, per oz.....	\$13 @ \$14.50
Tungsten, pure, powder per lb.....	70c.
Tungstic acid, per lb.....	45c.
Ferro-tungsten, 60% in ton lots, per lb.....	60c.

The variations in price are chiefly on size of order.

**CHEMICALS AND MINERALS.**

New York, Friday Evening, May 8.

**Heavy Chemicals.**—This market remains as featureless as last reported, and the little business that has been done was transacted at slightly lower prices. It is possible that there may be a further shading in the current quotations. In caustic soda there is still the quietude which has characterized the trade for weeks past. Alkali does not show much change. Bleaching powder remains the same. Sal soda continues dull. We quote: Caustic soda, 2½ @ 2½c. for spot, according to test carbonated soda ash, 48%, is 95 @ 1.20c., according to quantities and packages. Alkali is 77½ @ 87½c.,

according to test and package. Bleaching powder, prime brands, \$1 1/2 @ \$1 3/4. Sal soda, 60 @ 65c.

**Acids.**—Dullness prevails in this market, and prices are without change. We quote as follows: per 100 lbs. in New York and vicinity, in lots of 50 carboys or over, Acetic acids (in barrels), \$1.25 @ \$1.40. Muriatic acid 18", 70 @ 80c.; 20", 75 @ 85c. Nitric acid, 36", \$5.25 @ \$4.25; 40", \$4 @ \$4.50; 42", \$4.50 @ \$5.50. Oxalic acid, \$7.25 @ \$7.50. Mixed acids, according to mixture. Sulphuric acid, 66", 75 @ 80c.; 10 @ 15c. higher for small quantities; chamber acid, \$6.00 @ \$6.50 per ton at factory. Blue vitriol, \$3.87 1/2 @ \$4, according to size of order.

**Brimstone.**—The market for this article is exceedingly dull, and the business that is being done is of a hand-to-mouth nature. We quote for shipments, best unmixed seconds, \$16.00; thirds are 50c. less.

**Fertilizing Chemicals.**—There is but little change to report in this market; it remains quiet. Our quotations this week are as follows: Sulphate of ammonia, gas liquor, \$2.30; bone, \$2.25 @ \$2.30. Dried blood, high grade, \$1.75 @ \$1.80; low grade, \$1.60 @ \$1.65 per unit. Azotine, \$1.80. Concentrated phosphate (30% available phosphoric acid), 70 @ 71 1/2c. per unit. Acid phosphate, 13% to 15%, av. P<sub>2</sub>O<sub>5</sub>, 54 @ 55c. per unit at seller's works in bulk. Dissolved bone black, 17% to 18%, P<sub>2</sub>O<sub>5</sub>, 90 @ 92c. per unit. Acidulated fish scrap, \$10 @ \$11 and dried scrap with few or no sales, nominally \$18 @ \$19 f. o. b. fish factory. Tankage, high grade, \$18.50 @ \$19.50; low grade, \$18 @ \$19. Bone tankage, \$21; ground bone, \$22.50 @ \$23.00. Bone meal, \$22 @ \$23.

Sulphate of Potash: 90-95%, New York and Boston, \$1.90 1/2; Philadelphia, Baltimore and Norfolk, \$1.98; Southern ports, \$2.

Double Manure Salts: 48-53%, New York and Boston, \$1.01; Philadelphia, Baltimore and Norfolk, \$1.02; Southern ports, \$1.03 1/2.

**Muriate of Potash.**—New prices for muriate are New York and Boston, 178c.; Philadelphia, Baltimore and Norfolk, 179 1/2c.; New Orleans, 181 1/2c., for 80 @ 85% (basis of 80%), in lots 50 tons and upward.

**Kainit.**—Quotations for 1896 are as follows: New York, Boston, Philadelphia and Baltimore, \$8.80 per ton; Norfolk, \$9.15, and New Orleans, \$9.30 per ton, for 25 tons and upward. Sylvinit at the same ports is quoted at 36 1/2c., 37 1/2c. and 38c., respectively.

**Nitrate of Soda.**—Spot, \$1.67 1/2 @ \$1.70; to arrive, \$1.70 @ \$1.75.

**Nitrate of Soda.**—Messrs. Mortimer & Wisner, the well known brokers of this city, send us the following statement of nitrate of soda issued under date of May 1st:

	1896.	1895.	1894.
	Bags.	Bags.	Bags.
Imported into Atlantic ports from West Coast S. A., from Jan. 1, 1896, to date.....	347,625	305,006	157,185
Imported into Atlantic ports from Europe, from Jan. 1, 1896, to date.....			
Totals.....	347,625	305,006	157,185
Stock in store and afloat May 1, 1896, in New York.....	74,859	73,215	20,403
Boston.....		8,500	
Philadelphia.....		420	
Baltimore.....	4,000	5,000	500
Norfolk, Va.....		700	
Charleston.....		2,000	
To arrive, actually sailed.....	181,000	190,000	223,400
Vis. supply to Aug. 15, 1896.....	259,859	270,835	244,303
Stock on hand, Jan. 1, 1896.....	53,839	58,367	44,938
Deliveries past month.....	117,017	87,363	44,986
Deliveries Jan. 1 to date.....	322,655	273,538	181,220
Total yearly deliveries.....		828,012	70,202
Prices cur. May 1, 1896.....	1'67 1/2 @ 1'70	1'60	2'30 @ 2'32 1/2

**Liverpool.** April 28.

(Special Report of Joseph P. Brunner & Co.) There is little doing in chemicals and the market generally is dull and featureless.

Soda ash is slightly firmer, owing to the bulk of the second hand lots having been disposed of, but the demand is poor. We quote nearest spot range for tierces about as follows: Leblanc ash, 48%, £4 @ £4 5s.; 58%, £4 5s. @ £4 10s. Ammonia ash, 48%, £3 2s. 6d. @ £3 10s.; 58%, £3 7s. 6d. @ £3 12s. 6d. per ton, net cash; bags 5s. per ton less. Soda crystals are slow at £2 7s. 6d. per ton, less 5% for barrels and 7s. less for bags.

Caustic soda is inactive, but steady. Spot range, according to export market, is about as follows: 60%, £5 5s. @ £6 10s.; 70%, £7 5s. @ £7 10s.; 74%, £8 5s. @ £8 10s.; 76%, £9 @ £9 5s. per ton, net cash.

Bleaching powder is very quiet at £7 2s. 6d. @ £7 5s. per ton, net cash is about nominal range for hard-wood packages.

Chlorate of potash is neglected and 4% d. @ 4% d. per pound, are nominal quotations.

Bicarb. soda keeps very firm at £6 15s. per ton, less 2% for the finest quality in one cwt. kegs, with usual allowances for larger packages.

Sulphate of ammonia is rather better, at £8 5s. @

£8 7s. 6d. per ton, less 2 1/4% for good gray and 2 1/2% in double bags, f. o. b. here, according to quality. Nitrate of soda is quietly steady at £8 5s. @ £8 7s. 6d. per ton, less 2 1/4% for double bags, f. o. b. here, as to quality. Carb. ammonia, lump, 3 1/4 d. per pound; powdered, 3 1/4 d. per pound, less 2 1/4%.

**Valparaiso, Chile.** March 28. (Special Report of Jackson Brothers.)

**Nitrate of Soda.**—The market has shown no activity, the quotations from Europe being if anything lower than at the close of last fortnight. Meanwhile, producers maintained their former limits until lately, when some symptoms of accepting slightly lower prices were shown, the market closing with sellers of 95%. April, 5s. 8d.; May, 5s. 8 1/2 d.; June, 5s. 9d.; July, 5s. 9 1/2 d.; August, 5s. 10d.; September and November, 5s. 10 1/2 d., while the refined April is offered at 5s. 10 1/2 d.; May and July, at 5s. 11 1/2 d. The price of 5s. 8d. with 22s. 6d. all round freight stands in 7s. 6 1/4 d. per cwt. net cost and freight without purchasing commission. Reported sales amount to 198,000 quintals.

In freights an almost absence of demand for vessels for near and forward nitrate shipments has weakened rates and even lower figures than those quoted are indicated privately from Europe without eliciting any response. The disposable tonnage now on the coast has increased to about 31,000 tons. We quote for nitrate in iron bottoms to United Kingdom ports, 21s. 3d. @ 22s. 6d.; to United States 22s. 6d. nominal to Hampton Roads or order.

**MINING STOCKS.**

Complete quotations will be found on pages 462 and 463 of mining stocks listed and dealt in at:

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

NEW YORK, Friday Evening, May 8.

The mining stock market has experienced comparative activity during the past week. The volume of business transacted on the Consolidated Stock and Petroleum Exchange amounted to 38,670 shares, double the number of sales made last week.

A rich strike is reported to have been made in the Chollar mine, one of the Comstocks, which has advanced from 70c. in the early part of the week to \$1.75 at the close, with total sales of 900 shares. This stock also made a rapid advance on the San Francisco stock exchange during the week. This was also responsible for the advance in other Comstock stocks. Trading in Comstock Tunnel rose from 6c. to 9c., with sales of 5,500 shares. Consolidated Imperial was active with sales of 3,750 shares at 4c., and Yellow Jacket records sales of 1,350 shares at 40c. @ 45c. Crown Point was in some demand and shows dealings to the extent of 900 shares at 40c. @ 60c. There was a jump in the price of Potosi from 34c. at the opening of the week and 80c. at the close, with sales of 900 shares. Other sales were as follows: 300 shares of Belcher at 58 @ 65c.; 100 shares of Best & Belcher at 90c.; 220 shares of Consolidated California & Virginia at \$1.85 @ \$2.15; 200 shares of Gould & Curry at 78c.; 150 shares of Hale and Norcross at \$1.35; 500 shares of Mexican at 45 @ 65c.; 300 shares of Sierra Nevada at 65 @ 80c., and 200 shares of Union Consolidated at 60 @ 63c.

The California stocks have been in better request. Brunswick Consolidated was the most active, with sales of 11,500 shares at 14 @ 15c., while Bulwer shows transactions of 1,300 shares at 35 @ 37c. The superintendent of the Brunswick Consolidated Mining Company, under date of May 2d, reports that the ore body is now about 8 in. thick in the 800-ft. west drift. The mill has started on the ore and is running well. Mr. C. H. Morgan, the superintendent, also states that the severe rains of the past two weeks are now telling on the water in the mine, which has risen so much that the hoist cannot be run, the water being nearly even with the 800 ft. station, and the pumps are all working to full capacity.

The Colorado stocks were also fairly active, relatively speaking, and sales were as follows: Breece, 1,200 shares at 18c.; Leadville, 1,500 shares at 13c.; Mt. Rosa, 3,000 shares at 9 @ 10c.; Pharmacist, 2,000 shares at 8 @ 9c.; Iron Silver, 800 shares at 20 @ 24c.; Victor, 600 shares at \$3.25 @ \$3.50; Union, 400 shares at 40c.; Small Hopes, 200 shares at 90c.; Portland, 600 shares at \$1.45.

The last act of the farce known as the New York Mining Exchange took place on May 4th, when Justice Truax, of the Supreme Court, appointed Horatio W. Stocker receiver of the Exchange. Directors C. V. Holman, William Brandreth, Horatio W. Stocker, Ella Wooster, and W. L. Boyd made the application on proceedings for the voluntary dissolution of the company. They recite the causes to be heavy expenses, actions pending against the company on which judgments are about to be recovered, and other actions threatened. The liabilities are \$5,637, of which \$3,341 are contested claims; nominal assets, \$5,358, of which \$3,775 is doubtful.

