

# THE ENGINEERING AND MINING JOURNAL



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

Vol. LV, APRIL 15, No. 15.

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.

**SUBSCRIPTION PRICE:** For the United States, Mexico and Canada, \$5 per annum; \$2.50 for six months; all other countries in the Postal Union, \$7.

REMITTANCES should always be made by Bank Drafts, Post-Office Orders or Express Money Orders on New York, payable to THE SCIENTIFIC PUBLISHING CO. All payments must be made in advance.

**NOTICE OF DISCONTINUANCE.**—The ENGINEERING AND MINING JOURNAL is sent to subscribers until an explicit order for its discontinuance is received by us, and all payment of arrearages is made, as required by law. *Papers returned are not notices of discontinuance.*

### THE SCIENTIFIC PUBLISHING COMPANY.

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

### LONDON OFFICE:

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

### CONTENTS.

	Page.
The Zone Theory of Lodes.....	337
The Geological Survey of Missouri.....	337
Smelters and the Tariff on Mexican Ores.....	337
Taxing Iron and Copper Ores in Michigan.....	337
The Transvaal Silver Mines.....	337
The Meadow Lake Camp, California.....	338
Senator Jones and the International Silver Conference.....	338
The Carson Mint Scandal.....	338
Improvements in the Cyanide Process.....	338
New Publications.....	339
Books Received.....	339
The Russell Process and Pyritic Smelting..... W. G. Lamb	339
Should the Ontario Company Adopt the Leaching Process?.....	340
Ore Deposits and Their Enclosing Walls..... W. Lindgren	340
The Portland Cement Industry in Europe..... Pierre Giron	341
* The Monte Cristo Mining District, Washington..... R. H. Stretch	343
Mineral Products of North Carolina.....	343
* Construction of Lead Blast Furnaces..... H. O. Hoffman	344
The Dewey Refining Process for Sulphide Precipitates.....	346
Abstracts of Official Reports.....	346
The Moissan Electric Furnace.....	346
* Lemichel's Siphon Water Elevator.....	347
Decisions Affecting the Mining Industry.....	347
Patents Granted by the United States.....	347
Patents Published in Great Britain.....	347
Notes—The Largest Gun, 341—Alloys of Aluminum and Antimony, 341—An Old Ship, 343—Copper from Birds, 345—Steel Canal Boats, 345—Lowest Price of Steel Rails, 346—Production of Pig Iron in Germany, 346—Old Timber, 346—Soldering Aluminum, 346—Open-Hearth Steel Production in England, 346—Electric Power Transmission in Sweden, 346—German Railroads, 346—The Alaska Boundary Survey, 347.	

\* Illustrated.

MINING NEWS.	FOREIGN.	MARKETS:	
Arizona..... 319	Belgium..... 352	METALS..... 353	San Francisco. 36
California..... 319	Brazil..... 352	IRON:	Coal Stocks..... 319
Colorado..... 319	Br. Columbia..... 352	New York..... 354	Colo. Springs. 360
Florida..... 319	Br. Guiana..... 352	Buffalo..... 355	Rico..... 360
Idaho..... 319	Canada..... 352	Chicago..... 355	Baltimore..... 360
Indiana..... 350	Lower California..... 352	Louisville..... 355	London..... 360
Michigan..... 350	Mexico..... 352	Philadelphia..... 355	Paris..... 360
Minnesota..... 350	South Africa..... 352	Pittsburg..... 355	Ashpen..... 360
Montana..... 350		COAL:	St. Louis..... 360
Nevada..... 350		New York..... 355	Duluth..... 360
New Mexico..... 351		Boston..... 356	Denver..... 360
North Carolina..... 351	MINING STOCK	Buffalo..... 356	
Ohio..... 351	MARKETS:	Chicago..... 356	CHEMICALS AND
Oregon..... 351	New York..... 353	Pittsburg..... 356	MINERALS..... 357
Pennsylvania..... 351	Boston..... 353		
Pennsylvania..... 351	San Francisco..... 353		
South Dakota..... 351	London..... 353	MINING STOCK	CURRENT PRICES
Utah..... 352		TABLES:	Chemicals..... 357
Washington..... 352	DIVIDENDS..... 353	New York..... 358	Minerals..... 357
Wyoming..... 352	MEETINGS..... 353	Boston..... 358	Rarer Metals..... 357
			ADVT. INDEX..... 19

SUBSCRIBERS to the ENGINEERING AND MINING JOURNAL will receive with the next number, for April 22d, the index to Volume LIV. The issue of this has been somewhat delayed on account of the amount of work required in the office in the preparation of the great volume of the MINERAL INDUSTRY; but the index is now on the press, and will be sent out as announced above.

THE suit of DOE vs THE WATERLOO MINING COMPANY, one of the most important mining cases tried in California in late years, has been decided in favor of the plaintiff by Judge ROSS in the United States District Court at Los Angeles. The suit involved some of the most valuable mining property in Calico, San Bernardino County, and was decided on purely geological testimony. The experts for the defendant, Messrs. JOHN HAYS HAMMOND and J. ROSS BROWNE, of San Francisco, introduced the zone theory, first made famous in the Eureka-Richmond suit at Eureka, Nev., contending that all the mines on Silver Mountain, Calico, were practically on one lode, while the expert for the plaintiff, Mr. LOUIS JANIN, considered them to be separate and distinct ledges. The decision in this suit, which was brought several years ago, will practically settle several others in the same locality.

THE Geological Survey of Missouri is, we regret to hear, to be seriously crippled in its operations, the Legislature of the State having appropriated only \$20,000 for its maintenance during the next two years. There is already work enough completed and ready for publication to require the entire sum thus allotted for its proper presentation, so that it will be impossible to undertake any new investigations, or to continue those now in hand. The Survey has done some very creditable work in the examination of the iron ores and other mineral resources of the State and it has been so directed as to give material aid in the development of those resources. The continuance of the work on the lines already laid down is desirable and its delay will be unfortunate. Economy in legislation is a good thing, but that economy is sometimes misplaced, as in this case, where a sufficient appropriation would have been for the best interests of the State.

SMELTERS in the Southwest are complaining of the dearth of Mexican ores, due directly to the working of the tariff on Mexican lead ores, and the establishment of smelters in the republic beyond the Rio Grande. Increased smelting charges on dry silver ores are becoming a burden to the miners, and while the production of lead ores in New Mexico, Arizona and parts of Colorado was stimulated for a short time, no new bodies of great size were discovered and the old ones are gradually being exhausted. Many of the dry ore mines have been forced to close down and their owners see but little prospect of any future lowering of smelting charges, as what little Mexican ore might come to this country now is liable to be diverted by the new smelters building at Magdalena, 80 miles south of the Mexican boundary, and that near Chihuahua, to work the ores of the Santa Eulaha mines and incidentally other ores. Capitalists are now fully aware of the profits to be made in smelting ores in Mexico and are investing liberally, so liberally in fact that there may be danger of the business being overdone. All of which goes to prove that the ENGINEERING AND MINING JOURNAL was correct in its stand on the Mexican ore question, and that our ill-advised tariff law relating to this subject has greatly benefited our neighbors while injuring ourselves.

BILLS have been introduced in the Michigan Legislature providing for the repeal of the direct tax law passed two years ago, and imposing a specific tax on all ores mined in the State. The bills presented differ somewhat in detail, but are alike in general tenor. One, which is a type of the rest and which was, at latest accounts, under serious consideration, provides for a tax of five cents a ton on all iron ores mined and 25 cents a ton on all copper ores. While there is no question that the miners should pay their proportion of the State taxes, the injustice of a specific tax can very easily be shown. "Iron ore" and "copper ore" are terms covering products of very unequal value, and a specific tax must levy a very unequal tribute on the output. In our last number a summary of the report of one Michigan company (the Atlantic) showed an average yield of 0.615 per cent. of copper per ton of rock treated, while in other cases the yield may be 4 1/2 per cent.; in one case the tax would frequently absorb more than the entire profit at the most economically managed mine, while in another it might be a burden easily carried. The fact is that no specific tax of this kind can be devised which would be a just or equitable one, or in any way a fair substitute for the ordinary system of taxation on the valuation of property. The latter is not perfect by any means, but it does not present the gross inequalities of the other. If a specific tax were imposed it should at least be on the metallic copper or iron contained in the ore and not on the ore itself.

THE Transvaal silver mines, the largest and most promising silver mines in the world which has won such great reputation as a gold pro-

ducer, have not as yet proved profitable in spite of being favorably reported upon by such eminent engineers as Mr. O. HAHN, formerly of Pueblo, Colo., and Mr. HENNING JENNINGS, formerly of the El Callao and the New Almaden Mines. The experts seemed to agree that smelting was the process best adapted for these ores, but those unforeseen difficulties which seem predestined to occur in mining ventures as well as other enterprises proved an obstacle to the success of the reduction plant built under Mr. HAHN's direction. The property has been lately examined by Mr. EDMUND WERTHEMAN, formerly of Topia, Mexico, who agrees with the previous examiners as to the value of the property, but differs as to the method of treatment. Mr. WERTHEMAN, who has accepted the position of general manager, believes that in the Transvaal as in the Coeur d'Alenes it will prove more profitable to ship concentrates than to either smelt the ore direct or to treat the concentrates. The concentrates being high grade they can bear the expense of the high freight rates to England, which will be reduced in time by the completion of the Delagoa Bay Railroad. It seems probable that this change in the metallurgical treatment, substituting a comparatively inexpensive process for what, until good coal and coke are more easily obtainable in the Transvaal, is an extremely expensive one, may yield in profits much more than the difference between the freight on bullion and that on concentrates.

OUR esteemed contemporary the *Mining and Scientific Press*, of San Francisco, in its issue of April 1st, reiterates the statement made in our issue of Feb. 18th that the failure of Meadow Lake Camp, California, was due to an absence of ores of a profitable grade rather than to their rebelliousness, but intimates that California miners are conversant with all processes and particularly with the barrel chlorination process, which we had suggested for these ores, provided they contained a sufficient quantity of precious metal. We said and still believe that California miners are slow and unprogressive at present, however good their records have been in the past; and we are positive they are not so well acquainted with the barrel chlorination process as our contemporary would intimate, else it, as a well informed paper, would not refer to this as a "patented process," when it is well known that its application is as free as amalgamation. To the statement that California holds the record for cheap working of gold ores we may also take some exceptions. We do not believe California does, but concede it to Dakota and Alaska.

We were thoroughly familiar with the record of the Spanish Mine in Nevada County, California, and admit that to our knowledge no other mine has succeeded in working at such low costs as this property; but the costs cannot be taken as representative of the State, as it is an exceptional case, working under conditions which permit of economies not applicable elsewhere. Far more representative mines, when they were being successfully worked, were the Plymouth Consolidated or the Zeile, both of Amador County. At these the costs averaged above \$3 per ton, while at the Deadwood-Terra, in the Black Hills, they are about \$1.25 a ton, and at the Alaska Treadwell have averaged for some time about \$1.50 a ton, and during the six months ended November 31st, 1892, fell to \$1.32. This certainly is far less than any California mine except the Spanish, and that, as we have said, while a highly creditable record, was an abnormal case.

THERE have appeared in the daily papers several times within the past week statements to the effect that President CLEVELAND is thinking of reappointing Senator JOHN P. JONES as a delegate to the Monetary Conference, which is expected to meet in May. It is to be hoped that he will spare the country a repetition of such a disgrace. The connection of Senator JONES with the infamous Comstock mill ring, as President and one-fifth owner of the Nevada Mill & Mining Company, which under his administration systematically swindled the stockholders of the Comstock mines, is well known, and the proofs of it are given very fully in the decision of the California court in the Hale & Norcross case.

Nothing more rascally has ever been recorded than the doings of the Comstock mill ring, and the court's decision justly condemned Senator JONES' associates and his company to refund more than one million dollars of which they had defrauded the stockholders of the Hale & Norcross Mining Company. The only reason Senator JONES was not made personally liable, as were his associates, for the amount thus taken was that he carefully kept out of the jurisdiction of the court.

The ENGINEERING AND MINING JOURNAL has frequently pointed out some of Senator JONES' disqualifications, and it is to be hoped that President CLEVELAND will spare us a repetition of the shame his appointment would involve. There are plenty of able, honest and honorable men in each party from whom to make selection, and no need of taking one so eminently unfit as the Nevada senator. It is extremely doubtful whether any useful decision will be arrived at should the conference again meet, but it becomes incumbent upon the United States Government to formulate a definite and practicable plan for the several governments to act on and to support it by representatives who by their abilities and reputation will lend weight to our case.

#### THE CARSON MINT SCANDAL.

The Carson Mint has been shown in the California courts (Hale & Norcross case) to have been used by the Comstock mill ring as a kind of "fence" in realizing on the bullion stolen from the mining companies. The control of that mint has been held by the mill ring, which has had power in Washington not only to have the tool of the ring, T. R. HOFER, who is cashier of the ring's Bullion and Exchange Bank, made chief clerk of the mint, but also to have him appointed superintendent of the Carson Mint, after his connection with the ring and his active part in its disreputable transactions, had been proved in the courts. This is a national disgrace, which we trust will receive the attention and prompt action of President CLEVELAND and of Secretary of the Treasury CARLISLE.

The administration of the United States Mint, aside from this disgraceful exception, has long been a credit and a pride to Americans, and the present director of the Mint, Mr. E. O. LEECH, has been an acceptable and very efficient officer. The appointment or promotion of the discredited agent of the infamous mill ring to the superintendence of the Carson Mint, we have reason to believe, was not suggested by him. But Mr. LEECH should lose no time in recommending the prompt removal of so unfit an officer, and the appointment of a superintendent above reproach or suspicion; or, if the "ring" is still too strong to permit this, and only our long experience as a historian induces us to admit this shameful possibility, then he should earnestly recommend the closing of the Carson Mint.

Mr. LEECH, who is not ignorant of the facts and charges in the case, and who has won for himself universal confidence both in his ability and his high character, could no doubt effect this much needed reform better than could a new man; and as the mint should be wholly divorced from politics, and its director be retained in office so long as he is able to efficiently discharge its duties, we presume Mr. LEECH will continue in the responsible and honorable position he has filled so acceptably. It is essential, however, for the honor of the Government that a prompt end be made of the Carson Mint scandal.

#### IMPROVEMENTS IN THE CYANIDE PROCESS.

After a certain amount of experience with any process, its weak points are seen and opportunities for improvements present themselves. To this rule the cyanide process is no exception. One of the great difficulties experienced in this process, or indeed in any lixiviation process, is the treatment of the slimes of an ore otherwise well suited to reduction by the method. They pack upon the filter, forming beds impermeable to the solution, and even if mixed with large quantities of coarser material are rarely attacked, although laboratory experiments will show that their precious metal contents are extremely soluble. Of such material the Robinson Gold Mining Company, of South Africa, operating one of the largest cyanide plants on the Transvaal, has accumulated 60,000 tons, and the management has long despaired of treating it successfully, as the gold would not amalgamate nor would the cyanide permeate the mass if it were charged into vats. The average assay value was between \$7 and \$8 a ton, but the fineness, it is estimated, is such that it would pass a 225 mesh screen.

Mr. WM. BETTEL, the chemist of the company, has been experimenting with these slimes for some time past and has devised a plan which, it is claimed, will solve the difficulty. The process consists in mixing a mass of the slimes with 50 per cent of its weight of the double cyanide of manganese and potassium ( $K_4Mn_2Cy_{12}$ ) mixed with ordinary cyanide solution.

The fine slimes are thoroughly mixed with this solution, and while in a state of suspension are pumped into a Johnson filter-press under a pressure of 100 pounds to the square inch. Charging the press occupies about 20 minutes. At the end of this period the charging of slimes is shut off and water is forced through the press, which, it is said, thoroughly washes out the gold cyanide solutions. Forcing water through the slimes is continued until the escaping fluid does not show an alkaline reaction. The gold in the solutions which flow off is precipitated preferably by the Molloy process. Slimes at the Robinson works which contained originally \$7 to the ton showed but 12 to 16 cents after treatment by this method.

In various experiments, 97.6% to 98.2% was obtained, and from fine ground concentrates 96.85% was extracted. When it was attempted to treat coarse sands by this method, an absolute failure was made, however, showing that the ore must be in an extremely fine state of division to be successfully treated by Mr. BETTEL's process. When tailings and slimes are treated direct from the mill, the use of classifying spitzluten is proposed.

While the application of the filter-press to the treatment of ores by the cyanide process is undoubtedly new, yet such a procedure has been proposed for the hyposulphite lixiviation process by the late E. N. RIOTTE; a description of it will be found in the ENGINEERING AND MINING JOURNAL of March 31st, 1888.

Mr. RIOTTE's plans were never put into operation beyond an experimental stage, but he claimed that the solution could be easily and cheaply expressed from large quantities of ore. What the cost of working by this method would be it is impossible to say, but if this plan will allow the large quantities of slimes on the Rand to be worked to a profit it has a good field before it.

Considerable difficulty was encountered in applying the cyanide process to the ores of the Stewart mine, in Bingham Cañon, Utah. The free gold would not dissolve, nor would the fine amalgamate, so a combination of both amalgamation and cyanide process has been made, it is claimed, with good results.

The ore is crushed and amalgamated in Huntington and Crawford mills successively, the water used being a solution of cyanide. The free gold is said to amalgamate readily, and the fine and rebellious particles to dissolve easily. The solution and pulp, after leaving the mill, are run into settling tanks, and after remaining there a certain length of time the supernatant solution is drawn off and the gold precipitated by the ordinary means.

While it is claimed that this system is being worked to a success, it would seem that grave objections might be raised to it. The agitation of the solution in the mills will certainly tend to the decomposition of the cyanide, and the recovery of all the solution is practically impossible unless, as in Mr. BETTEL'S process, a filter-press is employed. It is a reversion almost to the old and discarded method of agitation first proposed for the cyanide process, and as unsuccessfully attempted with it as some years before with the hyposulphite lixiviation process.

While neither of the improvements, if they are such, which we have mentioned may amount to anything, yet they show that metallurgists are on the alert for innovations and modifications to suit special cases. It may be possible that in time many of the present unfavorable features of the cyanide process may be so modified as to make it of far more general application than it is at present.

#### NEW PUBLICATIONS.

THE MINE AND MINERAL STATISTICS OF THE STATE OF MICHIGAN. By James P. Edwards, C. E., Commissioner of Mineral Statistics. Lansing, Mich.: Robert Smith & Co., State Printers. Pages, 138.

This report, which bears the date of August 1st, 1892, on the letter of transmittal from Mr. Edwards to Governor Winans, has been issued recently, so that the statistical information which it contains, derived mainly from the mining companies reports for 1891, has but little value when those of a date a year later are obtainable.

Mr. Edwards states that he has been hampered by the lack of uniformity on the part of the companies issuing reports and by the neglect of others to report, although required to do so by the statistics.

Such a work, containing, as it does, brief notes of the more important mines, is not without historical value, although many of these notes bear the early marks of "write-ups" from the daily press, rather than evidences of personal investigation on the part of the commissioner or his aids, but as we have said, its interest and its usefulness are seriously impaired by the late date at which it is issued. It would seem only fair, however, to excuse Mr. Edwards from any responsibility for this and to charge it to the insufficient means at his command.

THE CAUSES OF OCEAN CURRENTS; ALSO OF THE SHAPE OF THE EARTH, THE SALTNESS OF THE SEA AND THE NORTHERN LIGHTS. By G. B. Sanborn, Ballard, Wash.: G. B. Sanborn. Pamphlet, 40 pages. Price 25 cents.

A new scientific light has dawned on the world in the person of Mr. G. B. Sanborn, of the State of Washington, who tersely and, in his own opinion, completely explains the causes of ocean currents, the Northern Lights, the open Polar Sea, the shape of the earth, the saltiness of the ocean, and various other matters which have hitherto remained problems unsolved by generations of scientists. All this Mr. Sanborn does in a modest looking little pamphlet of 40 pages now on our desk. Not content with the presentation of this wonderful amount of knowledge to the world at once, the author hints at further achievements in the future, such as the navigation of the air in artificial cloud structures, the regulation of climate and a few other smaller matters. We do not wish to insinuate plagiarism; it is very possible that Mr. Sanborn may never have heard of Captain Symmes and his famous hole, or of that eminent traveler, M. Verne, but it is nevertheless true that the central point of his cosmic theory is the existence of a hole or passage through the earth, very much like that described by both those great explorers. He is positive as to his facts, however, and does not admit any doubt as to the truth of his theory. Having settled these matters so completely, we suggest that Mr. Sanborn apply himself to the solution of some other apparently insoluble problems, such as devising a plan of rapid transit for New York which will suit everybody, fixing the date when the Palmarejo mine will pay a dividend, and some others which might be presented.

PUMPS: MACHINERY: A PRACTICAL HANDBOOK OF THE CONSTRUCTION AND MANAGEMENT OF STEAM AND POWER PUMPING MACHINES. By William M. Parr. Philadelphia: The J. B. Lippincott Company. Pages 450, with 260 illustrations. Price \$5.

The great importance and widely extended use of steam and power pumps in modern engineering seems to give room for more than one treatise on this kind of machinery, but it is a somewhat singular fact that few or no books of the kind exist in our language outside of the special catalogues of some of the large manufacturers. One or two of these rise almost to the level of treatises on pumps, but they were

written for a special object and are naturally devoted to a special class of machines. The present book may therefore be said to supply a want and to be of service to many engineers. In writing it the author has not attempted to treat of the theory of water movement, or of the mathematics of pumping, but has devoted himself almost entirely to the details of pumping machinery, and the descriptions of various kinds of power pumps which are in general use. In some cases he has indicated his preference for certain methods, but in most instances he has limited himself to description, leaving the reader to make his own selection. The object has been to present facts and approved practice and not theory. The author has himself had much experience in designing and constructing pumps, and has added the results of that experience to the material which he has collected. He has certainly been careful to note the defects as well as the advantages of the various devices which he presents.

The contents of the book will be indicated by the chapter headings, which are as follows: Water-pistons and Plungers; Piston-rods and Plunger-rods; Water-valves and Seats; Air and Vacuum Chambers; Suction and Delivery Pipes; Water End Design; Hydraulic Pressure Pumps; Steam and Power Crank Pumps; Direct-acting Steam Pumps; Duplex Pumps; Compound Direct-acting Steam Pumps; Fire Pumps; Mining Pumps; Rotary Pumps; Centrifugal Pumps; Duty Trials of Pumping Engines; High Duty Pumping Engines—Direct-acting and Fly-wheel.

In pump design and detail the book is most full and complete, and the chapters under those heads leave very little to be desired. As a practical man the author appreciates the value of drawings, and those chapters are very fully illustrated, the engravings being generally from working drawings and fairly well executed. In illustrating the various kinds of pumps he has depended more on outside elevations, which are less satisfactory than working drawings, if they are a little more ornamental.

The chapter on Fire-pumps is mainly occupied by the requirements and regulations of the Underwriters' Association with regard to the pumps of this class in factories and other buildings. The chapter on rotary pumps is rather short and unsatisfactory; that on centrifugal pumps is much fuller and better, though it dismisses with a short paragraph the somewhat interesting question of working centrifugal pumps in series. It must be admitted, however, that there is not much experience to quote from on this head. Under mining pumps reference is made chiefly to the various classes of pumps used in the coal mines of Pennsylvania. The chapter on Duty Trials is mainly a presentation of the results obtained by a committee of the American Society of Mechanical Engineers, whose report, by the way, was one of the best and most complete ever presented to that society. The chapters on High Duty Pumping Engines present the latest development of the pumping engine in its various forms. Throughout the book there are no mathematical calculations or formulas beyond the reach of the ordinary rules of arithmetic, and the tables of dimensions and results given are generally useful for reference. The book is free from the charge of excessive tabulation which holds good against so many technical works.

While it is not a perfect book, Mr. Barr has made it a very useful one, and, generally, a very reliable one, the defects it has being those of omission usually, due probably to the fear of making it too large. It will be a most useful addition to the engineer's library. The publishers have given it an excellent setting, the type, illustrations and mechanical execution generally being very good.

#### BOOKS RECEIVED.

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

*Selected Papers of the Institution of Civil Engineers.* Edited by James Forrest, Secretary. London, England: Published by the Institution.

*Transactions of the Federated Institution of Mining Engineers, Volume IV., Part 2.* Edited by the Secretary. Newcastle-upon-Tyne, England: Published by the Institution.

*A Manual of Machine Drawing and Design.* By David Allan Low and Alfred William Bevis. London and New York: Longmans, Green & Co. Pages 376, illustrated; price \$2.50.

*Fourth Annual Report of the Witwatersrand Chamber of Mines, for the Year Ending December 31st, 1892.* Johannesburg, Transvaal Republic: Published for the Chamber of Mines. Pages 144; illustrated by maps.

*The Measurement of Electric Currents.* By James Swinburne. *Meters for Electrical Energy.* By C. H. Wordingham. Science Series No. 109. New York: the D. Van Nostrand Company. Pages 240, illustrated; price 50 cents.

*Handbook of North Carolina: Its Farms, Vineyards, Orchards, Mines, and Factories.* Compiled under supervision of J. D. Cameron. Raleigh, N. C.: issued by the State Board of Agriculture. With 43 illustrations and 1 map.

#### CORRESPONDENCE

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.

All letters should be addressed to the MANAGING EDITOR.

We do not hold ourselves responsible for the opinions expressed by correspondents.

The Russell Process and Pyritic Smelting.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: In the "Journal" of March 18th appeared an article by Mr. Herbert Lang entitled "The Russell Process and Pyritic Smelting." It contains so many misstatements as to facts, that it is necessary to take them up in detail:

First, Mr. Lang twice refers to the mill at Mineral, Idaho, as a "Russell Mill." Now this "rather complete" mill, as Mr. Lang calls it, consisted of one 4 x 6 in. rock breaker, one set of small second-hand rolls (not Krem's), a reverberatory furnace built of stone, common brick and adobes, without a single firebrick in it, and without dust chambers, the furnace being connected with stack by a straight flue about 12 ft. long.

The two ore leaching vats were built on the site and were well constructed; the four precipitating tanks were second-hand brewery tanks and in poor condition. It is hardly necessary to state that no officer or stockholder of the Russell Process Company ever recommended any such apparatus or mill to any one, or had anything to do with this one. Hence Mr. Lang's references to the "Russell Mill" have no foundation in fact.

Second, Mr. Lang states: "The ores in question, of which only the more tractable part were or were sought to be worked in the "Russell mill," etc.

As the mine from which all the ore came was only a prospect without drifts or workings of any kind, except a single 90-ft. tunnel, evidently there could not have been any "sorting" of the ore as stated by Mr. Lang.

Third, He also says: "Mr. Lamb labored ardently and intelligently through several months," etc. This is hardly a fair statement, as the total amount of their ore treated while I was there, or at any other time, amounted to less than 225 tons.

Fourth, Mr. Lang states: "I am told that the best results reached 76%." To hold the Russell process responsible for the losses occurring in roasting, and in a furnace never recommended, but always opposed by them, is certainly not just. The "actual clean up" on all the ore delivered to the Russell process was 88%, and considering that it was a new mill, new ore and poor apparatus, the showing is good, and will compare very favorably with the first or experimental run in any new mill, or with the first run at Mr. Lang's so-called pyritic smelter.

Fifth, Mr. Lang "wonders" that the Russell process is "tolerated" at Aspen, or at Park City, and says: "I deny that the Russell process ever has been or ever will be a rival of smelting in the field named." Now, the historical facts are these: The only smelter which ever ran in Aspen, Colo., has been shut down over six months, while the Russell process, within 500 ft. of it, is still in operation, the mill running to its full capacity.

The only smelter which ever ran at Park City has been shut down for six years, having been operated at a continual loss, never having paid a dividend. The Daly Mining Company, using the Russell process in its Marsac mill, a quarter of a mile away, has paid dividends every month for more than four years and has a large surplus in the treasury.

PARK CITY, Utah, April 5th, 1892.

W. G. LAMB.

Should the Ontario Silver Mining Company Adopt the Leaching Process?

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: The editorial on the Russell process in the "Journal" of December 17th, 1892, and also the article in the same issue, embodying most of the facts, published by you in your issue of April 11th, 1891, have induced me to compare amalgamation at the Marsac Mill with leaching at the Marsac Mill. Being a stockholder in the Ontario, and holding on with the expectation of better times, I naturally take a great interest in anything pertaining to its operations; and the report in the Engineering and Mining Journal a short time ago that they were about to adopt the leaching process led to this investigation.

It is not necessary to call the attention of those acquainted with silver milling to the great difference in cost for treating the same ore in mills of different construction and arrangement. Such a difference means increased cost under the three great heads—Labor, Supplies and Repairs. If, therefore, we take a mill in which two processes have been tried, both of which worked successfully, and make a comparison, we reach a true conclusion in regard to the processes. Such a mill is the Marsac.

From the official report of the Daly Mining Company, for 1888, which undoubtedly gives a true statement of the affairs of the company to its stockholders, we find that the total cost per ton for treating the ores of the company at the Marsac mill to be \$6.40; the percentage of extraction, 90.7, and the consumption of quicksilver, 0.96 lb. per ton of ore at a cost of about 43.7 cts.

In the article of December, 1892, we read: "During 1892, up to December 1st, the percentage extracted at the Marsac mill was 91.9." Also the cost of chemicals, owing to the use of hot solutions, was 92.4 cts. per ton. The total cost of treatment for the eleven months is not given; but, as the cost of chemicals has increased over 1891, it is fair to assume that it will not be less than \$6.30.

