

THE ENGINEERING AND MINING JOURNAL



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

VOL. XLIX.

APRIL 19.

No. 16.

RICHARD P. ROTHWELL, C.E., M.E., Editor.

ROSSITER W. RAYMOND, Ph.D., M.E., Special Contributor.

Cable Address: "Rothwell, New York." Use A. B. C. Code, Fourth Edition
London: 76 Finsbury Pavement, London, E. C., Mr. Thomas B. Provis, Civil and Mining Engineer, Manager.
Mexico: Mr. R. E. Chism, M. E., Callejon Espirito Santo No. 4, City of Mexico.
Peru, S. A.: Mr. John Newton, No. 2 Calle Constitucion, Calla.
Australasia: Messrs. Moffat, Judd & Co., 11 Bridge street, Sydney, N. S. W.; Mr. W. Forster, 56 Elizabeth street, Melbourne, Victoria; Messrs. J. T. Partridge & Co., 134 Manchester street, Christchurch, New Zealand.

SUBSCRIPTION PRICE, including postage:
Weekly Edition (which includes the Export Edition), for the United States, Mexico and Canada, \$4 per annum; \$2.25 for six months; all other countries in the Postal Union, \$5.
Monthly Export Edition, all countries, \$2.50 gold value per annum.
 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.

THE SCIENTIFIC PUBLISHING CO., Publishers,

SOPHIA BRAEUNLICH, Sec'y & Treas. R. P. ROTHWELL, Pres. and Gen'l Manager.
P.O. Box 1833. 27 Park Place, New York.

CONTENTS.

PAGE.	PAGE.
Coxe Brothers vs. the Lehigh Valley Railroad Company..... 441	Cape Breton, N. S., and the Coxbeath Copper Mines..... 445
The Persistence of Keely..... 441	Isochemic Lines in Ore Deposits..... 446
President Diaz' Message to Congress..... 411	The Waters of the Passaic River and Its Tributaries—Self-Purification of Streams..... 448
Plans for Increasing the Capacity of the Brooklyn Bridge..... 442	The Central Mining Company..... 450
German Government Encouragement to Miners..... 442	The Montana Mining Company..... 450
Mr. Knox's National Bank Bill..... 443	A New Salt-Making Process..... 451
The Air-Lift Pump..... 443	How to Win Fortune..... 451
Hungarian Government Contract for Improving the Danube..... 443	Iron Works for India..... 452
Plans for Increasing the Capacity of the Brooklyn Bridge..... 443	Coke Ovens in the Flat-Top Region..... 452
Gold Treatment in Salvador..... 443	The Preparation of Manganese..... 452
Close Sizing Before Jigging..... 443	Books Received..... 452
Mining in Sonora, Mexico..... 444	Patents Granted..... 452
The Postal Statistics of Holland..... 444	Personals, Obituary, Industrial Notes..... 453
Artificial Malachite..... 444	Contracting Notes..... 453
	Machinery and Supplies Wanted at Home and Abroad..... 453

* Illustrated.

MINING NEWS:	MEETINGS..... 456	Coal Stocks..... 463	IRON:
Arizona..... 454	DIVIDENDS..... 456	London..... 464	New York..... 459
California..... 454	ASSESSMENTS..... 456	New York..... 463	Chicago..... 459
Colorado..... 454	MINING STOCK	Pittsburg..... 464	Louisville..... 459
Dakota..... 454	MARKETS:	Paris..... 464	Philadelphia..... 460
Michigan..... 454	New York..... 456	San Francisco..... 463	Pittsburg..... 459
Missouri..... 454	Boston..... 456	St. Louis..... 464	IMPORTS AND EXPORTS..... 461
Montana..... 455	Colorado..... 457	Trust Stocks..... 464	
Nevada..... 455	Minneapolis..... 457	MARKETS:	
Pennsylvania..... 455	Denver..... 457	COAL:	CHEMICALS AND MINERALS..... 463
Utah..... 455	Lake Superior..... 457	New York..... 457	BUILDING MATERIAL MARKET..... 461
West Virginia..... 455	Gold and Iron Stocks..... 457	Boston..... 47	CURRENT PRICES:
Wyoming..... 455	Pipe Line..... 457	Buffalo..... 458	Chemicals..... 464
	MINING STOCK	Chicago..... 458	Minerals..... 464
	TABLES:	Pittsburg..... 548	Rarer Metals..... 464
	Baltimore..... 464	FREIGHTS..... 458	Building Mat'rs..... 464
Austria..... 455	Birmingham..... 464	METALS..... 458	ADV. INDEX..... XIX
Canada..... 455	Boston..... 463		

WHY does not the Inter-State Commission announce its decision in the case of Coxe Brothers v. the Lehigh Valley Railroad Company? This case has now been under consideration for more than a year, and several times it has been stated in the newspapers that it has been pigeon-holed. The great delay gives credence to these reports. In the meantime, the individual operators are suffering, as is shown by the following extract from the Philadelphia Times, of April 4th:

"A. Pardee has stated that six collieries operated last year in the Lehigh region did not make sufficient profit during the year above royalties and expenses to pay for a carpet for the company's office. He estimates that coal on board the cars in the Lehigh region cost the operators \$2.08 per ton. The present price at which the companies which both carry and mine coal are selling anthracite shuts the individual operators out of the market, as they reap no profit upon the carrying business."

This is exactly what Messrs. Coxe Brothers claimed in their suit. Are the railroads to be allowed to render all private coal mining property valueless by unjust charges?

THE PERSISTENCE OF KEELY.

When the history of the psychology of the nineteenth century shall be written, one of its strangest chapters will contain the account of the KEELY motor, and its remarkable persistence through a score of years, in spite of its failure to redeem any of its promises, to do a single piece of useful work, or to contribute one cent's worth either to the wealth or knowledge of mankind. Hundreds of thousands of dollars have been received by its promoters. No mechanical engineer or physicist of reputation has been found in many years to give a favorable opinion of it; but, on the contrary, men of this class have denounced it as the basest of humbugs. Still it persists, and men are still found who will put their money in it. This is the real great KEELY mystery. The motor is now apparently getting ready for one of its periodical "booms," for, after giving it a rest for a long time, the newspapers are beginning to discuss it again, and letters are being published by its adherents. The latest publication of the kind is a letter from a Mr. H. OXNARD WARD, of Philadelphia, dated April 13, 1890, addressed to "Professor DEWAR, of the Royal Institution of Great Britain," which is printed in one of the Philadelphia papers. Why the letter was made public so soon is not settled.

The letter gives an account of some "experiments" which a number of scientific men were invited to witness, but it is noticeable that of the eminent physicists such as Prof. BARKER, of the University of Pennsylvania, and Prof. ROWLAND, of the Johns Hopkins University, who were invited, none were able to be present. Much stress is laid upon the favorable opinion of Dr. JOSEPH LEIDY, of the University of Pennsylvania. He is a professor of anatomy and natural history, and is eminent for researches in botany, biology and paleontology. How these qualifications fit him for forming an opinion either good or bad on the Keely motor or on any other mechanical device is not apparent.

Mr. WARD makes some admissions which are worth putting on record. He says: "Mr. KEELY admits now that he cannot construct a patentable engine to use this force until he has mastered the principle." So there can be no protection to investors, for "principles" are not patentable under our law. Of course, Mr. KEELY needs money to "master the principle." Money, indeed, seems to be always the "principle" that Mr. KEELY is after, and he appears to understand thoroughly the method of "disassociating" money and men in the "sympathetic globe" he operates on.

With high-sounding terms and sleight-of-hand-like experiments he has mystified the public now for nearly twenty years, but without adding one single scientific fact to the sum of human knowledge, or showing one particle of real work accomplished.

A mechanical engineer of our acquaintance was recently asked if he would like to go to Philadelphia to examine and report on the KEELY motor. "Yes; for a sufficient fee," he replied. "Do you think that your report could be of value to your client sufficient to warrant him paying the fee?" was asked. "Certainly it would," was the reply, "if my report should be the means of preventing his making an investment of a greater sum in the KEELY motor." "But suppose he has already invested, and he wished your report to decide his mind whether to hold on to his stock or to sell out?" "In that case," replied the engineer, "I think I should advise him to hold on to it, for I would consider his unloading it about equal in morality to his unloading counterfeit money with which he had been 'stuck' upon an innocent party. If he has been swindled into buying the stock, I don't think that justifies him in swindling any one else with it."

That, however, is only an engineer's opinion. A Wall street man or a politician might look at the matter differently, but it shows that engineers are apt to be constitutionally disqualified for giving opinions to financiers concerning such mechanical devices as this. A biologist or palaeontologist is a much better kind of man for the purpose.

PRESIDENT DIAZ' MESSAGE TO CONGRESS.

The speech of General DIAZ at the opening of the Mexican Congress on the 1st inst., presents a history of continued and steady progress in the affairs of the sister Republic. This topic is only a repetition of what it has been the good fortune of the able statesman who is at the head of the Government, to dwell upon in his recent annual messages to Congress, and supported as he is by an honest and capable administration which has the entire confidence of the country, it is only what might be expected from the vast natural resources of the country, now being at last developed.

A few complimentary phrases are devoted to the subject of the labors of the Pan-American Congress, with a hope expressed that they will conduce to the peace, harmony and progress of the New World. The references to the relations with the United States deal with the unfortunate Mizner affair in Central America, and to its conclusion by the re-proof administered by the Department of State to our representative for his imprudent language. Then the inconvenience to Mexico of the proposed transfer of Geronimo and his band of captive Apaches to the Indian Territory is pointed out as liable to expose the Mexican frontier to Indian

raids, and it is hoped that the remonstrance addressed by the Mexican Minister in Washington, to the Secretary of State will have due effect.

Under the head of increased postal facilities, the contract with the representative of Mr. T. A. Edison to establish a phonograph service for the public is recorded, and although Mexico is the first country in which this new means of correspondence is to be tried, it is expected that the result will be satisfactory; and in one respect it may be that Mexico offers a good field for such an experiment, as there are many persons, to whom writing is a difficulty, who might be anxious to avail themselves of such a facility.

Railroad construction in every part of the Republic is actively progressing, the total now amounting to 8,850 kilometers, and the completion of the San Luis Potosi to the Tampico branch of the Mexican Central is referred to with especial satisfaction. In connection with this it may be well to mention the harbor works at Tampico, the active commencement of which is announced by the President. It is stated that the channel over the bar will be a mile long and 1,000 feet wide, with a depth of 24 feet. Once inside this bar the river Panuco forms a magnificent natural harbor. The width of the channel is about one-quarter of a mile, with a depth of from 30 to 35 feet for about 10 miles. The natural advantages are such that, the obstacle of the bar once overcome by dredging and jetties, its superiority over Vera Cruz as a harbor is at once apparent.

The President relates what has been and is still being done to construct a harbor at Vera Cruz, viz., that 5,200 blocks of concrete; of 28 tons each, have been put in place, and that there are ready for immersion 800 more. On account of the opinion expressed by various persons that the closing of the North East Channel by the Harbor Works was having an injurious effect on account of silting up within the port, a commission of investigation had been appointed, whose report was not alarming, and that a second commission of engineers had been appointed to verify the results of the former one.

The mining industry, as usual, receives due recognition. Its development is satisfactory, and since September of last year the number of "denouncements" or applications for mining rights amounts to 724 in thirteen States of the Republic. During the same period there have been made 43 contracts for the exploitation of mining zones in accordance with the law of June 6th, 1887, which, together with those formerly made, form a total of 210 contracts for working mining zones. There has been entered into, besides, a contract for the establishment of five reduction works in the country to treat every description of ore, accompanied by the exploitation of an equal number of mineral zones granted to the same undertaking. Since the law of June 6th, 1887, came into effect, 39 contracts have been declared forfeited. In order to guarantee the fulfillment of those in force, there has been made a deposit of \$448,595. It may be expected that by means of these contracts an investment of \$21,000,000 will be made in the mining industry.