**Boston.** May 7.

(From Our Special Correspondent.)

The market has been fairly active this week, dealings in Boston & Montana being the principal feature. There has been a good demand for this stock on the report that the mine is earning and will pay not less than \$8 in dividends the current

year. There is also said to be a short interest which is anxious to cover, and this has a tendency to keep up the price. The stock advanced to \$77 1/2 during the week, but lost \$1 1/2 in the final dealings. Calumet & Hecla sold at \$300 1/2, a gain of 1/2 for the week.

Tamarack was very weak early in the week, and on free selling dropped off to \$88, subsequently recovered in part to \$93, but closed heavy at \$90. At the annual meeting the directors were all re-elected. It was stated that the mine was in a better physical condition to-day than it has ever been in its history.

Quincy declined to \$112; a loss of \$3 for the week. The scrip sold at \$77 1/2 @ \$78. Kearsarge recovered from the extreme depression of last week and advanced to \$9 1/2 @ \$9 1/2. Osceola sold up to \$25 1/2, but declined to \$24 1/2 in later dealings. Franklin sold in a small way at \$11. Butte & Boston sold at \$2 1/2. Wolverine at \$7 and Tamarack, Jr., at \$12 1/2. Old Dominion was in good demand and advanced from \$15 1/2 to \$17, closing at \$16. The gold stocks have been only fairly active this week. Merced continues weak and declined from \$13 1/2 to \$9 1/2 on free selling. Pioneer has ruled very steady at \$8 1/2 @ \$8 1/2. Santa Ysabel sold at \$12, and Gold Coins declined from 70c. to 62 1/2c. with later sales at 65c. The market closed without special feature.

**Chicago.** May 6.

(From Our Special Correspondent.)

The trading for the week has been unusually light, owing to politics, the great Cripple Creek fire and the usual dullness prevailing at this season of the year. There has been no disposition, however, to shade prices in order to effect sales, and quite a number of orders remain unfilled in consequence. The fact is, those who are on the inside and who have access to the latest information from the mines whose stocks are traded in, believe that present prices are too low—lower than the entire properties they represent could be sold for, and that a general advance may be expected. The bears made a determined effort to break the market early in the week, but were obliged to beat a retreat as the short side of the market had some dangerous spots.

Little Gem and Cosmopolitan were in good demand. Peerless and Sumpter were moderately inquired after. Finance closed weak and lower and can be picked up in small lots at considerably below its intrinsic value. Imperial preferred advanced from 15 to 20. This was due to the announcement that 100,000 shares of the treasury stock had by unanimous vote of the stockholders of the company been constituted a guarantee stock—guaranteed to pay a monthly dividend, commencing May 1st, of not less than 1%. Each share of this special preferred stock is stamped accordingly and countersigned by the secretary of the Chicago Mineral and Mining Board. Twenty-five thousand shares of this were sold privately to a prominent member of the Board of Trade, in addition to those mentioned below.

The following table gives the highest prices with sales of the stocks recorded on the Chicago Mineral and Mining Board for the week ending May 6th:

Stocks.	April 30	May 1	May 2	May 4	May 5	May 6	Sales.
Alchemist.....				.07 1/2		.07 1/2	16,600
Boston & C. C.....							
Capazone.....		.03 1/4					2,000
C. C. & C. C.....							
C. C. G. M. B. & L. Co.....							
Chi. & G. Mt.....							
Cosmopolitan.....	.05 1/2	.05 1/2	.05 1/2	.05 1/2	.05 1/2	.05 1/2	97,000
Delaware Cf.....							
Finance.....	.06	.05	.05	.04 1/2	.04 1/2	.04 1/2	11,600
Hawkeye.....	.28	.29		.31	.31	.31	15,300
Imperial.....				.20	.20 1/2	.20 1/2	16,000
Iron Mt.....							
Justice.....							
Little Gem.....	.04 1/2	.04 1/2	.04 1/2	.04 1/2	.04 1/2	.04 1/2	129,500
Lyons Gold.....				.06 1/2		.07	2,500
Medina G. M. Co.....							
Peerless G. M. Co.....	.11	.11 1/4	.11	.11 1/2	.11 1/2	.11 1/2	35,500
Pharmacist.....							
Rhyolite.....		.11	.10 1/2		.10 1/2		2,600
Squaw Mt.....							
Sunnyside.....							
Gilpin.....	.11		.08	.10			5,000
Union Gold.....							

Total shares sold, 333,600.

**Cleveland, O.** May 7.

(From Our Special Correspondent.)

Sales in Republic Iron Company stock are reported at about \$18, but the market is not active. Prospective buyers seem disposed to wait until further sales of ore for this season are made. Holders are not disposed to let go and so till the parties can get closer together the market will continue dull. Following are quotations of the more active stocks.

Name of Company.	May 7.		
	Par val.	Bid.	Ask.
Aurora.....	\$25		\$8
Chandler.....	25	\$38	40
Cleveland-Cliffs Iron Co.....	100	43	45
Jackson Iron Co.....	25	70	75
Lake Superior Iron Co.....	25	30	32
Lake Superior Consolidated.....	100	20	21
Minnesota Iron Co.....	100	70	71
Pittsburg & Lake Angeline.....	25	80	85
Republic Iron Co.....	25	18	19

**Colorado Springs, Colo.** May 2.  
(From Our Special Correspondent.)

The more or less depressed condition of the mining stock market during the past few weeks may not improve immediately, owing to the disastrous conflagrations in Cripple Creek. To be sure, the mines themselves are not affected, but it is feared that many of the sufferers from the fire will be likely to try to dispose of some of their holdings of stocks of Cripple Creek companies, and thus retard the long expected "bull" movement. The market, considering the exaggerated and unfavorable rumors which circulated soon after the second fire, has held its own quite well, but the danger noted above remains yet. As soon as the re-building of the burned town begins in earnest we shall see whether much stock is to be thrown upon the market.

The "Short" interest did not prove to be as formidable as was expected and after a momentary increase in the weakness of last week, the market closed to-day better than was anticipated, and brokers are hopeful that the reaction towards higher prices will not be long in coming.

Colorado Springs has responded well to the call for help from Cripple Creek. The Colorado Springs Mining Stock Exchange donated \$1,000. Members of the Exchange, by the way, state that they still continue to receive inquiries from the East concerning mining companies whose names are unknown here, and whose "mines at Cripple Creek" are mythical. The Eastern public has been warned against "wild-cats" so often in these columns, and by so many people that it is difficult to excuse a person who permits himself to be swindled by fraudulent "promoters."

Messrs. Gardner & Co. furnish the closing quotations of the Colorado Springs Mining Stock Exchange for the week ending May 7th, as follows.

Name of Company.	May 1	May 2	May 3	May 4	May 5	May 6	May 7	May 8
Alamo	.06	.06	.16	.06	.06	.06	.06	.06
Anaconda	.57	.60	.61	.68	.63	.63	.63	.63
Argentum-Juniata	.57	.57	.16	.57	.56	.56	.56	.56
Blue Bell	.06	.06	.06	.06	.06	.06	.06	.06
Cripple Creek Con.	.13 1/2	.14	.14	.14	.14	.14	.13 1/2	.13 1/2
Golden Fleece	.65	1.68	1.65	1.65	1.65	1.65	1.65	1.65
Isabella	.53	.53	.53	.54	.53 1/2	.53 1/2	.53 1/2	.53 1/2
Mollie Gibson	.59	.60	.61	.61	.61	.61	.61	.61
Mount Rosa	.09 1/2	.09 1/2	.09 1/2	.10	.09 1/2	.09 1/2	.09 1/2	.09 1/2
Pharmacist	.08	.08	.08	.08	.08	.08	.08	.08
Portland	1.45	1.45	.47	1.50	1.51	1.51	1.51	1.51
Silver State	.01 1/2	.01 1/2	.01 1/2	.01 1/2	.01 1/2	.01 1/2	.01 1/2	.01 1/2
Union	.38	.38	.39	.40	.39 1/2	.39 1/2	.39 1/2	.39 1/2
Work	.10 1/2	.11	.11 1/2	.11	.11	.11	.10 1/2	.10 1/2

In addition to the above quotations Messrs. A. Pick & Co., of New York, furnish the following:

Name.	May 1	May 2	May 4	May 5	May 6	May 7
Bankers	.12	.12 1/2	.12 1/2	.12		.12 1/2
Des Moines						
Gold & Globe	.21	.22 1/2	.22 1/2	.23 1/2		.22
Gold Standard	.07 1/2	.07 1/2	.08	.08 1/2		.08
Isabella	.53	.53	.53	.54		.54
Jefferson	.18	.17 1/2	.17 1/2	.17 1/2		.18
Keystone						

**San Francisco.** May 2.  
(From Our Special Correspondent.)

The market opened as quietly as usual and inactivity was the rule up to Thursday morning, when the announcement that good ore, carrying a large proportion of gold, had been struck in the Chollar section of the Brunswick, started up quite a brisk movement. Chollar stock, which had been selling at about 40c., jumped up at once and has sold as high as \$1, closing to-day at 95c@97c. The others felt the impetus also, and dealing was more active all around.

The sales on regular call at the San Francisco Stock Board for the first four months of the year were as follows:

	1895.	1896.
January	251,315	296,415
February	195,700	183,790
March	295,530	246,105
April	262,810	264,735
Total	1,005,355	991,045

The stock of the Pioneer Mining Company, of Amador County, has been listed by the San Francisco Stock Exchange. It is the first California mine on the Mother Lode ever listed in the old board. The stock is \$2,000,000. John Curry is president; John Barton, George Goodman, Louis F. Reichling and Dr. Thomas Boyson are directors. The company owns four contiguous properties on the Mother Lode. One location has been developed and fully equipped with mill and machinery. This mine, which was opened in the 50's, was idle until 1883 when Dr. Boyson took hold of it. The company will commence milling as soon as the ore is developed down to the 500 level.

**THE NEW EXCHANGE.**

The total sales of stock on the call-board of the Exchange from the opening on March 16th to April 30th were 333,325 shares. The stocks dealt in were Grant, Thorpe, Savannah, Champion, Keystone, Providence, Amalie, Kennedy, Lockwood Consolidated, Sebastopol, Mayflower.

An offer has been received for the purchase of the entire stock of the Thorpe Company in Calaveras County. The offer has been made on the strength of the report made by the mining experts of the Exchange.

A plan is under consideration to reorganize the Amalie Company, of Kern County, with 500,000 shares capital stock, and to offer 100,000 shares for

sale for the purpose of building a new 40-stamp mill and chlorination works.

The Gold Mining Exchange of San Francisco has completed preparations for the illustrated course of popular lectures on mining which it proposes to give. The State Mining Bureau has consented to lend the Exchange a set of mining photographs. From these stereopticon plates will be prepared and used in illustrating the lectures.

**London.** April 25.  
(From Our Special Correspondent.)

The interest in the South African market has continued to center round the Chartered Company during the whole of the past week. The market for the stock has been sensitive, but has been very restricted, and the whole of the speculation was on the part of those who usually look for small daily profits. Every device has been used to produce temporary depressions by this class of bear, and as they bought back within an hour or so the quotation has oscillated continually between £3 and £3 10s. during the week. The manufacture of news from Bulawayo has been the chief device, but rumors about indemnities to the Boer government for the Jameson raid and the cost of the present Matabele war have also been used extensively. Nobody can foresee sufficiently clearly the outcome of either the war or the Transvaal difficulty, so that speculation at a long range is not indulged in at all.