We now have the facts up to date for our comparison:

	Extraction.	Cost of Chems.	Total Cost.
Amalgamation.....	90.7%	43.7c.	\$6.40
Leaching.....	91.9%	92.4c.	6.30
Difference.....	1.02%	48.7c.	0.10

A difference of 1.2% on a 38-oz. ore, reckoning the extraction at 91.9% and silver at 83 cts. per oz. is 37.8 cts. This, added to 10 cts., the difference in total costs, gives 47.8; so there is practically no advantage, although amalgamation is a little ahead.

As 1888 was our year of comparison for amalgamation, it is proper to consider any improvements which have been added to the mill decreasing the cost of the mechanical part of the milling process, or the cost of fuel, or tending to better chloridize the ore, and render it more amenable to the subsequent treatment for the extraction of the precious metals. From an article by C. A. Stetefeldt, in the Engineering and Mining Journal, we find that during the year 1890 a Taylor gas producer was put in operation, increasing the chlorination of the ore by about 2%, and decreasing the cost of fuel and labor. According to Stetefeldt's figures the saving amounted to \$58.30 per day, or 83 cts. per ton, which, added to the extra 2% chlorination, gives a total of \$1.44 per ton; or, for 24,214 tons, amounting in a year to \$34,768.

Another point worthy of our attention is the greater percentage of gold extracted by amalgamation when it was running side by side with leaching during the year 1889, as shown by the report of the company for that year. Amalgamation extracted 1,002 oz. of gold for every 1,000 oz. of silver, while leaching extracted only 755 oz. per 1,000 oz.

of silver. This would amount to a yearly gain by amalgamation of 214 oz. of gold, or about \$4,280, estimating gold at \$20 per oz.

Summarizing the above we find that amalgamation if used at the Marsac mill at the present time and run as in 1888, would make a grand total saving of about \$33,000.

In the face of this data it behoves Mr. Haggin and the directors of the Ontario company to consider well these facts before erecting additional milling facilities.

I would suggest that the well equipped amalgamating plant of the Marsac mill, which did such good work in 1888, be started up and run on Daly ore. The Ontario could then work their old tailing beds (containing according to last annual report \$708,000) at the Marsac leaching plant, and thus the product of the Ontario be increased at a very small expense. There could also be a number of lots of the present Ontario roasted ore worked by the leaching process. It is surprising that the Marsac amalgamating plant should lie idle at such a time and talk of another mill being indulged in. Place a thorough amalgamator in charge of the Marsac and see what can be done at the present time under the changed conditions.

NEW YORK, January 26th, 1893.

ONTARIO STOCKHOLDER.

The Relation Between Ore Deposits and Their Enclosing Walls.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: In a recent number of your paper I notice an article by Mr. H. W. Fairbanks on the above-named subject, in which he describes "the conditions obtaining in some of the more important mining districts of California to see if we can understand what they do teach." The problem proposed for solution is: "Do certain wallrocks indicate rich seated regions, whose nature we do not know?" His conclusions are that the wallrock has no influence whatever on the character of the deposit, and that the metals are derived from regions of great depth. He also concludes that the only relation between ore deposits and the bodies of eruptive rocks frequently found with them is that the existence of the latter facilitated the forming of the fissures.

In the first place it should be stated that an influence of the wallrock on a mineral deposit does not necessarily indicate lateral secretion, as Mr. Fairbanks seems to think. It may be due to that or it may be due to a difference in the precipitating power which different wallrocks exercise on the solutions circulating in the fissure.

I am also afraid that there is some misapprehension in Mr. Fairbanks' mind as to the theory of "lateral secretion." It is not at all necessary, according to its advocates, that the metals should have been leached from an eruptive rock. Professor Sandberger's researches on the veins of Schapbach, for instance, have shown that many of the metals in the veins were also contained in the micas of the adjoining gneiss. He has also shown the existence of many of the heavy metals in various sedimentary rocks in the vicinity of mineral deposits which he has investigated. A complete proof of lateral secretion in any given instance is one of the most difficult things to furnish; if however, as has been done in many cases, it is found that small quantities of the metals of a certain mineral deposit are found in one of its wallrocks, and that the other one contains no appreciable traces of them, the probability is certainly great that the metals in the deposits have been extracted from the first mentioned wallrock, either by lateral secretion proper (by percolating surface waters), as advocated by Professor Sandberger, or by leaching by hot mineral waters; in the latter case it is not at all necessary that the metals should have been extracted from the wallrock immediately adjoining the ore shoot, for the circulating waters could easily have transported the substances dissolved for long distances.

It is a great error to believe that all deposits have been formed in one and the same way. Nobody has, as far as I am aware, claimed that eruptive rocks are invariably connected with mineral deposits; it is certainly very common, however, and, on the other hand, there are many regions of intense disturbance in which the absence of both volcanic rocks and mineral deposits is very noticeable. This Mr. Fairbanks really admits, for he says that "mineral deposits are more frequently found in regions of great disturbance and of volcanic activity." There must, however, not only be chemical activity, but there must be a source from which the metals may be concentrated. The crystalline rocks certainly do contain these metals in small quantities, and as we may be sure that they continue down to great depths the presumption appears strongly in favor of the view that the ores have frequently been extracted from them, either at the surface at moderate depths, or at great depths. That in many cases a distinct connection exists between the character of a mineral deposit and its walls is too well known a fact to be explained away in a few words.

That in case of the gold deposits of California the auriferous veins exist in almost any kind of rock is certainly an indisputable fact, and the question as to where the gold came from must as yet be considered unsolved; only by detailed and patient investigations can we hope to throw any light at all on this complex problem.

With all the diversity in the occurrence of gold in California there are, however, indications showing that the wallrock has not been without influence; such are, for instance, the absence or peculiar character of the veins in the granitic mass of the Sierra Nevada, or in the smaller Placer County, a distinct connection exists between the ore shoots and zones of earlier, pyritous impregnation of the amphibolite forming the wallrock.

Very prominent is the influence of the wallrock in the persistent belt of copper deposits, sometimes auriferous, which follow the diabase belt of the foothills from Yuba to Tuolumne counties. The connection of copper reaching another rock and the frequent deterioration of the veins when of mineral deposits.

Mr. Fairbanks mentions as proof of his views the many auriferous quartz veins in Southern California occurring in gneiss, usually with amorphosed sediments. It appears to me that this series of deposits is

on the contrary, a proof of an influence of the wallrock, for they do not, as a rule, occur in the granite rock forming the larger part of the ranges in that region, but only in the smaller areas of metamorphic rock inclosed in the granite. This rule also holds good for many auriferous veins in the northern part of Baja California, with which I am acquainted.

Two of Mr. Fairbanks' arguments deserve a further mention. Speaking of the veins of the mother lode he says, "The chemical action which led to the distraction of the minerals from their original, highly disseminated condition through rock masses must have taken place at far greater depths than it is possible to reach in mining undertakings." This implies that the present surface was also the surface of the country at the time the deposit was formed, an obviously erroneous supposition, since it in the case of the vein in question disregards the extensive erosion which must have taken place since the deposits were formed; Mr. S. F. Emmons has proved, in the case of the Leadville deposits, that they must at the time of this formation have been covered by about 10,000 ft. of superincumbent rocks. The statement quoted is moreover wrong in itself, since we know that hot springs can, even near the surface, leach and concentrate the metals contained in adjoining rock masses.

The next argument is as follows: "If the gold has been leached from the adjacent walls, how is the presence of the sulphur"—in the sulphides usually associated with the gold veins—"to be accounted for? I do not know that analysis has revealed it as a primary constituent of intrusives." It is very erroneous to suppose that sulphur is not contained as an original constituent of massive rocks. In small quantities pyrite and pyrrhotite are extremely common as primary minerals in diabases, diorites and gabbros. Some gabbros even contain such masses of the latter mineral as to be available as nickel ores. Modern investigators all agree as to the primary character of these sulphides. I might also call attention to the frequent occurrence of minerals containing sulphur as nosite and haunynite in recent eruptive rocks. Furthermore, a great number of the California quartz veins do not occur in massive rocks, but in dynamo metamorphosed, schistose rocks, frequently very rich in pyrites.

In conclusion, it appears as if Mr. Fairbanks had fallen into the same error of which he in his first paragraph accuses Mr. Melville Atwood, that is, of too broad generalizations from insufficient premises.

WASHINGTON, D. C., March 28th, 1893.

WALDEMAR LINDBERGH.

#### THE PORTLAND CEMENT INDUSTRY IN EUROPE.

By Pierre Girou

The first known cement factory in England was at Northfleet, on the Thames; another was built about 1825. For many years the manufacture of Portland cement made no advance. Owing to the crude process used then, this new product was looked upon with great suspicion. In 1850 four factories only were engaged in the manufacture of Portland cement; but from 1860 this industry increased until the quantity manufactured in England exceeds 8,300,000 bbls. a year. The annual production of the most important English cement works is about as follows: White Brothers, 550,000 bbls.; Knight, Bevan & Sturge, 450,000; Lee, Son & Smith, 450,000; Burham, 450,000; Robins, 450,000; Johnson, 330,000.

The process of manufacture used in England is very much the same as it was 20 years ago. Few improvements have been realized. The raw materials used in England are chalk and clay, both very pure and readily soluble in water. The quality of the raw materials is considered perfect, and this explains how with inferior methods of manufacture English manufacturers succeed in producing a satisfactory cement.

Only one quality of cement is made in English factories, and this includes the whole output of a kiln, less the under-burnt clinkers picked by hand with more or less care. But there are different commercial qualities of cement according to the fineness of grinding. Until a few years ago the English cement was put on the market just as it comes from the mills. The sifting operation did not exist, and the result was that the cement usually left a residue of 15 and 20% on the No. 50 sieve, and 25 to 30% on the No. 80 sieve. The progress in grinding made in other European factories has led English manufacturers to improve their own grinding facilities, but still the English cement, as a rule, is far from being as finely ground as the German and French Portland.

The manufacture of Portland cement was introduced in Germany by Mr. H. Bleibtreu, who, in 1852, established at Stettin the Zulchow works, which made from 25,000 to 30,000 bbls. a year until 1856. He built at about the same time, another cement mill at Obercassel, near Bonn on the Rhine. These two establishments still exist and produce yearly from 160,000 to 200,000 bbls.

New works were built soon after, and there are now no less than 60 large Portland cement works; the annual production in Germany is about the same as in England, 8,500,000 bbls. The production of the most important German cement works is about as follows: Alsen & Son, Hamburg, 550,000 bbls.; Dyckerhoff & Son, Amoneburg, 500,000; Germania Cement Fabrik, Manske & Co., 450,000; Schifferdecker, at Heidelberg, 450,000; Mannheimer, at Mannheim, 450,000; Pommerscher, Guistorp, at Stettin, 400,000.

The development in Germany of the cement industry is not due, as in England, to the favorable quality of the raw materials; on the contrary, in many of the German works the materials used are difficult to handle, but German manufacturers have made great efforts to produce an article of reliable quality, and to develop in their works the most progressive methods of manufacture. They have organized themselves into a public association; they admit foreign manufacturers among them, and in their meetings they discuss questions relating to the manufacture and quality of cement. Thus the researches and studies made in one establishment serve all others. This association of manufacturers is one cause of the development of the cement industry in Germany during these last few years.

The works of Messrs. Dyckerhoff & Son, at Amoneburg, near Biebrich on the Rhine, were built in 1863; within a few years the annual production attained 100,000 bbls.; in 1883 the output was 400,000 bbls., and now the yearly production is 500,000 bbls. The raw materials used here are a nearly pure but very hard carbonate of lime which is found in the vicinity of the works, and a certain marl very rich in clay, which comes from Florsheim to the works by boat. These materials are often analyzed and the proportions of their admixture carefully determined. The laboratory of this establishment deserves special mention. Its installation is perfect, and the experiments which are made under the supervision of Mr. R. Dyckerhoff and Dr. Schuman have contributed a great deal in Germany to enlighten manufacturers and users on the properties of Portland cement.

In France the Portland cement industry did not grow as rapidly as in England or Germany. In 1880 the whole production hardly exceeded 750,000 bbls. a year; it is now, however, 1,800,000 bbls. It was only in about 1850 that Portland cement commenced to be used in France, when Messrs. Dupont & Demarle started the manufacture at Boulogne-sur-Mer in the North. They had previously spent several years in experiments to find out the best way to use the chalk marl, in that vicinity, which is still the raw material they use. In a comparatively short time Mr. Demarle succeeded in finding a process so perfect that it is still followed, and the composition of the cement has not been changed.

The reputation of the cement manufactured at Boulogne is inferior to none in Europe. The works of the Company of French Cements alone manufacture about 800,000 bbls. a year, being the largest of the kind in the world.

In Russia the first cement works were built at Polen in 1857. There are now 12 of importance; 8 of them make Portland cement, the others only natural cement. The total production of Portland cement in Russia is about 900,000 bbls. a year. The three largest works are: Schmidt, at Riga, 140,000 bbls.; Port-Kunda, Eshstand, 140,000; Grodzice, Polen, 140,000.

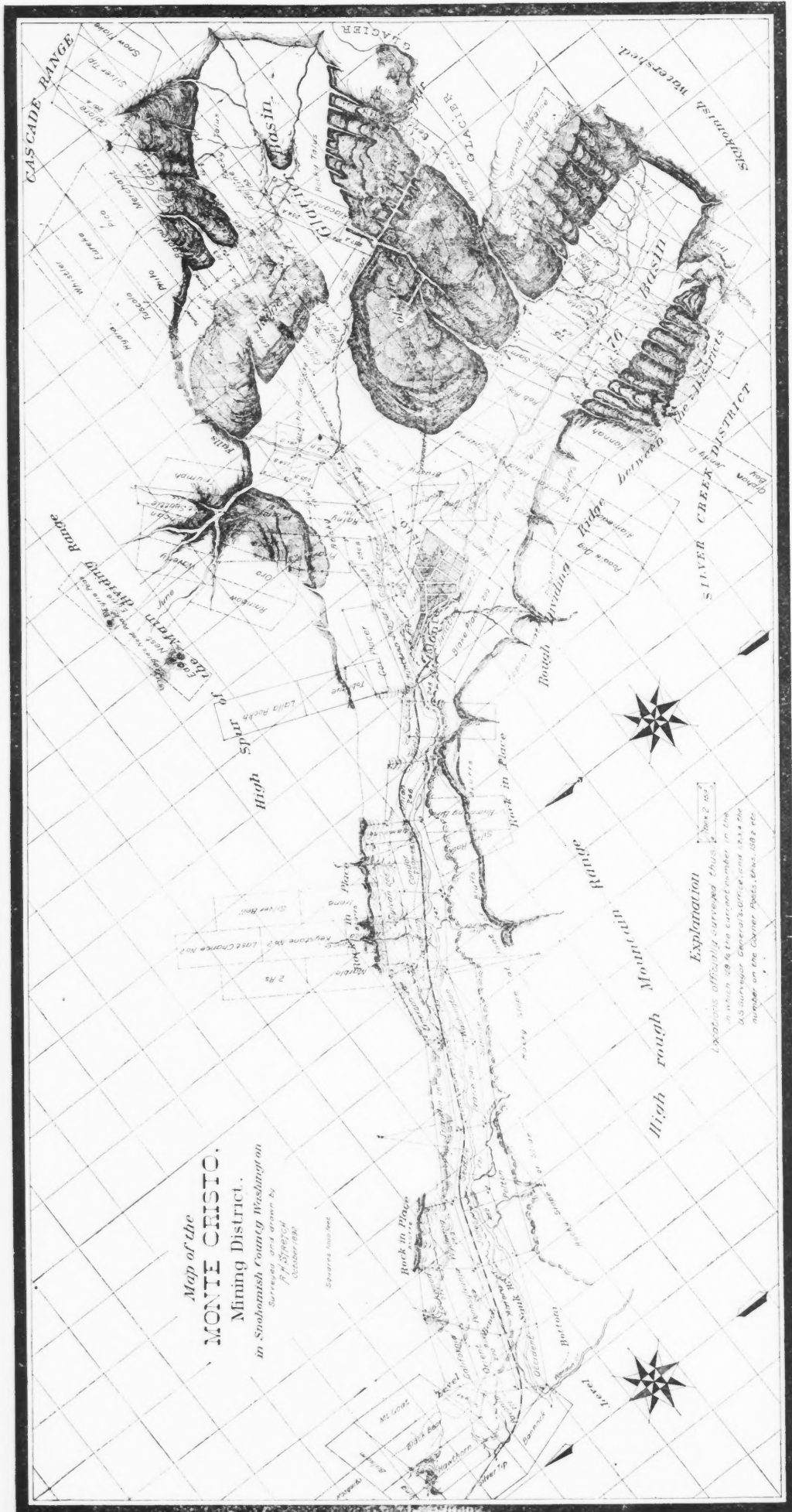
In Belgium there are 4 Portland cement works, making altogether about 800,000 bbls. a year; the largest being those of the Societe Anonyme de Niel, Ruppel, making 400,000 bbls. yearly.

In Italy the manufacture of Portland cement does not properly exist. Several works make a kind of natural Portland cement by burning cement rock to a little higher point than common cement. The two largest factories are located at Cazale and Bergamo. In Switzerland there are several Portland cement works, but a so-called natural Portland cement is mostly what they manufacture. In Austria there are only a few establishments producing Portland cement, and their product has acquired little reputation. There are 5 Portland cement works in Denmark, and their output reaches 300,000 bbls. a year. In Sweden 4 factories produce annually 425,000 bbls. One establishment in Norway makes 80,000 bbls.

The total annual production of Portland cement in Europe is estimated at 20,000,000 bbls.

The Largest Gun.—The great Krupp gun, weighing 250,000 lbs., to which reference was recently made, was successfully lifted from the hold of the steamer "Longueil" by the mammoth shears of the Maryland Steel Company, at Sparrow's Point, Baltimore, April 7th. The lift was made without the slightest hitch or trouble of any kind whatever, and the gun cleared the side of the vessel within the short time of 20 minutes after lifting was begun. The immense gun was immediately lowered on the special car purposely built by the Pennsylvania Railroad, and April 8th started on its way to the Fair.

Alloys of Aluminum and Antimony.—Hitherto it has been supposed that alloys of these two metals could not be obtained; in fact, Richards, in his Treatise on Aluminum, says, "Aluminum seems to have but a feeble tendency to unite with antimony and lead." The Tissier Bros., well known experimenters with aluminum, said that they could not obtain a homogeneous alloy of these two metals. According to M. D. A. Roche, the latest experimenter on the subject, alloys of aluminum and antimony in all proportions can be obtained in several different ways. An alloy can be made by melting aluminum with antimony, chloride or oxide, the latter with or without carbon; still the operation is facilitated by the addition of a flux, such as an alkaline chloride. The simplest process, however, is a direct fusion of the two metals in a Perrot furnace at a low temperature. The alloys containing a low percentage of antimony (less than 5%) are hard and possess a greater tenacity and elasticity than pure aluminum, yet are quite malleable. Their color is a little less white than that of aluminum, but their brilliancy is greater and more silvery, enabling them to well resist the atmosphere. When the percentage of antimony is increased, the alloy becomes harder, but its elasticity is diminished, and it is friable; the crystallization proper to aluminum gradually disappears, and when 90% of antimony is reached the alloy contains groups of separated crystals. It was also noted that the melting point became higher as the percentage of antimony increased, as did likewise the alterability of the compound in the air up to a point where the alloy had a composition: Al, 18.37%; Sb, 81.63%. This appears to be a true antimonide of aluminum. It is infusible at the highest temperature of the Perrot furnace, its melting point being apparently above that of soft steel. It is inalterable in dry air at ordinary temperatures, but at very high temperatures the antimony volatilizes. Moist air decomposes it even at low temperatures, a blackish powder containing aluminum being precipitated, and antimony hydride being evolved. The same reaction takes place with cold water. Alloys richer in antimony have a lower melting point, but they are less alterable in moist air. According to the author the aluminum-antimony alloys combine with other metals, forming more complex combinations, some of which can be used in the industrial arts. Among these he mentions the nickel and tungsten alloys, which are remarkable for their hardness, tenacity and elasticity, and the silver alloy, which is susceptible of a very high polish.



## THE MONTE CRISTO MINING DISTRICT, WASHINGTON.

Written for the Engineering and Mining Journal by R. H. Satch.

The following sketch of the geology and topography of the Monte Cristo mining district, situated at the headwaters of the Sank River in Snohomish County, Wash., is derived from observations made during the two years which have been officially spent in the district as United States Deputy Mineral Surveyor.

As the result of erosion we have a high ridge which reaches an altitude of 1,500 ft. above the '76 basin, dividing this basin from the Silver Creek District which is drained by the Skykomish River, with excessively precipitous walls on its eastern or '76 side and a more gradual slope on the western declivity; a very lofty ridge reaching an altitude of 3,000 ft. above the '76 basin, lying between the '76 and Glacier basins, and on the eastern side of Glacier basin, the main summit of the Cascade range, rising 3,000 ft. above the bottom of Glacier basin, with very rugged slopes, but not so steep as the western wall of the Glacier basin which is made up of perpendicular cliffs 1,000 ft. high and inaccessible.

We have, then, four excessively steep walls open to inspection with two less important ones on Mystery Hill in Glacier basin, and as the veins of the district, as a rule, run nearly at right angles to the crests of the mountains their outcrops are exposed to view from base to summit, and so far are easily exploited.

The rock formations of the district are very simple, consisting of black slate overlying a metamorphic granite, fine grained with distinct bedding.

These rocks apparently have been cut by a series of obscure porphyry dikes, with a general strike of about north 58° east magnetic, or north 80° east true. The tilting and erosion have taken off the bulk of the slates on the east side of Glacier basin, so that the veins are there found outcropping in the granites.

The rock structure largely determines the character of the ore. The east and west series of veins carry argentiferous galena in combination with arsenical iron pyrites and zinc blende, with silver largely in excess of the gold so long as the veins are in the slates, but as soon as they penetrate the underlying granite the galena is reduced in quantity or becomes altogether absent, the ore being almost exclusively an arsenical pyrite with gold largely in excess of the silver. The slates may be said in general terms to carry argentiferous galena and the granites auriferous pyrites. Taking a general average of the district, about one-third of the ore is suitable for direct treatment and about two-thirds must be concentrated to bring it up to working grade. The average value of the ore before concentration may be placed at about \$20 to \$25 per ton, with two-thirds of the value in gold and one-third in silver.

While there are numerous intimations of a north and south series of veins, the fact of their presence is chiefly based on the development in the Rainy mine and the Peabody group. In both these cases the ore lies parallel to the stratification of the slate, and evidently consists of a series of lenticular masses parallel to each other, as shown in many well known mines on the Mother Lode in California. As before stated, the ore of the Rainy is an arsenical pyrites with gold, and such is the case in the Peabody group, in this respect differing from the east and west series.

It has been largely in favor of the development of the district that the mines were held in groups by parties able to explore them. At the present time the principal groups are owned by the Pride of the Mountains, Monte Cristo, Rainy, Wilmans, Pearsall incorporated companies, and by the owners of the Peabody, Packard and Waverly series. These groups are located in all parts of the district, and have all developed ore, so that there does not appear to be any concentration of ore at a few particular points, but a general distribution over the entire area.

The Pride of the Mountains company is working an outcrop on the Pride of the Mountains and '89 mines which crop for 1,500 ft. with an average width of 4 ft. of ore, and have a cable tramway 7,000 ft. long from the mine to the bunkers at the railroad. The Monte Cristo Mining company is working the West Seattle, Mystery, Pride of the woods, Ibox, '76, '74 and Emma Moore mines, all in ore, while the '76 crops plainly for 5,000 ft. The Rainy company is working the Congress and Rainy mines, the tunnel of the latter being 200 ft. long. The Wilmans company is working the Monte Cristo, Comet, and adjacent group, in fine ore, and has a tramway 5,500 ft. long from the Monte Cristo mine to the bunkers. The Pearsall company has a large group of mines at the head of the '76 basin, all with "iron" as a prefix to the name of the location, and show satisfactory developments. The Packard group shows ore on fully a dozen locations and the development of galena on the Rantoul mine is most satisfactory. The Waverly group, consisting of the Waverly, Mexican, Oro, Pinto, and others, has numerous tunnels and large ore developments. The Peabody group, consisting of the Hannah, Rob Roy, Mountain Maid, Alameda, Tyee, Mirror and Poodle Dog, has ore on all of its locations and an excellent showing, which is enhanced by the probability that the north and south vein in the property is the extension of the Rainy vein, but even if this should not prove to be the case, there exists a member of the same series, which must cross the east and west group, and the intersections of veins are usually more productive than other portions of the lodes. Below the Peabody group there is a large group of mines from which I have a good series of ore, while just northwest of the junction of '76 and Glacier creeks the Lallah Rookh and Tobique show a good body of high grade galena.

From these data it would seem that a larger proportion than usual of locations will produce ore, and that the veins can be explored cheaply. The mines in the '76 basin are excellently situated, as all their product can be landed at the railroad bunkers at a minimum expense by means of a tram not more than 1½ miles long, to which 40 locations showing ore can be made tributary by short lateral branches.

An Old Ship.—The "Globe," a brig of 329 tons register, was recently in the Liverpool docks, unloading a cargo. She was built in 1836 and has been in constant service for 57 years, but a survey showed her to be seaworthy and apparently good for many more voyages.

## MINERAL PRODUCTS OF NORTH CAROLINA.

Gold.—During 1892 there were 56 gold mines in operation in the State, 15 being placer and 41 quartz mines. The total number of stamps in operation was 310; total number of employees, 500; total value of product, \$65,000.

Pig Iron.—Only one blast furnace was in operation during 1892, that at Cranberry, Mitchell County, belonging to the Cranberry Iron and Coal Company. It is a brick stack; height, 50 ft.; bosh, 10 ft. 2 in.; hearth, 3 ft.; capacity, 15 tons per day. It uses the low phosphorus magnetic ore of the Cranberry mine, magnesian limestone from Carter County, Tenn., and Pochontas coke. The total output in 1892 was 2,902 tons, of which 313 tons were charcoal and 2,589 tons coke pig; value of product, \$52,000. The iron is special Bessemer, averaging less than 1.00% silicon and less than 0.025% phosphorus. It was shipped to steel works in Ohio and Pennsylvania. The production of the Cranberry furnace has been as follows in gross tons: 1890, 2,840; 1891, 3,217; 1892, 2,902; total, from 1884 to 1892, inclusive, 20,891 tons.

Blooms.—There was a small amount of bloom or forge iron made at Pasley's forge, at the mouth of Hilton Creek in Ashe County. The fire is blown by a water-trompe and the hammer worked by water power. It is the only forge now in operation in the State, and the output is from 20 to 30 tons of bar iron for local consumption.

Bituminous Coal.—The Egypt Coal company is operating the Egypt coal mine, Chatham County. It shipped during the year 6,500 tons, valued at \$7,475. Accidents by fire and water reduced the output below that of 1891 by nearly one-half. The company has improved its plant by the addition of three underground pumps and a new hoist. An 8 x 12 ft. ventilating shaft is being carried down. An analysis of the coal is as follows: Moisture, 1.25%; volatile matter, 33.35%; fixed carbon, 49.18; ash, 16.22; sulphur, 1.72; specific gravity, 1.294.

Copper Ore.—The only producer last year was the Blue Wing mine in Granville County. Up to October, when the mine and the concentrator closed down indefinitely, the production of concentrates was estimated at a value of \$15,000. The concentrates were shipped to the Orford Copper Works, New York. The ore is chiefly bornite held in quartz, and the following analyses will show the quality of the ore and the concentrates: Run of mine ore, 8.66% copper and 3.55 oz. silver per ton; cobbled ore, 14.21% copper and 5.66 oz. silver; jig concentrates, 52.32% copper and 12.00 oz. silver; true vanner concentrates, 36.87% copper and 12.60 oz. silver.

Corundum.—The total production is estimated at 500 net tons, with no value given. The chief producers were the Corundum Hill, and Ellijay mines in Macon County, and the Hogback mines in Jackson County. In Iredell County, two miles west of Statesville, several veins were opened and about 9,000 lbs. taken out, but no regular mining was done.

Iron Ore.—The total production of iron ore in 1892 is estimated at 23,433 gross tons, valued at \$43,306. Of this amount 17,088 tons, valued at \$34,423 were shipped out of the State. The only mines in operation were the Cranberry, in Mitchell County, and the Ormond, in Gaston County. The Cranberry mine produced 18,433 gross tons, valued at \$25,806, shipping 12,088 tons, valued at \$16,923 to furnaces in Southwest Virginia. The ore is magnetite, the following analyses by Porter W. Shimer showing the average quality of run of mine: Silica, 23.72%; metallic iron, 45.90%; metallic manganese, 0.44%; alumina, 1.01%; lime, 9.69%; magnesia, 1.51%; sulphur, 0.012%; phosphorus, 0.007%.

The total output of the Cranberry mines has been as follows, in gross tons: 1890, 30,290; 1891, 27,628; 1892, 18,433; total, 9 years, 1884 to 1892 inclusive, 202,850 tons.