The coinage of the last fiscal year amounted to \$20,496,000, being \$666,000 less than the preceding year. The exports of the precious metals, however, show a large increase, of more than \$7,000,000, amounting to \$38,785,000.

One other point at least, is of interest, viz., the official statement that during the same period, since last September, the national lands which had been surveyed, or perhaps more correctly, measured, amounted to 5,061,000 acres, of which 3,374,000 acres belonged to the Government after remunerating the concessionaires or contractors who made the surveys. The total amount of national lands now at the disposal of the Government is 23,290,000 acres.

The record is a good one and must give satisfaction to the people of Mexico and to those who are interested in the progress of the country; indeed, we think that although we have not room for so much development and progress in this country, yet it would be a fortunate thing for the United States if our Presidential messages were as practical in their tenor.

PLANS FOR INCREASING THE CAPACITY OF THE BROOKLYN BRIDGE.

The urgent need of greater carrying capacity on the Brooklyn Bridge road, to which we called attention in the *ENGINEERING AND MINING JOURNAL* of April 5th, when we described and illustrated a proposed "loop" system, is now being discussed with accustomed warmth in the daily papers. The subject is certainly worthy of this attention, and more especially of the attention of the technical press. We, therefore, gladly give place on another page to an inquiry from a correspondent, who apparently questions the possibility of running trains safely at 25 seconds headway on the main line of the bridge. We have looked into the matter somewhat fully, and give the results of our investigation for the benefit of those who have not the time to work the problem out themselves.

Paradoxical as it may appear, the shorter the interval is at which trains are run, the less is the chance of accident from collision. Where a system consisting of several terminal independent loops is used, the whole question becomes one of making the switches work automatically and with certainty, and there need be no great difficulty in accomplishing

this. The switch difficulty has induced the proposal of plans calling for very long trains run at such intervals as are necessary for putting off and taking on passengers at platforms on the main track. Then, of course, the shorter the interval the greater the danger; but when the trains run successively onto three loops, the interval between an incoming and a standing train is nearly three times as great as if the trains ran and stopped on a single track; and as there are more switches in the present tail-switching system than in the proposed loop plan, no objection can be raised to the latter on this score by the advocates of the present system. It might, perhaps, be possible to discharge and take on passengers at the same stop, which would still further increase the capacity of the system.

Let us briefly investigate the points raised by Z. X. First, would there be "a disastrous collision, should a cable break while the train was on the up grade?"

The energy in the moving train at any point is calculated by the well-known formula $h = \frac{v^2}{2g}$, in which v = the velocity in feet per second,

g being the acceleration due to gravity in the height to which the energy would lift the body; v for 10 miles per hour = 14.66 feet, and $2g = 64.4$, from which $h = 3.49$ feet. The train of five cars weighs 210,000 pounds or 105 tons, and taking traction resistance at 8 pounds per ton, and grade resistance at 20 pounds per ton per cent. grade, the total resistance of the train on a tangent will be 8,757 pounds. In other words, every foot the train moves over the track will absorb 8,757 pounds of energy. As the train has stored within itself 210,000 pounds \times 3.49 feet = 732,900 foot pounds, the distance it would move before coming to rest would be represented by the total energy, divided by the energy absorbed per foot of distance, that is 83.6 feet, and the time occupied, 11.4 seconds.

The clear space between trains of 5 cars on 25 seconds intervals is 96.5 ft., equivalent to 6.5 seconds, so that the second train would overhaul the first by the time the speed of the first had become reduced by about one-half, or to about 5 miles per hour, or the rate of a fast walk. The difference between the two velocities will represent the force of the collision. No damage could possibly result. In fact, so far as danger from collision is concerned, the shorter the intervals between trains the safer will be the operation.

In reply to the question of Z. X., we need only say that the gripping appliance, referred to by us as having been proposed, is a kind of clip chain or belt, which gives great wearing surface and apparently works well in the experiments already made, and offers advantages over the grip between pairs of wheels. The train is controlled by one man, who can apply the air brakes, and pick up either cable at any point on the line.

To operate the short radius loop, cars would have to be fitted with longer sector bars, which support the drawbars, to enable the latter to describe a greater arc; also the side bearings will require lengthening, both changes can be accomplished easily and at small cost.

It would of course be entirely impracticable to haul trains around such curves without the side rails and horizontal wheels, for the bearing wheel flanges would be drawn against the rails with sufficient force to either soon cut them away or cause them to climb over the rail. With the improvements shown in the illustrations in the *ENGINEERING AND MINING JOURNAL* of April 12th this is overcome. The bearing wheel flanges never touch the rails. The friction is reduced to rolling friction, except that which is due to the parallelism of the axles, and this takes place on the top of the rail and tread of wheel, not on the flanges. The resistance is thus much reduced, and if the ordinary traction of the bearing wheels be taken at 10 pounds per ton and that of the horizontal wheels 30 pounds per ton, due to their smaller diameter, and that the cars weigh, empty, 12 tons, there will be a total resistance of 480 pounds per car. By the use of a diagram it is easily shown that four cars only will be on the curve, while the motor and last car are on straight track. Resolving the forces, we find about 1,100 pounds of inward pressure against the side rail sustained by two wheels at the front of the first car, and a drawbar pull of 2,050 pounds, which is gradually reduced to nothing at the end of the last car, the angle which the drawbar will make with the body of the car, is 81½ degrees, consequently the side wheels must roll.

This system seems to us to afford the cheapest and safest solution of the problem yet proposed, for it requires very little extra ground, the item of cost rendering totally impracticable the loop plan which contemplates discharging and taking on passengers at the same point on the loop. With curves of a radius of only 45 feet, the space occupied by three loops would but slightly exceed the present width of the bridge. We shall be pleased to have the views of our readers upon this question, which is so important to the thousands who cross the bridge daily.

German Encouragement of Mining.—The mining department of the German Government has recently taken steps to establish in six different towns in the principal mining districts a free library specially for the mining population. These libraries are furnished with all the principal works on geology and mining, a complete collection of maps and all the journals devoted to mining.

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.

Mr. Knox's National Bank Bill.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: A writer in the *Indicator*, commenting contemptuously on my review of Mr. KNOX's National Bank bill, says that I or my posterity may discover some time "that a railroad bond is a more stable and a more satisfactory security for circulation" than government bonds or silver bullion. What my posterity may find out I cannot undertake to say. But my own experience with railroad bonds has not been in the direction indicated by the above prophecy. Nor do the market prices of railroad bonds, which are deemed safe by investors, indicate that railroad bonds in general are considered secure. Nor does the list of reorganized railroad companies, with their new liens taking precedence of the old, speak very loudly of the stability of such securities. Silver bullion may fluctuate in value a few points one way or the other during the year. It cannot drop from 100 to 25, as I have known bonds to do which had been placed on the market by eminent banking houses.

There is no danger that prudent men will consent to have the national bank notes secured by railroad bonds. The surface indication exhibited by the *Indicator* indicates nothing at all. R. W. R.

NEW YORK, April, 1890.

The Air-Lift Pump.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In the *JOURNAL* of December 28th, 1889, I described a new pump under the name the Air-Lift Pump, the invention of Dr. Julius G. Pohlé.

Sending a copy of my article to Professor Bruno Kerl, Berlin, and communicating with him on the subject, I find Dr. Pohlé is not the inventor, but only one of the many inventors of this pump.

Identically the same pump, under the appropriate name, *geyser pump*, is described by Dr. Werner von Siemens, in the *Transactions of the Verein zur Befoerderung des Gewerbflusses*, Berlin, March, 1885, page 80.

This article brought out further information on the subject.

In the "*Zeitschrift der Deutschen Ingenieure*," 1885, No. 16, Gerlack says this system of pumping was described in 1797, by Bergmeister Loescher, of Freiberg, as "*Aeronautisches Kunstgezeug*."

Later on we find the subject discussed in the Austrian "*Zeitschrift fuer Berg und Huettenwesen*," No. 32, 1885, and in the "*Berg und Huttenmaennische Zeitung*," No. 4, 1886, where, it is stated, this system of elevating water was already known and used in the 16th century, and numerous examples are given up to recent times.

Why, under the circumstances, this pump has not found a more extensive introduction, appears to me strange, because there seems to be considerable merit in the idea. C. A. STETEFELDT.

SAN FRANCISCO, April 9th, 1890.

Hungarian Government Contract for the Improvement of the Danube.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: The Royal Hungarian Government will let contracts for works to regulate the so-called "Eisernes Thor" (Iron Gate) and the cataracts on the lower Danube. The government desires this fact to be made known to contractors in the United States, and I therefore take leave to ask you to publish the following in your esteemed *ENGINEERING AND MINING JOURNAL*:

The work will comprise—

1. The blowing up of rocks at the rapids near Szentka, Kazla-Dójké, Izlas Taihtalia Greben, Incz, etc., amounting in all to 162,000 cubic meters.

2. The building of breakwaters near Greben and Incz, amounting in all to 612,000 cubic meters of stone work and 104,800 cubic meters of pavement.

3. The building of a ship canal at the "Eisernes Thor," and the erection of a bridge with a span of 10 meters, etc.

The contracts will be let by His Excellency the Royal Hungarian Minister of Commerce in Budapest.

All offers have to be accompanied by guarantees, for the works in the first series, of 100,000 florins; for those of the second series, of 90,000 florins, and for those of the third series, of 160,000 florins.

The work to be done in each year must be 20 per cent. of the whole, and the entire work must be completed in 1895.

The plans, contract blanks, specifications and drawings of the depth of water, etc., are open for inspection of those interested, at this office.

Yours very respectfully,
PALITSHECK,
Consulate General of Austria-Hungary, New York.

Plans for Increasing the Capacity of the Brooklyn Bridge.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: As you appear to indorse the bridge terminal plan shown in your issue of the 5th, and referred to in connection with a certain patented device for reducing friction on curves in the following number, the undersigned would like to be enlightened as to a few points which their reading has suggested.

Assuming for the sake of argument that the formulæ and figures and tables and all that sort of thing are correct, and that trains of five cars can be moved over the bridge at intervals of 25 seconds, which is gravely, and, we have no doubt, honestly, proposed, what will be the probable result of an accident, as, for instance, should a cable break while the train is on the up grade? There will be, as shown by the table, only 96.5 feet of clear space between the trains, both running at a rate of 10 miles an hour, and to one who makes no pretension to the possession of engineering knowledge, it certainly seems as though the result must be a disastrous collision.

No doubt, could trains be operated and controlled by one man as they are with locomotives, it would be a most desirable accomplishment; but to one who has often looked at the present system of great heavy wheels and pieces of iron hung under each car, and listened to the rattle and

bang which take place when the gripman or brakeman begins to twist his wheel, it appears that they have to do about all they are capable of doing to pull one car. Now, the question naturally arises, what sort of a machine can be devised to concentrate enough such wheels to pull a train of five cars? Still another point. Is it really practicable to haul cars as big and heavy as those in use on the bridge around any such curve as shown (in 45 feet radius), even with the horizontal wheels and side rails? There must, a layman would think, be a tremendous pressure against the side rails, and would not such usage be rather severe on the cars?

It seems to be the universal sentiment that some radical improvements in the bridge methods and system are sadly needed. Many schemes have been proposed, but every one exhibits more or less serious defects when closely examined. The writer may, therefore, be pardoned for his skepticism regarding this latest proposed plan, notwithstanding its apparent economy, and the indorsement of your able and widely read paper. However, we should always be amenable to reason, and if what appears at first thought questionable features in the plan referred to, can be shown to have no realization in fact, the undersigned will be glad to know that one really practicable system has at last been suggested.

Yours truly,

Z. X.

Gold Treatment in Salvador.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: In the *ENGINEERING AND MINING JOURNAL* of February 15th, I find a very interesting letter from Mr. E. V. Wilkes upon the production of gold in the mining district of Oaxaca. The description which he gives of the working of the mines and the treatment of the ores in the Oaxaca district suggest to me the idea that a method which I am employing here for the treatment of soft gold ores would be just the right thing for the miners of that district.