The South African gold shares have been dull all the week, as a rule moving up and down with Chartered. The only item of news of importance has been that labor is becoming more plentiful, as the natives are returning to the mines in large numbers.

In other sections of the mining market, much greater activity has been the rule. West Australians have been in good demand on the publication of crushing returns. Indians have been busy, while New Zealanders have come back into prominence after a lull of a week or two. New South Wales mines have also received noteworthy attention.

It is several weeks since I was able to write anything very encouraging about the American mining market in London, but the prospects at present are much more hopeful than they have been lately. Several influential mining experts have recently left for America to examine properties in the United States and elsewhere in North America. Mr. Hamilton Smith and Mr. Henry Janin left London on Saturday last for this purpose, while Mr. Henry Bratnober left shortly before. The travels of these three gentlemen will cover from Mexico to Alaska. The interest taken by English capitalists in British Columbia is increasing. The Cripple Creek district is also taking hold on British capitalists. In addition to the mines which have been introduced on the London market for the purposes of flotation, I understand that the stock of the Victor mine has been sold largely here. A large proportion of this stock is already held in France, and if the contemplated sales in London are successful the whole of the stock will be held by European investors. A block of the Mercur mine, Utah, has also been acquired by London capitalists and will probably be introduced on the market at an early date.

**Paris.** April 26.  
(From Our Special Correspondent.)

As to the stock market, the South African shares continue very quiet in view of the unsettled state of affairs in the Transvaal. Our sympathies here are entirely with the Boer government and against the political financiers who have managed the whole affair there. As time goes on it becomes more and more clear that the whole conspiracy to seize the Transvaal was inspired from high quarters, which are now very anxious to disavow their connection. We can also see very plainly what a cowardly and altogether disreputable part was played by the leaders whose windy courage evaporated at once when they found that the Boers had lost none of their old resolute and masterful spirit. The disturbing elements just now are not these greedy but craven robbers of Johannesburg and Bulawayo, but the hysterical clamor of the London Times and the maneuverers of the stock-jobbing clique which has inspired those articles and helped to stimulate the various manifestations of so-called public opinion in London.

The copper stocks continue strong and are well supported, their prices generally holding the advance of recent weeks. Nickel shares have settled down to about 150 fr., and are apparently disposed to stay there.

The lead and zinc shares also maintain their prices well. At the Vieille Montagne Company's annual meeting this week a dividend of 20 fr. will be announced, while the report shows that the reserve funds have been fully maintained and a sufficient sum spent on improvements and new work, though the average price of the metal sold—453 fr. per ton—was 21 fr. less than in 1894.

There is continued strength also in the shares of the iron and steel companies. The distinct improvement in the trade makes it apparent that there is plenty of work for all, and that we are probably to have a year in which the sharp competition of the past three years will be replaced by general activity and consequently better prices. The contracts already placed are numerous, and more are reported as coming in. The same conditions exist in Belgium and Germany, and our steel works will be free from much outside competition, which has kept prices low. Among the other operations in prospect may be mentioned some large contracts for ironing machinery for Russia; that country promises to be a good customer.

In fact, conditions seem to be favorable to a general trade revival, if Messieurs the politicians, great and small, will only let us alone for a time; but perhaps that is too much to hope for. Under normal conditions we might begin to fear competition from your side of the water; but that will not be possible until your currency question is properly adjusted, and to us here it looks as if that was still distant and uncertain. I regret that I must say so; but am I not in the right? AZOTE.

**MEETINGS.**

Name of Co.	Location of office.	Date.	Time.
Dominion Mg. & Chemical	Mineral City, Va.	May 19	11 a. m.
Enola	1609 No. Weber St., Colorado Springs, Colo.	" 28	3 p. m.
Freddie Lee	Helena, Mont.	" 12	12 m.
Jay Gould	Helena, Mont.	" 25	2 p. m.
Magnet	New Chicago, Mont.	" 16	10 a. m.
Park View	108 East Pike's Peak ave. u., Colorado Springs, Colo.	" 30	7.30 p. m.
Peruvian Con.	34 Commercial Block, Salt Lake City, Utah	" 11	7.30 " "
Placer	510 Cooper Building, Denver, Colo.	" 11	10 a. m.
St. Paul & Butte	Butte, Mont.	June 15	10 " "
Scorpion	310 Pine St., San Francisco, Cal.	May 12	12 m.
Smuggler-Union	804 Boston Building, Denver, Colo.	" 18	2 p. m.
Yellow Jacket	816 Equitable Bldg., Denver, Colo.	" 29	10 a. m.

**ASSESSMENTS.**

Name of Co.	Loc'n.	No.	Dlnq.	Sale.	Amt.
Alpha Con.	Nev.	16	May 12	June 2	.05
Buckeye	Utah	2	" 4	May 19	.00 1/2
Bullion	Nev.	47	Apr. 22	" 14	.10
Burlington	Cal.	2	May 27	June 17	.3
Galedonia	Nev.	46	Apr. 6	May 27	.05
Camp Floyd	Utah	1	May 16	June 1	.01
Challenge Con.	Nev.	21	Apr. 29	May 20	.05
Channel Bend	Cal.	2	May 22	June 13	.05
Crown Point	Nev.	67	" 6	May 26	2.5 1/2
*Flint Creek	Mont.	"	" 22	June 12	.00
*Gold Queen	Utah	"	" 11	" 10	.10
Gould & Curry	Nev.	78	Apr. 25	May 20	.15
Lady Emma	Cal.	"	May 6	" 27	.15
*Mohawk Con.	Utah	"	June 1	June 29	.01 1/2
*New Era	S. D.	3	" 1	" 19	.01 1/2
*North Eureka	Utah	1	May 20	" 27	.00 1/2
Occidental Con.	Nev.	22	" 10	May 28	.10
Old Flag	Cal.	2	" 10	" 26	.63
Potosi	Nev.	45	" 11	June 4	.20
*Ruby Bell	S. D.	13	June 1	" 19	.03
*Surprise	Cal.	1	May 30	July 1	.20
Tetro	Utah	3	" 2	May 25	.01
Thorpe	Cal.	1	Apr. 20	" 15	.65
Utah Con.	Nev.	22	May 6	" 27	.05

\*New assessment.

**DIVIDENDS.**

NAME OF COMPANY	Current Dividends.	Paid since Jan. 1, 1896.	Total to date.
	Date.	Amount.	
Aetna Con.		\$10,000	\$50,000
Alaska-Mexican		16,200	119,031
Alaska-Treadwell		75,000	2,750,000
Anaconda	May 1	\$750,000	
Boston & Mont.	" 20	\$300,000	600,000
Bullion Beck & Ch.		65,000	2,015,000
*Calumet & Hecla	May 15	\$50,000	1,500,000
*Cariboo			63,000
*Centennial-Eureka		150,000	1,650,000
C. O. D.		5,000	25,000
*Dalton & Lark		37,500	37,500
Dominion Coal		600,000	
Florence	May 1	\$10,000	54,390
*Galena		6,100	25,000
*Gold Coin		45,000	60,000
*Golden Fleece		72,000	473,179
Gold & Globe Hill		15,000	24,375
Hecla Con.		30,000	2,130,000
Highland		25,000	3,109,918
*Homestake		125,000	5,837,500
Horn Silver		50,000	5,130,000
*Iron Mountain		25,000	435,000
*Isabella		67,500	90,000
Le Roi		25,000	10,000
Mercur		75,000	425,000
Minnesota Iron		247,500	2,992,500
*Mont. Ore Pur. Co.		160,000	320,000
Moon-Ancher	May 15	\$5,000	12,000
Moose		6,000	186,000
Napa Con.		30,000	770,000
*Ontario		60,000	13,235,000
Osceola Con.		75,000	2,022,500
Otaqueachy		1,000	
Portland		60,000	683,000
Quincy		40,000	8,070,000
*Silver King		187,500	637,500
Small Hopes		2,000	3,275,000
*Smuggler-Union		50,000	50,000
Union	May 5	\$12,500	12,500
*Utah		8,000	140,500
*Victor	May 15	\$20,000	100,000
Victor M. & L.		9,000	38,000
*War Eagle		25,000	157,500
Totals		\$1,538,500	\$5,132,090

\* April dividend paid.

STOCK QUOTATIONS.

BOSTON, MASS.\*

Table of stock quotations for Boston, Mass. listing companies like Allouez, Arnold, Atlantic, Bost. & C.C., etc., with columns for location, par value, and prices for various dates from May 1 to May 7.

\* Official quotations Boston Stock Exchange. + Ex-dividend. Total sales, 57,647.

INDUSTRIAL COAL AND COAL RAILROAD.\*

Table of stock quotations for Industrial Coal and Coal Railroad, listing companies like Balt. & Ohio, Ches. & Ohio, Col. C. & I. Dev., etc., with columns for location, par value, and prices for various dates from May 2 to May 8.

\* Official quotations N. Y. Stock Exchange. Total shares sold, 57,800.

NEW YORK.\*

Table of stock quotations for New York, listing companies like Adams, Ajax, Alamo, Alice, Alliance, Amer. Flag, Anaconda, etc., with columns for location, par value, and prices for various dates from May 2 to May 8.

\* Official quotations Con. Stock & Petroleum Exchange. Total sales, 38,670.

COLORADO SPRINGS, COLO.\*

Table of stock quotations for Colorado Springs, Colo., listing companies like Ajax, Alamo, Am'rican, Anaconda, etc., with columns for location, par value, and prices for various dates from April 27 to May 2.

\* Official quotations and sales Colo. Springs Mg. Stock Assoc. \* Board of Trade Exchange.

ST. LOUIS, MO., STOCKS. Week ending May 6.

Table of stock quotations for St. Louis, Mo., listing companies like Central Lead, Con. Coal, Doe Run Lead, etc., with columns for company name, office, par value, bid, asked, and last dividend.

SAN FRANCISCO, CAL.\*

Table of stock quotations for San Francisco, Cal., listing companies like Alta, Belcher, Best & Belcher, Bodie Con., etc., with columns for location, par value, and prices for various dates from May 2 to May 8.

\* Official telegraphic quotations, San Francisco Stock Exchange.

BALTIMORE, MD.\* Week ending May 7.

Table of stock quotations for Baltimore, Md., listing companies like Balt. M. & S. N. C., Conrad Hill, Con. Coal, etc., with columns for location, par value, bid, asked, and last dividend.

\* Official quotations Baltimore Stock Exchange.

MISCELLANEOUS SECURITIES. May 7.

Table of miscellaneous securities, listing companies like American Coal, Cataugaug Ore & Iron R. R., etc., with columns for location, par value, bid, and asked.

LONDON.

April 24.

Table with columns: NAME OF COMPANY, Country, Product, Capital stock, Par value, Last dividend, Quotations. Lists various mining companies like Nth Americans, Alaska-Mexican, etc.

DENVER, COLO.

Table with columns: NAME OF COMPANY, Par value, Apr. 27, Apr. 28, Apr. 29, Apr. 30, May 1, May 2, Sales. Lists companies like Addie C., Agate, Alamo, etc.