The Ormond mine, on the Atlanta & Charlotte Air Line Railroad in Gaston County, produced during the year about 5,000 gross tons, valued at \$17,500. It was shipped to Birmingham and Richmond as fettling. The ore is a mixture of hard hematite, porous limonite and soft, black ore slightly magnetic. An analysis at the works of Carnegie Bros. & Co., Ltd., of the lump ore gave: Silica, 1.51%; metallic iron, 65.79; phosphorus, 0.028. The soft, black ore showed: Silica, 1.55%; metallic iron, 65.35; phosphorus, 0.007. The lump ore does not average as high in iron or as low in silica as the analysis just quoted, for another analysis shows: Silica, 9.72%; metallic iron, 52.39, and phosphorus, 0.079. The mine was closed down in September, on coming into the possession of the Bessemer Mining company, which is remodeling the plant for a larger output. The North Carolina Iron and Steel company completed the furnace at Greensboro in June; the dimensions are: Height, 70 ft.; bosh, 16 ft.; capacity, 100 tons per day. The furnace will use the ores from Ore Hill, Chatham County, on the Cape Fear & Yadkin Valley Railroad, 40 miles south of Greensboro. The average of four analyses of this ore, made in the laboratory of the Geological Survey, shows: Silica, 7.03%; metallic iron 46.94; phosphorus, 0.88, and sulphur, 0.178. About 700 tons have been mined. The company may also use the magnetites of the Danbury belt. Flat Top coke will be used.

Kaolin.—The total production of prepared kaolin in 1892 is estimated at 3,900 net tons, valued at \$31,200 at the works. The principal producers were the mines at Sylva and Dillsboro in Jackson County.

Mica.—There were in operation in 1892 10 or 12 mines in Mitchell and Yancey counties. The total output is estimated at 10,000 lbs. of cut mica, valued at about \$35,000. The average price of cut mica, 3 x 5 in., at the mills is \$3.50 per lb. Three mills for preparing ground mica from waste scrap were in operation in Mitchell County, but no estimate of output can be given.

Talc.—Total shipments from the mills are estimated at 2,500 net tons, valued at \$19,000. The principal producers were: The Notla Consolidated Marble, Iron and Talc Company, of Cherokee County, and Messrs. Richard & Hewitt, of Swain County.

(The coal deposits of Chatham County are of Triassic age, or Jura-Trias. The Egypt shaft was put down to the depth of 494 ft. 30 years ago and a large amount of coal taken out just prior to and during the

\*Abstracted from a paper read before the Elisha Mitchell Scientific Society Chapel Hill, N. C., by H. B. C. Nitze, of the Geological Society of North Carolina.

civil war. The Egypt Coal Company, a Philadelphia concern, unwatered the shaft and the workings three years ago. The seam dips at a sharp angle and is divided by  $2\frac{1}{2}$  ft. of black band iron ore into an upper and lower bench, the former giving 3 ft. and the latter 5 ft. of clean coal. The coal is fiery and in places more sulphurous than the analysis quoted would indicate.—Ed. E. and M. J.)

#### THE CONSTRUCTION OF LEAD BLAST FURNACES.\*

The accompanying engravings, Figs. 84-88, represent the blast furnace of the Omaha & Grant Smelting and Refining Company's works at Denver, Colo.; Figs. 89 and 90 the furnace of the Globe Smelting and Refining Company at Denver, Colo., designed by Mr. Hes.

The materials required for the erection of a furnace as shown in Figs. 89 and 90 are: Cast iron, 27,300 lbs.; wrought iron, 3,200 lbs.; steel beams, 4,250 lbs.; fire-brick, 9,500; red brick, 17,000. Where a telescope stack is used, 1,600 lbs. of wrought iron must be added to the above figures. The cost of erecting the furnace, excluding all the fittings for blast and water, at Denver, was \$1,200, one-quarter of which went for labor.

The first thing in erecting a furnace is to have a solid foundation. Its depth will depend on the character of the subjacent ground. If there is exposed bed rock this will furnish as good a foundation as can be wished for. If there is loose soil or gravel covering bed rock for not more than 10 ft., it is best to excavate until this is reached; otherwise a depth of 5 ft. will usually be sufficient to start the masonry below frost line, and to give the foundation the requisite strength. With very loose soil it is sometimes advisable to place in the bottom of the pit two layers of 3 or 4-in. planks spiked crosswise to each other, and upon that to build the foundation, which should extend from 2 to 3 ft. beyond the bed plate and the four pillars. It is built up of undressed rock, well rammed into place, the largest pieces being used for the corners, and care being taken to fill up the crevices and joints with as many spalls as possible; the whole is well grouted with a mixture of four parts of lime mortar and one part of cement. The topmost course must be absolutely smooth and horizontal, being generally of brick. On the foundation is spread a thin clay mortar, upon which the wrought iron bed plate is placed. On the foundation are erected the four hollow cast iron pillars *u*, which are to support the shaft.

The height of the shaft, i. e., the distance from the center of the tuyeres to the feed floor, has been somewhat increased of late. It used to be from 10 to 12 ft.; it was then increased to 14 ft., which is the common dimension now, although occasionally it reaches 18 ft. The increase of height has been necessitated by the greater pressure of blast required for the highly siliceous and calcareous slags. The ferruginous slags, formerly made, needed only a pressure of from  $\frac{3}{4}$  to 1 in. quicksilver, instead of from 1 to 2 in. as at present. By enlarging the distance between the tuyeres, to increase the capacity of the furnace, it became necessary also to increase the pressure from 2 to  $2\frac{1}{2}$  in. quicksilver. The horizontal section of the shaft is either a circle or an oblong. When a square or polygonal furnace is blown out, the inside will have a similar appearance to that of the circular, as the corners very soon fill up. The same holds good with the oblong furnace.

For the usual run of ores the width at the tuyeres may range from 30 to 36 in., the height above the tuyeres from 11 to 14 ft., and the blast pressure from 1 to  $1\frac{1}{2}$  in. quicksilver. A furnace 33 by 100 in. at the tuyeres, with five  $3\frac{1}{4}$  in. tuyeres on either side, 12 ft. active height, will smelt with  $3\frac{1}{2}$  in. quicksilver pressure as much medium-coarse charge as one regular crew of men will be able to handle in a twelve-hour shift, i. e., 60 tons of charge, or about 45 tons of ore.

The gases are now usually drawn off by a flue *v* at the back of the furnace, or better, by two at the sides. To avoid sucking in air or letting out fumes the feed opening in the cast iron top plate *w* is made rather small; it is, however, large enough for the feeder to be able to spread his charge in any way that may be necessary, and to reach any part of the side walls with a bar when cutting out wall accretions. The flue leading to the dust chamber, which used to be sheet iron, is now commonly built of brick. It rests on heavy rails, and is thoroughly bound with brickstays and tie-rods.

Formerly a telescope stack *z*, was suspended by chains *k* over every furnace. It is a sheet iron pipe reaching through the roof and balanced by counterweights *l*. Its lower part is enlarged to the oblong form of the feed opening, and has a small feed door *m* on either side. The stack is lowered when the furnace is blown in or out, to carry off the gases into the open air. At present, large smelting plants have (say) two of these sheet iron stacks suspended from a traveler, to be used in case of necessity, and in some instances this stack has been thrown off entirely. Instead, above each furnace is suspended a  $\frac{3}{4}$ -in. cast iron plate sufficiently large to close the feed opening *m'*. It is lowered when the furnace is being blown out, to prevent the fumes from passing to the feed floor; the joint is made air-tight by spreading moistened fine ore over it.

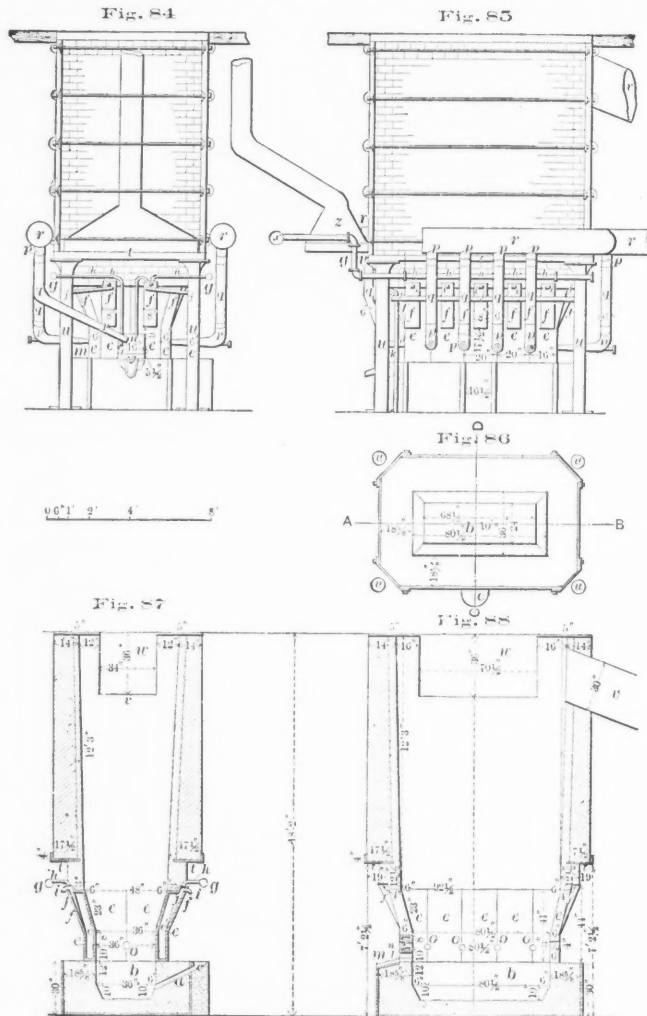
In a hearth with Arents' automatic tap, the bottom of the hearth is formed by a bed plate of boiler iron *y'*, which is to prevent any lead from percolating downward. It is placed on the foundation. Care must be taken to have its center coincide with that of the shaft by dropping a plumb-line from the feed floor. The bed plate sometimes has an angle-iron rim enclosing the bottom course of brick; sometimes it reaches beyond the castings, enclosing the hearth, which rests upon it.

These castings *h'*, reaching to the top of the hearth, have been and still are a great trouble, as they are very liable to crack. At first they were made 1 in. thick; later the front and back plates were strengthened by ribs; then the side plates, castings, and ribs have been made thicker and the beveled corners have been fastened together by special tie-rods. Still there is danger of their cracking, so that in some furnaces a wrought iron band is screwed to the sides to hold the casting together. It would seem as if making the outer wall of the hearth oval and en-

closing it with a  $\frac{3}{8}$ -in. wrought iron plate, as is done in the modern large iron blast-furnaces, would be the way to solve the difficulty.

To the casting on the front is fastened with bolts the slag spout *a*, and to the side the lead spout *a'*, if the well is confined within the hearth plates, as is now usual. It is not often that the slag is tapped alternately from the front and the back of the furnace, requiring two slag spouts, and that the lead is removed from the two sides. Two slag taps have been used at some furnaces to counteract the forming of a crust at the back of the furnace, where it usually begins growing toward the front, from which it cannot easily be reached. If the slag is tapped from both front and back, the danger of crusting at the back is in part at least avoided, and if an obstruction forms there, it is easily removed. Having two lead-wells is simply a waste of heat, for when one becomes clogged up, the other will also.

The hearth walls and bottom are of fire-brick. They usually rest on the bed plate. Sometimes on the bed plate and below the crucible a 6-in. layer of ground brick and raw clay (3 : 2, by volume) is beaten down firmly in the form of an inverted arch, on which the bricks forming the bottom proper are placed. In building the side walls it is better not to place the bricks in direct contact with the castings, but to leave a small space of (say)  $2\frac{1}{2}$  in. and tamp it out with brasque (equal



LEAD BLAST FURNACE, OMAHA & GRANT SMELTING COMPANY, DENVER, COLO.

volumes of ground coke and clay) while the bricks are being placed. In this way the crucible, when it expands, will simply pack the brasque tighter, and thus relieve the castings from at least part of the strain.

Arents' automatic tap, or siphon tap, which forms part of the side wall, consists of an inclined channel, the siphon *d*, 3 or 4 in. square, running from the lowest part of the crucible wall inside to the top on the outside, where it is enlarged into a dish-shaped basin—the lead-well *e*, the length, of course, depending on the depth of the crucible, which varies from 22 to 30 in. The tap is usually in the middle of one of the sides, although sometimes placed nearer the front; while the furnace is running, the crucible remains nearly full of lead, that in the automatic tap standing a little higher on account of the pressure of the blast. From the well the lead, as fast as it is made in the furnace, is either ladled into molds or it overflows into the cooling pot, or it is periodically tapped into it, and is thence ladled into molds.

The water-jackets *E* are water cooled iron shells that inclose the smelting zone of the furnace to protect it from the corrosion of the slag. Since about 1873 they have come into more general use, and have now entirely replaced the brick walls at the region of the tuyeres whenever there is sufficient water to warrant their use. Only where this is very difficult to obtain, sandstone, firebrick or other refractory material is reverted to.

The water-jackets, shown at *E*, Fig. 90; also at *F*, are placed

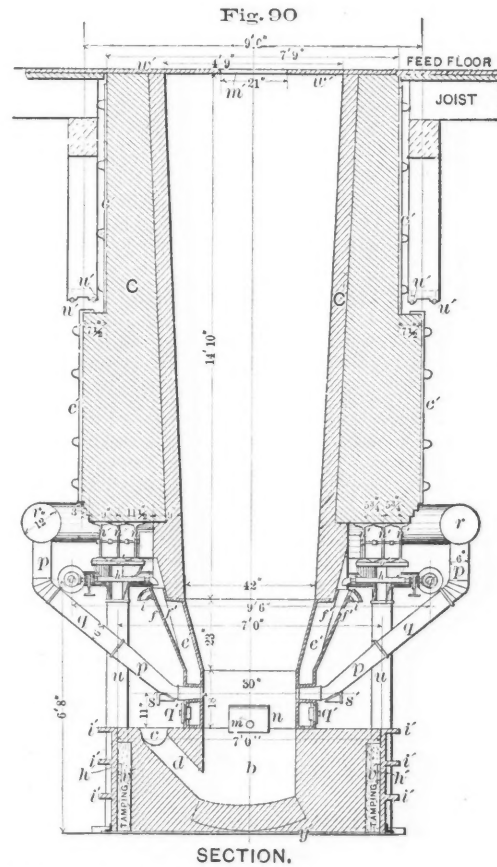
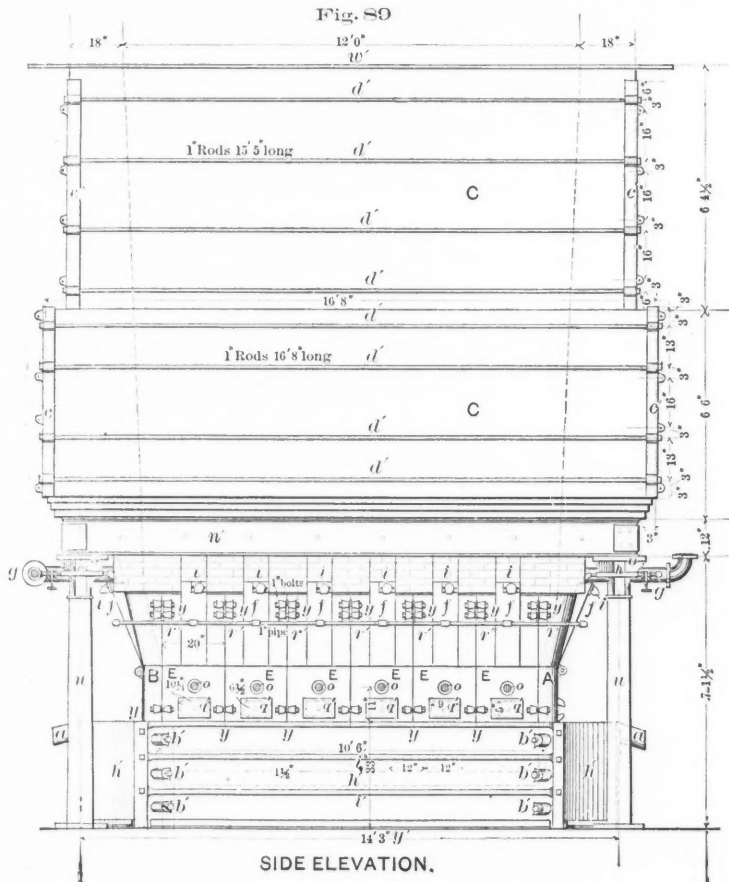
\* From the "Metallurgy of Lead," by Prof. H. O. Hoffman. Copyrighted by the Scientific Publishing Company.



on top of the hearth-walls, forming their continuation on the inside. Their height has varied from 2 to 4 ft.; 3 ft. 6 in. is an ordinary measure. They thus reach from the top of the hearth to within about 12 in. of the cast iron carrier-plate *t*, or the I-beams *n'*, which support the shaft. The center of the tuyeres is placed 10 in. higher than the bottom of the jackets, and from 8 to 10 in. above this begins the bosh, the amount of which varies from 6 to 10 in. Jackets are made of cast iron and wrought iron. Cast iron jackets are generally 6 in. thick, the sides being of  $\frac{3}{8}$  or  $\frac{5}{8}$  in. iron. Each jacket has a special water feeder *f*, which begins 8 or 10 in. above the center of the tuyere and runs from 3 to 4 in. above the top of the jackets, extending outward about 4 in. This insures the complete filling of the jacket with water. As the top of the feeder is closed only by a lid, tools can be introduced to scrape off scale. The feeder was formerly cast in one piece with the jacket, but now is a separate casting, which is fastened on with screws or bolts. At first there was no opening at the lower end of the jacket to remove mud or scale that had collected; now there is usually a hand-hole for this purpose, and thus the life of the jacket is much prolonged.

A plan much used is to fill the open place in front with a tapping-jacket to within  $2\frac{1}{2}$  in. of the top. This space is left for convenience in taking out the tapping-jacket, and is closed by brick. The jacket, 26 by 14 in., and  $3\frac{1}{2}$  in. deep, has,  $6\frac{1}{2}$  in. above its lower edge, a tap hole *m*, which is  $2\frac{1}{2}$  in. in diameter, and widens, after entering the jacket to the depth of 1 in., to 5 in. on the inner side. The lower edge of the jacket is placed 4 in. beneath the upper edge of the crucible castings,

often needed in blowing in or blowing out. The main delivery-pipe starts from the water tank and runs along the front or back of a row of furnaces. From it branch off separate supply-pipes, each of which ends in a pipe *g*, surrounding its own furnace. This supplies the small feed-pipes *h*, which deliver the water into the top of the feeders, the flow being regulated by a valve. The cold water, entering the jacket at the top, sinks down slowly and pushes upward the hot water, which runs off through the small pipe *i* below the inlet. This, the common arrangement, accomplishes on the whole its purpose, but if the temperatures of a jacket be compared at the top and the bottom, it will be found that the bottom is always hotter. There are two ways of equalizing this. One is to attach a rubber hose to the feed-pipe *h*, thus letting the cool water come in contact with the hot water at about the middle of the jacket. The other is to have an extra supply-pipe through which a small stream of water runs in near the bottom of the jacket. If these two methods do not succeed in cooling the lower part of the jacket, it shows that it contains mud or scale, and requires cleaning, if it is not soon to burn through. The hot water from the jackets is discharged into a galvanized iron trough, *j*, surrounding the furnace, from which it passes off through a cast iron standpipe *k* into a main under ground. The troughs are often in the way when the furnace is running, and are very inconvenient sometimes, as, for example, when a cracked jacket has to be exchanged. To remedy this, the water is sometimes carried away from the jackets by long pieces of gas pipe, terminating in the funnels of standpipes placed close to the supporting pillars and connected with the main under ground. There are two or four of these



LEAD BLAST FURNACE, GLOBE SMELTING COMPANY, DENVER, COLO.

and thus prevents at the front that leakage of lead from the crucible which is otherwise so difficult to stop. The last arrangement is the one now in general use at large smelting works. Having large ore beds from which to make up the charges, there is little probability of trouble in the furnace, and therefore a small opening closed by the tapping jacket is sufficient for all practical purposes. At small smelters, where the charges are changed often, it is probably better to have the front jackets 10 in. smaller than the side jackets, in order to give room for working in the crucible, should it prove necessary. The water-jackets have been joined in various ways by using wedges, screws, bands, etc. Now they are simply bolted to each other near the top and bottom, the bolts passing through lugs cast in the jackets. Wrought iron jackets have in many instances replaced those of cast iron. With circular furnaces they are exclusively used. They have no bosh, and are usually in two parts. They seldom have special water-feeders, like the cast iron jackets, the water inlet pipe being usually near the bottom and the outlet pipe near the top. With this arrangement, it is important, if a complete filling of the jackets with water is to be made possible, to have one or two small pieces of pipe protrude upward and outward from the top of the jackets, and to have the water outlet pipe also bent upward that it may discharge above the top of the jackets. Water jackets made of cast steel have also been used and have given great satisfaction.

The cooling water for the jackets is drawn from a wooden tank, the bottom of which should be at some distance above the water inlet, in order that there may be some pressure, as an extra amount of water is

standpipes. Thus, if a jacket has to be exchanged, it is only necessary to turn off the water supply from it instead of from the whole side, as is ordinarily done, the trough being also removed. The amount of water required to cool the jackets varies with the size of the furnace and the slag that is being made. A furnace 36 by 92 in. at the tuyeres, making a siliceous-calcareous slag, requires under normal conditions 11 gallons of water per minute. This is a good average figure. For blowing in or blowing out, one must be prepared to use double this amount. It is sometimes said that cast iron jackets require less water than wrought iron ones, but this remains to be proved.

Copper from Birds.—Prof. A. H. Church, of London, has succeeded in obtaining metallic copper from turacin, a crimson pigment yielded by the feathers of the turacin, an African bird. The average composition of turacin is: Carbon, 53.69%; hydrogen, 4.60; copper, 7.01; nitrogen, 6.96, and oxygen, 27.74%. The amount of copper in the turacin of a single bird is not quite one-fifth of a grain.

Steel Canal Boats.—According to "Transport," canal boats of iron and steel are now being extensively manufactured in South Staffordshire, England. The iron and steel boats usually built average from 9 to 10 tons in weight, 70 ft. long by 7 ft. wide, 9 to 10 in. in draught, and are capable of carrying 30 tons. Those intended for the rough traffic, such as tap cinder, pig iron and iron-stone, and other heavy weights, are made of thick iron sheets, but those designed for sand lime, ores and such traffic are made of thin steel plates.

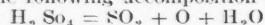
## THE DEWEY REFINING PROCESS FOR SULPHIDE PRECIPITATES.

The process invented by Frederick P. Dewey, of Washington, for treating the sulphides produced in the lixiviation of silver ores, and which is in use at the Marsac mill, Park City, Utah, contains some novel features. These precipitates, which contain approximately from a trace to 1% of gold, from 5 to 70% of silver, from 5 to 20% of copper, from nothing to 15% of lead, with considerable amounts of free sulphur and small quantities of zinc and cadmium sulphides if these metals occur in the ore, have been considered impossible to treat by a direct sulphuric acid process, and when C. H. Stetefeldt devised his earliest process he contemplated the use in addition to sulphuric acid of an oxidizing agent such as nitre. This was possible as a matter of course, but there were technical difficulties in the way, such as the violence of the reaction and the cost of the operation. In his later process he roasted the sulphides and treated the resultant mass, while we are informed by Mr. Stetefeldt that an analysis of the books and a clean-up of the works have proved his process to be an economical success, yet it has been superseded by Mr. Dewey's process, which in contradiction to the old ideas consists in treating the sulphides direct with strong sulphuric acid.

The first step of the Dewey process consists in subjecting the sulphide mixture in a suitable pot or kettle to treatment with heated sulphuric acid marking 50° B. or over. The acid is poured over the sulphides and may be heated by a steam coil. Its amount will vary with the percentage of copper and silver contained in the sulphides. When Russell sulphides are treated, acid of 66° B. is used, in quantity twice as great as the weight of the sulphides. Heat is then applied to the kettle and the contents are stirred until the dark color of the sulphides has disappeared. With a moderate heat the reaction is as follows:



the metallic sulphides becoming sulphate with evolution of sulphuretted hydrogen. When the heat is continued water is given off, the acid becomes stronger and the following decomposition takes place:

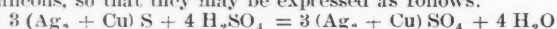


The sulphurous acid and oxygen produced in this reaction react upon the sulphuretted hydrogen produced as in the former reaction as follows:



Such a reaction causes the separation of sulphur in its elemental condition in order to avoid the oxidation of the sulphur, which would take place were the heat raised, to produce a rapid decomposition of the sulphuric acid into  $SO_2 + O + H_2O$ . Mr. Dewey prefers a lower heat, sufficient, however, to cause the second and third of the reactions before mentioned, to take place. If the temperature is carefully regulated and kept low enough all the sulphur combined with the silver and copper may be driven off as sulphuretted hydrogen, but Mr. Dewey prefers to use a higher degree, causing the second and third reactions to be carried on, as the operation is quicker and but little care is necessary.

In practice the first, second and third reactions are practically simultaneous, so that they may be expressed as follows:



The metallic sulphides become soluble sulphates, of which the sulphate of silver is entirely soluble in strong acids. The silver may be precipitated as in a parting process by metallic copper. The copper may be readily separated while the lead and gold are completely insoluble. These may be separated in the melting, the lead sulphate being slagged off and the last traces being removed from the bullion by nitre. The bullion produced by this process is said to be nearly fine, and the cost is stated to be less than 1¼ cents per oz. of silver contained.

At the Marsac mill, where the process has been introduced, the cost of acid is high and it is proposed to erect acid chambers. The sulphate of copper produced in the refining is utilized in the Russell process, and there are strong possibilities of the plant being extended to a capacity to treat the sulphides which will be produced in the new Ontario lixiviation mill as well as others from other localities. Mr. Dewey has a large number of patents under way and expects to introduce certain improvements which will cause the routine to differ slightly from that here described.

**The Lowest Price of Steel Rails.**—The Cockerill Company, at Seraing, Belgium, has just taken an order for 3,600 tons of steel rails for a Spanish road at 99.50 francs, f. o. b. at Antwerp. This price, about \$19, is stated to be the lowest on record for steel rails.

**Production of Pig Iron in Germany.**—During February, 1893, Germany and Luxembourg produced 551,842 tons of pig iron, against 578,700 tons in February of 1892. The output from January 1st, 1893, to March 1st, was 725,485 tons, against 787,075 during the corresponding period of 1892.

**Old Timber.**—Two of the original mud sills of the old Madison & Indianapolis Railway have been taken from the bed of the track at Champion, Ind., where they have been for 60 years. They were of white oak, 18 ft. long and 10 × 12 in. square hewn. They were found in a perfect state of preservation, but had turned in color almost blue. The Madison & Indianapolis was the first railroad in Indiana, and one of the first in the West. The track was laid on longitudinal sleepers with a strap iron on one side, like many of the early railroads.

**Soldering Aluminum.**—A method of soldering aluminum and its alloys is recommended by Mr. G. Wegner, a goldsmith, of Berlin. The method consists essentially of the use of a flux made of 80 parts of stearic acid, 10 parts of chloride of zinc and 10 parts of chloride of tin. Any ordinary soft solder can be used, but the best solder is composed of 80 parts of tin to 20 parts of zinc. After the pieces of metal have been cleaned and damped with the flux the solder is applied in the usual way. This flux and solder can be used for soldering aluminum and its alloys or for attaching them to any other metals.

## ABSTRACTS OF OFFICIAL REPORTS.

## ELKHORN MINING COMPANY LIMITED, MONTANA.

The third annual report of this successful property shows that in 1892 some 486,059.19 fine ounces of silver and 542,303 fine ounces of gold were produced by the mill from 12,448 tons of ore. In addition to this 3,985 tons were shipped, containing 422,270 fine ounces of silver, 519,916 fine ounces of gold and 794,304 lbs. of lead, netting \$290,436, or \$72.87 a ton. The cost of mining was \$11,628 per ton, and that of treating, \$8,678; a total of \$20,306 per ton. The costs of treating were divided as follows: Labor account, superintendence and foremen, \$0.4678; engineer, \$0.232; crushermen, \$0.1729; dryermen, \$0.1735; batterymen, \$0.2324; roastermen, \$0.2026; cooling floormen, \$0.1735; carmen, \$0.346; pummen, \$0.2327; panhelpers, \$0.1928; assayer (proportion), \$0.0905; storekeeper, \$0.0493; millwright, \$0.0755; machinists, \$0.1858; teams and labor, \$0.1903; watchmen, \$0.0871; talling storage, \$0.0881; office expense, \$0.0710; total, labor account, \$3,2638. Supplies account: Chemicals, \$0.057; lubricants, \$0.0404; illuminants, \$0.0066; fittings, \$0.0153; tools, \$0.0050; castings, \$0.3786; iron and steel, \$0.0257; lumber, \$0.0126; charcoal, \$0.0393; belting, \$0.0360; iron ore, \$0.1004; quicksilver, \$0.3334; salt, \$2.218; fuel, \$1.1735; assay office, \$0.0342; stables, \$0.0369; office and incidentals, \$0.0597; freight, \$0.1145; insurance, \$0.1617; machine shop, \$0.0053; legal expenses, \$0.4684; sundries, \$0.0918; total milling supplies account, \$5,4143; total cost milling, \$8,6781. This was \$0.548 per ton less than in 1891.

The net profits during the year, after payment of all charges and allowance for income tax, amounted to £79,883 12s. 8d., or about \$390,000. Four quarterly dividends at the rate of 40% per annum on the capital stock, together with a bonus of 2½%, were declared, amounting in the aggregate to £74,377 19s. 6d., and leaving a balance on hand of £7,714 0s. 4d. The mine showed, according to careful estimates made December 31st, 1892, some 23,500 tons of ore of an average grade of 50 oz. in sight, as against 25,000 tons at the beginning of the year. Developments in the lower levels are extremely encouraging, and it seems probable that the ore bodies will continue to a yet greater depth.

## THE MOISSAN ELECTRIC FURNACE.

M. Henri Moissan makes some more interesting announcements in a recent number of the "Comptes Rendus" with regard to the latest results obtained by means of his electric furnace.