Dealing here with the same difficulties as the Oaxaca people in transporting heavy and costly machinery, I have adopted the following plan, finding that the gold is principally in the fine stuff, and not at all, or much less, in the hard rock

1. Washers, which separate easily and speedily the fine stuff from the accompanying rocks and pebbles. These rocks contain some gold as a rule, but much less than the fines, which aggregate, here for example, from one-fifth to one-third part of the whole quantity, carrying from one-half to two-thirds of all the free gold contained in the ore. These washers are very simple and easy to transport. A man can wash in one of them 1½ to 2 tons in 10 hours, with a ¼ inch stream of water.

Later on, when there are facilities for transporting stamps or other modern mills, the rocks can be milled, but, as Mr. Wilkes states, that in the whole State there is but one five stamp mill, the device of separating the fine gold-carrying stuff with washers will be of some interest. To catch the gold in the slimes which flow from the washer I use:

2. A hydrostatic amalgamator which I have constructed. The slimes of two washers, or of an arrastra, or of a five-stamp mill, is directed to pass continually through two of these amalgamators, placed the one behind and under the other. The first, or upper, contains about fifty pounds of quicksilver, and all the slimes, with the gold therein, must pass through this quicksilver, not in one stream, but divided again and again into many very small streams, which present a great surface and facilitate the action of amalgamating. The second amalgamator serves more to collect as a settler the little amount of quicksilver or amalgam that the force of the water carries over from the first. Experience has demonstrated that in the first amalgamator almost all the gold is caught.

To reduce the inevitable loss of quicksilver and catch the little quantity of amalgam which might escape, the tailings from the amalgamators are run over amalgamated copper plates or blankets, or both of them, the latter concentrating also a part of the sulphurets.

While running the slimes, a dilute solution of oxide of mercury in cyanide of potassium is used, aiding very sensibly the prompt and easy amalgamation.

With these precautions the loss of quicksilver is very small, and free gold cannot be detected in the tailings.

The amalgamators are so constructed that it is impossible for the men employed to steal the slightest quantity of amalgam or gold, the whole being kept under lock and key. A part of the amalgam can be taken out daily when desired; the remainder is collected at the weekly clean up, which takes an hour or two for the whole arrangement.

I am working at present on mines of my own, with these washers and amalgamators, and they have answered my expectations and needs. Their cost is very low, and, as I said, easily transportable, as a mule can carry two amalgamators or two complete washers. I should add, that it is necessary to convey the water in pipes, with cocks, to regulate the water.

Concerning the treatment of the tailings, which Mr. Wilkes says are in great quantity on the dumps, and which carry gold free and otherwise, the simplest treatment would be, to roast them in ordinary reverberatory furnaces—which I am sure, could be constructed there at a moderate cost. With the hydrostatic amalgamator the gold can then be caught in the same manner as from the crude ore.

I will give with pleasure further information, that may be desired.

Yours respectfully,
MANUEL HEGG, Assayer and Chemist.
SAN MIGUEL, Salvador, C. A., March 10, 1890.

Close Sizing Before Jigging.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: The article in your issue of March 29, "Is Close Sizing before Jigging Advantageous?" calls to my mind some rather crude experiments I made last summer shortly after the detailed description of the St. Joseph Lead Company's mill appeared in your columns. It has been, and still is, as far as I am informed, the opinion of mill-men through this section that close sizing is necessary in order to obtain good results, the violent motion of the coarse jigs causing much of the fine ore to be thrown off with the tailings when the ore is not closely sized.

This is undoubtedly true in the case of actual slimes. These remain suspended in the water and pass off with it without descending into the bed of ore in the jig. But as to all that part of the ore coarse enough to settle into the body of ore in the jig, the finer it is, the larger proportion of it will pass down with the concentrates.

At the time of making these tests, I was milling an ore carrying from five to eight per cent. of argentiferous galena which contained all the value that could be profitably saved, the remainder consisting of low grade blende and pyrites and gangue. I was crushing through a screen about equal to five mesh and making four sizes for jigs, the slimes going to a table. My jigs were the ordinary Hartz pattern of "through discharge." I divided the ore after passing the first screen, that one of the coarse jigs would get a suitable portion without further classification. I afterward made the same experiment on ore free from blende but containing some pyrites and about 18 per cent. galena, and in which, likewise, the galena was the only constituent of much value. In both cases I obtained as good samples of the tailings as I could without interfering with the operation of the mill. The hutchwork and tailings were then screened and assayed with results as follows:

CRUDE ORE CONTAINED 5 TO 8% GALENA ASSOCIATED WITH BLENDE, PYRITES AND GANGUE.

Hutch work.	Through 5 mesh.	And on 20 mesh.	Per cent. sample.	Per cent. Pb.
1st compartment of jig.....	20 "	40 "	40	77
	40 "	70 "	12	35
	70 "	100 "	12	21
	100 "	.. "	26	16
	5 "	40 "	70	68
1st compartment of jig.....	40 "	70 "	8	42
	70 "	100 "	8	25
	100 "	.. "	14	25
	5 "	40 "	60	22
2d compartment.....	40 "	70 "	28	1/2
	70 "	.. "	12	trace.
	5 "	40 "	..	1/2
Tailings.....	40 "	70 "	..	trace.
	70 "	.. "	..	2

CRUDE ORE CONTAINED ABOUT 18% GALENA ASSOCIATED WITH PYRITES AND GANGUE.

Hutch work.	Through 5 mesh.	And on 20 mesh.	Per cent. sample.	Per cent. Pb.
1st compartment.....	20 "	40 "	47	55
	40 "	100 "	14	42
	100 "	.. "	21	29
	5 "	40 "	22	30
	100 "	.. "	47	63
1st compartment.....	49 "	100 "	24	45
	100 "	.. "	29	35
	5 "	40 "	44	10
2d compartment.....	40 "	100 "	44	trace.
	100 "	.. "	12	10
	5 "	40 "	..	1/2
Tailings.....	40 "	100 "	..	trace.
	100 "	.. "	..	19
Fine slimes from hydraulic sizer.....	..	..	..	19

As I made these experiments solely to determine whether it were practicable to mill these ores without sizing, I did not make any size classifications or assays of the different sizes of the crude ore as it came to the jig. Nor did I make any change in the amount of water used in the jig, or any attempt to measure it. These conditions were practically the same as they were when the jig was handling ore between five mesh and eight mesh.

From these crude tests a few working results are apparent.

1. That ore coarser than 100 mesh will not be lost if treated in one class with the coarse sands.

2. That the only objection to milling this ore without sizing (except to remove the slimes) is the impoverishment of the concentrates with fine gangue.

3. That very little, if anything, is gained by separating ore between 5 mesh and 40 mesh into different sizes, unless it is necessary to make very high grade concentrates. With us there is more lost than gained in making galena concentrates run more than 50 per cent. lead. These ores must be crushed to about 5 mesh to effect a separation. It is not difficult to handle all this product coarser than 40 mesh in one class and make the concentrates of the required grade with a minimum loss.

Any system of concentration that may be adopted, must, to some degree, be modified for each variety of ore; and further, perhaps, for the same ore in different localities. This system of no sizing would seem to adapt itself to almost any conditions. That part of high grade argentiferous ores, which is most finely crushed, invariably contains a higher percentage of value than the coarser; consequently it is desirable to save more of it in proportion than of the coarse—just what this system will do. In heavy galena or pyritiferous ores a rather fine screen might be used in the jig with an automatic discharge for the coarser stuff. In cases where the product must be made very clean as at the Bonne Terre mill, it doubtless would be necessary to treat a portion of the hutch work a second time. The most satisfactory part of this arrangement to a mill man is to see the ore, which in a class by itself seems to be too coarse for a table and too fine for a jig, behave so nicely in a jig when mixed with the coarse sands. It shows no disposition to pack or trouble in any way. The doing away with two or three screens would be a considerable item of economy to most mills, besides reducing the annoyances of the mill man a good deal.

C. E. DEWEY.

GEORGETOWN, Colo., April 3d, 1890.

Mining in Sonora, Mexico.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Tecoripa is situated on a mesa or bluff, 80 feet or more above the bed of the river of the same name. The latter, like most of the Sonora rivers, is for most of the year a mere branch or creek, but in times of summer rains is a flood 200 to 300 feet wide and many feet deep, sweeping everything movable before it. The town of Tecoripa consists of some 50 dilapidated "dobies," mud huts, a church of same material, but roofless, and some 300 or 400 people, and it would puzzle a Philadelphia lawyer to tell how they subsist. It corresponds to a county seat in the United States. For a short distance above town and all the way down to the Yaqui River, some 50 miles, there is a valley five to fifteen miles wide, and wherever the rock shows at all, it is the peculiar conglomerate of both rounded and angular stones, which seems to have covered so much of Central Sonora, before the time when the sharp volcanic peaks were pushed up. These peaks are seen both to the east and west of the valley, and for that matter in every part of Sonora. Mining men, who have been much in Sonora, Sinaloa, in fact in all the Sierra Madre region, say no railway can ever be built through them. The cause of finding no level lines is not from elevations, but the excessive irregularity; it is everywhere peaks, no ridges

or mesas, constantly up and down, not like the regularities in Colorado or Wyoming, or the table lands seen in Arizona or Nevada. I should hesitate to say that a railway and even a good line could not be found through the Sierra Madre, but it would have great additional length and be very costly. All the larger streams, such as the Yaqui, rise in Chihuahua, either on the table lands or in the mountains, first flowing east, then north, and then west, and if the cañons did not prevent following river lines, no elevation of over 5,000 feet would be needed. With the present business in sight and the present population, a continental railway from Chihuahua west would not pay more than running expenses.

If there is coal in or near Tecoripa, it is deep, bedded down below the conglomerate, and so far as known does not crop out. From Tecoripa I went north and then east to some gold prospects, and examined them and the adjoining country, which proved to be chiefly granite, containing so much mica that it decomposes after long exposure. The La Fortuna has a 15-inch vein, rich at the surface—\$48 or more per ton. This gradually changes at 60 feet depth to chiefly a fine quality of calc spar, and is entirely calc spar at 160 feet, as a Mexican miner told me. The manager had it covered up at 60 feet, and told me the air was so bad, no one could stay lower down in the shaft. It appears to me I have heard of this covering up business before. The next three were the Año Nuevo, San Francisco and Rosales.

The first has a vein of fully 4 feet, exceedingly well defined, a quartz strongly colored with copper, and cropping out for over half a mile. Of this I made a mill test to discover its free milling gold value, which showed \$3.20 per ton entirely across vein, one shaft of 60 feet and one of 23 feet. The cabin belonging to the property has the appearance of that of an old settler, with stone walls over two feet thick and pierced with loopholes.

The San Francisco has a vein on the surface quite well defined, 3 feet wide, and showing a considerable distance; at the bottom of one shaft, 60 feet, the vein is some 10 feet wide, but the pay part was in streaks, and only measured up same at surface, some 3 feet. A mill test of this showed \$20 per ton free gold, taken only from the 3-foot wide. What this would show at greater depth no one can say, but in working annual assessments it would be well for the owner to concentrate work on this shaft and sink it 200 feet or more. The Rosales is a parallel vein 30 inches wide, with a 15-inch pay streak, shaft some 20 feet deep. I have been told that this group was once capitalized in St. Louis under the name of Rosales Gold Mining Company. Maybe some of the brokers on the St. Louis Stock Exchange may recognize it as an old acquaintance. There is plenty of wood on the mountains and in adjacent valleys. Water is four or five miles distant. There are thousands of palm trees in the valleys in this section, often 40 feet high or more, and with a diameter of 10 to 20 inches, and an elegant green top, which gives a tropical appearance to the landscape.