PARIS.

Week ending April 10.

Table with columns: NAME OF COMPANY, Country, Product, Capital Stock, Par value, Divs. last year, Prices. Lists companies like Acieries de Creusot, Fives-Lille, etc.

PHILADELPHIA, PA.\*

Table with columns: NAME OF COMPANY, Location, Par value, April 30, May 1, May 2, May 3, May 4, May 5, May 6, Sales. Lists companies like Bethlehem Iron, Lehigh Valley, etc.

MEXICO.

Week ending April 30.

Table with columns: NAME OF COMPANY, State, No. of shares, Last dividend, Last assessment, Prices. Lists companies like Amistad y Concordia, Arvalo y Anexas, etc.

SALT LAKE CITY, UTAH.\*

Week ending May 2.

Table with columns: Name of Company, Par value, Bld., Asked, Actual selling price. Lists companies like Ajax, Alliance, Am. Nat. Gas, etc.

PITTSBURG, PA.\*

Week ending May 6.

Table with columns: NAME OF COMPANY, Location, Par value, Bid., Ask., Selling price. Lists companies like Mansfield, N.Y. & C. Gas, etc.

VALPARAISO, CHILE.\*

Fortnight, Mar. 28.

Table with columns: NAME OF COMPANY, Capital, Share value, Last dividend, Prices. Lists companies like Arturo Prat, Caracoles, Descub. de Huantajaya, etc.

HELENA, MONT.\*

Week ending April 30.

Table with columns: NAME OF COMPANY, Location, Company's office, Par value, Bid., Asked, Shares sold, Price, Date. Lists companies like Am. Dev. & M. Co., Bald Butte, etc.

SHANGHAI, CHINA.

April 10.

Table with columns: NAME OF COMPANY, Country, No. of shares, Par value, Paid up, Last dividend, Price. Lists companies like Jelebu M. & Trad., Fulem M. Co., etc.

DULUTH, MINN.\*

Week ending May 2.

Table with columns: NAME OF COMPANY, Par value, Bid., Asked, NAME OF COMPANY, Par value, Bid., Asked. Lists companies like Adams Iron, Lake Superior Iron, etc.

\* Special Report of Jackson Bros. Values are in Chilean pesos or dollars.

\* Official quotations Philadelphia Stock Exchange. Total sales, 4,812. \* Official quotations Pittsburg Stock Exchange. \* Special Report of Samuel K. Davis. Total shares sold, 12,600. \* Special Report of J. P. Blissett & Co. The prices quoted are in Shanghai taels. \* Special Report of S. E. Frauts.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

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

G., Gold. S., Silver. L., Lead. C., Copper. B., Borax. \* Non-assessable. † The Deadwood previously paid \$275,000 in eleven dividends and the Terra \$75,000. ‡ Previous to the consolidation in August, 1884, the California had paid \$31,330,000 in dividends and the Cons. Virginia \$42,360,000. NOTE.—Corrections to this table are made monthly. Correspondents are requested to forward changes or additions so as to reach us before the end of each month.



CLASSIFIED LIST OF ADVERTISERS.

**Air Compressors and Rock Drills**  
 Block, M. C. Mfg. Co. | Leyner, J. Geo.  
 Burleigh Rock Drill Co. | Marvin Elec. Drill Co.  
 Clayton Air Compressor Works.  
 Fraser & Chalmers.  
 Ingersoll-Sergeant Drill Co.  
 Laidlaw-Dunn-Gordon Co.  
 (See Diamond Drills.)

**Air Hoists**  
 Whiting Foundry Equipment Co.

**Aluminum Bronze**  
 Fairbanks Co.

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

**Amalgam Plates**  
 Western Plating and Mfg. Co.

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

**Architects and Builders**  
 Berlin Iron Bridge Co.  
 Pittsburg Bridge Co.  
 Pollock, Wm. B. & Co.  
 Walker Mfg. Co.

**Assayers and Chemists' Supplies**  
 Agency  
 Penn. Sm. & Ref. Wks.  
 Baker & Adamson.  
 Roessler & Hasselacher  
 Chemical Co.  
 Sargent, E. H., & Co.  
 Denver Fire Clay Co.  
 Elmer & Amend.  
 Henry Hill Chem. Co.  
 Troemner, Henry.  
 Western Chemical Co.

**Attorneys, Corporation**  
 Emig, C. E.

**Automatic Boiler Feeds**  
 D'Este & Seelye  
 Penberthy Injector Co.

**Babbit's Metal**  
 Besley, Chas. H., & Co.

**Banks and Brokers**  
 Arkell, E., & Co.  
 Bartle, I. & Co.  
 Bonbright, W. P., & Co.  
 Breitung, E. N.  
 Carnaud, A. A.  
 Crandall & Huff.  
 Crip, Cr. Syn. Inv. Co.  
 Decker, L. R.  
 Duer, G. A. C.  
 Dorsey, H. H.  
 Doubleday, Rope & Co.  
 Edsall, Clarence & Co.  
 Fall, Brooks & Cramer  
 Farnsworth, C., & Co.  
 Fitch, G. W., & Sons.  
 Fletcher, C., & Co.  
 Freyschlag, Kirby & Gardner & Co.  
 Grant, E. H.  
 Handy & Harman.  
 Chicago S. W. & Sons.  
 Hendrickson, W. J.  
 Heron Bros.  
 Hodgins, L. W.  
 Hicks & Benzie.  
 Johnson, L. L., & Sons.  
 Keith, F. M.  
 Kenrick, W. F.  
 Key, J. J.  
 Kinney, M.  
 Krellender, C. F. & Co.  
 Ketting  
 Carpenter, Geo. B., & Co.  
 Hendrie & Bolthoff  
 Mfg. Co.  
 Leipheimer, N.  
 Miller, Chas. N., & Co.  
 Belt Lacing  
 Bristol Co.

**Blasting Caps**  
 Metallic Cap Mfg. Co.

**Blasting Batteries**  
 Climax Fuse Co.  
 Lau, J. H., & Co.

**Blowers, Pressure**  
 Connorsville Blower Co.

**Boilers**  
 American Engine Co.  
 Denver Eng. Wks. Co.  
 Enterprise Boiler Co.  
 Fraser & Chalmers.  
 Heine Safety Boiler Co.  
 Philadelphia Eng. Wks. Ltd.  
 Besley, Chas. H., & Co.  
 Brewster.  
 Pabst Brewing Co.  
 Brick Machinery  
 Frosche, E. H., & Co.  
 Bridges  
 Berlin Bridge Co.  
 Pittsburg Bridge Co.  
 Buckets  
 Scaife, Wm. B. & Sons.  
 (See Machinery.)  
 Car Wheels  
 Whiting Foundry Equipment Co.

**Carbons**  
 Bishop, Victor, & Co.  
 Lexow, Theodore.

**Chain and Link Belting** (See Belting.)

**Chemicals**  
 Baker & Adamson.  
 Bullock & Crenshaw.  
 Elmer & Amend.  
 Henry Hill Chem. Co.  
 Herold-White Coal  
 Mfg. Co.  
 Oster & Curran  
 Consolidation Coal Co.  
 Davis Coal & Coke Co.  
 Chemists  
 Simonds & Wainwright.  
 Chilled Castings  
 Whiting Foundry Equipment Co.

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

**Compressors**  
 Clayton Air Compressor Works.  
 Norwalk Iron Works Co.

**Concentrators, Crushers, Pulverizers, Separators, Etc.**  
 Allis, Ed. P., & Co.  
 Beckett Foundry & Machine Co.  
 Blake, Theo. A.  
 Boston Ore Machinery Co.  
 Bradley Pulverizer Co.  
 Colorado Iron Works.  
 Denver Eng. Works Co.  
 Dodge Mining Machinery Co.  
 Engelbach Mach. Mfg. Co.  
 Fraser & Chalmers.  
 Frue Vanner Concentrator.  
 Hendrie & Bolthoff Mfg. Co.  
 Joplin Mach. Co.  
 Krom, S. B.  
 Krupp, F.

**Link Belt Machinery Co.**  
 McCully, R.  
 Scoville, H., & Co.  
 Steedman Foundry & Mach. Co.  
 Walburn-Swenson Mfg. Co. (See Machinery Contractors.)

**Copper Dealers and Producers**  
 American Metal Co.  
 Arizona Copper Co.  
 Atlantic Mining Co.  
 Balbach S. & Ref. Co.  
 Baltimore Cop. Wks.  
 Bath, H., & Son.  
 Boston & Mont. M. Co.  
 Bridgeport Copper Co.  
 Butte & Boston Co.  
 Canadian Copper Co.  
 Copper Queen Mfg. Co.  
 Detroit Copper Co.  
 Elliott & Metal Co., Ltd.

**Corrugated Iron**  
 Berlin Iron Bridge Co.  
 Cincinnati Corrugating Co.  
 Scaife, Wm. B. & Sons.  
 Sikes Steel Roofing Co.

**Cranes**  
 Whiting Foundry Equipment Co.

**Cranes, Graphite, Etc.**  
 Brown, Victor, & Co.  
 Dixon, Jos. Crucible Co.  
 D'Este & Seelye.

**Cranes, Etc.**  
 Roessler & Hasselacher Chemical Co.

**Diamonds**  
 Bishop, Victor, & Co.  
 Lexow, Theodore.

**Diamond Drills**  
 Bishop, Victor, & Co.  
 Bullock Mfg. Co., M.C.  
 Lexow, Theodore  
 Sullivan Machinery Co.  
 (See Air Compressors and Rock Drills.)

**Draughtmen**  
 Young, Wm. J.

**Drawing Materials**  
 Besley, Chas. H., & Co.  
 Dietzgen, E., & Co.  
 Heer, Peter  
 Mahn & Co.  
 Taylor (See Engineering Instruments.)

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

**Dryers**  
 Brown, Horace T.  
 Cummer, F. D. & Son Co.  
 Denver Eng. Wks. Co.

**Dump Cars**  
 Denver Eng. Works Co.  
 Hendrie & Bolthoff  
 Mfg. Co.

**Educational Institutions**  
 Arizona School of Mines.  
 Columbian University.  
 Chicago School of Assaying.  
 Correspondence School of Mines.  
 Lehigh University.  
 Mass. Inst. of Technology  
 Michigan Mining School.  
 Rose Polytechnic Institute.

**Electric Batteries**  
 Macbeth, James, & Co.

**Electrical Machinery and Supplies**  
 Besley, Chas. H., & Co.  
 Carl Electric Co.  
 Denver Eng. Wks. Co.  
 Electrical Engineering Co.  
 General Electric Co.  
 Jeffrey Mfg. Co.

**Elevators, Conveyors and Hoisting**  
 Brown, Victor, & Co.  
 Mach. Co.  
 Caldwell, H. W., & Co.  
 California Wire Wks. Co.  
 Cooper, Hewitt & Co.  
 Crook, W. A., & Sons.  
 Denver Eng. Wks. Co.  
 Electrical Engineering Co.  
 Field & Goetzman.  
 Fraser & Chalmers.  
 Huff & Berger.  
 (See Rope Tramway and Machinery.)

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

**Engineers, Chemists, Metallurgists**  
 See Directory Pages 4, 5 and 6.

**Engineers' Instruments and Supplies**  
 Huff & Berger.  
 Heer, Peter.  
 Mahn & Co.  
 Seelig & Kandler.  
 Umnach, T. F.