At ordinary temperatures the oxides of uranium are practically irreducible; but they have yielded to the heat of the electric furnace. M. Moissan prepares a mixture of uranic oxide ( $U_2O_3$ ), and of the green oxide of uranium ( $U_3O_8$ ), adding a little powdered carbon, and strongly compressing the whole. Placed in M. Moissan's furnace, and exposed for a few minutes to a current of 450 amperes at 60 volts, one can obtain a metallic ingot, the pieces of which, if agitated, will emit sparks from the combustion of traces of foreign matter. The yield of uranium is fairly good, and from 200 to 220 grams may be obtained in 12 minutes; the average composition of the ingots being 90% uranium and 10% carbon. These carbides of uranium slowly decompose water at ordinary temperatures, and their melting point is much higher than that of platinum (1,780° C.).

Chromium and manganese have also been prepared by M. Moissan. Pure protoxide of manganese is mixed with carbon, and exposed to 300 amperes at 60 volts, and in five or six minutes there is at the bottom of the crucible an ingot of carbide of manganese (89% manganese), weighing 100 to 120 grams. With less power smaller quantities can be obtained in a little longer time. If the reduction is effected in presence of an excess of oxide the percentage of carbon is greatly diminished, and in some samples it is possible to get 95% manganese. When the proportion of carbon is small the metal may be easily preserved in an open vessel; but as soon as the proportion of carbon increases the humidity of the air decomposes the substance.

A mixture of calcined sesquioxide of chromium and carbon is reduced in eight to ten minutes by a current of 350 amperes at 55 volts, leaving an ingot weighing 100 to 110 grams adhering to the crucible. The average composition of M. Moissan's samples was about 89% chromium, and the rest carbon. By a further attack in the furnace practically pure chromium may be obtained. Not only may the sesquioxide be reduced in this way, but also the natural chrome iron ore  $FeO Cr_2O_3$ .

**Open-Hearth Steel Production in England.**—The British Iron and Steel Institute reports the total production of open-hearth steel ingots in Great Britain in 1892 at 1,418,830 tons, a decrease of 95,708 tons, or 6.3%, from 1891. Of the production in 1892 acid steel formed 1,310,774 tons, and basic 108,056 tons.

**Electric Power Transmission in Sweden.**—Plans have been completed for a power station at outlet of the Huella Lake, in Sweden, where there is a large water power. At present four turbines, each of 100 H. P., will be put in, one of them to be held in reserve, in case of a breakdown. The power will be transmitted by overhead wire to Grangesberg. The electric lighting station is six miles and the station from which power will be distributed is eight miles from the dynamo-house.

**German Railroads.**—An official report upon the railroad system in Germany contains the following interesting items: The total amount of capital invested in the railways is \$2,666,242,305, or \$63,000 per kilometre. Total receipts in 1891-2, \$335,367,000 or \$7,928 per kilometre; expenses, \$212,219,500, or \$5,016 per kilometre. This leaves an annual receipt of \$117,850,000, or \$282 per kilometre (after all deductions); equal to a yield of 4.49% upon the invested capital. These figures do not include the light local lines, of which there are altogether 1,155.42 kilometres. The capital invested in them amounts to \$15,318,000; receipts in 1891-2, \$1,333,000; expenses, \$981,400; gain, \$351,600, or 2.29% of the capital invested. At present more new construction is in progress on these light railroads, or "secundarbahnen," than on the other roads.

LEMICHEL'S SIPHON WATER ELEVATOR.

The engravings given herewith show an ingenious application of the siphon to the raising of water, which has been patented and brought out in France by Lemichel & Cie., of Paris. In this device the force of the column of water passing through the siphon is diverted in part at the highest point. The device is shown in section in Fig. 1, while Fig. 2 is an elevation and Fig. 3 a plan. The arrangement consists of the siphon with the two legs a and b, a tank b and a regulator g. In the tank or receiver b is a valve c, which can be opened or shut by means of the lever l, on which is a counterweight p. A small valve k is placed above, from which the siphon can be filled, and the delivery valve d is at the top of the reservoir, held ordinarily shut by the spring above it. The regulator g is a cylindrical cast iron box, with heads t, t made of very thin corrugated sheet iron. The vibration of these plates insures the continuous movement of the water, and prevents the siphon from running out.

In operation, the siphon is first filled through the small valve k. When the water begins to pass through, as in an ordinary siphon, the passage is closed by the valve c; the pressure in the reservoir b lifts the valve d and water is forced out. At the same time the leg h is partly emptied, causing a depression in the regulator g; but the pressure on c is also diminished to such an extent that it will be opened by the weight p. Water will then again pass into the regulator; its force will close the valve c and the whole process will be repeated. In practice the pulsations are regular, and have varied in different places from 150 to 400 per minute. Even at the lower speed the discharge from d seems to the observer continuous. The makers state that, while the height to which water can be raised by atmospheric pressure in the

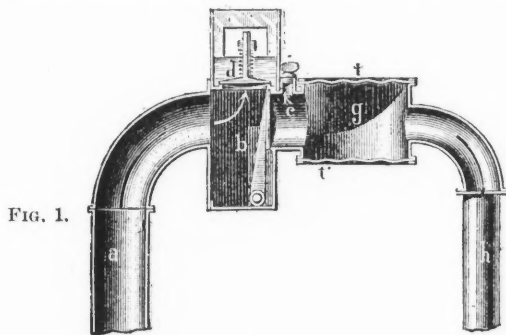


FIG. 1.

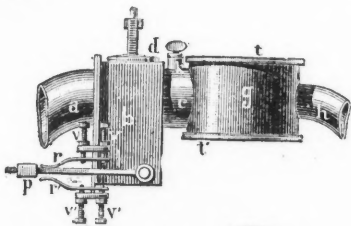


FIG. 2.

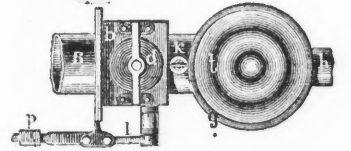


FIG. 3.

LEMICHEL'S SIPHON WATER ELEVATOR.

siphon is 10.33 meters, in practice about 9.5 meters lift can be obtained, while the delivery of water is about 90% of the capacity of the leg a. The device is simple and not expensive, and might be used in many places where a steam pump would be too expensive.

DECISIONS AFFECTING THE MINING INDUSTRY.

Circuit Court of the United States, Northern District of California.

Hydraulic Mining—Obstructions to Navigation.

This was a bill in equity filed by the United States against the North Bloomfield Gravel Mining Company, to enjoin it from continuing its hydraulic mining operations in Nevada County, Cal., on the ground of obstructing and endangering navigation in certain rivers.

By 24th statute at large, p. 326, appropriations were made for the improvement of certain rivers in California, with a provision that the balance of such appropriation should not be used until certain hydraulic mining operations, hurtful to navigation, had ceased on such rivers, and in the event of its continuance authorized the Secretary of War to institute legal proceedings to prevent the same. Held that such legislation was a sufficient assumption of national jurisdiction over the waters of such rivers, under the commerce clause of the constitution, to confer upon the federal courts jurisdiction of a suit by the United States to enjoin the continued deposit of mining debris where injurious to navigation.

In an injunction by the United States against a company engaged in hydraulic mining, alleged to be obstructive of navigation of the waters in question, it appeared that the operation of the defendant's mine had been enjoined some time prior to the commencement of this suit; that intimation was made in the decree of injunction that, when it was satisfactorily shown to the court that proper impounding reser-

voirs had been constructed, such decree would be modified so as to permit resumption of operations by defendant; and, that the company, before the bringing of the present suit, had caused to be erected extensive works, by means of which it impounded upon its own land and within its own mine all materials likely to injure the navigations of the streams involved.—Injunction denied.

Hydraulic Mining—Obstructions to Navigable Waters—Wooden Dam.

This was a bill in equity filed by the United States against Charles H. Lawrence for an injunction. An injunction will be granted at the suit of the United States to restrain hydraulic mining operations, when it is apparent that the dam constructed in connection with the impounding works is of wood, standing in the bed of a torrential mountain stream, and of necessity is liable to be carried away by freshets, so as to discharge all the impounded debris in the streams, thereby causing great damage.—Injunction granted.

Circuit Court of the United States, Eastern District of Pennsylvania.

Mining Lease—Construction—Royalty.

Action of M. S. Ridgely vs. The Conewango Iron Company for breach of mining lease. Opinion by Dallas, C. J. A mining lease requiring the lessee to mine 4,000 tons of ore yearly, and to pay therefor a fixed sum per ton, or, failing to take out such quantity, to pay therefor, imposes no obligation on the lessee to pay for such stipulated quantity after the ore in the demised premises has become exhausted. The contract is for promptitude and thoroughness in mining, not for the productiveness of the mine leased.—The rule for judgment is discharged.

Supreme Court of Virginia.

Mineral Land—Reformation of Deed.

In an action by a vendee to reform a deed the bill alleged that complainant had verbally contracted to purchase all the mineral in certain land, excepting lead and zinc; that the deed was altered after it had been sent to him for execution, by restricting the interest conveyed to the iron ore in the land; and that complainant had no notice of the alteration until after the deed had been recorded, and just before bringing suit, a letter written to complainant within a week after the contract of sale was entered into, and before the deed was executed, stating that he understood the agreement to cover all the mineral in the land, reserving to himself all the lead and zinc, entitled complainant to a reformation.—Palaski Iron Co. vs. Palmer, 16 Southeastern Rep., 275.

The Alaska Boundary Survey.—Professor King, who has been selected as the British member of the commission to determine the boundary line between Alaska and the British possessions, left Ottawa April 4th for Victoria, B. C. His party numbers about 100, including representatives of the Canadian Geological Survey. He will be joined at Victoria by Professor Mendenhall, the United States Commissioner, who will also be accompanied by a large staff. Two steamers will be placed at the disposal of the survey party by the Dominion Government.

PATENTS PUBLISHED IN GREAT BRITAIN.

WEEK ENDING APRIL 5TH, 1893.

- 1,598, of 1891. Method of Producing Water Gas Enriched with Volatilized Hydrocarbons. Professor V. B. Lewes, Greenwich.
- 4,111, of 1892 Separation of Mixed Gases. J. H. Parkinson, Manchester.
- 4,922 of 1892. Manufacture of Oil Gas. J. Les & S. Lancaster, Askrigg, Yorkshire.
- 5,136, of 1892. Machine for Cleaning Miners' Safety Lamps. W. Ackroyd & W. Best, Morley, Yorkshire.
- 6,314, of 1892. Gas Pressure Regulator. J. Lamb, Middlesbrough.
- 6,367, of 1892. Machinery for Making Block Fuel. G. A. Cannon, London.
- 6,990, of 1892. Rock Drills. W. O. Rooper and H. G. Tozer, Northampton.
- 7,270, of 1892. Asphalt Stone and Pavement, Unsoftenable by Heat. R. Huppertsberg, Berlin.
- 7,923, of 1892. Gas Pressure Regulator. W. Foulis, Glasgow.
- 8,108, of 1892. Electro-deposition of Metallic Hollow-ware. J. W. Davis & J. O. Evans, Wolverhampton.
- 8,452, of 1892. Electrically Driven Mining and Other Tools. A. Chapman, London.
- 9,188, of 1892. Hand-driven Percussive Rock Drill. C. W. Burbon, Nogent par Creil, France.
- 9,851, of 1892. Liquid Fuel Burner for Metallurgical Furnaces. P. S. Matthey & H. A. Kent, London.
- 22,950, of 1892. Dry Battery. R. Hadden, London. (R. Gabarro, Barcelona.)
- 512, of 1893. Flux for Soldering Aluminum. G. Wegner and P. Gührs, Berlin.
- 2,724, of 1893. Producing Thin Films of Metal by Chemical or Electrical Means. C. Endruveit, Berlin.

PATENTS GRANTED BY THE UNITED STATES PATENT OFFICE.

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

TUESDAY, APRIL 11TH, 1893.

- 495,042, 495,043. Process of Making Fertilizer from Tank-Water. Omar T. Joslin, Chicago, Ill.
- 495,059. Gas Separator or Purifier. Oliver Reasoner, Upland, Ind.
- 495,072. Water-Back for Furnaces. James Fittle, Johnstown, Pa.
- 495,085. Wire Rope Machine. Thomas Cookson, Merrilton, Canada. Assignor by direct and mesne assignments to James Wilson, same place, and Charles Gordon, Toronto, Canada.
- 495,111. Excavating or Dredging Machine. John Heaston, Topolobampo, Mexico, and Ephraim Sooy, Kansas City, Mo.
- 495,178. Method of Making Blasting Compounds. Jonas E. Blomen, Landing, N. J. Assignor to the Blomenite Manufacturing Company, New York, N. Y.
- 495,182. Tracjon Engine. Isaac C. Gray, Ilion, Ind.
- 495,255. Combination Clay Mill. Calvia W. Vaughn, Cuyahoga Falls, O.
- 495,281. Explosive Engine. Frank F. Tremper, San Francisco, Cal. Assignor to the Safety Vapor Engine Company of New Jersey.
- 495,295. Hydrocarbon Burner and Means for Supplying Fuel Thereto. John D. Blakely, Toledo, and Lycurgus Bowser, Cygnet. Assignors to James A. Dailey, Toledo, O.
- 495,323. Apparatus for Mixing Wet and Dry Cement Materials. Henry Froehling, Richmond, Va.
- 495,356. Metal Cutting Device. Hartvig C. Muller, Hamilton, N. Y.
- 495,388, 495,394. Apparatus for Electric Welding. Charles L. Coffin, Detroit, Mich.
- 495,397, 495,398, 495,399. Aerial Tramway. Joseph H. Dickinson, Trenton, N. J. Assignor to the Trenton Iron Company, same place.

## PERSONALS.

Prof. C. M. Fassett will have charge of the mineral exhibit of the State of Washington at the Chicago Fair.

Mr. Thomas H. Leggett, president and manager of the Standard Consolidated Mining Company, of Bodie, Cal., is in this city.

Dr. Walter P. Jenney has been tendered the professorship of geology and metallurgy by the Board of Trustees of the Dakota Mining School.

Mr. W. Lee Benedict, mining engineer, has returned to this city on the 1st inst., after an absence of six weeks on a professional trip to Mexico.

Mr. Walter Nolan, formerly with the El Oro Mining Company, of El Oro, Michoacan, Mexico, will assume charge of the New Nacional mill, at Talpugahua.

Baron de Batz, who is a member of the French Commission to the Chicago Exposition, has established his headquarters at the Lexington Hotel, in Chicago.

Mr. Otto Reibel, formerly superintendent of the Iron River mine, at Stambaugh, Mich., has charge of work on the Moose and Ohio mines on the Mesaba Range.

Messrs. Hooker & Lawrence, the well known mining engineers, have removed their New York office from 145 to 90 Broadway, in the United Bank Building.

Mr. J. W. Nesmith, president of the Colorado Iron Works Company, has returned to Denver from a three weeks' trip on professional business to the City of Mexico, Monterey and other Mexican cities.

Mr. W. F. Williams, recently chief engineer of the Cumberland Lands, Limited, at Dover, Tenn., has resigned that position and has opened an office in New Bedford, Mass., as a civil and consulting engineer.

Mr. Edward Coleman, after being superintendent of the Idaho mine, Grass Valley, Cal., for 28 years, during which time it produced \$11,500,000 and declared \$4,500,000 in dividends, resigned on April 3d to take a well-earned vacation in the Eastern States.

Mr. James Dredge, editor of London "Engineering," and member of the British Commission to the World's Columbian Exposition, is to be given a complimentary dinner at the Engineers' Club, in New York, on April 15th, by the board of management of the club.

Mr. Turpin, the inventor of melinite, the foundation of the French smokeless powder, who was sentenced to four years' imprisonment in 1891 for betraying the secret of its composition and manufacture to the Armstrong company, has been pardoned by President Carnot.

Mr. Arthur Wendt, the well known mining engineer and metallurgist who has had charge of the mines and reduction works of the Great Huanchaca silver mines of Bolivia, has returned to New York, and we regret to state in greatly impaired health. We trust his native air will re-establish this and afford him still many years of professional usefulness and success.

Mr. Joseph S. Harris, as reported in our columns last week, has been elected president of the Philadelphia & Reading Railroad Company. Mr. Harris was educated as an engineer, and served as assistant on the Coast Survey for a short time, and then on the North Pennsylvania and the Lehigh Valley Road. Later he was chief engineer of the Morris & Essex, assistant chief engineer of the Reading, and then chief engineer and manager and finally president of the Lehigh Coal and Navigation Company. With that company he has been identified for over 10 years, and he has also served as general manager and vice-president of the New Jersey Central Company.

## OBITUARY.

Alfred Bernard, a gold and silver refiner, of this city for many years, died in Brooklyn, N. Y., on the 12th inst.

Sr. Gregori Aurre e Ilbarguengoitia, mining engineer, of Spain, died at Oviedo March 22d. Since 1863 he has been director of the Fabrica de Hierros de La Felguera.

Mr. John S. Wood, of Cleveland, O., president of the Anchor Mining Company, died March 27th, in Augusta, Ga. Mr. Wood was a man of considerable wealth and was largely interested in mining.

Dr. Thaddeus S. Gardner, a prominent physician and banker and treasurer of the Altoona Iron Company, died at his residence in Hollidaysburg, Pa., April 12th, aged 54 years. For many years he was connected with the Phillips, Nimick & Co., the Pittsburg iron firm.

## SOCIETIES.

Engineers' Club of Philadelphia.—At the regular meeting April 1st the secretary read a paper on "Various Systems of Burning Portland Cement,"

by Mr. Pierre Giron. This was followed by a long and interesting discussion.

Association of Engineers of Virginia.—The next meeting will be held in Roanoke, Va., April 26th. The subjects for discussion will be "Aluminum," paper by Mr. J. C. Rayn; and "Sewage Disposal for Isolated Buildings," paper by Mr. R. P. C. Sanderson.

Engineers' Society of St. Paul.—At the regular meeting in St. Paul, Minn., April 3d, Mr. Estabrook read a comprehensive paper on the "Isthmus Canals and their Relation to a Deep Waterway Between the Great Lakes and the Atlantic Seaboard of New York." He gave a history and description, fully illustrated by maps, of the Suez, Panama, Nicaragua and Erie Canals, touched lightly on some exhaustive table of statistics, and closed with the expression of some broad views on the canal subject.

Engineers' Club of St. Louis.—At the regular meeting April 5th, a letter was read from Mr. Schmidt, secretary of the general committee Associated Engineering Societies, asking that lists of the important civil, mechanical, mining, metallurgical, electrical, military marine and naval engineering works and industries in St. Louis and vicinity be made out in order to aid visitors to the Columbian Exposition in making visits to see the work which they might be interested in. A committee of five, with the president as chairman, was appointed to act as an entertainment committee. The president appointed Messrs. Potter, Johnson, Oekerson and Ayer. Prof. J. H. Kinealy then read the paper of the evening on "Standardizing Indicators." The paper gave full details of indicators and their errors and the methods of correcting these errors. Discussion followed by Messrs. Johnson, Herman, Bryan, Russell, Moore, Baier, Ferguson and Crow.

General Committee of Engineering Societies.—Notice is given by the committee that the reception rooms and office of the general and executive committees of the Associated Engineering Societies of the United States and Canada and of the general committee of the World's Congress Auxiliary on the International Engineering Congress, on and after May 1st, 1893, and until the close of the World's Columbian Exposition, will be at No. 10 Van Buren street, Chicago. All communications after May 1st should be addressed to, or to the care of, Mr. Max E. Schmidt, secretary. Visiting engineers may have their mail thus addressed. The committee rooms of the Associated Societies at the exposition will be situated in the southwest corner of the gallery of the Mines and Mining Building, where the secretary or some of the staff will be present during the Exposition to meet visiting engineers.

Engineers' Society of Western Pennsylvania.—At the regular meeting in Pittsburg, March 21st, the paper for the evening was read by Mr. Thos. H. Johnson, entitled "A Note on Pin Plates." The author described some tests of full size top-chord members and their modes of failure.

At the chemical section meeting in Pittsburg, March 28th, the subject for the evening was "Water Supply." A number of engineers, physicians and other citizens were present. Mr. James Harlow read a paper on "The Water Supply of the Allegheny River Towns." He gave facts regarding the amounts of sewage now being deposited in the river, and told of how many towns engaged in putting in sewers. He showed by analysis that the water had been becoming more impure year by year, and that typhoid fever had correspondingly increased. As remedies, he suggested either an entirely new supply from the mountains or the river filtered. Mr. Jas. O. Handy gave the results of many analyses of waters of the Pittsburg vicinity. Remarks were made by Prof. F. C. Phillips, Dr. Le Moyne, Mr. A. F. McKenna, Mr. Reuben Miller, Dr. Thomas, Mayor Wm. Kennedy, Col. T. P. Roberts, Dr. Daly, Mr. F. L. Aschman, Mr. Jos. Abel and Mr. Alex. Dempster. A committee was organized with Mr. Alex. Dempster chairman; Mr. Jas. O. Handy, secretary. The committee consists of three members of the Pittsburg Chamber of Commerce, Mayor Kennedy, of Allegheny, five physicians, five engineers and five chemists. The work of the committee is to investigate and suggest improvements in water supply of Pittsburg and Allegheny.

## WORLD'S FAIR NOTES.

A Chicago dispatch of April 8th says that among the consignments delivered at the mining building on that date was one of seven cases from Greece. This exhibit is notable in a number of ways, as the Greeks have not the remotest hope of ever being reimbursed financially for the trouble and expense incurred in making this display. The exhibit, which comes from the famous Laurium region was collected from a purely patriotic desire to make as great a show as possible of the country's resources at the great fair. The exhibit is not very large, but in point of attractions and interest it makes up fully for what it lacks in quantity. The display will be varied, and contains many relics. There are tools and samples of ores that were used by the Greeks 30 centuries ago, utensils

which in many instances antedate Athens herself. The mining district of Laurium, in Southern Greece, is threaded with an underground mesh-work of shafts and galleries, numbering some thousands. The methods of mining several centuries before Christ were most primitive, and but little advance is made over those older methods today. The only difference, practically, is that the natives now use baskets instead of leather bags with which to carry the ores to the surface. Much of the mining to-day is done in the same shafts as left by the ancients. In them have been found many articles of apparel and household utensils left by the contemporaries of Themistocles, which give fully as much zest to the investigations of the archaeologists as the mearthed ruins of Pompeii. Charts, drawings and photographs help to make the collection a very complete history of mining in Greece. With the display comes a contribution of marble from the little island of Skiros, which is said to be fully as good for the purpose of the sculpture as is the famed Pentelic and Parian grades.

## INDUSTRIAL NOTES

The Crescent Steel Company, Pittsburg, has just issued a new price list, in a very neat pamphlet.

The Southern Bridge Company, Birmingham, Ala., has the contract for a highway bridge over the Cahaba River at Mariou, Ala.

The Tennessee Coal, Iron & Railroad Company has had plans prepared for the erection of extensive machine and repair shops, at Bessemer, Ala.

The Union Works, San Francisco, have had plans prepared for a new forge and works for the manufacture of heavy guns in connection with their present plant.

The Alabama Steel Works, organized as successor to the Old Fort Payne Iron and Steel Company, will, it is said, put up a basic steel plant at Fort Payne, Ala.

The Barr Pumping Engine Company, Philadelphia, has an order for three compound duplex pressure pumps for the Ohio Steel Company's new plant at Youngstown.

William Tod & Co., Youngstown, O., have received an order from the Durango (Mex.) Steel and Iron Company for a blowing engine to go to its furnace at Durango, Mex. The size of the engine is 38x48-in. steam cylinder and 84x48-in. air cylinder.

H. H. Porter & Co., Pittsburg, have shipped their exhibit to the World's Fair. It consists of five light locomotives of various styles. The smallest size, which is used around steel works and is termed the "Midget," will be operated at the Fair, by compressed air to show its working.

The Worcester Polytechnic Institute, Worcester, Mass., reports an attendance for the present term of 279 students, an increase of 15% over any previous year. The four years' course of study will hereafter be adopted for all departments. The Institute has now a large faculty, and its laboratories are well equipped.

A receivership is asked for the New Jersey Chemical Company, a concern with \$100,000 capital and extensive works at Cooper's Point and Camden and offices in Philadelphia. The entire stock of the company is held by Thomas Wattson & Sons, Mr. Wattson being president. The company's credit has always hitherto been above question.

The Riehle Brothers Testing Machine Company, in Philadelphia, report a number of sales of their screw-power testing machines, including one of 150,000 lbs. and one of 60,000 lbs. capacity. Machines of this class have recently been furnished to the Maine State College, the Leland Stanford, Jr., University, and the laboratory of the Chicago, St. Paul, Minneapolis & Omaha Railroad.

The Lehigh Iron Company, of Allentown, Pa., which failed some time ago, has been reorganized, a limited partnership having been formed. It is to run for 20 years unless dissolved earlier by a majority of the members or value of interest of the members. The capital stock is \$63,000, divided into shares of a par value of \$50. The following officers were elected: President and treasurer, William H. Ainey; secretary, Frank J. Remmel; managers, William H. Ainey, Martin Kemmerer, David Kuntz, John R. Gossler and Frank J. Remmel. The furnace of the company, at Aineyville, Pa., is being prepared for operations.

Press dispatches report negotiations in progress for the consolidation of the leading iron plants of the Mahoning Valley. The combination, according to the reports, will include properties of the Union Iron and Steel Company, controlling Cartwright's, the Youngstown, Girard and Pomeroy mills, the Brier Hill Iron and Coal Company, the Youngstown Steel Company, the Brown-Bonnell Iron Company, the Mahoning Valley Iron Company, the Andrews Brothers' Company, the Andrews-Hitchcock Company, and the Ohio Steel Company. The transfer of these properties will involve between \$7,000,000 and \$10,000,000.

## 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.

## Petroleum.

The Bureau of Statistics, Treasury Department, reports the exports for March as follows: Crude petroleum, 10,660,844 gallons; naphthas, 1,479,425 gallons; illuminating oil, 57,341,731 gallons; lubricating oils and paraffin, 3,185,596 gallons; residuum, 85,890 gallons; total, 72,753,486 gallons. For the nine months ending March 31st the total exports were 582,115,612 gallons, valued at \$31,169,752, against 530,308,218 gallons, valued at \$33,690,025 for the corresponding period of last year.

## ARIZONA.

Arizona Copper Company, Limited.—The annual meeting of the company took place at Edinburgh, Scotland, March 27th. The report and accounts for the year to September 30th last showed a deficiency in revenue of £22,033. After deducting this deficiency the sum at the credit of profit and loss remained at £16,691, out of which it was proposed to apply £2,700 to reduce the amount at the debit of the suspense capital account. The disappointing results of the year's workings were, the report stated, mainly due to the fall in the price of copper. The chairman stated that the cost of production had been reduced, and a better showing for the current half-year was expected. The reconstruction scheme had received the sanction of the directors and trustees of the Mortgage Company and of all the legal advisers concerned in Scotland and America. Of the total of 158,000 shares 101,679 had fallen in assenting to the scheme. With reference to the proposed issue of £100,000 of debentures, the directors have succeeded in effecting arrangements by which the holders have the option of taking the debentures with an insurance, which would, in his opinion, make them perfectly secure, at 5%, or at their own risk at 5½%.

## Yavapai County.

Seven Stars Gold Mining Company.—The Prescott "Courier" of a late date says concerning this company's property: The only noticeable change in the general character of the ore as depth is reached is that the percentage of gold increases somewhat. In north and south levels No. 4 are ledges from 3 to 8 ft. wide with ore valued at from \$50 to \$60 per ton. These levels are about as low as the bed of the creek. In level No. 3, north, the ore assays 11 oz. gold and 90 oz. silver per ton, and while the ledge in the south end of No. 3 is not over 3 ft. wide the ore holds up well to this value. A cyanide mill is in successful operation at the mines. The company now has en route a 40 H. P. hoisting engine, pump, cages, etc., and will sink 1,000 ft. on the mine, running levels at the end of each 100 ft. There will be a 4 x 12 shaft with double compartment eageway. The engine has a 10 x 12-in. cylinder and power to hoist 750 ft. Two large water storage dams have been constructed in Boulder Creek with a capacity sufficient to store water to run the two mills through the dryest season. The system of deep mining which this company is now about to commence is the first move of the kind in this section. It is proposed to soon commence the construction of a wagon road from the mines to the line of the new railroad, a distance of from 22 to 30 miles, at a cost of about \$4,000. There are now 2,000 tons of ore on the dumps on which the mills are steadily working.

## CALIFORNIA.

(From our Special Correspondent.)

The plan outlined a week ago for erecting a smelting plant at San Francisco, or at some point contiguous to the bay, is about to be discounted by a syndicate of Portland capitalists. Mr. William Selover, who is the head and front of the undertaking, in conjunction with his associates, erected the Portland Smelting Works, and after operating them for some time sold out with a view to locating a plant on a much larger scale at San Francisco. The site for the location of the works is now being considered.

## Amador County.

(From our Special Correspondent.)