From these mines I went via Las Lajas to La Barranca. At Las Lajas the rock in the valley has changed to a clay slate, tilted up and pitching southeast, and volcanic peaks 3,000 to 4,000 feet high all around.

BRAD BARNER, M. E.

THE POSTAL STATISTICS OF HOLLAND.

The annual government-report on the working of the post office in Holland for the year 1888, gives some interesting data, particularly with regard to one branch of the service, which we believe to be unique, that of the collection of small bills. For instance, this branch of the post office service would enable a man living in New York to get a bill collected in Boston, Philadelphia or any other point without the assistance and expense of a banker or agent. In Holland a very trifling payment constitutes the post office your agent. By handing over the bill, and by payment of a commission lower than any individual can afford to attend to such petty business for; the amount due is collected and transmitted by mail or special delivery to the payee.

In Holland, at the end of 1888, there were 237 principal post-offices and 27 minor head offices, besides 997 postal depots. Many of these are telegraph offices also, the telegraph service being in the hands of the government, but the accounts of the post-office and most of the telegraphs are kept distinct. In 1888 the number of letters transmitted amounted to 187,782,345, including 26,895,130 postal cards and 3,552,802 parcels. The registered letters amounted to 1,581,988, the patterns to 2,553,407, and the official letters on State business to 4,946,227. Nearly 290,000 letters were registered with a declared value.

These letters, with declared value, are insured against loss, and the government compensates in full the sender in case of non-delivery. In the newspaper and book post department, 82,665,462 pieces were transmitted, newspapers amounting to upward of 50,000,000. It does not sound very nice to convert the post office into a debt-collecting agency, but in a legitimate way, would it not be a great convenience to have this system adopted in this country. It seems to be almost a natural sequence of the money order system. Efforts are being made to diminish Sunday labor in post offices in Holland, and in the smaller towns only one delivery on Sunday is now the rule, and the dispatch of printed matter on Sundays is much reduced.

Artificial Malachite.—Malachite can be made in the following way: A solution of carbonate of copper, precipitated in a carbonate of ammonium, is heated in a bottle during eight days. To make the volatilization of the carbonate of ammonium slow, water is filled in according to the rate of the evaporation. Gradually, as the carbonate of ammonium becomes volatile, the carbonate of copper is deposited in the form of a green crystalline sediment on the walls of the bottle. The composition is the same as that of natural malachite, $2\text{CuO}, \text{CO}_2 \text{H}_2\text{O}$.

	Found.	Calculated.
CuO.....	71.33	71.95
CO ₂	19.72	19.91
H ₂ O.....	8.95	8.14

The crystals, when red hot, lose 28.71 per cent. of water and carbonic acid and are transformed into a black oxide of copper. Their density is, at 15 degrees, 3.86; their hardness about 3.5; and in crystallographic and optic respects, the artificial malachite conforms entirely with what is known about the natural.

CAPE BRETON, N. S., AND THE COXHEATH COPPER MINES.

The mineral resources of Cape Breton, Nova Scotia, are attracting the attention of mining men and capitalists to a greater degree than formerly, and as the island has the apparent basis for large mineral wealth and a healthful climate, and is under a reliable and stable government, and is distant only three days by sea from New York, it would seem to merit even greater attention than has yet been given to it.

Sir Wm. Dawson, Prof. H. Fletcher, Edwin Gilpin, Jr., M. E., Inspector of Mines of Nova Scotia, and other reliable authorities, give the prominent geological formations of the island to be: 1. Pre-Cambrian or Laurentian, including the felsile and crystalline limestone series. 2. Lower Silurian. 3. Devonian. 4. Carboniferous, including middle coal formation, millstone grit, gypsiferous series, limestone, and productive lower coal formation. The formations contain deposits of coal, iron, copper and limestone, a most valuable combination, all in a small district, surrounded and interlaced with deep water facilities, and located so that the products of the mines and furnaces can be cheaply transported either to Europe or America, as demand and tariff lines may warrant.

Coal.—The proved coal veins of the carboniferous formations of Cape Breton contain bituminous coals of excellent steam or coking qualities; they are located on the eastern coast from Cow Bay to Cape Dauphin, the principal mines being connected by railroads with the two good harbors of Sydney and Lewisburg. Other coal districts at Habitants Bay and along the west shore at Chimney Corner and Broad Cove promise well, but have not yet had extensive development; it is, however, certain that the coal

able extent, it seems certain that with such cheap fuel, supplies, limestone and transportation to market, it is only a question of time for Cape Breton to take its place among the more important cheap producers of copper in the world. The ores have been shown to be practically free from arsenic and other impurities, and they have added value in the nearness of the copper deposits of Newfoundland, which furnish ores suitable for fluxing those of Cape Breton. By far the most important development of the Cape Breton copper deposits is that at the Coxheath mines of the Eastern Development Company, Ltd., a corporation owned chiefly in Boston.

This company's mining rights cover an area three miles in length by one mile in breadth, or say an area about equal to the entire copper district of Butte, Montana. Some \$250,000 have been expended in the purchase of the Coxheath properties and in its mining operations. Two vertical shafts, 175 feet and 300 feet respectively, have been sunk, and from them extensive cross-cuts, drifts, etc., have been run proving a series of parallel veins dipping about 60 degrees north, with a strike of 56 degrees east. Two of these veins have been drifted upon for several hundred feet; one of them carries ore from 8 to 20 feet in width, much of which will assay from 10 to 12 per cent. copper. On the 200-foot level an ore body 600 feet in length has been opened. Recently an additional vein, located 1,500 feet to the south of these workings, has been opened up on the surface, at two points 600 feet apart, showing well mineralized rock for 8 to 10 feet in width.

Dr. E. D. Peters, Jr., M. E., from his personal study of the two districts, says the Coxheath compares favorably in general formation and prospects with the Butte district, although the surface ores of Coxheath are



COXHEATH COPPER MINES, NEAR SYDNEY, CAPE BRETON, NOVA SCOTIA.—VIEW AT NO. 2 SHAFT.

production can be easily increased to meet any possible local demand. The output of the working mines for 1889 was about 800,000 tons. An average analysis of Cape Breton coals gives: Fixed carbon, 58.74; volatile combustible matter, 37.26; moisture, 0.75; ash, 3.25; sulphur, —.

Limestone.—Important in connection with coal for smelting operations is cheap and good limestone, and immense deposits of it exist contiguous to the shore at various points, especially between the two arms of Sydney Harbor. Analyses of samples from this latter deposit made by Dr. E. D. Peters, Jr., M. E., give: Carbonates of lime and magnesia, 95.3; silica, 2.16; water, 2.1.

Iron.—The iron deposits of Cape Breton are principally in the lower silurian formations and are mostly of red hematite, they are numerous, extensive and valuable, though as yet they have been but slightly explored owing to the fact that the too liberal mining laws of the Province have enabled the native owners of the claims to lock up large tracts which they hold at high figures instead of making reasonable combination with capital for their development. Hon. E. T. Moseley's iron areas near East Bay are a fair sample of these deposits. The ore there gives the following analysis: peroxide of iron, 82.75 (metallic iron, 57.92); silica, 12.80; water, 1.12; alumina, 1.55; lime, 1.20.

Copper.—Surface evidences of deposits of sulphuretted copper ores exist at various points in Cape Breton. They are almost wholly in the Laurentian formation and this geological series embraces nearly one-half of the entire island. While the present commercial values of the coal and iron deposits are limited by the lack of accessible markets for those minerals, it is not so with copper, which has a natural market open to it in Europe, without intervening duties or expensive transportation; therefore, granted that the copper deposits of Cape Breton are of work-

not so rich as those of Butte, owing, probably, to the denuding glacial action.

George Grant Francis, M. E., of London, England, who has had wide experience in examining copper properties, has reported on the Coxheath veins, and says "they are well defined fissure veins. The ore being chalcopyrite with hardly any admixture of iron, and there being, I think, no question as to the large quantities of vein material, the only problem to solve is which is the best mode of concentration."

Mr. Francis has since then supervised the altogether successful concentration of a lot of these ores, which was sent to Germany.

The Eastern Development Company claims to be able, to-day, to make a daily output, from its No. 2 shaft alone, of 800 tons of ore, and proposes this season to build 6½ miles of railroad to connect the mine with the Government Cape Breton Railroad, and with tide water on Sydney Harbor, also concentration and smelting works.

The following analyses of the Coxheath ores give a fair idea of their characteristics: No. 1: Copper, 12.97; iron, 14.47; sulphur, 17.26; silicious rock, 53.14; arsenic, none; antimony, none. No. 2: Copper, 7.95; iron, 14.93; sulphur, 8.98; silicious rock, 47.67; magnesia, 3.45; alumina, 7.94; arsenic, trace; antimony, none.

The ores are reported to contain about one ounce of gold to the ton of matte. Concentration and smelting in large modern reverberatory furnaces have been adopted for the immediate treatment, but eventually, when other fluxing ores are obtained, as is expected from Newfoundland and Venezuela in exchange for coke, the treatment will no doubt be by smelting in water-jacketed furnaces.

The accompanying illustration shows the substantial surface improvements at this mine.

ISOCHEMIC LINES IN ORE DEPOSITS.

By David H. Browne, Ann Arbor, Mich.*

The Ludington mine, like most on the Menominee range, consists of several lenticular deposits of soft blue hematite. These deposits are contained between clay and soap slates, which conform with the Huronian strata represented in the district. The main deposit is about 700 feet in length; striking N. 75 degrees W., pitching about 45 degrees W., and dipping from 70 degrees to 80 degrees N. The ore is a very rich, soft, friable, bluish-black hematite, occurring in thin laminae, which cleave from each other very readily in the direction of the strike of the deposit. These layers alternate in places with layers of calcium-magnesium carbonate. The ore shows by analysis from 65 to 68 per cent. iron, 1 to 4 per cent. silica, and from 0.005 to 0.200 per cent. phosphorus. It is separated into Bessemer and non-Bessemer; about one-half falling below 0.035 phosphorus, and the rest averaging, perhaps, 0.075.

At first sight the ore, upon analysis, seems to have no regularity or method in its distribution of phosphorus. A room, as stoped out, will change from Bessemer to non-Bessemer, or *vice versa*, in a way at first totally inexplicable.

The fact that phosphorus exists as calcium phosphate led me to infer that some proportion between the percentage of lime and phosphorus might be found to exist; but such inference was not verified in practice. An ore containing 2 per cent. of lime may contain almost no phosphorus, or may run high above Bessemer limits. Nor does any proportion exist between the amount of silica or of iron and the phosphorus content. I have seen phosphorus vary as much in jasper as in any iron ore, and similarly a lean ore may run high or low in its percentage of phosphorus. The only difference I could find between Bessemer and non-Bessemer ores was this: As a rule, a soft blue hematite, high in phosphorus, has a brighter and more specular appearance than a low-phosphorus ore of the same value in iron. This distinction, slight as it is, does not always hold good, and the separation of such ores must be guided solely by chemical analyses.

The fact that the bright ore is generally high in phosphorus, and that such ore is almost always found near the hanging wall, led me to search for some regularity of phosphorus distribution dependent upon the position of the ore. After making an analysis of the ore from any room, drift or winze, I marked the percentage of phosphorus in a map of that portion of the mine. Having thus obtained a chemical map of each room, I noticed in each a certain regularity which seemed to me to throw considerable light both upon this problem of phosphorus distribution, and upon the vexed question of the method of formation of soft blue hematite deposits.

In order to give a clear idea of this relation, I must first state a few facts with regard to the physical features of the deposit. As previously observed, the so-called "veins" of the Ludington mine stand nearly vertical, dipping north and pitching west. A horizontal cross-section of the ore body shows it to form an elongated lens, about 65 feet thick at the center and tapering to an acute point at both ends. A vertical cross-section shows the dip to the north, and also the fact that the hanging wall is more curved than the foot. A cross-section of the Chapin mine, which possesses the same physical features as the Ludington, shows this very plainly.