**Engines**  
 American Engine Co.  
 Buckeye Engine Co.  
 Bullock, M. C. Mfg. Co.  
 Enterprise Boiler Co.  
 Ellison, Wm., & Son.  
 Fraser & Chalmers.  
 Heine Safety Boiler Co.  
 Lidgerwood Mfg. Co.  
 (See Machinery.)

**Excavators**  
 Bucyrus Steam Shovel & Dredge Co.  
 Marion Steam Shovel Co.  
 Souther & Co.  
 Vulcan Iron Works.

**Fire-Brick and Clay**  
 Chur, A. T.  
 Denver Fire Clay Co.  
 Moore, S. L., & Son Co.  
 Pollock, Wm. B. & Co.  
 Sheffield Car Co.  
 Hoskins, Wm. (See Machinery.)

**Fuses, Powder**  
 Ingersoll-Sergeant Drill Co.

**Fuse, Safety**  
 Climax Fuse Co.

**Gas Engines**  
 Norman, J. J., & Co.

**Gas Works**  
 Pollock, Wm. B. & Co.  
 Wood, H. D., & Co.

**Gauges, Recording, Etc.**  
 Bristol Mfg. Co.

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

**Grease, Graphite, Etc.**  
 Besley, Chas. H., & Co.  
 Dixon, Jos. Crucible Co.

**Harveyised Steel**  
 Pierce & Miller Engineering Co.

**Heavy Machinery**  
 Denver Eng. Works Co.  
 Fraser & Chalmers.

**Hose, Rubber, Etc.**  
 New York Belting & Packing Co. Ltd.

**Injectors**  
 Penberthy Injector Co.

**Insulated Wires and Cables**  
 Okonite Co., Ltd. The

**Insurance Companies**  
 Hartford Steam Boiler Inspect'n and Ins. Co.  
 Mutual Life Insurance Co.  
 Joint Fittings  
 Wks., Ltd.  
 Lead Linings for Chlorination Tubs.  
 Raymond Lead Co.  
 Leocomotives  
 General Electric Co.  
 Hunt, C. W. Co.  
 Porter, H. E., & Co.

**Machinery**  
 Dealers in Mining, Milling and Other Machinery  
 Allis, Edw. P., & Co.  
 Bacon, E. C.  
 Backus, F. & Mch. Co.  
 Besley, Chas. H., & Co.  
 Blake, T. A.  
 Boston Ore Mach'y Co.  
 Bradley Pulverizer Co.  
 Buckeye Engine Co.  
 Bullock, M. C. Mfg. Co.  
 Caldwell, H. W., & Co.  
 Card Electric Co.  
 Carpenter, Geo. B. & Co.  
 Channon, H. Co.  
 Colorado Iron Works.  
 Connorsville Blower Co.  
 Crandall & Huff.  
 Crook, W. A., & Sons.  
 Davis-Cobly Ore R. Co.  
 Denver Eng. Wks. Co.  
 Dodge Mfg. Mach. Co.  
 Ellison, Wm., & Son.  
 Engelbach Mfg. Co.  
 Field & Goetzman.  
 Fraser & Chalmers.  
 Hammond, Mfg. Co.  
 Heine Safety Boiler Co.  
 Hendrie & Bolthoff  
 Mfg. Co.  
 Ingersoll-Sergeant Drill Co.  
 Jeffrey Mfg. Co.  
 Jessop, W., & Sons, Ltd.  
 Leyner, J. Geo.

**Manganese Steel**  
 Taylor (See Engineering Instruments.)

**Metallurgical Works and Ore**  
 American Dev. & Mfg. Co.  
 Amer. Zinc Lead Co.  
 Baker & Co.  
 Bath, Henry & Son.  
 Besley, Chas. H., & Co.  
 Bridgeport Copper Co.  
 Cooke & Co.  
 Elliott's Metal Co., Ltd.  
 Eureka Co.  
 Foster, Blackett & Wilson.  
 James & Shakspeare.  
 Johnson, Matthey & Co.  
 Metallurgical Works and Ore Processors  
 American Dev. & Mfg. Co.  
 Amer. Zinc Lead Co.  
 Baker & Co.  
 Balbach S. & Ref. Co.  
 Baltimore Copper Wks.  
 Bridgeport Copper Co.  
 Canadian Copper Co.  
 Cooke & Co.  
 Denver Eng. Wks. Co.  
 Elliott's Metal Co., Ltd.  
 Electro Cyanide Gold & Silver Ex'tn Co.  
 Foster, Blackett & Wilson.  
 Fraser & Chalmers.  
 General Gold Extraction Co.  
 Mine Cars  
 Crandall & Huff.  
 Denver Eng. Wks. Co.  
 Hendrie & Bolthoff  
 Mfg. Co.  
 Hunt, C. W. Co.  
 Nelsonville Foundry & Machine Co.  
 Sheffield Car Co.  
 Whiting Foundry Equipment Co.  
 (See Machinery.)

**Mine, Mill and Smelters Supplies**  
 Carpenter, Geo. B., & Co.  
 Crandall & Huff.  
 Denver Eng. Wks. Co.  
 Dodge Mining Machinery Co.  
 Gates Iron Works.  
 Park's & Wilkinson.  
 Roessler & Hasselacher Chemical Co.  
 Stierner, William E.  
 (See Machinery.)

**Mining and Land Companies**  
 American Dev. & Mfg. Co.  
 Copper Queen Mfg. Co.  
 Detroit Copper Mfg. Co.  
 Eureka Co.  
 Kearsage Mfg. Co.  
 Osceola Con. Mfg. Co.  
 Tamarack Mfg. Co.  
 Clark Land & Mines Co.

**Nickel**  
 Canadian Copper Co.  
 Ore Cars  
 Truax Mfg. Co.

**Ore Hoisters**  
 Brown, Horace F.  
 Cummer, F. D., & Sons Co.  
 Davison, Victor, & Co.  
 Denver Eng. Wks. Co.  
 (See Machinery.)

**Ore Testing Works**  
 Hunt, F. F.  
 Lecloux & Co.  
 Moore, S. L., & Son Co.  
 Montana Ore Purchasing Co.  
 State Ore Sampling Co.

**Packing and Pipe Coverings**  
 Brandt, Randolph.  
 Jenkins Bros.  
 Hine & Robertson.  
 Robertson, W. F.  
 Aitchison, R. Perf. Metal Co.  
 Fraser & Chalmers.  
 Harrington & King Perforating Co.  
 Peroxide of Sodium.  
 Roessler & Hasselacher Chemical Co.