Amador Gold Mining Company.—For a very considerable time past rumors have been current regarding the peculiar methods adopted in effecting a sale of the mine belonging to this corporation to an English syndicate. On more than one occasion the "Engineering and Mining Journal" has made note of the action of A. P. Minear, who floated the company in London, but it seems as if the true inwardness of the deal is to have full light thrown upon it as a consequence of a suit just commenced in the Superior Court by William A. Wallace against the company. Wallace is an ex-United States senator from Pennsylvania, and is a creditor of the

company to the extent of \$120,231, for which amount he is now suing. It appears from the complaint that A. Minear succeeded in floating the stock of the Amador mine in London through the good offices of Charles Edward Harrison and A. Basil Cochrane, who were men prominent in a concern known as the English & Foreign Contracting Company. The sum of \$200,000 was to be paid for the mine, according to the agreement made, and one-fourth of the capital stock granted to the owners of the property. The remainder of the stock is said to have been disposed of in London at fabulous prices by means of a glowing prospectus, which gave an exaggerated account of the property and the immense profits which it would yield in the immediate future. Pending the consummation of the "deal" the mining property was placed in escrow. It is now ascertained that neither money nor stock was ever delivered, but that, despite this fact, the English concern, by some peculiar manipulations, obtained possession of the mine, which, if rumor is to be believed, they have since worked at a loss, to the great disappointment of the English stockholders. During the time that these transactions have been in course of consummation ex-Senator Wallace has held the notes of the California corporation for about \$120,000. He is now suing for the money in order to protect the rest from being outlawed under the statute of liquidations. Inasmuch as the mine was recently sold under a decree of foreclosure of mechanics' liens, and the time for redemption by the owners has now almost expired, the London company showing a disinclination to act, the present suit may develop the interesting question of ownership. The only person who is said to have made money out of the entire deal is Mr. Minear. He, it is stated, got the only shares of stock issued here; and all the shares which he received were promptly hypothecated with the company, presumably for cash.

## Calaveras County.

(From our Special Correspondent.)

The Comet, Hidden Treasure and the Harley mill site, have been incorporated with the following directors: E. C. Lukens, C. S. Benedict, O. B. Hardy, A. A. Abbey and John S. Doe.

## Mono County.

Bulwer Consolidated Mining Company.—The latest official weekly letter says: During the past week 143 carloads of ore were extracted from the various stopes and put into the main ore chute. The ore stopes continue to look well. We have considerable trouble in hauling ore, as the snow is so soft it is very hard for horses to haul over it. Shipped to the Carson mint, March 31st, bullion valued at \$5,047.35. Average battery sample, \$27.50. Tailings, \$8.67 per ton.

(From our Special Correspondent.)

Bulwer Consolidated Mining Company, Bodie.—The ore stopes continue to look well, 143 cars of ore having been hoisted from the various stopes and put into the main ore chute. The average battery samples during the past week were \$27.50; tailings, \$8.69.

Standard Consolidated Mining Company, Bodie.—A shipment of bullion, valued at \$20,800, has been received by the San Francisco company.

## Napa County.

(From our Special Correspondent.)

An important discovery of a quicksilver ledge is reported from Middletown. Four miners struck the ledge opposite the Napa Consolidated mine, close to James Creek and ten miles from the town of Middletown. They have been at work for some little time, and on a 36-ft. ledge have sunk a 70-ft. tunnel, so far without reaching the bottom wall. A rough clean-up has been made and, with an improvised retort, a return from the ore of 10% of quicksilver was obtained.

## Nevada County.

North Banner Consolidated Tunnel Company.—At the annual meeting of this company held recently at Grass Valley, the following were elected directors: George Fletcher, John F. Kidder, E. H. Brown, Joseph Weissbein, Grass Valley; Julius Jacobs, San Francisco. Officers were elected as follows: George Fletcher, president; John F. Kidder, vice-president; E. H. Brown, treasurer; Thomas J. Michell, secretary.

North Banner Consolidated Tunnel Company, Grass Valley.—The annual meeting was held this week. The following officers and directors were elected: G. Fletcher, president; J. F. Kidder, vice-president; E. H. Brown, treasurer; T. J. Michell, secretary, and E. J. Weissbein and Julius Jacobs, directors.

## San Bernardino County.

(From our Special Correspondent.)

Borax Lake.—The new placer field at Borax Lake, 50 miles from Mohave, the nearest point on the railroad, is yielding fairly. Bedrock is found at a depth of 4 ft., and at first the dirt was packed for half a mile to the lake, where it was washed in cradles. Dry washers are now being used, producing from \$10 to \$25 each man per day. As the field is practically unexplored rich finds are hoped for.

## Trinity County.

(From our Special Correspondent.)

The Trinity gold mine, or, as it is better known—the Ward mine—situated a short distance from Weaverville, has been sold to a syndicate of Colorado capitalists. The purchase price was \$250,000.

## COLORADO.

Yankee Hill Mining and Milling Company.—This company has had a force of men working the Ebert and Josie lodes for several weeks, running an adit which is now about 110 ft. long.

## Boulder County.

Carpet Bagger vs. Ingram.—The suit of the Carpet Bagger mine against the Ingram was ended at Boulder last week. The Carpet Bagger claimed the Ingram was taking the rich ore out of the Carpet Bagger territory. The case was tried once, and was decided in favor of the Ingram. Another trial was to be had this month, and the expense of preparing for it would have been great. To avert all further trouble the Ingram folks purchased the Carpet Bagger, and now own all the territory.

Colorado Fuel and Iron Company.—During March this company produced 6,243 tons of pig iron, 6,750 tons of rails, 1,049 tons of castings and pipe and 1,253 tons of merchant iron, etc. The company is increasing its shipments to the Northwest States and the Pacific slope, and is employing in its coal and iron mines and at the works at Pueblo over 7,500 men.

## El Paso County.

Crystal Mining Company.—This company, at Cripple Creek, has recently bonded the Storm lode for \$20,000. The property is on Beacon Hill, and joins the Prince Albert.

Favorite.—Messrs. J. K. and J. W. Miller have purchased from Messrs. J. H. Dolan and John Hogan a half interest in the Favorite lode at Cripple Creek. The consideration was \$12,500.

Gold Geyser Mill.—This stamp mill, in Squaw Gulch, Cripple Creek, was April 7th sold under attachment by Sheriff Bowers. It was bid in by Fairbanks & Morse, for \$5,000, the purchasers agreeing to assume bills against the concern for nearly \$4,000 more. The mill was built last season by a company, of which C. Roudebush was president, and cost in the neighborhood of \$20,000, but has never been a paying investment. It is understood that it will be operated in the future by E. E. Gedney & Co.

Specimen.—A bond and lease for \$20,000 was given on April 6th by Messrs. Banta and W. M. Garnett to Thomas Thornton and David H. Huston on the Specimen lode, in the Womack district. The lease is to run a year.

## Mineral County.

Creede.—During March Creede shipped 549 cars of ore, the output being somewhat reduced by the miners' troubles on the New York. Development work on a number of properties gives indications of a lively camp next summer. The King Solomon is pushing work vigorously.

## San Miguel County.

Shipments of ore and concentrates from Telluride for the week ending April 1st aggregated 253 tons; total shipments since January 1st, 5,242 tons.

## FLORIDA.

## Phosphates.

Belle Phosphate Company.—This company has leased a large tract on Bowlegs Creek, near Fort Meade, Fla., and is making preparations to take out 100 tons per day.

Marion Phosphate Company.—This company has completed its preliminary work, and will soon have its log washers in place.

Stonewall Phosphate Company.—This company is now running the new Cumber dryer at its works, near Ocala, Fla., with satisfactory results.

Virginia-Florida Phosphate Company.—This company has recently put in its mine, near Fort Meade, Fla., a large steam shovel built specially for the work by the Bucyrus Steam Shovel and Dredge Company.

## IDAHO.

## Alturas County.

North Star Mine.—This mine will close down for about four weeks, as the roads are impassible. The Wood River "Times" says that the Ketchum smelter, Red Elephant and Star will also be obliged to suspend operations.

## Boise County.

Wolverine.—A shoot of rich ore has been discovered on the 600-ft. level. The mill is not yet in working order.

## Idaho County.

California Mine.—A tunnel, which is now being driven 35 ft. above the level of the American River, is now in 325 ft., cutting a 4-ft. vein of good concentrating ore. There are said to be 300 tons of \$20 ore on the dump. On the mountain side a shaft has been sunk, and is now down 75 ft. The ore in the shaft is higher grade than that below.

Cleveland Group.—A combination tunnel is being driven to cut the two veins exposed. It is now in 140 ft. On the Cleveland vein there is a 60-ft. tunnel exposing an ore body from 2 to 6 ft. wide.

## Latah County.

Willow Creek.—Work will be resumed on the mines at this place by the end of April.

## Owyhee County.

Blaine Tunnel.—The ledge in the face of the Blaine tunnel is now 7 ft. between walls. In the Blaine stope the ledge is 2 ft. wide, with from 4 to 6 in. of \$100 ore. The ledge in the Trade Dollar stope, is 2 ft. wide, with from 8 to 12 in. of \$140 ore.

Phillips & Sullivan Mining Company.—Some 10 men are employed, and good ore is being taken out.

Poorman Mines, Limited.—The report of the directors to December 31st states: Since December 31st, 1891, the date of the last balance sheet, two quarterly dividends at the rate of 20% per annum, one at the rate of 26%, and one at the rate of 30% have been declared and distributed, and the directors recommend a further increased quarterly dividend for the quarter ended February 28th, 1893. During the year the sales of bullion have amounted to £42,035, the results obtained from 3,663 tons of ore. Mine charges, etc., have amounted to £20,358. A sum of £67 expended on account of capital has been charged to revenue. The sum of £16,524 has been distributed in dividends. Directors' fees from September, 1890, to December, 31st, 1892 (two years and a quarter), amount to £82. There has been paid on account of purchase of property £7,500 (£1,500), while the amount carried forward (£2,553) is equivalent to a further quarterly distribution of about 15% per annum. The year's earnings show a gross yield of over 60%.

Poorman Mine.—A body of high-grade ore has been opened up in the Oso, one of the Poorman group, at a point 100 ft. lower than the former workings.

Ralph Pool.—The adit tunnel is now in 800 ft., and at a point 400 ft. below the former workings some very good ore has been struck. The ledge is from 3 to 5 ft. wide.

#### Pend d'Oreille.

Black Jack.—The shaft is down 100 ft. and cross-cutting is under way.

Black Tail Mining Company.—This company is now running a tunnel on the Lady of the Lake claim. The ore from the tunnel runs 32 oz. to the ton.

Blue Bell.—This claim, which is owned by E. Dempsey, of Spokane, consists of a vein 13.5 ft. wide of hematite and carbonate of iron. Assays are said to show 14% lead, 55% iron, \$4 to \$7 gold and 3 oz. silver; 70 ft. of development work have been done.

### INDIANA.

#### Oil.

Stowell's report notes the completion of 31 wells, with a total production of 2,805 barrels during March. At the close of the month only 22 new wells were in progress.

### MICHIGAN.

#### Copper.

Calumet & Hecla Mining Company.—No. 4 shaft cross-cut is in on the back of the Osceola amygdaloid, and in the course of a week or two that lode will be open up for examination 3,400 ft. below the outcrop. The nature of the lode is bunched, and if the point of intersection happens to be poor that should not be taken as an indication that it is unprofitable further north and south, says the Torch Lake "Times." A fair trial, it is reported, will be given the vein in the cross-cut by drifting north and south for quite a distance.

Centennial Mining Company.—At the annual meeting of this company the following directors were elected: A. M. Hoyt, J. W. Jackson, S. L. Smith, J. Q. Adams, E. B. Hinsdale. No change in the executive officers of the company was made.

#### Iron.

(From our Special Correspondent.)

With the advent of spring the ore producers are feeling a trifle more cheerful, though the market is far from having assumed a settled condition. It is undeniable the case that the furnaces are buying from hand to mouth, and that they are nearly all sold ahead from 60 to 90 days. Recent sales of Lake Superior ore, aggregating 750,000 tons, were taken principally by the smaller furnaces. The Carnegie company and the Illinois Steel Company, who use half the Bessemer ore product of the lake district, are still standing out for lower prices. It seems simply a question of backbone. The two companies named are strong financially, and the principal ore producers mining Bessemer grades are equally strong in proportion to the capital invested and business done. The question of lake freights is unsettled yet, but every indication points to the highest ore freights for the past five years this season. The vesselmen are masters of the situation. Were it not for the attitude of the vessel owners, two or three times as much ore from this season's shipment would have been already sold as is now contracted for. The Minnesota, Lake Superior, Republic and Cleveland-Cliff companies, which own their own vessels, are placed in a much better position naturally than the other large producers. The dividends of these companies for the past two or three years—except the Cleveland-Cliff company, which has paid none—have been possible only because of the money saved on lake freights.

The rumor that the Volunteer mine, at Palmer, would close down seems to be without adequate foundation, and it is denied by General Alger, the principal stockholder in the company. There seems a prospect that more work will be done in the Palmer district this year than ever before. Mr. Jos. Kirkpatrick has a lease of the Wheat mine, and will work it vigorously this season, while recent discoveries of good ore bodies at the Platt give

promise of active operations at that property this summer.

The electric traction plants for underground haulage are being installed at the lake shaft of the Cleveland and the Lake Angeline mines. Great things are hoped for in the way of saving in cost of handling ore. The change will mean further reduction in force, many trammers being thrown out of work, or increased production. In the past six years the leading mines have introduced improved methods and machinery, which has increased the efficiency per man employed at least 50%, and the large mines are constantly seeking for methods of saving cost through lessened labor. It is doubtful if there are half a dozen mines in the entire lake district which could go back to the methods of 10 years ago and make expenses. As the season for shipping comes nearer to hand it becomes evident to all that the Mesaba ores will cut a very small figure this year. The production of the entire Mesaba Range will not exceed 6% of the total output of the lake district, and will be exceeded in quantity by at least three individual mines on older ranges. Ore cannot be mined at any such ridiculously low figures as were predicted by interested parties and enthusiasts who knew nothing of mining. The cost of shipping is two and three times the figures given out, and fully half of the mines are unable to mine from ore pits. Steam shovels can be used to mine the soft ores at a few promising properties, but cannot replace the power drill and the miner with his pick and shovel at many of the properties.

The crushers of the Cleveland-Cliffs company, now building at Houghton, are to be placed at the Cliff shaft this month. If they prove a success this year the ore will be crushed at the mines by many of the large producers of hard ore next year.

#### Iron—Marquette Range.

Lake Angeline Iron Company.—An electric plant is being put in at the East End mine.

Lake Superior Iron Company.—At Section 16 mine of this company all the available stock pile room is occupied with ore, and preparations are now under way for the shipping of a portion of the winter's accumulation to the ports of Marquette and Escanaba.

#### Iron—Menominee Range.

Pewabic.—The new shaft is down about 125 ft. and sinking is going on at a satisfactory rate. The stock piles at this mine aggregate about 50,000 tons.

#### Building Stone.

The Portage Entry Quarries Company has been organized with office in Chicago, Henry Furst, president. The object is to control the sandstone-quarry business in the Upper Peninsula. The newly formed company includes the Michigan Red Stone Company, the Portage Red Stone Company, Furst, Nen & Co., and Nen & Malone.

### MINNESOTA.

State mineral leases are not in such a great demand this year as last, and it is a noticeable fact that the tendency is to seek fields of investments in northern Minnesota, says the Vermilion "Iron Journal." Lately there has been a number of prospectors leases issued on the State lands situated south and east of Gurdint Lake. Last year 989 prospectors' leases were issued, which were this year either made permanent or were taken by the prospectors, and besides this, 200 more have been issued this year. It is estimated that the revenue on the leases will be \$28,000, while the permanent leases, yielding \$100 the first year, will foot up \$25,800. In addition to all this, there is great income from the filing of articles of incorporation.

#### Iron—Mesaba Range.

Mesaba Mountain Mine.—A steam shovel and train of flat cars are employed in stripping at this mine. Fair progress is being made, and the shovel is now working directly on top of the ore bed, the surface being only 10 or 12 ft. deep.

New England Mine.—There are now 4,000 tons of ore in stock. Ore is being hoisted from two shafts.

#### Iron—Vermilion Range.

Anderson Mine.—This mine is again dry, and a shaft is being sunk at No. 1. It is down 95 ft. The diamond drill has shown good ore below.

### MONTANA.

#### Beaverhead County.

Jay Hawk and Lone Pine Consolidated Mining Company, Limited.—Battery assays for March averaged 37½ oz. silver per ton; assay of tailings, 5 oz. The estimated return for the week is 8,000 oz., making a total of 30,000 oz. for the month. The mine is looking well.

#### Deer Lodge County.

Butte & Deer Lodge Placer Mining Company.—At the annual meeting, held at Phillipsburg, March 22d, Mr. E. H. Irving was elected general manager.

Granite Belle.—The tunnel is now in 1,100 ft. A 16-in. vein of rich ore was recently cut through.

Magnet Mining Company.—Two shifts have been kept at work during the winter, and the mine is now well opened up. The shaft is down 300 ft. on an incline following the vein, which varies from 8 in. to 3 ft., and assays from 10 to 60 oz. At present a cross-cut is being made at the 200-ft. level, and another will soon be commenced at the 300-ft.

level. It is reported that the company will erect a 20-stamp mill at Dinklebury Creek. There are now 1,200 tons of ore on the dump.

Puritan.—The ore body lately found on the 300-ft. level has pinched out, until there is only sufficient left to call it a vein, says the Phillipsburg "Mail." The ore on the 200-ft. level is exhausted.

#### Jefferson County.

Agua Fria Mine.—About 60 men are employed and regular shipments are being made.

Comet.—The concentrator can hardly be called a success, as it has not been in operation over a month at a time since its construction, 18 months ago.

#### Meagher County.

Snowdrift.—By a late decision of the Supreme Court Mr. George R. Choate becomes the owner of this mine, says the Neihart "Miner." The parties to the suit were the present owner and Almon R. Spencer, who were at one time partners in the claim.

#### Park County.

Henderson Mountain Mining and Milling Company.—Mr. F. W. Nichols, in the Phillipsburg "Mail," reports the new cyanide mill as running all right during the winter until an accident interfered with the working of the dryer. Until a new dryer arrives operations at the mill will be limited.

#### Silver Bow County.

Boston & Montana Consolidated Copper and Silver Mining Company.—According to the Anaconda "Standard" this company has made arrangements to refine the entire output of the Butte & Boston Mining Company. This change will not affect the working force of the Butte & Boston company, at Butte, however, as heretofore their copper matte has all gone to the Orford Works, N. J., Pawtucket, R. I., and Swansea, England, for treatment. The output of this company amounts to about 2,500,000 of copper matte per month, and the Boston & Montana converters will have to be increased. The new machinery will be ordered at once, and the improvement will be completed about July 1st, when the capacity of the refinery will be 6,000,000 lbs. monthly. The Butte & Boston company expect to commence the shipment of matte to Great Falls about the date mentioned above. The increased capacity of the Great Falls smelter will necessitate the employment of about 100 additional men.

### NEVADA.

#### Elko County.

Union Mill Company.—The Tuscarora "Times-Review" says that this company is preparing the tailings to start the new cyanide plant, which is completed and only awaiting material to run on to be put in operation. While these tailings cannot be worked by any of the old methods of reduction, it has been shown, it is claimed, with a trial plant that they can be successfully and profitably worked by the McArthur-Forest cyanide process, the rights of which have been secured, and for which purpose the works just completed have been built. If the scheme proves profitable, there will be considerable prospecting in the North Belle Isle, Nevada Queen and Commonwealth mines, to whom the mill belongs.

#### Esmeralda County.

(From our Special Correspondent.)

The War Eagle Mine, Hawthorne.—Quantities of rich ore are being taken out, a shipment of 30 tons now being hauled for reduction. This ore runs from \$200 to \$300 per ton.

#### Lincoln County.

(From our Special Correspondent.)

Reliable information from Lincoln County states that there was never any reason for a great excitement in Ferguson District, but the Magnolia and April Fool (gold) mines are prospecting well, and bear promise of becoming good mining propositions. Interesting correspondence tells of the Yellow Pine District, which was located in early days in the southern part of Lincoln County. The writer states his belief that it embraces the most extensive and richest mineral belt that remains unexplored and undeveloped in the United States, with a gold belt of about ten miles square. It is situated about 35 miles west of a small place laid down on the map of Nevada as Las Vegas, and is eight miles west of Goode Springs, a point on the Nevada Southern Railroad that is now under construction. The country rocks are limestone and porphyry. The country is much broken up, being the result of former volcanic disturbances. The veins strike irregularly in a northerly and southerly course. The Keystone mine, in the gold belt, is developed to a depth of 150 ft., has paid from the grass roots and yielded a profit of \$35,000 in three months, after a deduction of \$52 per ton paid for hauling the ore. The mine is opened by three tunnels.

The Golden Chariot is a promising prospect opened to a depth of 20 ft. from the surface by a tunnel in 60 ft. It is producing ore in shipping quantities, and of average value of about \$800 per ton.

The Marcen Clementina has a shaft 11 ft. deep, with a vein exposed in the bottom of about 2 ft. in thickness and 4 ft. in length. Six tons of ore on the dump gives assays of about \$500 in gold per ton. This property is under the consideration of

some Denver, Colo., men, who are negotiating for the purchase of it. Outside of the gold belt is another metalliferous belt, with mines of argenticiferous lead ore, carbonate and sulphuret in character, carrying from 20 to 60% of lead, and from 3 to 60 ounces of silver to the ton. This belt crosses the Nevada State line. There were only about 80 men in camp, and the country is reported as not being easy of access; but as the Nevada Southern Railroad Company expect to have their line completed to Goode Springs by June 1st, it will then come within easy reach.

**Storey County—Comstock Lode.**

The amount of money disbursed to employees of the Comstock mining, milling, water and other companies for the month of March was \$113,067.

**Belcher Mining Company.**—The latest official letter says: We have hoisted during the week 41 tons of fair-grade ore.

**Consolidated California & Virginia Mining Company.**—This company has received notice of the shipment to the Carson mint of nine bars of bullion, valued at \$33,376, being the final shipment on March account, and making a total of \$59,092 shipped during that month. The average yield in bullion from 2,463 tons of ore crushed at the Morgan mill in March was \$23.98 per ton, and the average assay value of the battery samples per ton was \$29.61. The ore was worked up to nearly 81% of its assay value, a marked increase over the showing last month, when the average was only 63½%.

**Crown Point Mining Company.**—The latest official weekly letter says: The raise from the west cross-cut, 250 ft. west of the shaft, 400-ft. level, is now up 56 ft. The top is in porphyry and quartz, showing occasional spots of ore. An inclined raise has been started from the end of the west cross-cut from the 500-ft. level and advanced 26 ft. through porphyry and low-grade quartz.

**Justice Mining Company.**—The latest official weekly letter says: The south drift from the north stope on the S22 level is in 143 ft. The face is in low-grade quartz. We are taking out 5 tons of ore per day from the north stope on the S22 level, the car samples of which average about \$20 per ton.

**Lady Washington Mining Company.**—An official letter from the superintendent says: I commenced work in the Lady Washington mine on March 26th through the Consolidated New York shaft. We put in a blower for ventilation and 250 ft. of air pipe and the same length of track. We have begun upraising in quartz of a favorable character, and I have hopes of continual improvement as we advance.

**Savage Mining Company.**—The latest official weekly letter says: On the 1,100 level the west cross-cut, started from the end of the south drift on the 16th floor, is advanced 3 ft.; face in quartz and porphyry. In the south drift, at a point 150 ft. south of the main east drift from the shaft, we have started east cross-cut 2 and advanced some 22 ft. This drift passed through 6 ft. of fair-grade ore; face is in quartz and porphyry. On the 1,300 level the upraise in the ledge is advanced 57 ft.; top in quartz, with occasional bunches of ore. The east cross-cut, started from the north stope 30 ft. below this level, is advanced 33 ft., passing through the south boundary is advanced 35 ft.; face in porphyry. On the 1,800 level the north drift from 2 ft. of quartz giving some fair assays; face in quartz and porphyry.

(From our Special Correspondent.)

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

Mines.	Tons Hoist'd	Car Assay	Tons Mill'd.	Av. Bat'y Assay.	Bullion for Week.	Bullion Shipped
Belcher...	41	...	...	...	...	...
C. C. & Va.	640	35.71	905	32.52	...	133,376.52
Justice...	35	20.	...	...	...	...
Kentuck...	21	28.	...	...	...	...
Potosi.....	504	27.65	508	26.88	...	...

<sup>1</sup> Total to date on March account. \$59,092.33.

**Consolidated California & Virginia Mining Company.**—The monthly bullion statement shows that during March there was worked at the Morgan mill 2,463 tons of ore, which produced in bullion: Gold, \$27,731.08; silver, \$31,361.25; total, \$59,092.33. Yield per ton in bullion—Gold, \$11.25; silver, \$12.73; total, \$23.98. Assay of the ore per ton per battery samples—Gold, \$11.44; silver, \$18.36; total, \$29.61.

**Kentuck Mining Company.**—The stopes above the 160 level continue to yield small quantities of ore. It is stated that for some time Senator Jones has been desirous of retiring from an active participation in the fraudulent practices commonly in vogue on the Comstock. This surmise receives confirmation from the fact that the above corporation is no longer controlled by the most worthy Senator, but is under the tender and watchful care of Mr. H. M. Levy. In conducting the affairs of the Hale & Norcross company Mr. Levy proved himself as incompetent to handle stockholders' money. He nevertheless controls the Kentuck, Justice and Segregated Belcher and Midas mines, and is not altogether out of the Hale & Norcross, and from his past record it may be assumed that he will bleed the stockholders of these three corporations.

**Savage Mining Company.**—No ore is being hoisted from the mine, the ostensible reason being the reduced value of the ore output and the necessity for curtailing the expenses. As the actions of the management in the past has not been beyond cavil it is interesting to note the details of ore worked during the year from March 1st, 1892, to March 1st, 1893. During the period of time mentioned the mine produced 26,550 tons of ore, worth, according to the average car sample assay \$23.64 per ton, or \$627,642, this ore being handed over to the Nevada mill for reduction. The gross value of bullion returned was \$396,499.90, or 63% of the car sample value; from which was deducted discount on silver, \$101,525.14; milling charges, \$159,300, a total of \$260,825.14, leaving net returns of \$135,674.76. This is equivalent to 21.60% of the value of the ore at the mine, and although the management cannot be called to account for the loss on silver there certainly is scope for objection when the milling charges are considered. There are plenty of mill men who stand ready to contract to return to the company 65% of the car sample value of the ore, and charge nothing for milling. Responsible parties did offer to contract for milling Savage ore on the following basis: \$4 per ton for crushing, and a guaranteed return of 65% of the car sample value of the ore. With such a contract the year's output would have shown somewhat as follows: 65% of \$627,642, \$407,967.30; deduct discount on silver, \$104,439.55, and milling charges, \$106,220, a total of \$210,639.55. We have left \$197,327.75, as against the Nevada Mill company's return of \$135,674.76, showing a net saving of \$61,652.99. During the past seven months the same milling company has been reducing at the same mill and with the same operative ore of precisely similar character from the Potosi mine; and has shown at the end of that period of time net returns equivalent to 33.70% of the car sample value of the ore, against 21.61% saved to the Savage Company. This difference of 12.09% makes a loss to the last-named company of \$75,881.91. The average per cent. saved of the pulp assay of the Potosi was 84.10%, of the Savage 73¼%. Accepting the ore from both mines to be similar (the Potosi ore was taken from a ledge 200 ft. east from the point from which the Savage ore was taken) the loss to the Savage company stands as follows: 12.09% on \$627,642, \$75,881.91; \$2 per ton excess charges for milling 26,550 tons ore, \$53,100; total loss for 12 months, \$128,981.91.

**West Consolidated California & Virginia Mining Company.**—It will be remembered that during the trial of the suit instituted by Oscar Steel against M. W. Fox and others it transpired that the old Hale & Norcross contingent had supplied the money necessary to carry on the legal war. It is expected that within the next week Mr. Fox will enter suit against H. M. Levy, Sam Jones, "Bob" Keating and Evan Williams for conspiring to defame Fox and otherwise injure him and his business. The sum of \$100,000 is claimed as damages.

**White Pine County.**

(From our Special Correspondent.)

**White Pine County** shows some improvement in her prospects. Several small mines are being profitably worked. A valuable strike has been reported on White Mountain, the details of which are at present too meager for particular notice. In Robinson District the people are very hopeful. Litigation over the Joanna gold mine has been definitely settled, and Montana parties have paid down a forfeit of \$7,500 on a bond for \$150,000, which expires some time in May. Since then the property has been examined by prominent experts, and their reports are stated to be very satisfactory. The same parties have bonded valuable water rights, and it is believed they will take an option on the Chairman mine.

**NEW MEXICO.**

**Grant County.**

**Gold Bullion Mining Company.**—This company's property is situated in the Greenlee district, above Clifton. There is a large body of ore, says the Lordsburg "Liberal," that has been hit by a canyon having cut the ledge to the depth of 300 ft. A dam is nearly completed, and there is a ditch or race 1,500 ft. long, which gives a fall of 18 ft. and power sufficient to run a 100-stamp mill. A test mill will be put in, and if the ore works satisfactorily, a mill with a crushing power of 100 tons daily will be erected.

**Manhattan Gold Mining and Milling Company.**—Work has been resumed on the Montana tunnel of this company at Pinos Altos. The tunnel is already in about 700 ft., and the work will be completed by the 1st of June if there are no further delays. The company is now paying \$18 a foot for driving the tunnel. The main vein on the property will be struck considerably below the deepest workings in any of the mines belonging to the company.

**Pacific Gold Mining Company.**—Work was commenced sinking on the Pacific company's shaft, at Pinos Altos, last week. The shaft is 205 ft. below the tunnel level, which is equal to about 400 ft. from the surface. In the bottom of the shaft there is 2 ft. of good ore. Ore to supply the mill is now being taken from the level above the tunnel, and from a level 75 ft. below. There are, says the Silver City "Enterprise," large bodies of ore developed and ready for extraction.