A horizontal cross-section of a small vein shows that the hanging wall curves toward the foot. On large veins, the strata have been subjected to so much lateral flexure that this curvature is not clearly seen. On small veins it is unmistakable. I must here observe that in the greater number of mines on the Menominee range the dip is to the south; and hence what is called the hanging wall in the Chapin and Ludington mines answers in other mines to the foot wall. Fig. 13 gives a vertical longitudinal section of a small vein in the Ludington mine, in which the shape is very clearly seen. The ore will now be understood to lie in the form of lenticular deposits, dipping north and pitching west.

With regard to the content of phosphorus, the first thing noticeable was that if a room, in stoping up, changed from non-Bessemer to Bessemer ore, such change was liable to occur first at the foot-wall side of the room. In making maps of those rooms in which change occurred, it was also noticeable that the ore at the eastern end of the rooms was higher in phosphorus than that at the western end.

Besides this regularity from west to east there is a corresponding increase from foot wall to hanging. Notice the gradual change from 0.032 and 0.028, on the foot wall, to 0.045 and 0.040 in the middle, and 0.156 and 0.068 on the hanging. The streak of low phosphorus ore, 0.021, 0.018, 0.020, I will speak of again. It frequently happens, however, that a streak of high or low phosphorus ore crosses a room from west to east. This seems to be due to the fact that one or more individual layers of ore were originally either very high or very low in phosphorus, and this individuality has not been obscured by subsequent changes. Moreover, an irregularity is often noticed in the increase from west to east. This tendency is not nearly so uniform, or so well marked, as is the increase from foot wall to hanging wall. Nor is this to be wondered at; for, since the layers of ore present smooth surfaces in the direction of foot and hanging-walls, an average of the ore along a series of sets on the foot wall will represent, roughly, analyses of at most a very few layers of ore. In this way it will be seen why analyses taken from foot to hanging show more regularity of composition than do analyses taken east and west. In driving a drift or stoping a room, on the other hand, where analyses are taken in an eastern and western direction, averages are taken of a large number of separate deposits, and as these are much flexed and broken, the analyses show little method or correspondence. Supposing each layer of ore has a thickness of half an inch (which is much above the average), there will present themselves for analysis, in the breast of a drift 8 feet wide, the edges of no less than 192 layers; and, in consequence, more confusion is liable, and does occur, in analyses taken east and west than in those taken north and south.

Having obtained thus a general idea of how the lines of phosphorus tend in two directions, the next question naturally is, what would be the lines of equal phosphorus-content in any individual layer of ore. These, for want of a better term, I have herein been obliged to term "isochemic"

lines. It is evident that mere analyses of the ore in the breast of a drift or in the bottom of a winze would not give any clue to the isochemic lines of a particular stratum of ore. They would simply show the average of some hundred separate strata. It is also evident that no analysis would represent accurately the character of an individual layer, unless this layer, in no case over half an inch, and rarely over one-quarter inch in thickness, could be followed by chemical analyses along drifts, and up stopes, and down winzes and shafts, for a distance in some way proportionate to the extent covered by the ore deposit, of the thickness of which it forms a very small part. This would be, and for me was, practically impossible. For analyses, to be of commercial value, must show, not the amount of constituents in any particular stratum of a deposit, but an average of that amount of ore which a gang of men, working under contract, can take out of a given room before another analysis be made. For this reason I have been obliged to confine myself to analyses which represent averages of perhaps 200 or more layers, and from these analyses I have attempted to outline the probable direction of isochemic lines in separate strata. It is plain that, if a single layer of ore shall have its percentage of phosphorus in some way modified by its manner of deposition, every other layer of ore, subjected to similar conditions, will be in similar manner modified; and, in consequence, analyses representing averages of a large number of strata will show the characteristics common to each individual stratum.

In sinking a winze in Shaft 5, Level 5 $\frac{1}{2}$, Room 1, the following facts were noticed: The drift running east from the winze showed ore running from 0.013 phosphorus to 0.030; the winze as sunk passed through ore running from 0.015 up to 0.030; lines drawn from the point in the drift where a certain amount of phosphorus was noted, to a corresponding point in the winze showed an angle of about 45 degrees, which corresponded with the pitch of the ore. (Fig. 12.)

Again, in sinking the winze in Shaft 5, Level 5 $\frac{1}{2}$, Room 2, a decrease in amount of phosphorus was noted, which was paralleled by the decrease in the amount of phosphorus in the entry to the east. Similarly, in sinking Shaft 5, and in sinking winzes from Rooms 2 and 3 on the seventh level, the continuance of isochemic lines, with a pitch of 40 degrees to 50 degrees, was noticed. (Fig. 21.)

If now we take up a small vein, as that composing Rooms 4 and 5 of Shaft A, Level 6, and attempt to outline the isochemic lines in the plane of the winzes, the regularity is at once patent. On the level of the entry the first-class ore was confined to the west set, and one-half of the next set east. As the room was stoped up the first-class ore seemed to widen and gain somewhat toward the east. (Fig. 13.) Analyses taken of a small and very characteristic vein, forming Room 4 of Shaft 1, Level 6, showed also the tendency of the phosphorus to gain toward the upper part of the deposit and to maintain uniformity in the direction of the dip of the deposit.

In attempting to draw up a vertical longitudinal section of the western end of the mine the principal difficulty lay in reducing so many analyses to the same plane. In consequence of the impracticability of attempting to represent every analysis taken, and its relation to others in the same vein, I have been obliged to select those analyses which represent averages. The figures entered in the drawing represent, therefore, the average percentage of phosphorus in the ore in that particular place covered by the figures. Fig. 20 gives the detail of various averages in Rooms 1 and 2 of Shaft 5, Levels 5 and 6, in the plane of the shaft.

While the ore left in the pillars has not been subjected to analysis, I have, for the sake of convenience, drawn through the pillars the isochemic lines indicated by the percentage of phosphorus in the rooms which they support. Fig. 23 is an attempt to apply the same system to the entire course of Shaft 5. By actual measurement the distances along various levels, through which certain average percentages of phosphorus obtained, have been carefully ascertained, and the exact point at which change occurred from Bessemer ore to non-Bessemer, was located in the section map to correspond. The curvature of the isochemic lines, therefore, is in accurate correspondence with the course of high and low phosphorus throughout the western end of the Ludington mine. The drawing of various rooms and pillars is omitted in this map. The curved lines, when close together, represent high phosphorus. The arrows indicate the direction of low phosphorus, and the figures represent averages of several hundred analyses, taken in the immediate neighborhood indicated thereby. From the map it will be noticed that on the upper levels the greater portion of the ore is non-Bessemer. On the western end a small streak of Bessemer ore follows the shaft, gaining to the west until it reaches the fifth level, where it flexes east and joins the main current of first-class ore that flows upward and eastward from the lower end of Shaft 5. The non-Bessemer ore follows the western boundary of rock, and seems to accumulate in shoals outlined by projections or intrusions of jasper.

In stoping up Room 1 of Shaft 5, Level 7, through ore gradually increasing in phosphorus, a thin seam of rock was encountered. An analysis of the drift 100 feet overhead had shown low phosphorus, I concluded that the ore found over the rock would be of first-class quality. The winzes in Room 1 had not at this time been sunk, nor had any ore from above the rock been taken for analysis. The only indication offered of its probable quality was that afforded by the passage of the drift 100 feet above, and of the shaft 50 feet to the west through first-class ore. Analyses had been made of two sides of a triangle; and, upon the supposed consistency and continuance of isochemic lines, prediction was made that the ore found above this rock was first-class. I was at this point called to New York on business; and, before leaving, left word with the mining captain that any ore found above this rock should be sent up for Bessemer ore. On returning to the mine some three weeks later, I found that the rock in this room had been pierced and about 200 tons of ore from overhead sent up and dumped on the first-class stock pile. Analysis of this ore showed it to be from 0.011 to 0.027 phosphorus, which will be seen to agree with other analyses along the isochemic line. (Fig. 21.)

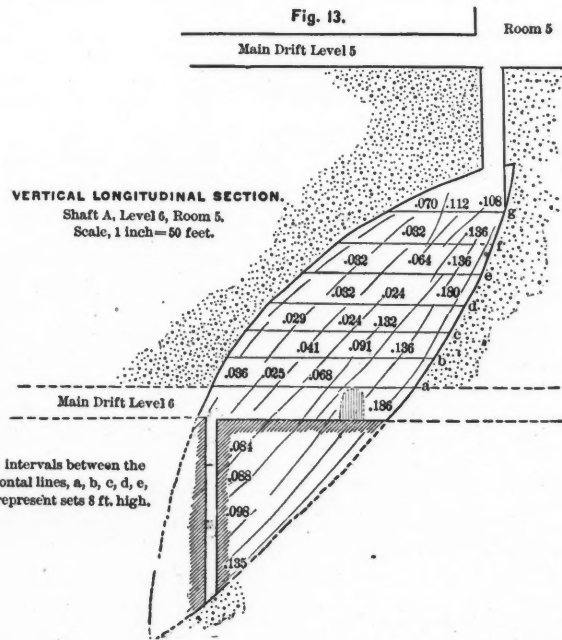
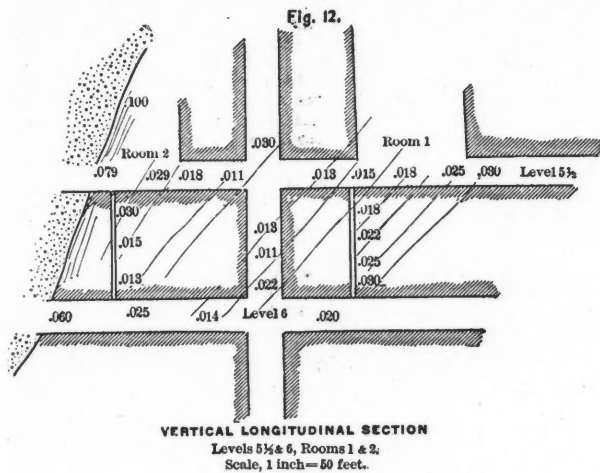
Below this seventh level, at the western part of the vein, the intrusion of rock seems to have caused an inflow of high-phosphorus ore. It appears as if this rock had formed shoal water on its lower side, and into this shallow the lighter particles of calcium phosphate had drifted. In a large number of instances I have noticed this tendency of rock, occurring in vein matter, to alter the percentage of phosphorus in the adjoining ore.

* Abstract of a paper in the transactions of the American Institute of Mining Engineers.