**Phosphor Bronze**  
 Phosphor-Bronze Smelting Co.

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

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

**Refrigerated Steals**  
 Aitchison, R. Perf. Metal Co.  
 Fraser & Chalmers.  
 Harrington & King Perforating Co.

**Peroxide of Sodium**  
 Roessler & Hasselacher Chemical Co.

**Phosphor Bronze**  
 Phosphor-Bronze Smelting Co.

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

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

**Refrigerated Steals**  
 Aitchison, R. Perf. Metal Co.  
 Fraser & Chalmers.  
 Harrington & King Perforating Co.

**Peroxide of Sodium**  
 Roessler & Hasselacher Chemical Co.

**Phosphor Bronze**  
 Phosphor-Bronze Smelting Co.

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

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

**Refrigerated Steals**  
 Aitchison, R. Perf. Metal Co.  
 Fraser & Chalmers.  
 Harrington & King Perforating Co.

**Peroxide of Sodium**  
 Roessler & Hasselacher Chemical Co.

**Phosphor Bronze**  
 Phosphor-Bronze Smelting Co.

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

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

**Refrigerated Steals**  
 Aitchison, R. Perf. Metal Co.  
 Fraser & Chalmers.  
 Harrington & King Perforating Co.

**Peroxide of Sodium**  
 Roessler & Hasselacher Chemical Co.

**Phosphor Bronze**  
 Phosphor-Bronze Smelting Co.

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

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

**Refrigerated Steals**  
 Aitchison, R. Perf. Metal Co.  
 Fraser & Chalmers.  
 Harrington & King Perforating Co.

**Peroxide of Sodium**  
 Roessler & Hasselacher Chemical Co.

**Phosphor Bronze**  
 Phosphor-Bronze Smelting Co.

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

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

**Refrigerated Steals**  
 Aitchison, R. Perf. Metal Co.  
 Fraser & Chalmers.  
 Harrington & King Perforating Co.

**Peroxide of Sodium**  
 Roessler & Hasselacher Chemical Co.

**Phosphor Bronze**  
 Phosphor-Bronze Smelting Co.

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

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

**Refrigerated Steals**  
 Aitchison, R. Perf. Metal Co.  
 Fraser & Chalmers.  
 Harrington & King Perforating Co.

**Peroxide of Sodium**  
 Roessler & Hasselacher Chemical Co.

**Phosphor Bronze**  
 Phosphor-Bronze Smelting Co.

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

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

**Refrigerated Steals**  
 Aitchison, R. Perf. Metal Co.  
 Fraser & Chalmers.  
 Harrington & King Perforating Co.

**Peroxide of Sodium**  
 Roessler & Hasselacher Chemical Co.

**Phosphor Bronze**  
 Phosphor-Bronze Smelting Co.

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

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

**Refrigerated Steals**  
 Aitchison, R. Perf. Metal Co.  
 Fraser & Chalmers.  
 Harrington & King Perforating Co.

**Peroxide of Sodium**  
 Roessler & Hasselacher Chemical Co.

**Phosphor Bronze**  
 Phosphor-Bronze Smelting Co.

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

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

**Refrigerated Steals**  
 Aitchison, R. Perf. Metal Co.  
 Fraser & Chalmers.  
 Harrington & King Perforating Co.

**Peroxide of Sodium**  
 Roessler & Hasselacher Chemical Co.

**Phosphor Bronze**  
 Phosphor-Bronze Smelting Co.

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

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

**Refrigerated Steals**  
 Aitchison, R. Perf. Metal Co.  
 Fraser & Chalmers.  
 Harrington & King Perforating Co.

**Peroxide of Sodium**  
 Roessler & Hasselacher Chemical Co.

**Phosphor Bronze**  
 Phosphor-Bronze Smelting Co.

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

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

**Refrigerated Steals**  
 Aitchison, R. Perf. Metal Co.  
 Fraser & Chalmers.  
 Harrington & King Perforating Co.

**Peroxide of Sodium**  
 Roessler & Hasselacher Chemical Co.

**Phosphor Bronze**  
 Phosphor-Bronze Smelting Co.

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

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

**Refrigerated Steals**  
 Aitchison, R. Perf. Metal Co.  
 Fraser & Chalmers.  
 Harrington & King Perforating Co.

**Peroxide of Sodium**  
 Roessler & Hasselacher Chemical Co.

**Phosphor Bronze**  
 Phosphor-Bronze Smelting Co.

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

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

**Refrigerated Steals**  
 Aitchison, R. Perf. Metal Co.  
 Fraser & Chalmers.  
 Harrington & King Perforating Co.

**Peroxide of Sodium**  
 Roessler & Hasselacher Chemical Co.

**Phosphor Bronze**  
 Phosphor-Bronze Smelting Co.

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

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

**Refrigerated Steals**  
 Aitchison, R. Perf. Metal Co.  
 Fraser & Chalmers.  
 Harrington & King Perforating Co.

**Peroxide of Sodium**  
 Roessler & Hasselacher Chemical Co.

**Phosphor Bronze**  
 Phosphor-Bronze Smelting Co.

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

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

**Refrigerated Steals**  
 Aitchison, R. Perf. Metal Co.  
 Fraser & Chalmers.  
 Harrington & King Perforating Co.

**Peroxide of Sodium**  
 Roessler & Hasselacher Chemical Co.

**Phosphor Bronze**  
 Phosphor-Bronze Smelting Co.

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

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

**Refrigerated Steals**  
 Aitchison, R. Perf. Metal Co.  
 Fraser & Chalmers.  
 Harrington & King Perforating Co.

**Peroxide of Sodium**  
 Roessler & Hasselacher Chemical Co.

**Phosphor Bronze**  
 Phosphor-Bronze Smelting Co.

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

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

**Refrigerated Steals**  
 Aitchison, R. Perf. Metal Co.  
 Fraser & Chalmers.  
 Harrington & King Perforating Co.

**Peroxide of Sodium**  
 Roessler & Hasselacher Chemical Co.

**Phosphor Bronze**  
 Phosphor-Bronze Smelting Co.

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

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

**Refrigerated Steals**  
 Aitchison, R. Perf. Metal Co.  
 Fraser & Chalmers.  
 Harrington & King Perforating Co.

**Peroxide of Sodium**  
 Roessler & Hasselacher Chemical Co.

**Phosphor Bronze**  
 Phosphor-Bronze Smelting Co.

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

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

**Refrigerated Steals**  
 Aitchison, R. Perf. Metal Co.  
 Fraser & Chalmers.  
 Harrington & King Perforating Co.

**Peroxide of Sodium**  
 Roessler & Hasselacher Chemical Co.

**Phosphor Bronze**  
 Phosphor-Bronze Smelting Co.

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

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

**Refrigerated Steals**  
 Aitchison, R. Perf. Metal Co.  
 Fraser & Chalmers.  
 Harrington & King Perforating Co.

**Peroxide of Sodium**  
 Roessler & Hasselacher Chemical Co.

**Phosphor Bronze**  
 Phosphor-Bronze Smelting Co.

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

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

**Refrigerated Steals**  
 Aitchison, R. Perf. Metal Co.  
 Fraser & Chalmers.  
 Harrington & King Perforating Co.

**Peroxide of Sodium**  
 Roessler & Hasselacher Chemical Co.

**Phosphor Bronze**  
 Phosphor-Bronze Smelting Co.

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

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

**Refrigerated Steals**  
 Aitchison, R. Perf. Metal Co.  
 Fraser & Chalmers.  
 Harrington & King Perforating Co.

**Peroxide of Sodium**  
 Roessler & Hasselacher Chemical Co.

**Phosphor Bronze**  
 Phosphor-Bronze Smelting Co.

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

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

**Refrigerated Steals**  
 Aitchison, R. Perf. Metal Co.  
 Fraser & Chalmers.  
 Harrington & King Perforating Co.

**Peroxide of Sodium**  
 Roessler & Hasselacher Chemical Co.

**Phosphor Bronze**  
 Phosphor-Bronze Smelting Co.

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

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

**Refrigerated Steals**  
 Aitchison, R. Perf. Metal Co.  
 Fraser & Chalmers.  
 Harrington & King Perforating Co.

**Peroxide of Sodium**  
 Roessler & Hasselacher Chemical Co.

**Phosphor Bronze**  
 Phosphor-Bronze Smelting Co.

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

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

**Refrigerated Steals**  
 Aitchison, R. Perf. Metal Co.  
 Fraser & Chalmers.  
 Harrington & King Perforating Co.

**Peroxide of Sodium**  
 Roessler & Hasselacher Chemical Co.

**Phosphor Bronze**  
 Phosphor-Bronze Smelting Co.

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

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

**Refrigerated Steals**  
 Aitchison, R. Perf. Metal Co.  
 Fraser & Chalmers.  
 Harrington & King Perforating Co.

**Peroxide of Sodium**  
 Roessler & Hasselacher Chemical Co.

**Phosphor Bronze**  
 Phosphor-Bronze Smelting Co.

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

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

**Refrigerated Steals**  
 Aitchison, R. Perf. Metal Co.  
 Fraser & Chalmers.  
 Harrington & King Perforating Co.

**Peroxide of Sodium**  
 Roessler & Hasselacher Chemical Co.

**Phosphor Bronze**  
 Phosphor-Bronze Smelting Co.

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

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

**Refrigerated Steals**  
 Aitchison, R. Perf. Metal Co.  
 Fraser & Chalmers.  
 Harrington & King Perforating Co.

**Peroxide of Sodium**  
 Roessler & Hasselacher Chemical Co.

**Phosphor Bronze**  
 Phosphor-Bronze Smelting Co.

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

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

**Refrigerated Steals**  
 Aitchison, R. Perf. Metal Co.  
 Fraser & Chalmers.  
 Harrington & King Perforating Co.

**Peroxide of Sodium**  
 Roessler & Hasselacher Chemical Co.

**Phosphor Bronze**  
 Phosphor-Bronze Smelting Co.

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

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

**Refrigerated Steals**  
 Aitchison, R. Perf. Metal Co.  
 Fraser & Chalmers.  
 Harrington & King Perforating Co.

**Peroxide of Sodium**  
 Roessler & Hasselacher Chemical Co.

**Phosphor Bronze**  
 Phosphor-Bronze Smelting Co.

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

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

**Refrigerated Steals**  
 Aitchison, R. Perf. Metal Co.  
 Fraser & Chalmers.  
 Harrington & King Perforating Co.

**Peroxide of Sodium**  
 Roessler & Hasselacher Chemical Co.

**Phosphor Bronze**  
 Phosphor-Bronze Smelting Co.

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

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

**Refrigerated Steals**  
 Aitchison, R. Perf. Metal Co.  
 Fraser & Chalmers.  
 Harrington & King Perforating Co.

**Peroxide of Sodium**  
 Roessler & Hasselacher Chemical Co.

**Phosphor Bronze**  
 Phosphor-Bronze Smelting Co.

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

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

**Refrigerated Steals**  
 Aitchison, R. Perf. Metal Co.  
 Fraser & Chalmers.  
 Harrington & King Perforating Co.

**Peroxide of Sodium**  
 Roessler & Hasselacher Chemical Co.

**Phosphor Bronze**  
 Phosphor-Bronze Smelting Co.

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

**Pipes**  
 Pollock, Wm. B.,

**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.

**1447—WANTED—FOR A GOLD MINE** in Georgia, competent assistant foreman; also nine miners experienced in the use of power drills to take charge of boarding house for 40 men; references required; state wages expected for steady work. Address GOLD STAR, ENGINEERING AND MINING JOURNAL.

**1448 WANTED.—A CHEMIST WELL UP** in the manufacture and analysis of salts. State age, experience and salary expected. Address SODIUM, ENGINEERING AND MINING JOURNAL.

**1449 WANTED—ASSAYER AND CHEMIST** at gold mine using cyanide process. Have references and experience. Address C. N., ENGINEERING AND MINING JOURNAL.

**1450 CHEMIST WANTED FOR A VIRGINIA** Furnace Works. Must work very accurate and be able to give proof of his ability. A good position for a good man. Address E. J. S., ENGINEERING AND MINING JOURNAL.

**1452 WANTED — AN ACTIVE, AMBITIOUS,** young Mining Engineer to act as Assistant in California, British Columbia, and perhaps South Africa. Good recommendations required. Address ACTIVE, ENGINEERING AND MINING JOURNAL.

**1453 WANTED A COMPETENT MAN TO** take charge of sulphuric, nitric and muriatic acid departments; state age and experience. Address MODERN, ENGINEERING AND MINING JOURNAL.

**1454 WANTED—A CHEMIST, ONE WHO** has had experience in the assay of silver-lead bullion, doree bars and argentiferous copper; a good salary will be paid to the proper man. Address BI-METALL, ENGINEERING AND MINING JOURNAL.

**1455 WANTED—AN ASSAYER FOR SILVER** department of smelting works. Must have had experience and be able to furnish testimonials as to ability and honesty. Address DENVER, ENGINEERING AND MINING JOURNAL.

**1456 WANTED—A DRAUGHTSMAN WHO** has had experience in designing and building blast furnaces. State qualifications, references, etc. Address P. Z., ENGINEERING AND MINING JOURNAL.

**1457 WANTED—FOR FREE MILLING** and smelting property (gold) near Prescott, Arizona, competent mine superintendent who can make his own assays and run his own levels; must have gilt-edged references; developed property. Address FREE MILLING, ENGINEERING AND MINING JOURNAL.

**SITUATIONS WANTED.**

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

**POSITION WANTED AS ASSAYER AND** assistant by young graduate who is at present employed in Colorado gold mine. Considerable practical experience, and has studied abroad. Can survey, keep books and is familiar with cyanide process. Speaks French and some Spanish. Best of references. Address I. S., ENGINEERING AND MINING JOURNAL. No. 17,409, May 30.

**EXPERIENCED, PRACTICAL, ACCURATE** Chemist and Metallurgist wishes position as Chemist or Assistant in acid works, smelting works, steel works, or blast furnace. Low salary. Address PRACTICAL, ENGINEERING AND MINING JOURNAL. No. 17,408, May 16.

**MINING ENGINEER, GRADUATE, AGED** 28, single, would like a position as assistant manager or superintendent in charge of mines or reduction works. Salary no object. Best references. Address MINING, ENGINEERING AND MINING JOURNAL. No. 17,407, May 30.

**CHEMIST (AGE 30), EXPERIENCED IN** expert in station work and in control and running of fertilizer factory, desires position. Can design and erect small fertilizer factory. Best references. Address Box 192, ENGINEERING AND MINING JOURNAL. No. 17,410, May 30.

**ENGINEERING GRADUATE, 15 YEARS'** practical experience with large coal corporations in all the departments of coal mining and trade from preliminary prospecting to mine management and general sales agent, is open for engagement, home or abroad. Can guarantee most economical American methods. Best references. Address L. U. E., ENGINEERING AND MINING JOURNAL. No. 17,401, May 28.

**METALLURGIST, CHEMIST AND AS-** sayer desires position, preferably with smelting company. Competent and experienced furnace manager and rapid and accurate chemist. Proficient and systematic record keeper and is economical. Speaks Spanish. Good references. Address HABL, ENGINEERING AND MINING JOURNAL. No. 17,398, May 16th.

**AN EXPERIENCED ASSAYER, LATE** with Balbach, S. & R. Co., desires position; either West, Mexico or South America. Address H. Z., ENGINEERING AND MINING JOURNAL. No. 17,438, May 16.

**A METALLURGIST, LEAD AND COPPER,** in charge of large works in Mexico, wishes engagement with reliable company in the States. Successful experience. Best references. Address MEXICO, ENGINEERING AND MINING JOURNAL. No. 17,413, June 27.

**SITUATION WANTED AS CHEMIST AT** iron mine, blast furnace or steel works by a chemist of thorough experience and education. Neat, accurate and reliable. Accustomed to conduct work of laboratory in first-class manner. Good references. Address ACCURATE, ENGINEERING AND MINING JOURNAL. No. 17,412, May 16.

**A CHEMICAL WORKS MANAGER AND** Superintendent of long and practical experience is open for a new engagement. Address PYRITES, ENGINEERING AND MINING JOURNAL. No. 17,411, May 16.