**Silver City.**—The Bremen mill, at Silver City, which was leased by the owners of the Langston

mine, at Pinos Altos, has been closed down. The expense of hauling the ore from Pinos Altos to Silver City, in addition to the cost of mining and milling, is more than the ore will justify. It is reported that the narrow-gauge railroad, which is graded from this place to Pinos Altos, will soon be completed. This will probably enable some of the mines which are now idle to start up again.

**Sierra County.**

**Animas District.**—Hopewell's new mill on the Animas has been completed, and is ready to run on custom ores. There are quite a number of mines in the Animas district which will furnish ore for this mill. It is the first one built in the district.

**Inter-Republics Placer Mining Company.**—According to the Silver City "Sentinel" this company will soon commence placer mining near Hillsborough on a large scale. It is proposed to put in a pipe line from the Animas to the placers to bring water there. It is believed that a sufficient supply of water can be obtained under pressure to carry on placer mining on a more extensive scale than has hitherto been attempted in Southern New Mexico.

**NORTH CAROLINA.**

**Clay County.**

The Heaton Corundum Mining Company has struck a vein of corundum from 4 to 10 ft. in width in Clay County. Headquarters of the company are at Hiawassee, Towns County, Ga.

**OHIO.**

**Oil.**

The monthly report shows in the Buckeye district 163 wells completed in March, with a total yield of 6,241 barrels. There were 88 wells drilling on March 31st.

In the Southeastern district 13 wells with a total yield of 109 barrels were completed during March, and 15 wells were under the drill.

**OREGON.**

**Sucker Mining Company.**—This company has been incorporated. Capital stock \$4,000, in shares of \$100 each. Incorporators are: William Page, H. D. Dalmas, Wm. W. Phillips and J. M. Sturtevant. Office Myrtle Point, Oregon. This company will work in the Salmon Mountain country.

**Texas & Oregon Gold Mining and Milling Company.**—This company has been incorporated under the laws of Oregon to work the Flagstaff mine, at Cornucopia. Capital stock, \$1,000,000. Officers are: E. T. Wilcox, president; E. H. Brice, vice-president; W. R. Bell, secretary and treasurer and M. Welloff, superintendent. Office, Baker City, Oregon.

**PENNSYLVANIA.**

**Anthracite Coal.**

An explosion of gas took place on the 10th inst., in the Black Diamond mine, operated by John C. Haddock, at Luzerne Borough. Two miners were killed.

**Lehigh & Wilkes-Barre Coal Company.**—In our last issue a press dispatch was noted to the effect that the engineers had made a mistake in the locations of the shaft and breaker, and missed three veins of coal they expected to strike. General Superintendent Lawall informs us that this dispatch was untrue. The facts are that the shaft referred to has been sunk 276 ft., and is to be sunk about 940 ft. to the Red Ash vein. The size of the shaft is to be 12x54 ft. to the Baltimore vein, and 12x37 ft. 4 in. from the Baltimore vein to the Red Ash vein. The shaft has already cut two veins of coal, the Kidney and Hillman. Openings have been made in the Baltimore vein, from the workings in the adjoining Jersey colliery, to the point where the Maxwell shaft will pass through, and by the time the shaft is sunk to the Baltimore vein 15 gangways will have been opened thereto. Shipments from this mammoth shaft will commence the latter part of this year. The work of developing this new colliery is being pushed forward as rapidly as possible.

**Philadelphia Coal Company.**—This company, of Philadelphia, has been chartered, with a capital of \$950,000, the incorporators of which are Frank W. Chase, Harvey Vollmer, Philadelphia; Fred M. Chase, Wilkes-Barre; John M. Chase, Edward B. Chase, Burmont, Pa.

**Oil.**

Stowell's report gives for the Pennsylvania and New York oil field in March 130 new wells completed, with a total yield of 7,541 barrels; an increase of 46 wells and 727 barrels over the February statement. At the close of March there were over 191 wells under the drill.

**SOUTH DAKOTA.**

**Fall River County.**

A 30-in. vein of coal has been discovered within half a mile of Hot Springs, according to the Custer "Weekly Chronicle." The property is said to be bonded to an Omaha man.

**Lawrence County.**

**Central City Consolidated Mining and Milling Company.**—This mine, which was filled with water, has been cleaned out. Several tons of ore which were taken out recently show an average of \$10 per ton in gold. The mill will be started immediately.

**Godfrey.**—Work has been resumed on the Godfrey Brothers & Stevens property, adjoining the

Monitor, and the ore is being shipped to the old Columbia mill. Five men are at work, and the last run cleaned up \$11 to the ton, besides two tons of concentrates, from 40 tons of ore, which returned \$250 per ton.

Horseshoe.—The shaft passed through the quartzite and struck ore at a depth of 350 ft. The vein at the point cut is about 16 ft. wide and well defined.

Sundance.—Work on the shaft has been temporarily abandoned on account of too much water. A pump has been ordered.

#### UTAH.

Little Bell Mining Company.—This company has been incorporated; capital stock, \$3,750,000, divided into 150,000 shares of \$25 each. The officers are: P. L. Williams, president; Hugh Kilkeny, vice-president; and Charles D. Savery, secretary and treasurer. Office, Salt Lake City. This company will carry on mining in the Uintah district, near Park City, Utah.

Leami Gold Mining and Milling Company.—This company has been organized; capital stock, \$600,000, shares \$2 each. J. C. Coad, president; E. B. Parsons, vice-president; Henry J. Osburn, secretary and treasurer. Office, Salt Lake City, Utah.

#### Juab County.

New Tintic Mining and Smelting Company.—At a meeting of the stockholders of this company, held in Salt Lake City, April 5th, at which 275,000 shares out of 300,000 were present, a resolution was passed reducing the capital stock of the company from \$3,000,000 to \$600,000. It will now be in 120,000 shares of the par value of \$5 each, instead of 300,000 shares of the par value of \$10 each. The company decided to push work on the two shafts, which are now on the property, and push them to a depth of 500 ft. each before shipping any ore and before doing any other work. There are at present 33 men at work on the property. The officers elected were: F. A. H. Franklin, president; Samuel Hine, vice-president; E. J. Dunwick, secretary and treasurer.

#### Pi Ute County.

Alma.—In the long tunnel a stringer of ore has been followed for 100 ft.; it has widened from 22 in. to the full face of the tunnel. It has 3 ft. of copper-stained quartz and 2 ft. of carbonate.

#### Salt Lake County.

Petro Mine.—The tunnel is in 500 ft. A good body of ore was recently struck in an upraise 400 ft. from face of tunnel. The upraise will be continued to connect with the upper workings. There are 500 tons ready for shipment.

#### Summit County.

Lucky Bill Mining Company.—Work is confined to sinking the shaft, which is now down 600 ft.

Mackintosh Sampler.—A complete change of plan has been made in regard to the sampler, and it is now decided to erect it on the old site.

#### Tooele County.

Honorine.—The tunnel is now in 2,600 ft., having been driven 400 ft. since January 1st. It must be driven 400 ft. more to reach the vein, which has 3 ft. of good ore.

#### WASHINGTON.

Columbia Placer Mining Company.—This company filed articles of incorporation at Spokane on April 6th. Capital stock, \$500,000, divided into 500,000 shares. The incorporators are A. P. Curry, John Johnston, F. H. McCullough, L. H. Prather and J. S. Watson, all of Spokane. The purpose of the corporation is mining for gold, silver and other precious metals in the States of Washington and Idaho and the province of British Columbia. Office, Spokane, Wash.

Hannah Gold and Silver Mining Company.—This company has filed articles of incorporation. Capital stock, \$2,000,000. Office, Seattle, Wash. The property of the company is in the Monte Cristo district.

#### Cowlitz County.

Washington Consolidated Mining Company.—This company has purchased 14 claims in this county.

#### Okanogan County.

Rush Mine.—At the 125-ft. level 5 ft. of free milling gold ore has been struck.

#### Pierce County.

(From our Special Correspondent.)

Tacoma Smelting Company, Tacoma.—This corporation is about to make an attempt to divert the ores shipped from Central and South America to Wales for reduction. An agent has been detailed to visit the various ports of Central America, Peru and Chile, and then establish agencies for the purchase of ores to be brought up north as ballast in ships clearing from those ports. The scheme has also been mooted of establishing a branch smelter at San Francisco, but in any case that step will not be taken just yet. The Northern Pacific Railroad Company is a large stockholder in the smelting company, and is said to be favorably inclined to the establishment of a smelter at San Francisco. Ezra Rust, manager of the concern, earnestly advocates such a course, as the question of freights from the south might be more easily adjusted. Deposits would be established at Guayaquil, Ecuador, Payta, Peru; Taitai, Caldera and other Chilean

ports, where bunkers would receive the crude ore to await shipment.

#### Stevens County.

Le Roi Mining Company.—At the annual meeting of the stockholders of this company, held March 31st, the following officers were elected: President, George M. Forster; vice-president, George Turner; treasurer, B. H. Bennett; secretary, I. N. Peyton; trustees, George M. Forster, George Turner, B. H. Bennett, I. N. Peyton, J. G. English, W. M. Ridpath, D. W. Henley, J. W. Buckley, L. F. Williams. The company has under consideration a proposition of a company to purchase 100,000 tons of ore, and if the deal is consummated a smelting and refining plant will be constructed, either at the confluence of Sheep Creek and the Columbia River or at the mine.

Spokane & Great Northern Mining Company.—The Republic incline on the None Such mine is down 40 ft., and will be sunk 50 ft. further. The last assay of this incline run 16% lead, 56 oz. silver and 11.5 oz. gold, over \$275 per ton.

#### WYOMING.

##### Crook County.

Hay Creek Coal Company.—In the shaft driven to tap the coal on the north of the present workings a 5-ft. seam was cut at a depth of 50 ft. The shaft is now down 66 ft., and drifting will soon commence. From the old workings an average of 5 cars per day are being shipped.

##### Fremont County.

Bartlett Mill.—This quartz mill was totally destroyed by fire March 23d. The mill was a new one, having been completed only two months ago.

#### FOREIGN MINING NEWS.

##### BELGIUM.

A cable despatch from Brussels states that 5,000 coal miners in the Borinage district, Province of Hainault, have resolved upon a general strike, partly for higher wages and partly for universal suffrage.

##### BRAZIL.

Ouro Preto Mining Company, Limited.—The February output was 877 oz. gold, obtained from 2,900 tons of ore crushed.

##### BRITISH COLUMBIA.

British Columbia Coal, Petroleum and Mineral Company, Ltd.—This company has been incorporated. Capital stock, \$4,000,000, shares \$100 each; officers, J. D. Pemberton, E. G. Prior and Wm. Fernie. Office, Victoria, B. C.

Siwash Creek Bedrock Flume Company, Ltd.—This company has been incorporated. Capital stock \$500,000; shares \$10 each, par value. Trustees, H. T. Ceperlen, Geo. de Wolf, J. M. Buxton, J. Wallfsohn and Edward Mahon. Office, Vancouver, B. C.

Strathgryne Mining Company.—This company is erecting a 10-stamp mill at Camp Fairview.

Van Winkle Consolidated Hydraulic Mining Company.—This company has been organized. Capital stock, \$500,000; shares, \$10 each. Trustees, R. G. Tatlow, H. T. Ceperlen, J. M. Buxton, Edward Mahon, and George de Wolf; Office, Vancouver, B. C.

##### Sloean.

Enreka.—This mine is said to have two veins in sight of from 10 to 12 in. in width. The mine has been bonded for \$20,000.

##### BRITISH GUIANA.

The production in gold of this colony is still increasing, the output for 1893, up to Feb. 20th, having been 8,216 oz., worth \$146,239 against 6,259 oz., worth \$112,410, for the same period of 1892.

##### BURMAH.

An agent of the Indian Geological Survey has been sent to Upper Burma to make a careful examination of the oilfields.

Burmah Ruby Mines, Limited.—This company reports for the three months ending January 31st: Number of loads washed, 6,493; jewels obtained, 11,103 carats, value about \$13,500, or an average of about \$2 per load. The question of rental of the mines is still unsettled.

##### CANADA.

##### Nickel.

(From an Occasional Correspondent.)

Sudbury District.—The long severe winter is about over, and preparations are being made for considerable development work on the nickel range this season. A good many of the speculative owners of mining claims here have found out that only a few exceptional properties can be sold at any price until they are opened up.

In doing some preliminary surface work on Lot 8, Con. 4, Denison, last week, a remarkable ore bed was disclosed. It is actually a field of massive nickel ore of the finest quality. There is no rock capping on the mineral bed, only a thick covering of gossan or decomposed ore. And what is still more unusual, the lower stratum of this gossan was found to carry a great deal of platinum, mere pan concentrates of it having assayed as high as 75 oz. of platinum to the ton.

The Worthington mine has been worked all winter in a small way. Some 50 men are employed in getting out ore, and part of the machinery for a rock house is on the ground now. It is said that work on the Traverse mine will be resumed by May 1st.

##### Gold.

A number of parties have gone up to the Lake Wahnatipae region already this spring to test some of the gold claims discovered there last summer. Free gold has been found on both ends and the middle of the range. The work done on the Ophir mine on the North Shore and on the Gordon mine in Creighton shows that gold ore occurs in paying quantities at different points in the district, but most of the prospectors lack the necessary capital to exploit their claims.

##### Asbestos.

Asbestos has lately been found near Webbwood on the Sault Ste. Marie line. The vein is about 11 in. wide, but split into layers, making the fibre only from 1 to 2 in. long.

##### LOWER CALIFORNIA.

(From our Special Correspondent.)

A mine, recently discovered at Saragoza, is being opened up experimentally by a San Diego capitalist. If the run on the one now being taken out is satisfactory a stamp mill costing \$4,000 will be erected and the mine developed as quickly as the prospect will warrant. The vein is nearly three feet wide, the entire body averaging well.

##### MEXICO.

##### Michoacan.

Las Trojes.—The output of this company is 11,000 oz. a week.

##### San Luis Potosi.

Concepcion.—It is reported that a great improvement has recently taken place in this mine at Catorice.

##### Zacatecas.

Asturiana y Anexas.—This company has stopped paying dividends since January last.

La Purisima de los Compadres.—The directors of this mine believe they will be able to continue paying the present dividends of \$5 per share monthly up to June next, and from July on, increase them.

##### SOUTH AFRICA.

Transvaal Silver Mines.—Results at these mines, the largest silver mines in that region of South Africa, a description of which has appeared in the "Engineering and Mining Journal," have not as yet met the expectations of the several mining engineers who examined this property. In fact, those unforeseen difficulties so prone to occur in any enterprise have arisen here and a change has to be made in the manner of working. Mr. O. Hahn, who has done as much as any one man to build up the smelting industry of this country and to perfect that branch of metallurgical art, was the former general manager of the property, and in June, 1891, made a thorough report upon the method of treating the ore and upon the profits to be made. Mr. Hahn considered smelting the proper process and in accordance with his views a plant was built with which he calculated he would be able to earn over \$10,000 a month. When the plant was started it was found that instead of the ore containing 3% of sulphur only it averaged 8%. This of course was too heavy a percentage to treat direct in the furnace, as, if done at all, it would entail the use of a considerable quantity of barren iron flux and the formation of matte in large quantities which would carry a considerable percentage of the silver.

Then again the ore proved on mining, on a large scale, to be of lower grade than had been anticipated, and to earn the anticipated profits the quantity treated would have to be increased, as well as ten reverberatory roasting furnaces erected. This the directors considered would cost too much, and a concentrator plant to produce high grade concentrates to be shipped abroad is to be erected. The plant is now being made in England under the direction of Mr. Edmund Wertheman, mining engineer, formerly of California and the Comstock Lode, who has had much experience in treating the class of ore found at the Transvaal silver mine in various localities in Mexico, at which he owned mines, such as Piomasas in Sinaloa, and Topia in Durango.

Mr. Wertheman has accepted the general management of the property and is expected to arrive in South Africa with the machinery in August. He has examined the property and reported that at Gross there was 15,800 tons of ore, assaying over 20% lead and 21 oz. silver, and that in the mine there was available for concentration some 28,000 tons of ore assaying 18% lead and 22 oz. silver. Mr. Wertheman has the confidence of the company, and if he duplicates his record as one of the most successful mine operators of Mexico, the Transvaal silver mines will justify the reports made by the previous examining engineers.

##### Diamonds.

Recently three large diamonds have been discovered at Klipdam. One weighed 59 carats, one 35 carats, and the other 24 carats.

#### MINING STOCKS.

[For complete quotations of shares listed in New York, Boston, San Francisco, Aspen, Colo.; Baltimore, Pittsburg, Deadwood, S. Dak.; St. Louis, Helena, Mont.; London and Paris, see page 360.]

NEW YORK, Friday Evening, April 14.  
One of the duller weeks on record has just passed at the Consolidated Stock and Petroleum Exchange. The trading has been devoid of features of interest



and prices with few exceptions have shown a declining tendency.

Of the Comstock stocks, Comstock Tunnel was the most active; the stock was stationary at 10c., with total transactions of 3,300 shares; the bonds were also traded in. Consolidated California & Virginia shows sales of 300 shares at \$2.40@2.15; of Ophir 330 shares changed hands at \$2.20@2.60. Best & Belcher was quiet, only 200 shares being sold at \$1.50@1.60. Mexican advanced from \$1.55 to \$1.65; total sales, 320 shares. Other sales were as follows: 100 shares of Belcher at \$1.30; 50 shares of Crown Point at \$1.15; 200 shares of Hale & Norcross at \$1.00@1.05; 200 shares of Savage at 65c.; 300 shares of Sierra Nevada at \$1.10@1.30; 300 shares of Yellow Jacket at 75@95c.; 100 shares of Alta at 25c.; 100 shares of Chollar at 55c.; 200 shares of Segregated Belcher at 35c.; 300 shares of Union Consolidated at 90c@1.05. The monthly statements of the various Comstock mining companies showing financial condition on the 1st inst. are as follows: Cash on hand, which in a number of cases will be increased by assessments now in process of collection: Alta, \$12,004; Andes, \$19,007; Alpha Con., \$4,250; Belcher, \$13,633; Bullion, \$538; Best & Belcher, \$11,252; Consolidated California & Virginia, \$50,211 in cash and \$13,023 in unsold bullion, with further shipments to arrive, and the monthly expenses of the mine, amount not yet known, to be paid; Crown Point, \$15,517; Challenge Consolidated, \$3,378; Consolidated New York, \$5,959; Exchequer, \$7,981; East Sierra Nevada, \$6; Gould & Curry, \$2,363; Hale & Norcross, \$17,036; Justice, \$1,489; Lady Washington, \$4,167; Mexican, \$538; Segregated Belcher, \$3,233; Silver Hill, \$2,658. The following companies report having had an indebtedness on April 1st: Chollar, \$12,638; Consolidated Imperial, \$5,964; Kentucky Consolidated, \$330; Occidental, \$5,098; Ophir, \$22,400; Overman, \$4,690; Potosi, \$21,657; Savage, \$17,839; Sierra Nevada, \$715; Utah Consolidated, \$2,139; and Union Consolidated, \$1,900.

Of the Tuscarora stocks Navajo shows a solitary sale of 200 shares at 15c. The following Tuscarora mining companies report having had cash on hand on the 1st inst.: Nevada Queen, \$1,736; North Commonwealth, \$1,174; Indebtedness, Belle Isle, \$5,214; Commonwealth, \$26,973; Del Monte, \$24,691; Grand Prize, \$207; North Belle Isle, \$8,296; Navajo, \$8,155.

Of the California stocks Bodie Consolidated shows sales of 200 shares at 35c. There was a solitary sale of 100 shares of Mono at 30c. Standard Consolidated was in very fair demand, 600 shares being sold at \$1.45. The following Bodie mining companies report having had cash on hand on the 1st inst.: Bodie Consolidated, \$11,972; Mono, \$4,848; Standard Consolidated, \$32,019; Bulwer Consolidated had an indebtedness of \$592.

Brunswick Consolidated shows sales of 2,700 shares at \$0.9c. The superintendent of this company writes as follows from Grass Valley, Cal., under date of the 5th inst.: During the past week we have driven the east drift 7 ft. and the west drift 8 ft. (700 level). We have stopped the east drift for a time and have put the men to raising the 600 level west drift, where the ledge shows a fair prospect. In the 700 west drift the ground seems broken and the ledge small.

The Colorado stocks were very quiet this week. Little Chief shows sales of 300 shares at 21c. Of Chrysolite 800 shares were sold at 21@23c. We note a transaction of Lacrosse of 500 shares at 5c.

Of the Black Hills stocks the only one traded in was Father de Smet, of which 200 shares were sold at 25c.

Ontario was in fair request; total sales this week aggregated 500 shares at \$1.50.

Monte Cristo this week shows sales of 600 shares at \$3.15, and El Cristo sales of 500 shares at 30@42c.

There was a sale of 20 shares of Minnesota Iron Company at \$64.50.

Phoenix of Arizona was in good demand, 2,200 shares being sold at 16@22c.

**Boston.** April 13.

(From our Special Correspondent.)

The market for copper the past week has been quite in contrast to the prevailing dullness of the preceding month, and prices have suffered more or less in consequence. It has been believed that some unfavorable developments in regard to Boston & Montana were likely to be promulgated, as the stock has been heavy for some time past and orders to buy the stock at prevailing prices did not materialize, while all the brokers had selling orders which could not be filled. It now appears from official statements that the company is not in a condition to resume dividends for some time to come, and this fact becoming known orders to sell were pressed upon the market, and the stock declined from \$31 to \$24½, with a rally later to \$26½, but selling to-day again at \$26. The transactions exceeded 18,000 shares, and considering the large amount of stock pressed for sale the market took it remarkably well. As the par value of the stock is \$25 per share it will be noticed that for the first time in the history of the company its stock sold below par. The decline in Boston & Montana naturally affected its near neighbor, Butte & Boston, although the decline was not so marked, neither was there any great pressure to sell it at the low price. It declined from \$9¼ to \$8¾, but closed quite firm at \$9.

Calumet & Hecla was the strongest stock on the list, and shows an advance from \$310 to \$315, the latter being the latest price.

Tamarack was heavy and dropped from \$161 to \$159, with a rally of only ¼.

Quincy was weak and heavy and declined from \$130 to \$120 with a subsequent rally to \$125. The stock was depressed upon the theory that a large stockholder was a heavy creditor of a failed banking house, and that the stock was likely to be put on the market.

There was considerable activity in Osceola, and the stock sold off from \$34½ to \$33½, notwithstanding the announcement of a \$1 dividend, but recovered later to \$34. Centennial sold at \$8½@9, Franklin at \$12¼@12½, and Kearsarge was steady at \$8½. Atlantic declined to \$9 for small lots. Wolverine sold at \$2¼, a decline of ¼; Mesnard at 50c. and Santa Fé at 5c. Tamarack, Jr., sold up to \$22½ on favorable reports, but later declined to \$21, with some small lots selling at \$21¼@22.

3 P. M.—The afternoon call did not show much change. Boston & Montana was a little firmer and sold at \$26¼, but Osceola declined a ¼ to \$33¾, while Tamarack gained \$1 to \$160.

**San Francisco.** April 7.

(From our Special Correspondent.)

The stock market fluctuated rather wildly early in the current week, but a better feeling all along the line has been manifested yesterday and to-day. The North End Comstocks are much stronger than last week, and some of the Gold Hill stocks also show advances in values. Rumors are current of a contest for control of several of the leading Gold Hill mines, but as the annual elections do not take place for some time, it can scarcely be supposed that either party would show their hand at this early date. The Challenge, Confidence, Yellow Jacket and other mines are run as close corporations, no information regarding the ore output, car and battery assays, or bullion product being vouchsafed the stockholders. A change to honest management of these properties would mean tens of thousands of dollars saved to the stockholders, but though such a consummation is "devoutly to be wished," the gambling element, as distinguished from the stable investors, is so strong on the street that it can scarcely be expected.

J. L. Flood, with his attending satellites, Messrs. G. R. Wells and Nat T. Messer, have been examining the Vanderbilt mines, in which they are now largely interested with J. W. MacKay. It is reported that these properties will soon be listed in the boards, when the market may be livelier somewhat. In any case these mines will serve the purpose of an anchor to windward when the clouds that have been lowering over the Comstock culminate in a storm of contentions disapproval of the "ring" methods there in vogue.

Meantime, Mr. Mackay is convalescent with small possibility of any relapse, and this fact has tended to strengthen the North End Comstocks. Consolidated California & Virginia sold to-day at \$2.35; Ophir for \$2.10, an advance of 55 cents on the week's trading; Mexican for \$1.40. Sierra Nevada for 90 cents and Union Con. for 80 cents, also show an increase in values.

The middle group of Comstocks—little variation in prices has been noted. An important improvement in Potosi is reported, the bunches of ore showing in the upraise, 1,000 level, having made into good ore again. Notwithstanding this favorable showing the price of the stock remained steady at \$1.55, the ruling rate of a week ago. Best & Belcher at \$1.45 has rated 10 cents stronger than last week, but Chollar at 60 cents, Gould & Curry at 65 cents, Hale & Norcross at 95 cents, and Savage at 60 have been selling at practically last week's rates.

Some of the Gold Hill and South End Comstocks have been in demand: Alpha at 15c., Alta at 20c., Belcher at \$1.05, Challenge Consolidated at 40c., Exchequer at 10c., Occidental at 10c. and Overman at 30c. have ruled steady at the same prices prevailing last week. Bullion has shown a 5c. decline at 35c., Crown Point an advance of 35c. at \$1.05, Justice a point advance at 15c., Kentucky a point advance at 40c. and Yellow 15c. advance at 65c.

The outside stocks, of all kinds, have been left severely alone during the week.

**SAN FRANCISCO, April 14th (By telegraph).—**The opening quotations to-day are as follows: Best & Belcher, \$1.40; Bodie, 25c.; Belle Isle, 10c.; Chollar, 60c.; Consolidated California & Virginia, \$2.35; Eureka Consolidated, \$1.50; Gould & Curry, 60c.; Hale & Norcross, 90c.; Mexican, \$1.35; Mono, 25c.; North Belle Isle, 10c.; Navajo, 10c.; Ophir, \$2.15; Savage, 50c.; Sierra Nevada, \$1.25; Union Consolidated, 80c.; Yellow Jacket, 95c.

**London.** April 5.

(From our Special Correspondent.)

The Palmarejo Mining Company, Mexico, is in difficulties again. On March 21st the directors published a statement, in which they recommend one of two courses to be followed, either the issue at par of 50,000 preference shares at £1 each, to bear 10% interest, or the winding up and reconstruction of the company. The former course is recommended by the directors, and they invited their present shareholders to express an opinion. Up to April 4th they have received replies from only one-tenth of the shareholders in favor of the issue of the preference shares. The time for consideration as to the course to pursue is extended until April 13th.

The Abaris Mining Corporation working the San Cristobal, San Juan de las Lagos and Victoria gold and silver mines at Zacatecas, Mexico, is offering for public subscription at par 14,000 shares of £1 each in order to enable them to purchase and erect

a gold and silver mill. This company was first formed about 18 months ago, and £136,000 have already been spent without anything been done; additional capital, £14,000, is required to provide machinery. The ore is apparently of good quality, and the location of the mine favorable for its exploitation by a British company. The most unsatisfactory part of the prospectus is that there is no definite information as to the ore in sight. It is simply stated that the ore in the drift assayed \$50 per ton, and that the engineer estimates that the vein extends 100 ft. above the 175-ft. level, though this 100 ft. of ore has not been opened up or proved to exist.

The Coal-Brick Syndicate of the United Kingdom is being floated in London with a capital of £50,000. It has been formed to work the patents of T. W. Lee for making coal waste into briquettes, not with pitch, but a material the nature of which has not yet been made public. John Brown & Co., of Sheffield, state that these briquettes give better thermal results than even ordinary-sized coal.

The Poorman Mines, Idaho, have declared a quarterly dividend at the rate of 33% per annum for the quarter ended February 28th, payable on and after March 30th. The South Poorman Mines have declared a similar quarterly dividend at the rate of 30% per annum.

The Valley Gold Mining Company, working in Holcomb Valley, San Bernardino County, California, has just been reconstructed under the name of the Holcomb Valley Gold Company. The nominal capital of the reconstructed company is £135,000 in 540,000 shares, at 5s. each, of which 400,000 shares are credited with 4s. 6d. per share and 80,000 shares reckoned as fully paid. The debenture holders of the old company have accepted the fully paid shares in payment, and the ordinary shareholders have taken up the remainder. The directors have called up 4d. per share and will call up the remaining 2d. in May. The water supply for working the gold gravels has been very variable and seldom of sufficient head, being dependent on rainfall and the melting of snow. The consequence has been that work has only been possible on an average of 10½ days a month. On the advice of Colonel Carey, the representative of the company, a Bucyrus steam shovel is to be bought. There is an ample supply of water to work this shovel, and it is calculated that operations can be carried on for 11 months of the year. The resident mining engineer is Mr. W. E. Pedley.

**MEETINGS.**

Evening Star Mining Company, at the office of the company at No. 53 Broadway, New York City, May 1st, at 2 p. m. Transfer books close April 28th.

Florenca Mining and Milling Company, at the office of the company in New York, May 2d, at 1 p. m.

Iron Silver Mining Company, at the office of the company, No. 52 Broadway, New York City, May 3d at 12 o'clock noon.

Morning Star Consolidated Mining Company, at the office of the company, No. 53 Broadway, New York City, May 1st, at 2 p. m. Transfer books close April 28th.