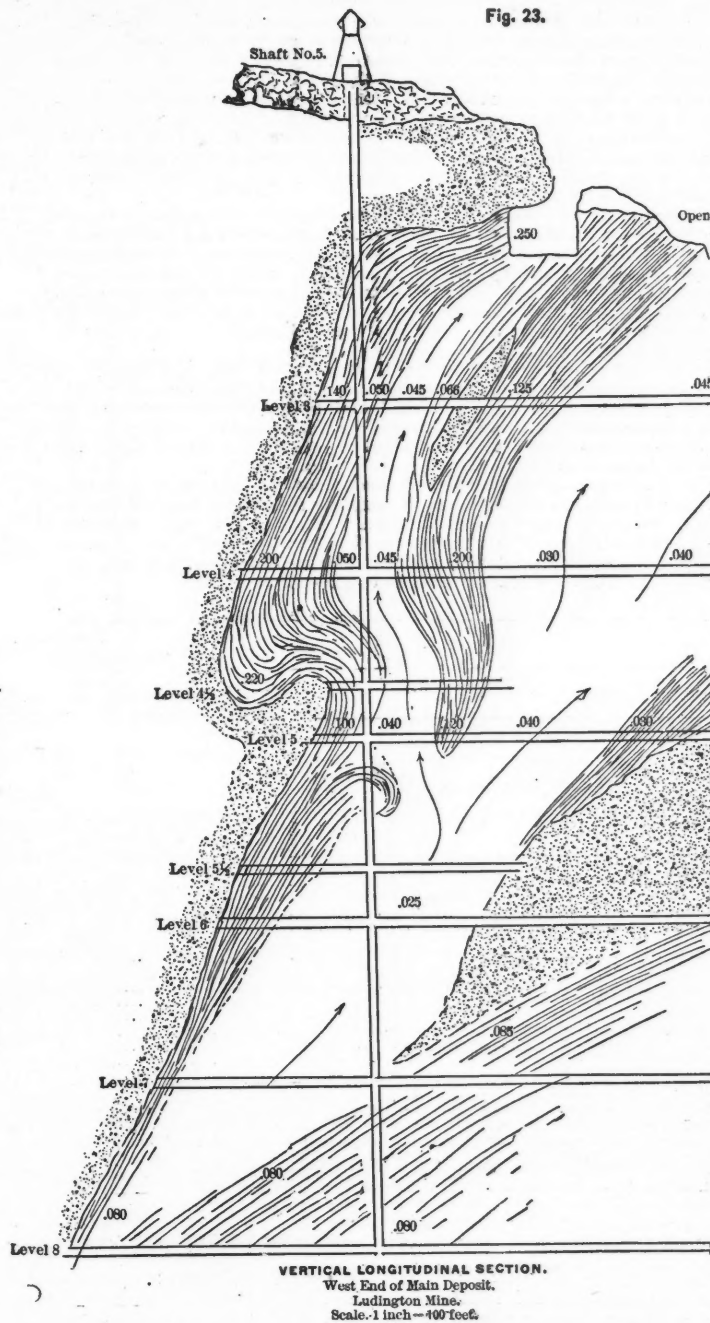
In fact, I do not remember any instance in which a horse of jasper did not in some way alter the proportion of phosphorus in the ore penetrated by it. The statement that high phosphorus follows rock is one which is corroborated by every one familiar with the mine under consideration.

Another fact I must state is this: On the upper levels of Shaft 5 almost all the non-Bessemer ore mined was exceedingly high in phosphorus. The ore found on the lower levels shows a greater tendency to uniformity, the difference between ore below and above Bessemer limit being less striking. A glance at the sketch-map, Fig. 23, will show this clearly. It was no uncommon occurrence on the third and fourth level, and in the western end of the open pit, to find streaks of ore running as high as 0.350 phosphorus. Now, such ore is very rarely met with. The average of non-Bessemer ore on the upper levels of Shaft 5 was somewhere near 0.150 phosphorus. The average of non-Bessemer at present drawn from Shaft 5 is probably 0.075 or 0.080. Again, on the upper

of the hanging wall towards the foot, the numerous ripple marks found on the hanging wall and the hydrated, muddy-looking ore next to the foot wall, all seem to indicate that the ore was deposited from water in hollows of the exposed slates which now form the hanging wall. Furthermore, since it is well understood that the almost uniform tendency of all deposits east of the Mississippi River is in a line from southwest to northeast, it is very probable that this deposit, as originally laid down, was no exception to the general rule. If we suppose that the ore was formed in hollows in the hanging wall, and, after its formation, covered by the foot-wall slates; and that this bed has been tilted up from the north side and overturned, through an angle of 100 to 110 degrees, it will be readily understood that the original trend of the deposit becomes approximately the complement of the present pitch of the ore. This supposition explains also the strike of N. 75 degrees W., and the fact that what is now the hanging wall seems to have been the original bed of deposit.



The intervals between the horizontal lines, a, b, c, d, e, f, g, represent sets 8 ft. high.



ISOCHEMIC LINES IN THE LUDINGTON MINE.

levels, some streaks of low-phosphorus ore were found, but in narrow, irregular courses. On the lower levels the reverse of this is true, the first-class ore occupying the larger part of the deposit.

To state this in general terms: The tendency of phosphorus, on this vein, is to increase in percentage with the distance from the lower western extremity of the deposit. This is not true of the eastern end of the mine, in which the upper portion of the deposit is low phosphorus. This low percentage seems due to the fact that a large horse of jasper, occurring near the middle of the vein, has thrown the current of Bessemer ore to the east; and below this comes the drift of high phosphorus ore, met with on the lower levels of Shaft 5.

In endeavoring to correlate these isochemic lines with the physical phenomena of the deposit, the only theory which will, to my mind, furnish adequate explanation is that of aqueous deposition. The easy longitudinal cleavage of the laminae of ore, the curvature in small veins

It is improbable that the tilting has been from the south side upwards through an angle of 70 to 80 degrees, for if this had been the case the ore would now pitch east at the same angle as that of the present pitch west.

The theory of hematite deposits is then briefly as follows: From previously deposited beds of bog-iron ore, by the action of acidulated water, iron, silica, lime and phosphorus were dissolved. The first solution contained a large amount of phosphorus in proportion to the amount of iron dissolved. On coming into depressions in the exposed slates, this acid solution, losing acid by evaporation, deposited iron as hydrated oxide, which carried down an amount of phosphorus proportional to the amount of iron precipitated. As the acid became still weaker, crystals of carbonate of lime and magnesia settled out, forming a stratum of carbonates. A second inflow of acid water would tend to dissolve part of the carbonates, and to precipitate a layer of hydrated oxide of iron, similar to the first, but lower in phosphorus.

In similar manner by successive inundations the depression became filled with alternating deposits of iron oxy-hydrate and calcium and magnesium carbonate, each layer being, as a rule, lower in phosphorus than that immediately preceding it. The carbonates, being more soluble, were more liable than the oxy-hydrate to removal by acid. Moreover, as both phosphate of lime and phosphate of iron are more soluble and of lower specific gravity than oxy-hydrate, the tendency of the water was to carry these phosphates toward the lower end of the ore deposit, and to form deposits higher in phosphorus in the shoal water alongside banks of previously precipitated silica, or in places where the evaporation progressed more rapidly than elsewhere. By reference to Fig. 23, it will be seen that those parts of the deposit in which the current seems to have been strong and rapid are lower in phosphorus than where the deposit is shallow and pinched out by jasper. After the deposit was completed, further action of the water would stir up the upper layers of ore and mix them with suspended sand or clay, while the iron and phosphorus were carried further along to be deposited in other depressions to the north-east. The jasper, which occurs as vein matter, and in laminae cleaving parallel with the ore, seems to have been produced, either by precipitation at the same time as the iron, or by subsequent action, eroding the beds of iron ore thus formed and substituting silica for the iron oxide removed. A study of the vein map of the sixth level of the Ludington mine shows that the jasper seems bedded in the ore, the deposits of jasper being in all cases widest toward the foot wall. (See Fig. 22.)

The deposits of ore and jasper were, I conclude, covered by the foot-wall slates, and, after subjection to heat and pressure from superincumbent strata, were, in some local upheaval, tipped up at the north and brought into their present position.

That subsequent action of percolating surface-water has wrought changes in the distribution of both iron and phosphorus, I do not doubt. In fact, the western end of the Ludington mine, protected by overhanging jasper, has shown far greater regularity of structure than the eastern end of the same deposit. In the former, the original lines have been preserved unchanged; in the latter, where the thin cover of drift allows free action of surface water, the lines are much broken, and regularity of structure is hard to trace.

This theory of aqueous deposit will explain, as will no other, the marked continuance of isochemic lines and their peculiar curves, the regular decrease of phosphorus from hanging wall to foot, the alternation of carbonates with oxide of iron, the ripple-marked hanging wall, the uniform lamination of the ore, and the hydrated, muddy look of the ore next to the foot wall.

The conclusions given above are intended, not as general and applicable in all cases, but simply as an explanation of certain chemical phenomena, noticed in the Ludington mine. Whether the same tendency would be found to exist in other mines, I am not prepared to say; but the fact that apparent irregularity has been observed does not preclude the discovery of a law—in other words, an order—pervading it.

THE WATERS OF THE PASSAIC RIVER AND ITS TRIBUTARIES—THE SELF PURIFICATION OF STREAMS.

By Henry Wurtz, Ph. D., with the Assistance of Durand Woodman, B. Sc.*

(Continued from page 425.)

It should be pointed out that this loss of nitrogenous matter, through the self-depuration of your river, in its flow between your city and Dundee lake as well as through the latter, (as will be shown further on) is an absolute loss, and no mere transformation. The nitrogen passes away altogether into the air, as ammonia or inert nitrogen gas. No indications remain in the forms of ammoniacal salts, nitrates, nitrites, etc., in the water to represent the pollution that comes from your city. The water at the Broadway Bridge has come back (except the $\frac{1}{8}$ grain per gallon of additional mineral and mostly imputrescible organic matters) to the condition impressed upon it by the natural depurating agencies that exist above Paterson. Any nitrates or nitrites formed, go doubtless to fertilize the water-weeds.

C. THE DUNDEE LAKE.

But one sample (Table I., No. 4) was collected from the Dundee Lake itself; as it was considered much more important to determine, from examination at different times of the water of its outlet, the Dundee Canal, the average composition of the lake, that is, the final result of the slow passage through its entire expanse. No. 4 came from the lower end of the lake, at a distance from the outlet, and in shallow marginal water. It is, therefore, of some interest in comparison with sample 3 from the Broadway Bridge, which may be considered as about the upper end of the lake. Distinct variations of composition, even on the same day, are thus brought out, arising from varying conditions. An effect of evaporation in shallows, comes out in the increase of nearly every component; and a more rapid degree of concentration is shown to have arisen from the shallowness, by comparison with the figures in Table V., for the outlet of the lake, which are mostly smaller than in No. 4, and, of course, represent the whole body of this beautiful sheet of water.

D. THE DUNDEE CANAL.

By this name is indicated the large millrace, probably $1\frac{1}{2}$ miles in length, which leads the water from the Dundee Lake to the factories at Passaic City, discharging afterwards into the tideway below. The four sets of figures in Table V. are of even greater interest than those in Table IV. In Table V. they are placed in comparison both with the averages of the Broadway Bridge water at the upper end of the lake, and with those of the upper Passaic above the Falls. The changes are thus readily followed up.

Thus there appears from the Falls to the Broadway Bridge at the lake-head a net increase of about a quarter of a grain per gallon of total organic matter, while the total N decreases a little. While there are small increases of both salt and sulphates, innocuous mineral residues of

*Report to the Board of Alderman of the City of Paterson.

TABLE V. The Dundee Canal; below the Lake.

1. Original Numbers.	2. LOCALITIES.	3. Dates.	4. Total Solids.	5. Combustible and Volatile.	6. Ash.	7.	8. Common Salt.	9. Sulphuric Oxide.	10. Ammonia (as such.)	11. Ammonia Albumenoid.	12. Ammonia from N. Acids.	13. Ammonia Total.	14. Nitrogen Total.
9.	Canal at Passaic.....	Sept. 9, 1881.	6 275	1 312	4 963		429	590	0007	0070	0280	0357	0294
19.	Exit from lake into canal; at west end of dam.....	" 29, "	5 587	1 050	4 537			691	0047	0033	0146	0266	0235
26.	Canal at Passaic.....	Oct. 31, "	5 552	1 050	4 502		505	1 156	0021				
41.	Canal at Passaic, river in flood.....	Dec. 30, "	6 777	3 674	3 103		371	954	0085	0105	0090	0271	0231
	Means*.....		5 805	1 104	4 276		435	848	0040	0089	0172	0304	0250
	Means of Broadway bridge; Table IV.....		5 008	1 409	3 600		285	854	0035	0146	0194	0578	0309
	Increase in traversing Dundee lake.....		797		676		150		0005				
	Decrease in traversing Dundee lake.....			305				006	0057	0022	0071	0050	
	Means above falls; Table III.....		4 918	1 166	3 752		194	802	0056	0125	0210	0591	0322
	Increase from falls to Passaic city.....		887		915		241	046					
	Decrease from falls to Passaic city.....			062					0016	0036	0038	0087	0072

* Regarding these mean figures, one point needs explanation. As stated, the flood sample 41 was turbid when analyzed, and the total solid and combustible matter were both therefore overestimated. In the means of columns 4 and 5, therefore, the figures of 41 have been neglected. Not so with the ash, however (column 6). Here two mean figures have been computed, the first with, and the second without, No. 41. It will be observed that the mean of the waters above the falls does not include a flood sample, this having been duly collected, but broken and lost in transit (See Table I, No. 44). It was judged proper, therefore, to compute the figure .915, representing the increase of mineral matter from the falls to the lake-outlet, from the second mean, 4,667, without the flood water. The figure .676, however, the increase of mineral matter in the lake, does include the flood water, as it is the difference between two means, both containing flood water figures.