**YOUNG MINING ENGINEER WANTS** position; experienced assayer and surveyor; has references. Address H. E. M., Durango, Colo. No. 17,416, May 16.

**COLLEGE GRADUATE, AGE 23, DEGREE** B. A., desires a business position with a reliable firm or corporation; references furnished. Address ALPHA, ENGINEERING AND MINING JOURNAL. No. 17,414, May 16.

**POSITION WANTED BY MECHANICAL** engineer; thoroughly posted in foundry, machine, boiler and architectural iron shops, drawing office, etc.; or would take charge of large steam plant; 20 years' experience; will go anywhere. Address B. J. H., ENGINEERING AND MINING JOURNAL. No. 17,415, May 23.

**Contracts Open.**

**STEEL-FRAMED CONSTRUCTION AND RE-** pair Shop at U. S. Naval Station, Port Royal, S. C.—Bureau of Yards and Docks, Navy Department, Washington, D. C.—Separate sealed proposals, in duplicate, for the following object, endorsed proposals for "Construction and Repair Shop," at U. S. Naval Station, Port Royal, S. C., will be received at this Bureau until May 22d, 1896. Specifications and blank forms of proposal will be forwarded upon application to this Bureau or the commandant of the Naval Station, Port Royal, S. C. Bidders are expected to fully inform themselves of the character of the work required, by visiting the station, where plans may be examined, and, if necessary, obtained. A certified check of two thousand (\$2,000) dollars must accompany the proposal as a guarantee that the bidder will execute the required contract after his bid has been accepted. Responsible security will be required for the faithful performance of the contract, and the right is reserved to reject any or all proposals not deemed advantageous to the Government, and to waive defects. E. O. MATTHEWS, Chief of Bureau.

**WATER-WORKS.—Sealed proposals, marked** "Proposals," for the construction of a system of water-works will be received by the Board of Water Commissioners of Brocton, N. Y., until May 18, 1896. The estimated quantities are: 8,900 ft. of 12-in. main, 2,800 ft. of 16-in. main, 2,400 ft. of 8-in. main, 10,600 ft. of 6-in. main, 13,300 ft. of 4-in. main, 50 fire hydrants and the necessary gates and specials; 17,000 cu. yds. earth excavation, 20 cu. yds. Portland cement concrete.

**ELECTRIC LIGHT PLANT.—The Common** Council of the City of Millville, N. J., will at their meeting, to be held June 5, 1896, receive sealed bids for the erection of an electric light plant, with a capacity of running 100 arc and 1,000 incandescent lamps. The area to be covered to be 14 miles of wiring and poles. The bids are wanted with and without the brick building necessary for such a plant. The horse-power of engine to be not less than 200. Two boilers will be wanted. For further information, apply to N. P. HOWELL, Chairman Committee.

**STEEL-FRAMED CONSTRUCTION AND RE-** pair shop.—Bureau of Yards and Docks, Navy Department, Washington, D. C.—Separate sealed proposals, in duplicate, for the following object, endorsed, "Proposals for the Construction and Repair Shop," at U. S. Naval Station, Port Royal, S. C., will be received at this Bureau until May 22d, 1896. Specifications and blank forms of proposal will be forwarded upon application to this Bureau or the Commandant of the Naval Station, Port Royal, S. C. Bidders are expected to fully inform themselves of the character of the work required, by visiting the station where plans may be examined, and, if necessary, obtained. E. O. MATTHEWS, Chief of Bureau.

**WATER-WORKS.—Notice is hereby given that** until May 18th, 1896, the City Council of the City of Franklin, Ky., will receive sealed bids for the erection of a system of water works, or any part thereof, according to the plans and specifications of J. A. Holmboe, Engineer, which plans and specifications can be seen after May 1st, 1896, at the office of J. A. Holmboe, 410 Columbia Building, Louisville, Ky., or by calling on JAS. N. IARUE, Mayor, at Franklin, Ky.

**Thro' Ute Pass**



**Colorado Midland Railroad**

**Shortest and Best Route**

The Line to  
Manitou  
Cascade  
Green Mt.  
Falls  
Manitou Park  
Cripple Creek  
Buena Vista  
Leadville  
Aspen  
Glenwood  
New Castle  
Grand Junct.  
Salt Lake  
Ogden  
and the  
West

+ Pullman  
Sleeping  
Car  
and  
Reclining  
Chair Cars  
on  
Thro' Trains  
+ General  
Offices  
Denver

GEO. W. RISTINE, Receiver. W. F. BAILEY, Gen. Pass. Agt.

**THE ENGINEERING AND MINING JOURNAL**

**ADVERTISING RATES.**  
(NONPAREIL MEASUREMENT.)

	Lines.	Inches.	Regular Edition 1 time.	One Month 4 times.	Three Months 13 times.	Six Months 26 times.	Nine Months 39 times.	Twelve Months 52 times.
	6	1 1/2	\$2	\$5	\$12	\$20	\$28	\$34
	9	1 3/4	3	8	18	28	38	47
	12	2	4	11	24	35	47	60
	15	2 1/4	5	14	33	48	68	87
	18	2 1/2	6	17	42	62	88	113
	21	2 3/4	7	20	51	75	108	142
	24	3	8	23	61	90	132	178
	27	3 1/4	9	26	72	105	153	207
	30	3 1/2	10	29	84	123	180	243
	33	3 3/4	11	32	97	144	207	281
	36	4	12	35	111	168	243	327
	39	4 1/4	13	38	126	195	281	378
	42	4 1/2	14	41	141	225	327	435
	45	4 3/4	15	44	157	258	378	501
	48	5	16	47	174	300	435	576
	51	5 1/4	17	50	192	354	501	666
	54	5 1/2	18	53	211	411	576	759
	57	5 3/4	19	56	231	480	666	885
	60	6	20	59	252	561	771	1026
	63	6 1/4	21	62	273	666	891	1191
	66	6 1/2	22	65	294	786	1026	1386
	69	6 3/4	23	68	315	921	1191	1602
	72	7	24	71	336	1080	1386	1854
	75	7 1/4	25	74	357	1260	1602	2142
	78	7 1/2	26	77	378	1461	1854	2478
	81	7 3/4	27	80	399	1686	2142	2862
	84	8	28	83	420	1935	2478	3306
	87	8 1/4	29	86	441	2208	2862	3816
	90	8 1/2	30	89	462	2505	3306	4398
	93	8 3/4	31	92	483	2826	3816	5058
	96	8 1/2	32	95	504	3180	4398	5802
	99	9	33	98	525	3666	5058	6642
	102	9 1/4	34	101	546	4185	5802	7578
	105	9 1/2	35	104	567	4737	6642	8616
	108	9 3/4	36	107	588	5322	7578	9762
	111	10	37	110	609	5940	8616	11028
	114	10 1/4	38	113	630	6591	9762	12516
	117	10 1/2	39	116	651	7275	11028	14136
	120	10 3/4	40	119	672	7992	12516	15888
	123	11	41	122	693	8742	14136	17874
	126	11 1/4	42	125	714	9525	15888	19998
	129	11 1/2	43	128	735	10341	17874	22362
	132	11 3/4	44	131	756	11190	19998	24978
	135	12	45	134	777	12072	22362	27846
	138	12 1/4	46	137	798	12987	24978	30978
	141	12 1/2	47	140	819	13935	27846	34386
	144	12 3/4	48	143	840	14916	30978	38076
	147	13	49	146	861	15930	34386	42054
	150	13 1/4	50	149	882	16977	38076	46422
	153	13 1/2	51	152	903	18057	42054	51174
	156	13 3/4	52	155	924	19170	46422	56322
	159	14	53	158	945	20316	51174	61866
	162	14 1/4	54	161	966	21495	56322	67818
	165	14 1/2	55	164	987	22707	61866	74184
	168	14 3/4	56	167	1008	23952	67818	81066
	171	15	57	170	1029	25230	74184	88474
	174	15 1/4	58	173	1050	26541	81066	96414
	177	15 1/2	59	176	1071	27885	88474	104898
	180	15 3/4	60	179	1092	29262	96414	113928
	183	16	61	182	1113	30672	104898	123516
	186	16 1/4	62	185	1134	32115	113928	133664
	189	16 1/2	63	188	1155	33591	123516	144384
	192	16 3/4	64	191	1176	35091	133664	155682
	195	17	65	194	1197	36624	144384	167568
	198	17 1/4	66	197	1218	38190	155682	180042
	201	17 1/2	67	200	1239	39789	167568	193116
	204	17 3/4	68	203	1260	41421	180042	206796
	207	18	69	206	1281	43086	193116	221082
	210	18 1/4	70	209	1302	44784	206796	236082
	213	18 1/2	71	212	1323	46515	221082	251796
	216	18 3/4	72	215	1344	48279	236082	268224
	219	19	73	218	1365	50076	251796	285372
	222	19 1/4	74	221	1386	51906	268224	303246
	225	19 1/2	75	224	1407	53769	285372	321852
	228	19 3/4	76	227	1428	55664	303246	341196
	231	20	77	230	1449	57591	321852	361284
	234	20 1/4	78	233	1470	59541	341196	382122
	237	20 1/2	79	236	1491	61512	361284	403716
	240	20 3/4	80	239	1512	63513	382122	426066
	243	21	81	242	1533	65544	403716	449184
	246	21 1/4	82	245	1554	67604	426066	473076
	249	21 1/2	83	248	1575	69693	449184	497742
	252	21 3/4	84	251	1596	71811	473076	523182
	255	22	85	254	1617	73958	497742	549402
	258	22 1/4	86	257	1638	76134	523182	576408
	261	22 1/2	87	260	1659	78339	549402	604206
	264	22 3/4	88	263				

**MACHINERY AND SUPPLIES FOR SALE.**

**FOR SALE, CHEAP.**

One 9 x 14 cylinder Porter Locomotive, with saddle tank, six 28-in. drivers, coal burner, 36-in. gauge, steam brake; weight 11½ tons. Immediate delivery in Western Pennsylvania.

**ROBINSON & ORR,**  
419 Wood Street - PITTSBURG, PA.  
Also a small car of light T Rails for relaying.

**FOR SALE**

Owing to death of proprietor, **LABORATORY** having an established reputation.

For further particulars address  
**JOHN H. WESTENHOFF,**  
No. 17½ Third St., Cincinnati, O.

**FOR SALE**—Hoisting Engines, etc. All in good serviceable condition and can be seen near Chicago. Two 12½ x 15 Lidgerwood Double Cylinder, Double Friction Drum Mine Hoisting Engines (weight, 35,000 lbs.), 60-in. Drums, Reversible Link Motion. One 12 x 15 Double Cylinder Single Drum Copeland & Bacon Hoisting Engine, 48-in. drum; and a large number of Wheel Scrapers, Drag Scrapers, Plows, etc., and General Contractors' Plant. Correspondence and inspection solicited. **HEARTHUR BROS. & O.,** 184 La Salle St., Chicago.

**FOR SALE, MACHINERY.**

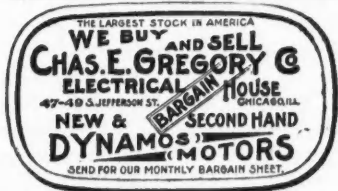
Owing to radical changes in our Power House, we offer for sale the following, all in good condition:

- One 300 H. P. Cross Comp. Engine, extra heavy.
  - One 160 " Armington & -inms Engine.
  - One 140 " "
  - One 1,000 " Hoppe's Live Steam Purifier.
  - One 300 " Exhaust Steam Heater.
  - Two Bipolar Dynamos, 100 H. P. each, " 500 volts."
- For particulars, etc., address  
**CALUMET EL. ST. RY. CO.,** Chicago, Ill.