Ouray Union Mining Company, at the office of the company, No. 53 Broadway, New York City, May 1st, at 2 p. m. Transfer books close April 28th.

Trinity Gold Mining Company, at the office of the company, room 10 No. 504 Kearney street, San Francisco, Cal., April 20th 4 p. m.

Ward Consolidated Mining Company, at the office of the company, No. 53 Broadway, New York City, May 1st, at 2 p. m. Transfer books close April 28th.

**DIVIDENDS.**

Centennial Eureka Mining Company, dividend No. 28, of fifty cents per share, \$15,000, and No. 29, of twenty-five cents per share, \$7,500, payable April 15th at the office of the company, No. 34 West Second South street, Salt Lake City, Utah.

Osceola Consolidated Mining Company, dividend of \$1 per share, \$50,000, payable May 5th at the office of the company, in Boston, Mass. Transfer books close April 15th and reopen April 22d.

Trinity River Hydraulic Gold Mining Company, dividend No. 3, of one-half cent per share, \$2,500, payable April 15th at the office of the company, Boston Block, Denver, Colo.

**METAL MARKET.**

**NEW YORK, Friday Evening, April 14, 1893.**  
**Prices of Silver per Ounce Troy.**

April.	St. Ex.	London Pence.	N. Y. Cls.	Value of st. in \$1.	April.	St. Ex.	London Pence.	N. Y. Cls.	Value of st. in \$1.
8	4 87¼	38	82½	629	12	4 87¼	38	82½	629
10	4 87¼	38	82½	629	13	4 87¼	37½	82½	628
11	4 87¼	38	82½	629	14	4 87¼	37½	82½	628

Silver has been unusually steady the past week. No features of importance have presented themselves. The prospect of the assembling of the Brussels silver conference next month is discussed, but so far awakens an only apathetic interest.

The United States Assay Office at New York reports the total receipts of silver for the week to be 94,000 ounces.

**Government Silver Purchases.**

The Government has purchased during the week the following quantities of fine silver at the accompanying prices per fine ounce:

April 10th, 130,000 oz., at 83.4 to 83.45c.  
 April 12th, 505,000 oz., at 83.24 to 83.3c.  
 April 14th, 426,000 oz., at 83.15 to 83.19c.

**Gold and Silver Exports and Imports at New York Week Ending April 8th, 1893, and for Years from January 1st, 1893, 1892.**

Week.....	Gold.		Silver.		Excess of Exports.
	Exports.	Imports.	Exports.	Imports.	
1893.....	\$2,630,862	\$508,589	\$179,290	\$17,466	\$2,584,697
1892.....	\$6,976,165	5,661,419	8,945,786	867,703	38,491,873
1891.....	12,852,230	5,825,869	7,283,056	356,419	13,952,998

Of the gold exported \$2,100 went to Bremen, the rest to Havana; the silver went to London.

Nearly all the imports of gold were from France, practically in transit for Havana, although regularly entered at this port.

During the five days ending April 14th the exports and imports, so far as ascertained, have been as follows: Exports: Gold, \$3,576,909; silver, \$291,700. Imports: Gold, \$89,817; silver, \$19,428. Of the gold exported \$3,500,000 went to Bremen, probably for Austrian account.

**NOTES OF THE WEEK.**

During the past week there has been a notable depreciation of values, consequent upon the large exports of gold, and the signing of the Maximum Freight Bill passed by the Nebraska Legislature. The outward movement of gold has become unexpectedly strong and there is no end to it yet in sight. It is predicted on a merely conjectural basis, however, that exports of gold during the coming week will reach from \$7,000,000 to \$10,000,000. This we have every reason to doubt. Exactly how much gold will be shipped before an inward flow commences is a difficult question to answer, but from a most extended survey of the date involved we are inclined to think that \$30,000,000 will be the limit of the present outward movement.

The question that most strongly presents itself is, What will the Treasury Department do when the gold in the treasury reaches the statutory limit? Will bonds be sold, or will the \$100,000,000 be encroached upon? As yet the Government has given no indication of its purpose other than that Secretary Carlisle is of the opinion that the \$100,000,000 may be used lawfully if necessity requires it, but we think that the administration will not hesitate to issue bonds in the London market if a great break in prices should follow the use of any part of what we have for many years considered a treasury reserve, devoted to the especial purpose of redeeming equal tender notes.

At present the free gold in the treasury is about \$2,870,000, and it is quite probable that this will be wiped out by Saturday's and Tuesday's shipments; \$1,250,000 have already been demanded for Saturday, and it is said that at least \$750,000 more will be required. This would leave the treasury with but \$870,000 in gold to meet the requirements of shippers on Tuesday, which promise to be fully as large as during the present week. Such being the case, the question of a bond sale must be decided during the coming week or within the next month at the latest.

Opinion in Wall street differs considerably as to the effect of the use of any part of the \$100,000,000, some brokers saying that its possible influence has been already discounted, while others fear a panic. While not expressing an opinion regarding the commercial results that might follow such a move we feel assured that the shock to the sentiment of the country would be great.

Senator Allison is reported as saying that Senator Jones of Nevada, President Andrews of Brown University, Providence, and Banker Henry W. Cannon of New York, will probably be delegated to attend the adjourned monetary conference opening May 20th. He believes the conference will be in session six months and that it will eventuate in the large use of silver by all nations participating. The small gold coins of Europe will be withdrawn and all nations will adopt the policy of purchasing silver bullion and issuing silver certificates thereon. There is no prospect that European nations will open their mints to silver.

At the same time a Washington despatch says that President Cleveland, Secretary Carlisle and Prof. David A. Wells have been in consultation and that President Cleveland is anxious to have the old delegates reappointed. We refer to this matter on our editorial page. Our readers already know of Senator Jones and of his special unfitness to represent the United States in any such capacity. Leaving aside for the moment his unsavory record in Nevada, his views on silver are visionary and antiquated. His identification with a corrupt milling company renders any influence he might possess entirely nugatory, and we hope that he will not be appointed. As for Mr. Cannon, although he has a great reputation as a banker, his utterances heretofore on the silver question leave much to be desired. His statement made to an "Engineering and Mining Journal" reporter that neither the relative cost of producing silver and gold nor the quantities in which they were produced should have any in-

fluence upon the ratio of value between them is not only contrary to the teachings of history, but to the plainest of common sense.

The statement of the Imperial Bank of Germany for the year ending December 31st, 1892, shows that the bank holds 942,000,000 marks of gold and silver, an increase of 45,000,000 marks as compared with the preceding year and an increase of 135,000,000 marks over the year 1890. The bank purchased 61,500,000 marks in gold bars and foreign coin during the year 1892.

The Austrian minister of finance has placed at the disposal of the Rothschild syndicate the second installment of about \$20,000,000 of the new 4 per cent. rentes at 97. The first installment was oversubscribed six times. There are also impending the \$18,500,000 Brazilian 5 per cent. and the German and Prussian loans of \$45,000,000 and the Greek loan.

**Domestic and Foreign Coin.**

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

	Bid.	Asked.
Mexican dollars.....	\$65.4	\$66
Peruvian soles and Chilean pesos.....	.594	.60
Victoria sovereigns.....	4.85	4.88
Twenty francs.....	3.86	3.89
Twenty marks.....	1.74	1.78
Spanish 25 pesetas.....	4.80	4.85

**Copper.**—Producers of Lake copper having at last made up their minds to accept lower prices, a fairly large business has been done during this week. The prices which have been paid are not reported, but supposed to be about 11%, and nearly all the business done is for shipment after the opening of navigation on the Lakes. Electrolytic copper was freely offered at 11c., and somewhat below, and the transactions are perhaps even larger than those of Lake copper. Casting copper is still quoted at 10 1/2%, delivered, and for Arizona pig copper, 9 1/2%, 9.75 to 9.70 is quoted. There has been a good demand for lake and electrolytic copper abroad, and some sales are reported, but the prices are kept secret. From what we hear it is probable that a very large business could be done in that direction if producers would give way somewhat in price. Of late the exports of fine copper from this country have somewhat increased.

The foreign markets are reported to be quiet, but steady, and the demand for consumption appears to be fairly good. G. M. B.'s have ruled steady at £44 15s. for spot and £45 5s. for three months prompt. For refined and manufactured we quote: English Tough, £47 10s. @ £8; Best Selected, £49 @ £49 10s.; Strong Sheets, £56 @ £56 10s.; India Sheets, £52 @ £52 10s.; Yellow Metal, 4 1/2 d.

The exports of copper from the port of New York during the past week were as follows:

To	Copper Matte.	Lbs.	\$5.50
S. S. Etruria.....	1,679 bags	120,150	\$5,500
" Cufic.....	8,942 bags	983,270	46,000
" Lake Superior.....	2,869 bags	314,490	13,000
" Servia.....	5,714 bags	621,609	27,000
To Rotterdam.....	Copper.	Lbs.	
S. S. Werkendam.....	34 bbls.	67,500	\$5,625
" ".....	1,641 pigs	450,367	14,000
" ".....	613 bars	112,003	11,320
To Hamburg.....	Copper.	Lbs.	
S. S. Gellert.....	92 plates	11,279	\$1,241
" ".....	10 bars	655 (bullion)	1,800
" ".....	2 bars and 1 box	330	40
S. S. Sorrento.....	63 bbls.	78,750	9,900
To Havre.....	Copper.	Lbs.	
S. S. La Normandie.....	1,563 pigs	448,137	\$41,000
" ".....	45 casks	56,250	6,700
Britagne.....	239 pigs	88,672	8,800

**Tin** has been in quite a good demand, and prices have advanced somewhat against those of last week. There is a strong undercurrent, and it is believed in well-informed circles that before long prices will advance rather sharply. It is supposed that shipments from the East during April, May and June will be rather light, as all stocks have been drained. For spot and April, we quote 20.90; May 21 cents, and June 21 1/2. The market in London; on the 10th inst., opened at £94; and closes very firm to-day at £94 17s. 6d. for spot; but three months prompt is obtainable at £90.

**Lead.**—Smelters have great difficulty in securing the necessary supply of furnace material. We hear from Idaho that some of the more important mines have shut down, and others are likely to follow. The production in Colorado has also been decreasing, and with the present good demand for pig lead, it was natural that under all these circumstances, prices for refined lead would advance. We must today quote pig lead at 4 1/2 @ 4 17/8 New York, with hardly any sellers below the latter price, while at the former only a limited business has been done. The bulk of the transactions was made at 4.25.

This brings us quite near the point where foreign lead can be imported, and efforts have been made on the part of importers to market it, but their prices were somewhat too high.

In England the quotation remains at £9 15s. for Spanish and English at £9 17s. 6d. @ £10.

**Chicago Lead Market.**—The Post, Boynton, Strong Company telegraph us as follows: The market is strong and higher. Producers are very firm in their views and practically no lead can be had below 4c., with 3.95c. being freely bid.

**St. Louis Lead Market.**—The John Wahl Commission Company telegraph us as follows: Lead stronger than ever. Latest sales are at 3.92 1/2. Several sellers refuse quoting now below 4c.

Spelter is considerably firmer, and Western producers are asking rather higher prices, in consequence of which we have to raise the price here to 4.35 @ 4.40. In London good ordinaries are quoted at £17 15s, specials £17 17s. 6d.

Antimony remains dull and neglected, and we have to quote Cookson's at 10 1/2 c.; L. X., 10%; and Hallett's at 10 1/2 c.

Nickel.—The quotation is nominally 48 @ 52c

**IRON MARKET REVIEW.**

NEW YORK, Friday Evening, April 14, 1893.  
**Pig Iron Production.**

Fuel used.	Week ending		From Jan., '92.	From Jan., '93.
	April 14, 1892.	April 14, 1893.		
Anthracite.....	94	38,970	73	34,310
Coke.....	164	138,990	146	134,595
Charcoal.....	55	11,820	36	8,623
Totals.....	313	189,780	255	177,528
			2,623,969	2,450,318

Northern brands: No. 1, \$14.50 @ \$15.25; No. 2, \$13.75 @ \$14.50; Gray Forge, \$12.75 @ \$13.50. Southern: No. 1, \$14.25 @ \$14.50; No. 2 F. and No. 1 soft, \$13 @ \$13.75; Gray Forge, \$12 @ \$12.50, tidewater. Scotch irons: Coltness, \$21.50 @ \$22; Eglinton, \$19.50 @ \$20.

The production of pig iron to April 14th shows a decrease as compared with the production in 1892 to the same date of 173,611 tons, distributed by fuel as follows: Anthracite 78,520, coke and bituminous 85,490, charcoal 9,591. If this movement continues throughout the year the production for 1893 will be about 700,000 tons less than the output in 1892, which was 9,157,000 tons. The stocks held on the first of April were as follows: Anthracite, 138,328 tons, a gain of 2,477 tons; coke, 337,080, a loss of 85,401; charcoal, 195,866, a gain of 4,292; the total being 671,274 tons, a net decrease of 78,632 tons, or 11 1/2%.

The decrease in the production and stocks of coke iron is a step in the right direction, for it largely overbalances the slight gain in anthracite and charcoal iron. The market has not begun to respond to the stationary output and the decrease of stocks, nor is it to be expected that it should. It will require a more decided diminution of output and depletion of stocks to affect current quotations. With a largely reduced production and small holdings of stock last year in England prices were very low, and they have not yet shown evidences of a steady advance.

Demands for iron are fair, but nothing beyond the ability of makers and dealers to fill promptly. The Louisville & Nashville Railroad Company has made a new tariff on Southern pig iron, based on 2,268 lbs. per ton and carloads of not less than 17 1/2 tons. The rates to some of the more important points are as follows:

To	From Birmingham District.	Chattanooga.	South Pittsburg, Tenn.	Sheffield, Florence and Decatur, Ala.; Rockdale and Napier, Tenn.
Ashtabula, O.....	\$3.35	\$3.35	\$3.36	\$3.70
Beaver Falls, Pa.....	4.40	3.9	3.81	4.15
Buffalo, N. Y.....	4.40	3.90	3.81	4.15
Chicago, Ill.....	3.85	3.60	3.47	3.60
Cincinnati, O.....	2.75	2.25	2.14	2.50
Cleveland, O.....	3.85	3.35	3.26	3.60
Duluth, Minn.....	5.39	5.14	5.01	5.14
Montreal.....	5.85	5.35	5.26	5.30
Pittsburg District.....	4.40	3.90	3.81	4.15
St. Louis, Mo.....	3.25	3.00	2.87	2.80

**Billets and Rods.**—Steel billets, tidewater, \$25 @ \$25.25; foreign, \$29 @ \$29.50; wire rods, \$32.50 @ \$32.75; foreign, \$40 @ \$40.50; Swedish, \$52.50 @ \$53.

**Manufactured Iron and Steel.**—Angles, 1.8 @ 2c.; axles, scrap, 1.90 @ 2.10c., delivered; steel, 1.85 @ 2c.; bars, common, 1.55 @ 1.60c.; refined, 1.65 @ 1.9c. on dock; beams, up to 15 in., 2 @ 2.15c.; 20 in., 2.35 @ 2.4c.; car truck channels, 2 @ 2.10c.; channels, 2.10 @ 2.20c., on dock; hoops, steel, 1.8 @ 1.9c., delivered; links and pins, 1.85 @ 2.10c.; plates, bridge, 2 @ 2.10c.; fire-box, 2.5 @ 2.8c.; flange, 2.25 @ 2.50c.; marine, 2.50 @ 2.75c.; sheared, 1.85 @ 2.10c.; shell, 2.10 @ 2.25c.; tank, 1.8 @ 2c.; universal mill, 1.85 @ 1.90c.; tees, 2.30 @ 2.60c., all on dock.

**Merchant Steel.**—Quotations are: Tool steel, \$6.50 @ \$6.75 and upward; tire steel, \$2 @ \$2.10; toe calk, \$2.30 @ \$2.40. Bessemer machinery, \$2.10 @ \$2.20. Bessemer bars, \$1.70 @ \$1.75; open hearth machinery, \$2.30 @ \$2.40; open hearth carriage spring, \$2.10 @ \$2.20; crucible spring, \$3.75 @ \$4.

**Old Material.**—Rails, iron, \$16.50 @ \$17; steel, \$13 @ \$13.50; No. 1 scrap, \$15.75 @ \$16; car wheels \$12.50 @ \$13, f. o. b. Jersey City.

**Rail Fastenings.**—Fish and angle plates, 1.55 @ 1.60c. at mill; spikes, 1.9 @ 1.95c.; bolts and square nuts, 2.45 @ 2.50c.; hexagonal nuts, 2.55 @ 2.60c. delivered.

**Spiegeleisen and Ferromanganese.**—10 to 12% Spiegel, \$22 @ \$22.50, 20% \$25 @ \$25.50. Ferro, 80% \$57 @ \$57.50.

Some sales of imported ferro-chrome have been made at \$400 per ton.

**Steel Rails.**—\$20 mill or tidewater. Girder rails, \$2.50 @ \$33.

**Buffalo.**

April 13

(Special Report from Rogers, Brown & Co.) Nothing of interest in the pig iron market has occurred during the week. There is a steady and apparently increasing demand, but as yet it is hardly sufficient to take up the slack of the past three months. Prices remain unchanged. We quote for cash f. o. b. cars Buffalo: No. 1 X foundry strong coke iron, Lake Superior ore, \$14.50; No. 2 X foundry strong coke iron, Lake Superior ore, \$13.75; Ohio strong softer No. 1, \$14.50; No. 2, \$14; Jackson County silvery No. 1, \$17@17.50; No. 2, \$16.30@16.80; Lake Superior charcoal, \$16.75; Tennessee charcoal, \$18; Southern soft No. 1, \$14; Alabama car wheel, \$19; Hanging Rock charcoal, \$20.50.

**Chicago.**

April 13.

(From our Special Correspondent.) The continuous growth of the iron roofing and cornice industry in Chicago and elsewhere has been phenomenal. Some few years ago there were not to exceed a dozen large firms engaged in the business, whereas there are now over that number in this city. This increase is due to the excellence and cheapness of iron and steel for building material, together with its lasting and fireproof qualities. The Chicago city council have recently passed building ordinances which declare against and prohibit the use of sheet iron on bay windows or roofs, the enforcement of which will have the effect of throwing a large number of skilled workmen out of employment, to say nothing of the losses accruing from the amount of capital invested. The architectural iron workers here are on strike for shorter working time, and a large number of firms have acceded to their demands. The great strike of the World's Fair mechanics lasted just one day; conservative action and mutual concessions resulted in the men resuming work. The iron trade here shows but little change as compared with that of the previous week. Some fair sized orders have been taken for crude iron of Northern and Southern make; inquiry is improving, and producers look for increased activity. With regard to finished iron and steel, some of the more conservative concerns are looking up material for their summer wants, as they consider the question of labor and transportation a very serious problem for solution during the next six months.

**Pig Iron.**—A number of sales of local coke iron have been made at slightly stronger prices; these were for large as well as for small lots. Business generally in pig iron circles has been rather more lively and the prospects are promising for increased activity, as inquiry has greatly improved from the larger consumers. All foundries in this vicinity are well employed, and several of the more prominent are building additional cupolas. Renewed inquiry is noted for Bessemer iron. Southern coke iron is in fair demand, and a number of small orders have been placed, which, together with several for round quantities, aggregate a good tonnage. Prices, though, are in no wise improved; on the contrary, some of the business booked has been at concessionary rates. Lake Superior charcoal iron is dull, and while there is more inquiry, buyers intimate they want lower prices; so far agents hold firm.

Quotations per gross ton f. o. b. Chicago are: Lake Superior charcoal, \$16.50@17.25; Lake Superior coke, No. 1, \$13.75@14.00; No. 2, \$13.25@13.50. No. 3, \$12.75@13; Lake Superior Bessemer, \$14.75; Lake Superior Scotch, \$14.50@15; American Scotch, \$16.00@16.50; Southern coke, foundry, No. 1, \$14.25; No. 2, \$13.10; No. 3, \$12.50; Southern coke soft, No. 1, \$13.10; No. 2, \$12.75; Ohio silveries, No. 1, \$16.50; No. 2, \$16.00; Ohio strong softeners, No. 1, \$16.75; No. 2, \$16.25; Tennessee charcoal, No. 1, \$17; No. 2, \$16.50; Southern standard car wheel, \$19.50@20.

**Steel Billets and Rods.**—Billets from stock are selling at \$25. Rods are nominally unchanged at \$32.50.

**Structural Iron and Steel.**—There is a much better inquiry and demand for bridge material and contracts are more frequent. Beams and other building shapers are in moderate request only. Quotations, car lots, f. o. b. Chicago, are as follows: Angles, \$1.85@1.90; tees, \$2.15@2.25; universal plates, \$1.90@1.95; sheared plates, \$1.90@1.95; beams and channels, \$1.95@2.25.

**Plates.**—Boiler shops are running full, but the strike talk prevents them from accepting a good deal of the work offered. Warehouse trade is fair, but mill business is slow and prices weak. Steel sheets, 10 to 14, \$2.30@2.40; iron sheets, 10 to 14, \$2.20@2.30; tank steel, \$1.95@2; shell iron or steel, \$2.50@2.75; firebox steel, \$1.25@1.55; flange steel, \$2.75@3; boiler rivets, \$1@1.15; boiler tubes, all sizes, 60%.

**Merchant Steel.**—There is a fair demand for miscellaneous soft steels, other than from the implement makers; some of the latter are already figuring on their season's needs. Quotations are: Tool steel, \$6.50@6.75 and upward; tire steel, \$2@2.10; toe alk, \$2.30@2.40. Bessemer machinery, \$2.10@2.20. Bessemer bars, \$1.70@1.75; open hearth machinery, \$2.30@2.40; open hearth carriage spring, \$2.10@2.20; crucible spring, \$3.75@4.

**Galvanized Sheet Iron.**—Some makers have advanced prices on mill lots and shipments are still slow. Demand shows increasing activity from warehouse as well as mill. Discounts are very firm at 70 and 10% off on Juniata and 70 and 15% off on charcoal, and jobbing quantities at 70 and 5% off on the former and 70 and 10% off on the latter.

**Black Sheet Iron.**—The large buyers of light gauge sheets appear to have filled their requirements

for summer deliveries and demand is much quieter. Mill quotations are easier at 2.50@2.85 for No. 27 common Chicago. Jobbers quote 3.10c. for iron and 3.10@3.15c. for steel, same gauge.

**Bar Iron** is in moderately fair demand from mill and warehouse. A season's contract for upward of 1,000 tons of iron and steel bars was booked by a mill in this vicinity for an implement firm this week at good figures all around. Inquiry from this source is more active. Regular quotations are 1.55@1.58c., base Chicago, and shaded according to delivery. Jobbing price is 1.70@1.80c. on iron and steel.

**Steel Rails.**—The market is more active. A number of negotiations for good-sized amounts were closed during the week, the aggregate tonnage of which is large. The steel company also secured the splice bars, etc. Inquiry is better than it has been for some time. Prices steady at \$30@31.50. Quotations on iron and steel splice bars are 1.55@1.60c.; track bolts, square nuts, 2.55c.; hexagon, 2.65c.; spikes, 2.05@2.10c. according to style.

**Nails.**—Steel cut and wire nails are in better demand from mill, but the former are easier at \$1.35 in mill lots, and the latter firm at \$1.67½. Jobbing prices are \$1.50 for steel cut and \$1.75 for wire in less than car loads.

**Scrap.**—Locally, there is very little doing; several of the larger dealers are selling in a moderate way to consumers on the outside. Quotations are largely nominal: Railroad, \$15; No. 1 forge, \$14; No. 1 mill, \$9.50; fish plates, \$15.50; axles, \$19.50; horseshoes, \$15; pipes and flues, \$7; cast borings, \$5.50; wrought turnings, \$8; axle turnings, \$9.50; machinery castings, \$10; stove plates, \$6.50; mixed steel, \$10; coil steel, \$15; leaf steel, \$15.50; tires, \$14.50.

**Old Material.**—Iron rails are dull; we hear of no transactions and holders are quoting \$18 @ \$18.50. Steel rails remain quiet at \$11 @ \$14.50 as to length, condition, etc. Car wheels are moving in a small way at \$14.50 @ \$14.75.

**Louisville.**

April 8.

(Special Report by Hall, Bros. & Co.)

A general complaint of quietness is heard in local iron circles. Nothing of special interest has transpired during the past week. The tendency of prices, it may be said, is to weakness, and here and there evidences of urgent necessities crop out in the shape of special concessions on the part of some of the smaller producers who cannot well afford to carry stocks for better figures.

**Hot Blast Foundry Irons.**—Southern coke No. 1, \$13@13.25; Southern coke No. 2, \$12@12.25; Southern coke No. 3, \$11.25@11.50; Southern charcoal No. 1, \$15.50@16; Southern charcoal No. 2, \$15@15.50.

**Forge Irons.**—Neutral coke, \$10.75@11; mottled, \$10.50@10.75.

**Car Wheel and Malleable Irons.**—Southern standard brands, \$17.50@18.50; Southern (other brands), \$16.50@17; Lake Superior, \$18@18.50.

**Philadelphia.**

April 14.

(From our Special Correspondent.)

**Pig Iron.**—An improvement in prices is predicted by brokers handling pig iron. The opinion is based on the fact that stocks are not heavy. Good brands are pretty well sold up. Southern irons are not as urgently offered, and a good many consumers will soon be obliged to buy. A few good brands have been advanced 25c., but iron is still plenty. No. 1 is \$14.75@15; No. 2, \$14.25@14.50, and forge irons \$12.50@13. Makers of forge have inquiries for large lots, but sales are light.

**Muck Bars.**—Very little business is done at any price and stocks are offered at \$22.75 at mill to-day.

**Steel Billets.**—There are parties in the market who would buy in a large way at \$24.50. Consumption is heavy and manufacturers are quite well sold up.

**Merchant Iron.**—A large business has been done during the past few days but at prices dictated by buyers. Mills are filling up. Quotations run from \$1.50@1.80, iron or steel, according to quality. There is fierce competition for large orders.

**Skelp.**—An active demand prevails at \$1.50 @ \$1.55. Mills are better supplied with work than they have been for some time.

**Sheet Iron.**—The accumulation of orders has enabled two or three concerns to slightly advance prices on prompt deliveries for small lots of very fine sheet iron, especially fine soft steel. The orders for galvanized, best bloom have been quite encouraging.

**Wrought Iron Pipe.**—Low prices are the rule on large orders. Two or three manufacturers talk of reducing capacity.

**Plate and Tank.**—One exceptionally large order, it is expected, will be placed by Saturday. Several small quick delivery orders have been placed since Monday. There is less sacrificing done to obtain business, as the mills are filling up. Much new work is also being offered. Altogether the plate mills are quite well fixed.

**Structural Material.**—Manufactures express the belief confidently that the volume of business that will be placed during the next two months will be very large. They think they know. Mills are already quite well supplied with work. Beams, ties and channels are 2c.

**Steel Rails.**—Light sections have the call and orders foot up well. The statement is given out

that several large orders for street rails will be placed before May 1. Standard sections, \$29.

**Old Rails.**—Brokers have no large sales to report. Quotations: \$18; street rails, \$15.50; No. 1 scrap, \$15.50.

**Pittsburg.**

April 13.

(From our Special Correspondent.)

**Raw Iron and Steel.**—Trade continues to show a fair degree of steadiness, principally for the leading descriptions. An enormous production of raw material, met by an enormous consumption, operates to keep most branches of trade in active employment and also maintain prices at a level but little above cost. The situation is a peculiar one, possessing elements of both strength and weakness. In the pig-iron department manufacturers report a steady condition, buyers taking moderate quantities without asking for concessions in prices. Less Southern iron is said to be offering, and some orders, from points heretofore supplied by Southern furnaces, have been rescinded. On the whole there is a good deal of business doing, but in proportion to the capacity for production there is barely enough to go around; hence the continuance of low prices. The general tone of the market, however, is undoubtedly of a more cheerful character than we have had for some weeks past.

**Pig Iron.**—The demand is up to the full average of expectations, but as the supply keeps pace, any decided improvement in prices seems out of the question. It is certainly some satisfaction to find that stocks are kept in good shape, and to that extent the situation is favorable; but it will require heavy buying before any impression can be made on prices. Some of the best known Pennsylvania and Virginia brands are close sold up, and furnaces are pushed for deliveries, but there is no scarcity of good iron; if one brand cannot be had others can, so there is no real inconvenience. Taking the market all the way through, the average situation is such as to preclude much, if any variation, in prices. We are reported the following:

Tons.	Cash.
400 N., prompt.....	21.25
<b>Skelp Iron.</b>	
700 S.,.....	1.70 4 m.
450 W. G. ....	1.50 4 m.
380 N. G.,.....	1.50 4 m.
<b>Steel Skelp.</b>	
720 W. G.,.....	1.0 4 m.
<b>Ferro-Manganese.</b>	
200 80% dom.,.....	59.00
125 80% del.,.....	59.60
75 80% del.,.....	59.00
<b>Blooms, Billets and Bar Ends.</b>	
1,000 B. and B. ends.....	15.50
<b>Sheet Bars.</b>	
380 at mill,.....	28.50
<b>Spelter.</b>	
200 Spelter,.....	4 21¼
50 Spelter,.....	4 22¾
<b>Steel Wire Rods.</b>	
350 Gauge Am., at mill.....	30.80
<b>Old Iron and Steel Rails.</b>	
750 L. R., Youngs-town.....	20.00
700 Short Steel Rails.....	15.50
500 Steel, mixed lengths,.....	14.50
500 Iron Rails,.....	19.50
300 S., mixed lengths.....	15.00
<b>Scrap Material.</b>	
350 C. S., gross.....	11.75
250 R. and T., net.....	15.25
200 C. M. S., gross.....	14.50
200 C. S., gross.....	17.80
150 L. S., gross.....	21.00

**COAL TRADE REVIEW.**

NEW YORK, Friday Evening, April 14.