TABLE VI. The Tidal Channel, from Passaic to Belleville; Group 1 st.

1. Original Numbers.	2. LOCALITIES.	3. DATES.	4. Total Solids.	5. Volatile and Combustibles.	6. Ash or Mineral Com-pounds.	7.	8. Common Salt, NaCl.	9. Sulphuric Oxide, SO ₂ .	10. Ammonia (as such).	11. Ammonia Albumenoid.	12. Ammonia from Nitrogen Acids.	13. Ammonia Total.	14. Nitrogen Total.
6.	County Drawbridge, in Passaic, ebb tide.....	Sept. 7, 1881.	6 631	1 137	5 494		657	1 015	0009	0064	0414	0487	0401
7.	Newark Pumping Works, ebb tide.....	" 8, "	7 220	1 575	5 645		924		0020	0088	0408	0516	0325
12.	One mile below Erie R. R. bridge, tide flowing up.....	" 15, "	6 240	1 108	5 132			1 059					
20.	Newark Pumping Works, about three-quarters flood.....	Oct. 19, "	6 742	1 517	5 225		847	1 167	0105	0117	0297	0519	0427
28.	Newark Pumping Works, extreme ebb tide.....	Nov. 1, "	6 928	1 633	5 295		1 324	1 064	0268		0838		
42.	Newark Pumping Works, extreme ebb, river flooded.....	Dec. 30, "	4 537	1 545	2 992		127	321	0128	0187	0235	0548	0445
	Means of Group 1st, excluding the flood sample, 42.....		6 732	1 394	5 338		938	1 081	0101	0090	0364	0508	0418
	Means of Dundee canal, Table V.....		5 805	1 104	4 667		435	848	0040	0089	0172	0304	0250
	Increase over Dundee canal.....		947	290	661		503	233	0061	0001	0192	0204	0168
41.	Dundee canal, river flooded.....		6 777	3 674	3 103		371	954	0085	0105	0090	0271	0231
	Increase in flooded river above canal.....								0043	0082	0143	0277	0214
	Decrease in flooded river below canal.....		2 240	2 129	181		244	633					

TABLE VII.
Strongly Polluted Waters, derived from the Tidal Channel; Group 2d of the Tideway Waters.

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.
Original Numbers.	LOCALITIES.	DATES.	Total Solids.	Volatile and Combustible.	Ash or mineral matter.		Common Salt, NaCl.	Sulphuric Oxide, SO ₃ .	Ammonia (as such.)	Ammonia Albumenoid.	Ammonia from N acids.	Ammonia Total.	Total Nitrogen.
28.	Newark Pumping Station, ebb tide.....	Nov. 1, 1881.	6'928	1'633	5 295	.....	1'324	1'084	'0268	'0117	'0338	'0723	'0595
30.	Newark Hydrant, Roseville avenue.....	Nov. 1, "	13'973	2'916	11'057	.....	6'331	1'260	'0117	'0216	'0274	'0667	'0499
29.	Newark Hydrant, Broad street.....	Nov. 1, "	13'927	3'149	10 778	.....	6'435	1'358	'0047	'0047	'0350	.....	.....
10.	Newark Hydrant, Broad street.....	Sept. 10, "	20'115	4'237	16'878	.....	11 747	1'229	'0026	'0093	'0254	'0373	'0307
8.	Newark Pumping Station, half flood.....	Sept. 8, "	46'382	6 415	39'967	.....	33'125	2'719	'0015	'0093	'0467	'0575	'0474
31	Off city of Newark, ebb tide.....	Oct. 19, "	64'152	10'264	53'888	.....	48'326	3'852	'0350	'0233	'0530	'1113	'0917
.....	Means, excluding 28 .....	.....	31'710	5'396	26'314	.....	21 193	2'084	0111	'0159	'0375	'0667	'0549

TABLE VIII.
Demonstration of the Derivation of large proportions of the Common Salt of the Polluted Tidal Waters of the Passaic from influx of Sewage:

1.	2.	3.	4.	5.	6.	7.	8.
Original numbers.	Sulphuric Oxide: Total.	Sulphuric Oxide normal to the down-flow (Table VI).	Sulphuric Oxide derived from the water from other sources.	Ratio of SO ₃ to NaCl in Atlantic Brine: by Forchhammer's Analyses.	Maximum of NaCl assumed as derived from Ocean Brine by this hypothesis.	Total NaCl in sample.	NaCl per gallon thus absolutely traced to Sewage.
28.	1'084	1'081	'003	× 11.3	'0339	1'324	1'29
30.	1'260	"	'179	"	2'027	6 331	4'308
29.	1'358	"	'277	"	3'131	6'435	3'305
10.	1'229	"	'148	"	1 6724	11'747	10'075
8.	2'719	"	'638	"	18'5094	31'125	14'616
21.	3'852	"	'771	"	31'3123	48'326	17'014

the Paterson sewage. there is really a small net decrease of total mineral matter, possibly through absorption of lime and magnesia compounds, etc., by the living creatures in the channel.

During the slow passage through the lake subsequently, the quarter grain of residual organic matter of the sewage is not only destroyed by aeration, etc., but in addition a small amount of that which is found above the Falls; so that the net loss of organic matter in the lake is .305 grain. The total N is at the same time reduced to .0072 grain less than above the Falls, the N of compounds lost in the lake summing up .0059 grain. The salt shows in the lake an increase of about .15 grain, which must have been due to evaporation; while the sulphuric oxide shows a trifling decrease of .006, indicating, when allowance is duly made for evaporation, a considerable absorption of sulphates by the vegetation of the lake bottom.

E. THE TIDAL WATERS OF THE PASSAIC.

About one-fourth of the analyses made pertain to the tidal portion of the river--these numbering 13 in all--my object having been to settle and determine, as a finality, some of the questions about which the large population supplied with this water, has so long been in discussion.

Study of these thirteen analyses has pointed to their division into two distinct groups. Group 1st, in Table VI., mostly ebb-tide waters, comes near enough for my purposes to what may be called a normal condition of the tidal waters; by which I mean a condition of minimum pollution from the great Newark population. Group 2d, in Table VII., on the contrary, shows at a glance in nearly every figure evidences of admixture with polluting ingredients, often very large in proportion. One sample, No. 28, appears to lie between the two groups, and has hence been placed in both tables. In Table VI., No. 42 is included to exhibit the immediate and great effect, on the tideway, of the flood that began on Dec. 29; but this is partially excluded from the mean figures (as explained in the foot note to Table V.). For comparison with 42, 41 is added below, taken on the same day from the Dundee Canal. In the means of Group 1st, in Table VI., an important increase is shown in every constituent over the Dundee Canal, the total increase being, however, less than one grain per gallon.* (If the flood-sample 42 be taken into the mean, this increase sinks to .578 grain.) That part of this increase which falls on total N, representing putrescible matter, is .0168 grain, which is 67 per cent. increase over the .025 grain in the Dundee Canal.

More than half the increment, .503 grain, is common salt, which is 116 per cent. over the .435 in the canal. This brings us at once to a most important mooted question, that has at last been completely set at rest by the present investigation. This is the question whether this salt in the tidal waters is of drainage origin, or a result of mixture with oceanic brine, brought up by rising tides. In 1873, I ascertained that sea-water does, at high flood tides, get up as far as the City of Newark, and at first the high NaCl figures in Table VII. were viewed by me as indicating oceanic origin. Tabulation and collective study of the analyses soon showed, however, that this was wholly untenable. The chemical data point unmistakably to the conclusion that the salt in Group 2d is mostly, if not wholly, of sewage origin.

Two keys to the question were found: First the proportion between the SO₃ and the NaCl in the waters of Group 2d. This ratio was found by me to vary in ocean-water within but narrow limits. Ten analyses of Atlantic-brines, by different chemists, gave this ratio in the mean, as 1:11.8. Now, in a mixture of ocean-brine with river-water, it follows that the SO₃ present, over and above that found in the river-water itself, must represent 11.8 times its amount of NaCl belonging to the ocean-brine, while any excess of NaCl over this, found in the mixture,

* It should be pointed out that part of this increase must represent the effect of evaporation on the waters from the canal, after they reach the tideway.

must have belonged to the river-water.† In the present case, the average of SO₃ in the river-water (see Table VI) is 1.081.

Table VIII. represents these computations, and their results are stated in Column 8 of the same.

The other key to the question is the organic, or "volatile and combustible" residues from these waters of Group 2d. (See Table VII, Column 5.)

OFFICIAL REPORTS.

THE CENTRAL MINING COMPANY.

The directors present the following statement of the operations during the year 1889 :

The production of mineral was 803,100 tons, which yielded about 79 per cent., or 1,270,592 pounds of refined copper. The following is a summary of the year's business: Production, 1,270,592 pounds copper at 12 1/2 cents, \$159,704.73; add interest received, \$5,815.78; total, \$165,520.51. Costs, working expenses at mine, \$143,475 89; smelting, freight and all other expenses, \$24,388.18; net running expenses, \$167,864.07; cost of straightening and repairing No. 2 shaft, new shaft-house, etc., \$24,232.03; making the total expenses, \$192,096.10; showing excess of expenditure over receipts of \$26,575.59. The surplus from 1888 was \$225,503.79. Add amount credited real estate for stampage, \$5,588.48, \$231,092.27; making the net surplus, December 31st, 1889, \$204,516.68; out of which a dividend of one dollar per share (\$20,000) was paid February 1st, 1890.

The average price obtained for our copper was about 2 1/2 cents per pound less than in 1888, while the production was nearly one-third less. This diminution in both quantity and price accounts for the reduction in receipts.

For about three months of the year nearly the entire force was engaged in the work of straightening, enlarging and retimbering our main working shaft, which had attained a depth of about 2,900 feet. The upper portion of the shaft had--many years ago--been sunk on the dip of the vein, as was customary in those days, and, while not departing from the vertical to any great extent in any place, yet it was too small and crooked to admit of hoisting loads of sufficient size, or with sufficient rapidity to compensate for the increasing depth, and its reconstruction had become indispensable.

An estimate based upon the average product while working, justifies the directors in assuming that if no interruption had taken place the net earnings would have been about \$20,000, and they, therefore, decided to pay out of the surplus a dividend of \$1 per share.

At this time it is more difficult to forecast the future than at any former time at which the directors have been called upon to report. Although the product continues fair in amount, yet the prospects at the bottom of the mine are not encouraging. The vein after passing through a belt of "amygdaloid" in which it became split up and disordered, is entirely cut off on reaching a thick belt of "conglomerate." There is no reason to doubt that the vein exists in the "conglomerate" and in the underlying belts, but the formation seems to have been displaced at the point of contact between the "amygdaloid" and the "conglomerate," carrying the vein with it, and its location has not yet been determined. How soon the vein will be found, or what its value will be, is of course uncertain.

For some months past we have been driving a cross-cut from the 19th level toward the "Northwestern" vein, approximately 1,640 ft. distant from and parallel with the "Central" vein. The drift is now about 560 ft. from the objective point, and as the "Northwestern" vein was worked many years ago to a depth of about 400 ft. and produced some large masses of copper, we expect to find something of value when we reach it, which we should do before the end of the current year.

THE MONTANA COMPANY, LIMITED.