**FOR SALE.**

- One Gates Spring Crusher.
- One Set Gates Pulverizing Rolls,
- Fifteen Gates Concentrations.
- One 10 x 4 Blake Crusher.
- One 30 H. P. Gasoline Engine.

**DEWEY BROTHERS,**  
604 Boston Bldg., Denver, Colo.



**DIVIDENDS.**

**HOMESTAKE MINING COMPANY, MILLS BUILDING,**  
15 BROAD STREET, New York, May 14, 1896  
DIVIDEND NO. 214.

The regular monthly dividend, TWENTY-FIVE (25) CENTS PER SHARE, has been declared for April, payable at the office of the company, San Francisco, or at the transfer agency in New York, on the 25th inst. Transfer books close on the 25th inst.  
**LOUNSBERY & CO.,**  
Transfer Agents.

**ISABELLA GOLD MINING COMPANY,**  
COLORADO SPRINGS, COLO., May 11, 1896,  
DIVIDEND NO. 5.

A dividend of ONE CENT PER SHARE (\$22,500) has been declared, payable May 25th, 1896, to stockholders of record May 18th, 1896.

The stock transfer books will be closed May 18th, 1896, at 3:00 p. m., and will be reopened on the morning of May 26th, 1896.  
**PERCY HAGERMAN,**  
V. P. & Treasurer.

**ASSESSMENT NOTICE.**

**SILVER KING MINING COMPANY,**  
Location of principal place of business, San Francisco, Cal.; Location of Works, Pioneer Mining District, Pinal County, A. T.

Notice is hereby given that at a meeting of the Board of Directors, held on the 7th day of May, 1896, an assessment (No. 14) of TWENTY-FIVE CENTS (25c.) per share was levied upon the capital stock of the corporation, payable immediately in United States gold coin, to the Secretary, at the office of the Company, No. 310 Pine street, Rooms 15 & 17, San Francisco, Cal.

Any stock upon which this assessment shall remain unpaid on the 16th day of June, 1896, will be delinquent, and advertised for sale at public auction; and unless payment is made before, will be sold on Tuesday, the 14th day of July, 1896, to pay the delinquent assessment together with costs of advertising and expenses of sale. By order of the Board of Directors, **J. W. PEW,** Secretary; Office, No. 310 Pine street, Rooms 15 & 17, San Francisco, Cal.

**LANDS AND MINES FOR SALE.**

**GOLD MINES FOR SALE.**

WE have some splendid propositions for you on dividend paying gold mines in Cripple Creek and Gilpin County districts. Investigate.

**THE CLARK LAND & MINES CO.,**  
Room 10, Opera House Block, Denver, Colo.

**GOLD MINES FOR SALE**

On Pacific Coast. Correspondence solicited.  
**J. F. CROSETT,**  
Secretary, Gold Mining Exchange,  
No. 628 Sacramento St., San Francisco, Cal.

**FOR SALE**—Practical Miner and Assayer will sell one-half interest in group of four Gold Mines, partially developed, in order to complete systematic development. For full particulars address **W. J. WEATHERBY,** Cooney, N. Mex.

**FOR SALE.**

A fair-sized Foundry and Machine Shop with additional land, in good condition and well equipped for medium heavy work; located on a railroad; within eight miles of New York. Can be seen in operation for few weeks only Owners giving up business. Terms easy. Call or address  
**Room 41, 22 William St., New York.**

**FOR LEASE.**

An Anthracite Colliery Property in the Borough of Shamokin, Northumberland County, Pa. Breaker comparatively new, and equipped with the latest coal-breaking and screening machinery; capacity about one thousand tons per day and now in operation. The property is in excellent condition and a large quantity of coal opened.

For further information apply to  
**IRVING A. STEARNS, Manager,**  
Wilkes-Barre, Pa.

**FOR SALE.**

**GOLD AND COPPER MINES,** extensive, high-grade, well developed. **BOOTH & BRINTON,** Portland, Oregon.  
N. B.—Make a note of this advertisement, as you may not see it again.

**GOLD AT CRIPPLE CREEK.**

**THE BEST WAY TO GET THERE IS OVER THE SANTA FE ROUTE.**

The fabulously rich gold mining district of Cripple Creek, Colorado, is attracting hundreds of people. By spring the rush bids fair to be enormous. That there is an abundance of gold there is demonstrated beyond doubt. Fortunes are being rapidly made.

To reach Cripple Creek, take the Santa Fe Route, the only standard gauge line direct to the camp. Through Pullman sleepers and chair cars. The Santa Fe lands you right in the heart of Cripple Creek.

Inquire of nearest ticket agent, or address **G. T. Nicholson, G. P. A., A. T. & S. F. Ry.,** Monadnock Block, Chicago, Ill.

Advertising enables a **BUSINESS MAN** to **PLACE HIS GOODS** before the **EYES OF THOUSANDS** who would otherwise **NEVER KNOW** of their existence or that of the owner.

**CONTRACTS OPEN.**

Continued from Page 18.

**WATER-WORKS**—Sealed proposals, marked "Proposals," for the construction of a system of water-work will be received by the Board of Water Commissioners of Brocton, N. Y., until May 18th, 1896. The estimated quantities are: 8,900 ft. of 12-in. main; 2,800 ft. of 10-in. main; 2,400 ft. of 8-in. main; 10,600 ft. of 6-in. main; 13,300 ft. of 4-in. main; 50 fire hydrants and the necessary gates and specials; 17,000 cu. yds. earth excavation; 20 cu. yds. Portland cement concrete. Plans may be seen at the office of the Board and specifications will be furnished on application. Each bid must be accompanied by a certified check for five hundred (\$500) dollars as a guarantee that a contract will be entered into.

**AMERICAN DEVELOPING & MINING COMPANY.**

OFFICE—INTER-MOUNTAIN BLDG.  
**BUTTE, MONTANA.**

Mines Leased, Bonded, Bought, Developed and Operated.

Correspondence from Owners of Mining Properties and Parties Seeking Mining Investments solicited.

References on Application.

Moreing & Neil Code Used.

Cable Address, **ADAMCO, BUTTE.**

**ATTORNEYS AT LAW.**

**CLAYTON ELY ENIG,**  
Lawyer.

Wardner Building, 9th and F Sts., Washington, D. C.

Practices before the Departments of the Government; all the Courts of the District of Columbia and Maryland, and the Supreme Court of the United States.

**THE CHRYSOMETER.** A Chemical Assay Outfit for Gold, all complete, with chemicals for 100 assays, for \$25.00. Also the Prospector's Outfit for \$10.00.  
**J. W. PETTEE,** Sole Manufacturer,  
907 17th Street, Denver, Colo.

**HANDY & HARMAN,**  
Dealers in Bullion, Specie and Bonds,

No. 32 Nassau Street, New York.

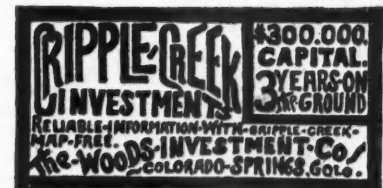
Sovereigns, Francs and Marks, Doubloons, Mexican Dollars, Fine Silver Bars, Fine Gold Bars. Special attention given to Investments and to Consignments of Silver and Gold Bullion of all grades.

REFERENCE: American Exchange National Bank, New York City.

**MISCELLANEOUS WANTS.**

**MINE LOCOMOTIVE**

**WANTED:** A Locomotive, 8 to 10 tons, 42-inch gauge, for underground work. Send particulars to **MILL CREEK COAL CO.,** No. 1 Broadway, New York City.



**MAP OF THE UNITED STATES.**

A large handsome Map of the United States, mounted and suitable for office or home use, is issued by the Burlington Route. Copies will be mailed to any address on receipt of fifteen cents in postage by

**P. S. EUSTIS,** Gen'l Pass. Agent, C., B. & Q. R. R. Chicago, Ill.

**IT'S A SLOW MAN**

That don't send for our CATALOG, describing and pricing our INDICATORS, OIL EXTRACTORS, STEAM SEPARATORS, FEED WATER HEATERS, DAMPER REGULATORS, EUREKA PACKING. As manufacturers we are able to quote lower prices than others.  
**HINE & ROBERTSON CO.,**  
51 Cortlandt St., N. Y.

**FRED. F. HUNT,**  
77 Pine St., New York,  
**ANALYST AND ASSAYER.**  
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.

**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.

**Matte Smelting**  
JUST OUT. ONLY \$2.00.

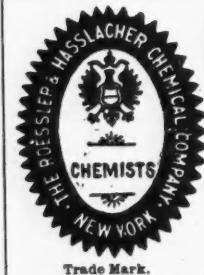
See Page 36.

**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 SMELTERS**  
Works at Constable's Hook, N. J., opposite New  
Brighton, Staten Island. Copper Ore, Mattes, or Bullion  
purchased. Advances made on consignments for refin-  
ing and sale. **Specialty made of Silver-  
Bearing Ores and Mattes.**  
SELL  
**INGOT AND CAKE COPPER.**  
President, **ROBERT H. THOMPSON,**  
Office, 37 to 39 Wall Street, New York.

**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.

Advertising not only brings trade; it  
directs trade, it creates trade.



**CYANIDE**  
PEROXIDE OF  
SODIUM  
And all other Mining Chemi-  
cals.  
The Roessler & Hasslacher  
Chemical Co.,  
73 PINE 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.

**THE HARRINGTON & KING PERFORATING CO.**  
**CHICAGO.**

**METALS PERFORATED AS REQUIRED.**  
**FOR MINING SCREENS OF ALL KINDS.**  
FOR USE IN  
MILLING AND MINING MACHINERY, STONE, COAL AND ORE SCREENS,  
REDUCTION AND CONCENTRATING WORKS, STAMP BATTERY SCREENS,  
WOOLEN, COTTON, PAPER AND PULP MILLS, BRICK AND TILE WORKS, FILTERS,  
RICE, FLOUR AND COTTONSEED OIL MILLS, SPARK ARRESTERS, GAS AND WATER WORKS,  
SUGAR AND MALT HOUSES, OIL, GAS AND VAPOR STOVES,  
DISTILLERIES, FILTER PRESSES, COFFEE MACHINERY, ETC., ETC.

**STANDARD SIZES PERFORATED TIN AND BRASS ALWAYS IN STOCK.**  
Main Office and Works, 222 to 240 N. Union St., Chicago, Ill., U. S. A.  
Eastern Office, No. 284 Pearl St., New York.

**HIGH GRADE HOISTING ENGINES AND DRUMS.**  
We have some of the heaviest plants in the world in Iron, Copper and Silver Districts of United States.  
**OUR CORLISS ENGINES ARE DESIGNED EXPRESSLY FOR HOISTS.**

OTHER SPECIALTIES.  
Diamond Core Drills.  
Rock Drills and Air Compressors.  
Cable Address: "BULLOCK"  
DENVER BRANCH: 925 17th Street.  
**M. C. BULLOCK MFG. CO.,**  
1170 W. LAKE STREET 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 Code, 4th Edition.

**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.