Statement of shipments of anthracite coal (approximated) for week ending April 8th, 1893, compared with the corresponding period last year:

	1893.		Difference.
	April 8,	April 9,	
	Tons.	Tons.	
Wyoming region.....	416,767	369,899	Inc. 55,868
Lehigh region.....	145,579	90,889	Inc. 54,690
Schuylkill region.....	250,273	157,012	Inc. 93,261
<b>Total.....</b>	<b>812,619</b>	<b>617,800</b>	<b>Inc. 194,819</b>
Total for year to date, 10,814,100	9,926,873	Inc. 887,227	

PRODUCTION OF BITUMINOUS COAL for week ending April 8th and year from January 1st:

	—1893.—		1892.
	Week.	Year.	
Shipped East and North:			
Phila. & Erie R. R.,.....	765	36,138	27,170
Cumberland, Md.,.....	96,313	992,799	1,007,202
Barelay, Pa.,.....	1,118	20,096	59,356
Broad Top, Pa.,.....	14,781	226,099	175,558
Clearfield, Pa.,.....	88,965	1,136,520	1,076,731
Allegheny, Pa.,.....	29,139	351,333	339,022
Beach Creek, Pa.,.....	30,784	533,459	606,022
Poconatas Flat Top.....	62,621	741,575	720,757
Kanawha, W. Va.,.....	53,811	882,641	731,293
<b>Total.....</b>	<b>372,288</b>	<b>4,920,660</b>	<b>4,803,176</b>

	1893.		1892.
	Week.	Year.	
Shipped West:			
Pittsburg, Pa.,.....	24,249	357,082	384,284
Westmoreland, Pa.,.....	53,346	583,700	535,604
Monongahela, Pa.,.....	9,554	193,081	140,488
<b>Totals.....</b>	<b>87,149</b>	<b>1,133,863</b>	<b>1,060,376</b>
<b>Grand totals.....</b>	<b>459,437</b>	<b>6,044,523</b>	<b>5,863,552</b>

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending April 8th, 1898, and year from January 1st, in tons of 2,000 lbs.: Week, 110,481 tons; year 1,555,039 tons; to corresponding date in 1897, 1,669,495 tons.

**Anthracite.**

The trade is quiet awaiting the result of the examination of the Reading accounts and the statement of the policy to be adopted by the new management. Mr. Harris is thoroughly familiar with the coal trade in all of its branches, and of late years has devoted himself to that part of the coal business in which a conservative regard for the future should always leave the emergencies of the present; that is to say, the transportation department. If the Reading were only a miner or a transporter or a seller of coal, the obstacles in the way of so excellent a manager as Mr. Harris would be comparatively slight. Or if the system were in better financial condition he would have plainer sailing. But as the Reading not only combines within itself all of the multifarious duties of mining, hauling and selling coal, and at the same time is brought to face the most serious crisis of its existence, one may well hesitate to prophesy as to the outcome of it all.

Under the conditions that maintain at present, and indeed under any that, so far as we see, are likely to arise within the next few months, the Reading must be the most important factor in the anthracite coal trade. If Mr. Harris' policy is to succeed at all, it must be along lines laid down by commercial conditions of long growth and standing. The possession of the Poughkeepsie Bridge and the control of the anthracite trade in New England are not essential to the success of the Reading system. New England takes less than 15% of the output of anthracite coal, and while the six or seven millions of tons consumed there are of course worth having, they are not worth the jeopardizing of the other thirty-seven or thirty-eight millions. This is a case in which it will not pay to light the candle and sweep the house for the sixpence that was lost. Better let it go than wear out a shilling broom in the sweeping.

When Mr. Harris was president of the Lehigh Coal and Navigation Company it was said that he wanted to secure the Poughkeepsie Bridge, and that he would have had the assistance of the Jersey Central had not the Reading whispered nay. Well, the Reading got the bridge on a basis of 75 per cent. for the bonds, whereas Mr. Harris would have paid 80 per cent., and Mr. McLeod was going to astonish folk by showing what a grand thing for the Reading the bridge was. He certainly astonished the public, and the bridge scheme helped mightily, but the Reading went into the hands of receivers and Mr. McLeod resigned.

There is a story in Aesop's Fables in which the *drumalis personae*, so to speak, are a bridge, a canine and a piece of meat. At the last account the bridge was there and the canine was there, but the meat was gone.

As to prices. These are not apt to change until after the meeting of the Western Sales Agents on the 25th of this month, if then. Reductions that may be made for holding the Western trade would react upon the seaboard, but any one who may be deferring his purchases in the hope that the rebound from the West is sure to come is not wise in his generation. The reduction recently made to the Eastern trade was a "feeler" and the increase of purchases have not been satisfactory. From a general review of the market we are disposed to the opinion that a return to the old rates is inevitable unless—and we wish to lay especial stress upon this point—there should be some concessions in the freight rates or a better car service to the independent operators.

Mr. Harris will certainly not make any sudden or radical change in the Reading's position. It is not his habit to act hastily or to tear down without putting something better up, and just at this time the Reading needs a man of this kind.

The Reading shipments for the week ending April 8th were (approximately) 434,000 tons, of which 37,000 were for Port Richmond and 60,000 for New York waters.

The shipments at present are probably in excess of consumption, and stocks are accumulating both at tide and in the interior.

The Philadelphia & Reading Coal and Iron Company contracted with the Philadelphia Traction Company for 20,000-30,000 tons of pea, and the Lehigh and Wilkes-Barre Coal Company with the Providence & Stoungton Steamship Company for about 40,000 tons of pea. Prices not given but said to be above those of last year.

Prices are as follows:

Philadelphia.				
	Broken.	Egg.	Stove.	Chestnut.
Hard white ash	\$3.75	\$3.75	\$3.90	\$3.90
Free white ash	3.65	3.65	3.90	3.90
Shamokin	3.90	4.10	4.30	4.30
Schuylkill R. A.	4.00	4.25	4.50	4.50
Lykens Valley	4.50	5.25	5.50	4.75
New York.				
	Broken.	Egg.	Stove.	Chestnut.
Hard white ash	\$4.00	\$4.00	\$4.15	\$4.15
Free white ash	3.90	3.90	4.15	4.15
Shamokin	4.15	4.35	4.55	4.55
Schuylkill	4.25	4.50	4.70	4.70
Lykens Valley	4.75	5.50	5.75	5.00

Pea, \$2.75; No. 1 Buckwheat, \$2 @ \$2.10; No. 2 Buckwheat, \$1.25 @ \$1.50. The demand for the smaller sizes is good, and this part of the trade is slowly building up to considerable proportions. It is not unlikely that the amount of pea and buckwheat sold this year will be over 1,000,000 tons.

**Bituminous.**

It is said by one of the large dealers that fully one third of the contracts for this year are still to be made. This is notably the case with contracts that require to be filled by ocean transportation. Charter rates that were 75 and 85 cents in April of last year are now ruling at \$1.10 to \$1.25. We have ascertained that large contracts for the best quality of steam coal have been made at \$2.55 Philadelphia, \$2.50 Baltimore and \$3.10 South Ambov. The \$2.55 Philadelphia contract was solicited by the Pocahtas people but went to a more northern field. The report as to the \$2.70 Long Island contract seems to have aroused some comments, and indeed the matter calls for language vigorous, pointed and picturesque. That figure can be touched only under the benign influence of rebates, which have shone with such happy effects upon more than one contractor in these parts.

Some of the bituminous operators of the lower Virginia district are beginning to feel their way into Ohio and the central regions. This is a wise thing to do, for the Virginia product is not suited for competition with the Cumberland and Clearfield coals. The struggle across the Ohio will not be as severe as across the Potomac, and the division of the market will be of a more equitable nature.

The competition between soft coal and the small sizes of anthracite, which was active last year, is not so evident now, although pea and buckwheat are steadily gaining ground. The fact is, that the two kinds of coal, anthracite and bituminous, have each their own special uses and do not materially interfere with each other under ordinary conditions. But when from any cause the usual course of the market is interrupted then comes the opportunity for dissatisfaction and change. There seems to be no doubt of the increasing use of the pea and buckwheat coal, and we may be prepared to see more or less of a struggle between these cheaper grades of anthracite and bituminous coal. With \$2.75 for pea and \$3.10 for best steam coal in New York waters there would appear, at first glance, to be a decided advantage in the use of pea. But some who have tried the pea, have gone back to soft coal, and some who have been using soft coal have taken up with pea, so that nothing definite can be said on one side or the other as to replacement. In our judgment there will be a greater replacement of the large sizes of anthracite by the pea and buckwheat than of soft coal by pea and buckwheat. Prices and charters are unchanged, and are as under:

Prices in New York Harbor are from \$3.10 to \$3.15, and at lower tidewater ports \$2.50 to \$2.60. Charter rates are: New York to Rhode Island, 65 to 75 cents; to Boston, 75 to 90 cents. Philadelphia to Sound ports, \$1.10 to \$1.15; to Boston, \$1.15; to Portsmouth, \$1.25. Baltimore to Sound ports, \$1.10 to \$1.15; to Boston, \$1.20 to \$1.25.

The Legislative Committee in Minnesota has presented its final report on the coal combination. It finds that the Northwestern Fuel Company is largely responsible for the combination whereby the price of anthracite coal was raised to nearly \$9 per ton, and says also that several members of the combine will be indicted for criminal conspiracy. This is the proper way to get at such matters; prosecute the chief offenders and send them to the penitentiary if they are found guilty.

(From our Special Correspondent.) April 13

Trade in anthracite coal has been rather quiet this week. Nowhere do dealers seem to want coal. They all feel that the market will not advance very soon, and before long something may turn up which will effect a lower market. Dealers everywhere are running on very low stocks and really need coal. Prices are steadily maintained.

We quote f. o. b. prices at New York on free burning coal: Stove, \$4.15; egg, \$3.90; free broken, \$3.90; chestnut, \$4.15. Lyken's Valley (at Philadelphia): Broken, \$4.85; egg, \$5.45; stove, \$6; chestnut, \$5.

Spot bituminous coal is active and firm. On cars here George's Creek coal is bringing from \$4.05 @ \$4.10 per ton, and Clearfield from \$3.75 @ \$3.85. The railroads and quite a number of the mills still hold off from closing, most likely expecting that they will get coal at lower prices than are now quoted. The coal companies and the railroads seem to be inexorable and hold out for the prices they first quoted.

Freight rates are very firm, and in one case there has actually been an advance, that is, in Philadelphia rates. From the Quaker City they are quoted \$1.10 @ \$1.15. From Baltimore they are strong at \$1.25. Vessels at both places are scarcer. From New York rates are easier, and are quoted from 70 @ 75c.

The retail trade in coal continues very good. The dealers are making handsome profits at quotations.

The receipts of coal at this port for the week ending April 8th were 43,521 tons of anthracite and 39,886 tons of bituminous, against 52,677 tons of anthracite and 18,239 tons of bituminous for the corresponding week last year. Since January 1st the receipts have been 362,411 tons of anthracite and 275,025 tons of bituminous against 450,160 tons of anthracite, and 157,507 tons of bituminous for the corresponding time last year.

(From our Special Correspondent.) April 13.

Anthracite coal quiet and unchanged in price. A new schedule of quotations is expected May 1st.

Bituminous coal is in good demand and steady market with supply inadequate for requirements of trade. Prices are nominally unchanged, but a small

concession is made occasionally to save demurrage charges.

Charters of coal by lake vessels from Buffalo to Chicago, Lake Huron and Green Bay have been made at 60c. to 1.00 to 25c. and to Duluth at 50c. per net ton fee on and off. The prospects of the opening of navigation of Lake Michigan at an early day are improving. The ice is honeycombed on the Straits of Mackinaw, and propellers are running from Toledo to Erie. Our tugmen think that in a day or two a passage might be made through the ice outside this port, and considerable ice is going down Niagara River. The wind yesterday sent the huge blocks up the lake, and if not driven back by a heavy gale they may be dispersed.

Our three gas companies made the announcement at the meeting of our aldermen on Monday last that after July 1st they would charge only \$1 per 1,000 cu. ft. for gas, a reduction of 20 cents per 1,000 cu. ft.

A communication received yesterday says: "Lake Erie is to have a new ore receiving port. Last fall the Connaught Dock Company began putting in a good plant and a few shiploads of ore were received. Now it is announced that the American Steam Barge Company, the Merrill syndicate of Mesaba mines, and heavy Pittsburg iron and steel interests have united upon that harbor in the extreme north-eastern corner of Ohio as the point where the ore is to be received. A company has been incorporated and docks will be constructed."

A later telegram from Cheboygan, Mich., dated April 12th, says: "Experienced captains think boats can now be got through the Straits of Mackinaw. Weather is very warm, with rains."

(From our Special Correspondent.) April 13.

Last week a number of coal-carrying steamers were badly damaged at the mouth of the Chicago river by two tidal waves rushing in from Lake Michigan. They were each about four feet high and were carried forward with irresistible force, tearing the vessels from their moorings and knocking them about like mere cockle shells. The amount of damage was considerable and several of them were so badly damaged that they had to be docked, as they were leaking, taking in water freely.

There is very little of interest occurring in the anthracite coal trade; extreme quietness is noted in wholesale and retail lots, and shippers anticipate no change until May, and if the rumors are correct, as mentioned in last week's issue of the "Engineering and Mining Journal," relative to the advance of 25c. in June over the opening prices to be determined at end of this month, the buying will be very light until after the turn of the year. A very small proportion of the country trade can afford to stock up and carry coal for five or six months, and run the risk of a break in the market. All-rail coal is coming forward in good shape and is taken into stock. Some shippers account for the existing quietude by the fact that the assessor makes his annual visit about May 1, when, of course, large stocks would be undesirable.

Bituminous coal is still in abundant supply, and that of Eastern production is heavy on the market, but on account of the low prices made is moving more freely. Outside of the steam trade demand is very light. The season is approaching for placing contracts; some have already been given out, and the tendency is towards better prices than those which ruled a year ago. So far as known, no cheap season's contracts have been made. The fact that the excessive supply of coal on track has not weakened the market for new coal, or as would have done in seasons past, is regarded with peculiar satisfaction by the trade. The miners' convention now being held in Columbus, O., and at which the question of wages will be settled, is viewed with indifference by operators, as they are determined that no advances will be paid for getting coal. They urge that with the increased freight charges they cannot stand any higher figures for mining. Indeed, some intimate that a strike at this juncture would be rather opportune. The prospect of trouble in the Indiana block coal field and in Illinois is not regarded as serious as that in Ohio. Contracts for Indiana block coal are not being made, as operators refuse to tie up their product as they did last year.

Coke is in moderate demand only, as most of the foundries are well stocked up on account of anticipated trouble in the Connellsville regions. There is but little surplus, not sufficient to affect values, which are fairly well maintained.

Quotations are: \$4.65 furnace; \$5.05 foundry, crushed; \$5.40 Connellsville; West Virginia: \$3.90 furnace, \$4.10 foundry; New River Foundry, \$4.65; Walston: \$4.65 furnace, \$5 foundry.

Circular prices are at the following rates: Lehigh lump, \$6.50; large egg, \$5.85; small egg, range and chestnut, \$6.10. Retail prices per ton are: Large egg, \$7.25; small egg, range and chestnut, \$7.25.

Prices of bituminous per ton of 2,000 lbs., f. o. b. Chicago, are: Pittsburg, \$3.35; Hocking Valley, \$3.00; Youghiogheny, \$3.25; Illinois block, \$2.50; Brazil block, \$2.50.

(From our Special Correspondent.) April 13.

Coal.—Trade along the Monongahela Valley has been very active and a fair amount of coal has been mined; the miners, with a few days' practice, will be able to dig the usual amount of coal. In the railroad district coal production is being kept back somewhat by inadequate shipping facilities; a better supply of cars promised. Coal shipments for April, so far, are: Cincinnati, 1,787,000 bushels; Louisville, 3,147,000; total, 4,934,000 bushels. The stage of

water is excellent, and coal is being forwarded to the lower markets as fast as loaded. A Greensburg dispatch reports the transfer of the Mutual Coke Company for \$300,000. The purchase includes all coal, surface, tipples and sidings. The plant is one of the best in the country.

**Cornellsville Coke.**—A slight improvement was made in shipment since our last and an increase in the running order of the plants. For the first time in many months the car supply is abundant in the region; productive shipments are steady. There are now 73 active plants; of these, 37 plants, with 7,131 active ovens, ran 5 days, 242 ovens ran 4 days, 11, C. Frick & Co. ran 6 days. The 11 active plants of the McClure company ran 5 days. The shipments of coke for the week aggregated 136,572 tons, an increase of 3,021 tons over the shipments of the preceding week. The distribution was as follows: To Pittsburgh, 1,800 cars; points east of Pittsburgh, 1,693; points west of Pittsburgh, 3,695; total, 7,188 cars. Western shipments increased 150 cars; Eastern shipments decreased 7 cars; Pittsburgh increased 16 cars, making a net increase of 159 cars over the previous week. Last week's prices still govern the market, at least to a certain extent.

A Columbus dispatch reports that the United Mine Workers, in session at that city, have decided to ask an advance.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, April 14.

**Heavy Chemicals.**—The heavy chemical market during the past week has been characterized by a general dullness. At the close of the week, however, there has been a freer inquiry although many actual sales have not resulted from it as yet. Caustic soda has been quiet, being in but little demand. Some sales are reported of carbonated soda ash and alkali; both of these chemicals continue scarce on the spot. Bleaching powder is rather firm. Prices show no change and we quote this week: Caustic soda, 60%, 2.95@3.10c.; 70%, 2.70@2.80c.; 74%, 2.72@2.82c.; 76%, 2.80@2.90c. Carbonated soda ash, 48%, 1.40@1.40c.; 58%, 1.35@1.40c. Alkali, 48%, 1.35@1.40c.; 58%, 1.30@1.40c., according to package. Sal soda, English, on the spot, 1c.; American, 90@95c.; bleaching powder, 2.25@2.50c.

**Acids.**—The acid market has been rather quiet during the past week, the demand having decreased somewhat this month, although it is still fairly active. There are no new features to report, and prices rule as they have for several weeks past. Our quotations are as follows: Acid, per 100 lbs. in New York and vicinity, in lots of 50 carboys or more: Acetic, \$1.75@2., according to quality; muriatic, 18%, 90c.@\$1.10; 20%, \$1@1.25; 22%,

\$1.25@1.50; nitric, 40%, \$1; 42%, \$4.50@4.75; sulphuric, 90c.@\$1.10; mixed acids, according to mixture, oxalic, \$6.30@6.50. Blue vitriol is quoted all the way from \$3.37½ to \$3.75; glycerine for nitroglycerine, 11½@12½c., according to quality and quantity.

**Brimstone.**—This market has been very quiet. There are no stocks worthy of mention on the spot, although they are nominally quoted at \$26 for best unmixed seconds. Futures are held at \$20 for best unmixed seconds and 75 cents less for thirds.

**Fertilizing Chemicals.**—There is very little change to report of this market. The main features continue exactly as described in this column last week. The market has been quiet and prices show no change. There was a freer inquiry for ammoniacates from the North, but no sales of importance have been made. Consumers still display the same disinclination to purchase at the present figures. In view of the limited supply available many dealers profess that prices will not go much, if at all, lower. Our quotations this week are as follows: Dried blood, \$2.85@2.90 per unit; azotine, \$2.90; sulphate of ammonia, on the spot, \$3.25 for gas liquor. No bone liquor is offering. Acidulated fish scrap, no stocks on hand; dried scrap is scarce and is quoted at \$31 f. o. b. fish factory. Tankage, high grade, \$28@30; low grade, \$27@29. Bone tankage, \$24@25; bone meal, \$24@25.50.

The potash salts generally show no change. The price of double manure salts as fixed by the syndicate is as follows: New York and Boston, \$1.12; Philadelphia, \$1.14; Charleston and Savannah, \$1.17 cwt. basis, 48@50% in 50 ton lots on foreign weights and analyses. Sulphate of potash, 90%-96% basis, 90%; New York and Boston, \$2.07; Philadelphia, \$2.09; Charleston and Savannah, \$2.12 sulphate of potash, 96-99% basis 90%, is 4% higher.

**Phosphates.**—There is a firmer feeling in this market and several large sales have been made. Quotations for high grade land rock, f. o. b. Charleston, are \$4.50@4.75. Freight are \$1.25. Shipments of fertilizers from Charleston, S. C., according to the well-known broker of that city, for the six months ending March 31, 1893, were 226,025 tons, an increase of 85,710 tons over the shipments during the same period of the year before.

**Muriate of Potash.**—Arrivals during the past week aggregated but 150 tons. Spot goods are very scarce, in consequence of which sales have been made at from \$1.83 to \$2 per cwt., according to quality. The prices fixed by the syndicate for 1893 are as follows: New York or Boston, \$1.74; Philadelphia, \$1.80; southern ports, \$1.3.

**Kainit.**—Quotations for shipments previous to September are as follows: New York, Philadelphia and Boston, \$8.75 for foreign invoice weight and

test, and \$9 for actual weight; Charleston, Savannah and Wilmington, \$9.50 for invoice weight and test, and \$9.75 for actual weight. Shipments after September 1st, 25c. higher.

**Nitrate of Soda.**—The nitrate market is very strong. For nitrate, ex ship in port, \$2.30 @ \$2.35 is asked. Future shipments are quoted at \$1.80 @ \$1.85 according to the month. Advices from the West Coast indicate that a stronger feeling prevails there also.

Liverpool, April 5.

(Special Correspondence of Jos. P. Brunner & Co.) Business has been practically at a standstill for the last week owing to the Easter holidays, and although they are practically over the "holiday feeling" still prevails and there is nothing of special interest to report.

Soda ash is only receiving a moderate amount of attention, and quotations are nominally unchanged at about as follows, viz: Caustic ash, 48%, £4 17s. 6d. @ £5 5s. per ton; 57% @ 58%, £5 15s. per ton. Carb. ash, 48%, £5 @ £5 5s. per ton; 58%, £5 7s. 6d. @ £5 15s. per ton. Ammonia ash, 58%, £4 17s. 6d. @ £5 5s. per ton, all net cash.

Soda Crystals are dull at £3 @ £3 2s. 6d. per ton less 5%. Caustic soda is inactive, but prices are nominally unchanged, quotations varying considerably according to quantity and export market. The nearest spot values range about as follows: 60%, £8 5s. @ £9 per ton; 70%, £9 5s. @ £10 per ton; 74%, £10 5s. @ £11 per ton; 76%, £11 15s. @ £12 5s., all net cash. For parcels under 10 tons, 5s. per ton extra is charged.

Bleaching powder is only in moderate request, at the same time the price is firm at £8 10s @ £8 15s. per ton, net cash, for hardwood packages.

Chlorate of potash remains in a very dull position and it is difficult to give any reliable quotations, there being scarcely sufficient business passing to test the market.

The nominal quotations are about as follows. Prompt delivery, 8½ @ 8¾ d.; April, 8½ @ 8¾ d.; May, 8½ @ 8¾ d.; June, 8d.; July, Dec., 7½ @ 8d., less 5%.

Bicarb. soda is in fair demand at £6 15s. per ton, less 2½% for 1 cwt. kegs, with usual allowances for larger packages.

Sulphate of ammonia is weaker and quotations are somewhat unreliable at the moment, and about £12 @ 10s. £12 12s. 6d. per ton for good grey 24% and £12 15s. @ £12 17s. 6d. for 25% may be called nominal spot values, for double bags, less 2½% f. o. b. here.

Nitrate of soda continues firm at £10 12s. 6d. @ £10 15s. per ton, less 2½% for double bags f. o. b. here, while in some cases an advance on the higher figure is asked.

Corb Ammonia.—Lump 3 l. per lb.; powder 3¼ d. per lb. net cash.

CURRENT PRICES.

Table listing various chemical and mineral products such as Acid, Alcohol, Ammonia, and their current prices per unit.

Table listing various mineral products such as Bromine, Cadmium, China Clay, and their current prices per unit.

Table listing various mineral products such as Marble Dust, Metallic Paint, and their current prices per unit.

Table listing various mineral products such as Tale, Terra Alba, and their current prices per unit.

THE RARER METALS.

Table listing various rare metals such as Aluminum, Arsenic, Barium, and their current prices per unit.

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

Table with columns for Name and Location of Company, April 8-14, Sales, and Name and Location of Company, April 8-14, Sales. Includes companies like Adams, Colo., Alcoa, Mont., Amador, Cal., etc.

Ex-dividend. \*Debit and New York Stock Exchange. Dividend shares sold, 2,255. Non-dividend shares sold, 2,635. Total shares sold, 23,930.

BOSTON MINING STOCK QUOTATIONS.

Table with columns for Name of Company, Apr. 7-13, Sales, and Name of Company, Apr. 7-13, Sales. Includes companies like Atlantic, Mich., Bodie, Cal., Bonanza Development, etc.

Dividend shares sold, 2,255. Non-dividend shares sold, 2,635. Total shares sold, 23,930.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Large table with columns for Name and Location of Company, Capital Stock, Shares, Assessments, Dividends, and Name and Location of Company, Capital Stock, Shares, Assessments. Includes companies like Adams, S. L. C., Alaska-Treadwell, g., etc.

DIVIDEND-PAYING MINES.

NON-DIVIDEND-PAYING MINES.

Main table with columns: Name and Location of Company, Capital Stock, Shares, Assessments, Dividends, Date and amount of last, Total paid, Name and Location of Company, Capital Stock, Shares, Assessments, Date and amount of last, Total paid.

G. Gold. S. Silver. L. Lead. C. Copper. B. Borax. \* Non-assessable. † This company as the Western, up to December 10th, 1881, paid \$1,400,000. ‡ Non-assessable for three years. § The Deadwood previously paid \$275,000 in eleven dividends and the Terra \$75,000. ¶ Previous to the consolidation in August, 1884, the California had paid \$31,320,000 in dividends, and the Cons. Virginia \$42,300,000. \*\* Previous to the consolidation of the Copper Queen with the Atlanta, August, 1885, the Copper Queen had paid \$1,350,000 in dividends. †† This company paid \$190,000 before the reorganization in 1880. ††† This company acquired the property of the Raymond & Ely Company which had paid \$3,075,000 in dividends. \*\*\*\* Previous to this company's acquiring Northern Belle, that mine declared \$2,400,000 in dividends against \$425,000 assessment &

COAL AND COAL RAILROAD STOCKS.

Table with columns for NAMES OF STOCKS, April 8, April 9, April 11, April 12, April 13, April 14, and Sales. Lists various coal and railroad stocks with their respective prices and sales figures.

Total shares sold, 161,020

INDUSTRIAL AND TRUST STOCKS.

Table with columns for NAME OF STOCKS, April 8, April 10, April 11, April 12, April 13, April 14, and SALES. Lists industrial and trust stocks with their respective prices and sales figures.

Total sales, 438,151.

CALIFORNIA.

Table for California stocks, San Francisco. Columns include NAMES OF STOCKS, April 8, April 10, April 11, April 12, April 13, and Closing Quotations.

Colorado Springs, April 8.

Table for Colorado Springs stocks. Columns include Bid, Asked, and various stock names like Anaconda Gold, Cleopatra, etc.

Denver.

Table for Denver stocks. Columns include High, Low, Sales, and various stock names like Anaconda, Amity, etc.

Hico.

Table for Hico stocks. Columns include Bid, Asked, and various stock names like Atlantic Cable Cons. M. Co., etc.

COLORADO.

Table for Colorado stocks, Aspen. Columns include Bid, Asked, and various stock names like Argentin Junlata, Aspen Contact, etc.

MARYLAND.

Table for Maryland stocks, Baltimore. Columns include Bid, Asked, and various stock names like Balt. & N. C., Corrad Hill, etc.

MINNESOTA.

Table for Minnesota stocks, Duluth. Columns include Bid, Asked, and various stock names like Biwabik M. Iron Co., Cincinnati Iron Co., etc.

UNLISTED STOCKS.

Table for unlisted stocks. Columns include Bid, Asked, and various stock names like Adams Iron Co., Allegheny Iron Co., etc.

MISSOURI.

Table for Missouri stocks, St. Louis. Columns include Bid, Asked, and various stock names like Adams, American & Nettie, etc.

MONTANA.

Table for Montana stocks. Columns include Bid, Asked, and various stock names like Bald Butte (Mont.), Benton Group, etc.

PENNSYLVANIA.

Table for Pennsylvania stocks, Schuylburg. Columns include Bid, Asked, and various stock names like Bdgwater Gas Co., Cartiers Val, etc.

Table for Excelsior B. & S., Locust Mt. C. & I., Penn. Sait, etc.

SOUTH DAKOTA.

Table for South Dakota stocks, Deadwood. Columns include Bid, Asked, and various stock names like Deadwood Terra, Double Standard, etc.

Pipe Line Certificates.

Table for Pipe Line Certificates. Columns include High, Low, Sales, and various certificate names like April 1, April 3, etc.

Total sales in barrels, 17,000

FOREIGN QUOTATIONS.

Table for foreign quotations, London. Columns include Highest, Lowest, and various stock names like Alaska Treadwell, Amador, etc.

Paris.

Table for Paris stocks. Columns include Bid, Asked, and various stock names like Belmez, Spain, Golden River, etc.

ASSESSMENTS.

Table for assessments. Columns include COMPANY, No., D't'nt in office, Day of sale, Amt. per sh're, and various company names like Anchor, Utah, Belle Isle, etc.