The accounts now submitted show on net revenue account a balance of £47,119 6d. for the half-year ending 31st December, 1889, out of which two quarterly interim dividends have been paid (one at the rate of 10 and one at the rate of 7 1/2 per cent. per annum), amounting in the aggregate to £28,875, and in addition to this item, £16,876 14s. 10d. have been appropriated from net revenue account for expenditure on capital account during the half-year (see statements A and C), leaving a balance of £1,376 5s. 8d. carried forward to credit of the current half-year ending 30th June, 1890.

By Statement A it will be seen that the item "Adjoining Locations" has been increased by the sum of £10,387 13s. 9d. The Reserve Fund has been debited with £10,000 toward the payment for these outlying properties, the acquisition of which must prove of the greatest advantage to the company, inasmuch as it has increased the original length of metalliferous ground, and added a large tract of land for the storage of mill tailings.

† It should be noted that we get here of course but a crude minimum result as to proportion of sewage-salt. The SO₃ in Column 4 is assumed to be all from sea-water; whereas sewage itself contains sulphates, and some sulphate come from Lodi. Both these would increase the sewage-salt but are both neglected in the computation.

Owing to the scarcity of water and sickness which prevailed during January, the production for that month was materially reduced. Only 5, 98 tons were passed through the mills, or about 1,500 tons less than the average return for a long month. The bullion produced was thereby affected by at least \$20,000. The profit earned in the month of February, and the estimated profit for the present month, however, justify the directors in declaring a first quarterly interim dividend for the half-year ending 30th June, at the rate of five per cent. per annum.

During the six months ending December 31, 1889, the mills crushed 39,605 tons, producing a yield in bullion and concentrates on assay of \$601,791.45, equivalent to \$15.20 per ton, but the actual realized value of the bullion and concentrates amounted to only \$520,467.39, giving an average per ton of \$13.14 net yield: the difference being \$81,324.16 or 13.51 per cent. As stated in the past half-year's report, the difference between the assay value of the yield and its realized value results: (1) From the heavy depreciation in the market value of silver below the United States' standard value of \$1.29³/₁₆ per ounce. (2) The difference between the estimated and realized value of the concentrates.

The average cost of prospecting, mining and milling per ton of ore for the six months ending 31st December, 1889, was \$8.82 against \$8.79 for the previous six months.

High grade ore in reserve, \$20 and upward per ton, estimated at.....	Tons.	43,300
Low grade ore in reserve under \$20 per ton, estimated at.....		161,000
Total		204,300
Ore crushed, 1888.....	Tons.	83,745
1889.....		78,749
Decrease in tonnage.....	4,996	
Gross yield, 1888.....	\$1,094,598	
1889.....	1,297,699	
Inc. in production....	\$203,101	
Average cost per ton for the year:		
Mining.	Milling.	
10 stamps.	50 stamps.	60 stamps.
1888.....\$3.10	\$3.15	\$1.13
1889.....3.83	4.34	1.22

A NEW SALT-MAKING PROCESS.

Improvements in the manufacture of salt have, of course, been attempted from time to time, says *Iron*, but the attempts have been few and far between, and they have been unattended by practical success. Makers still go on evaporating brine in open pans; still go on getting their plates sealed and burned; still go on subject to heavy charges for repairs; and still go on with a system in which the life of every pan put down is not more than three years. All this, however, would now appear to be at an end; at least the means of putting an end to it are at hand, and only require to be known to be adopted. We refer to a new system of salt manufacture by Dr. Sigismund Pick, of Szczakowa, Austria, which we have recently had the opportunity of seeing in successful operation. Salt is at present produced by means of open vats or pans, varying in size according to circumstances and the quality of the salt to be produced. Its manufacture necessarily requires a large area and an enormous consumption of fuel to maintain the brine at the boiling point; in order to secure that the salt shall be precipitated more or less rapidly, according to the quality required. For example, a salt pan 12 yards long and 2½ yards wide (= 30 square yards), exclusive of the brick work, is supposed to turn out about 40 tons of salt per week. Dr. Pick, who is one of the highest authorities on the subject of salt production, has, however, invented an economical process for evaporating liquors containing salts and for separating the salts from them. By means of this apparatus, which covers 35 square yards, it is stated that 600 tons of salt can be produced per week.

The apparatus in question is simple in construction and in operation, while the process of making salt by it is economical, continuous, and automatic. It depends for its success mainly upon two principles: Firstly, that the boiling-point of any liquid is lowered by reducing the pressure under which evaporation is carried on; secondly, that the steam generated by the evaporation of any liquid contains a certain quantity of latent heat, which is sufficient to evaporate another quantity of water, provided the boiling point of the latter is below the temperature of the steam used. Dr. Pick's apparatus is made in three sections, each performing similar functions. Each section consists of four main parts, namely, the boiling chamber, the heating chamber, the collecting chamber, and the filtering chamber. The steam used—whether live steam direct from a boiler or merely waste or exhaust steam—enters the heating chamber of the first section, in which the highest temperature is maintained. It there heats the brine, and as the steam given off from that brine enters the steam chamber of the second section, and is there condensed, it acts as a condenser, and, as the pressure is reduced by the condensation, the brine in the second chamber boils at a lower temperature. The same process is repeated in the second section, the steam chamber of the third section acting as a condenser. The steam generated in the latter section from the brine is drawn by means of a vacuum pump, and condensed by the application of cold water.

The advantages of the new process are obvious, but the greatest consists in the large saving of fuel which, in the ordinary method—viz.: the common salt pan—is used to evaporate the brine direct. In the new process the utmost possible use is made of the steam generated by evaporation, it being used twice over. Theoretically, two-thirds of the fuel ought to be saved; but in practice the saving is said to amount to three-fifths, and where the exhaust steam from an engine is available, there is no expense whatever for fuel, the cost involved in the manufacture being that of labor only. The present consumption of coal, according to actual figures, is 12 hundred-weights per ton of fine white salt. By the new process a saving of 7 hundred-weight of coal per ton is effected where waste or exhaust steam is not available. Another important advantage is the absence of frequent repairs, and the small amount of wear and tear. Hardly any repairs are necessary, while every manufacturer of salt is well aware of the large amount of repairs required by the old salt pans, the plates of which, especially those near the furnace, have to be constantly renewed, involving not only great expense, but a complete standstill for a considerable period of time. A great saving in labor is likewise effected. In the case of the ordinary salt pans, men have to be con-

stantly going along the pans, carefully raking the salt to the sides, so that nothing remains on the plates, otherwise these would be quickly burned through. By the new process no labor is expended in this direction, with the exception of that required for opening and shutting the valves. There are yet other advantages to which attention may be directed. By the ordinary process the black smoke and noxious gases emitted tell upon animal and vegetable life in the vicinity of salt works. No such nuisances can possibly arise in the case of Dr. Pick's apparatus. As the salt nowhere comes in contact with fire, no smoke nor acid vapor can be formed. Another very material advantage is the small area occupied by salt works on the new as compared with those on the old system. For example, an apparatus consisting of three sections, each 2½ yards in diameter, will turn out 50 tons of salt per day, or 300 tons per week, while a salt pan 12 yards long by 2½ yards wide, exclusive of brick work, only turns out about 40 tons per week.

Although, to carry out Dr. Pick's process with true economy, three sections are required, yet salt can be made, and cheaply, too, with one section. This has been demonstrated at a salt works in Staffordshire, where a single section has been put up under the superintendence of Mr. Perry F. Nursey, C. E. It has been at work for some little time, producing the best salt at the rate of one hundred-weight per hour, or about one ton per day of twenty-four hours, from fully saturated brine. With a complete plant of larger size, the output would be 50 tons of salt per day, at a calculated cost of 2s. 6d. per ton for labor and all other expenses. By the ordinary system of open pans, the cost of production is from 9s. to 12s. per ton, according to circumstances. By the invention of this new system, which is the outcome of many years of practical experience and investigation, Dr. Pick has succeeded in supplying to the salt trade a factor which, by so materially reducing the cost of manufacture, must benefit not only the maker and consumer, but must regain to England what would appear to be fast becoming a lost industry. In illustration of this, it may be mentioned that, whereas, in 1888, 898,671 tons of salt were shipped from England, the shipments during the year 1889 fell to 666,796 tons—a decrease in one year of 231,875 tons—in other words, a loss of more than one-fourth of the export trade in salt. When it is borne in mind that the export of chemicals from England and of the manufacture of which salt forms one of the principal items, stands at present at £2,000,000 per annum, it becomes apparent that, but for the introduction of such an invention as we have described, the decrease in export of salt shown last year must be repeated, and possibly exceeded, in the case of chemicals. Having witnessed the excellent results of the working of Dr. Pick's invention, we can congratulate him thereon. And no less do we congratulate salt manufacturers, inasmuch as it presents to them the ready solution of a very long felt and pressing difficulty.

HOW TO WIN FORTUNE.

Mr. Andrew Carnegie is one of the most versatile citizens whom an American environment and a Scotch ancestry have ever produced. Not satisfied with his achievements in rising to the ownership of one of the largest steel works in the world, and of various other industrial establishments, and in acquiring fame as a philanthropist, he is becoming no less famous in literature. His books and magazine and newspaper articles are now quite numerous. A very readable article from his pen appeared in the *New York Tribune* of April 13th, entitled "How to Win Fortune"—a subject in which every one is interested.

The article, referring to the inevitable and increasing tendency toward concentration of capital into vast manufacturing establishments—five, ten, and even twenty millions of dollars being sometimes massed into one corporation—states that this has given rise to a complaint on the part of young men that it is now no longer possible for them to rise beyond the position of employes upon salaries. This complaint Mr. Carnegie attempts to show is unfounded.

Considering the prospects of the mechanic in the industrial, and of the clerk in the mercantile world, he states that no classes other than these two have had much to do with establishing the factories, business houses and financial institutions which are best known to-day. He gives a long list of manufacturing concerns, including the largest and best known works in the country, in various branches, and says that every one of these great works was founded and managed by mechanics, men who served their apprenticeship, and that if the list included concerns which were created by men who entered life as office boys or clerks, it would embrace almost every famous manufacturing concern in the country.

Mr. Carnegie asks a most important question in this connection, "Where is the college graduate? I have inquired and searched everywhere in all quarters, but find scarcely a trace of him." This refers, of course, to his absence from industrial and commercial pursuits, and not from professional life, in which almost exclusively he is found. The reason, he says, is not surprising. The prize-takers have entered the race invariably in their teens, in the most valuable of all the years for learning anything, from fourteen to twenty. While the college student is learning such knowledge as seems adapted for life upon another planet than this, as far as business affairs are concerned, the future captain of industry is hotly engaged in the school of experience, obtaining the very knowledge required for his future triumphs. The almost total absence of the graduate from high position in the business world seems to justify the conclusion that college education as it exists is almost fatal to success in that domain. The graduate has not the slightest chance, entering at twenty, against the boy who swept the office, or began as shipping clerk at fourteen.

Exactly the opposite state of affairs seems to exist in the case of the graduates of the technical and scientific schools. Three of the largest steel manufacturing concerns in the world, Mr. Carnegie states, are already under the management of three young educated men—students of these schools who left theory at school for practice in the works, while yet in their teens. Walker, Illinois Steel Company, Chicago; Schwab, Edgar Thomson Works; Potter, Homestead Works, Pittsburg, are types of the new product, not one of them yet 30. Most of the chiefs of departments under them are of the same class. Such young educated men have one important advantage over the apprenticed mechanic—they are open minded and without prejudice. He goes in for the latest invention or newest method, no matter if another has discovered it. He adopts the

plan that will beat the record, and discards his own devices or ideas, which the working mechanic can rarely be induced to do. Let no one, therefore, underrate the value of education, only it must be education adapted to the end in view, and must give instruction bearing upon a man's career.

For these reasons Mr. Carnegie holds, while it is more difficult to start a new business to-day than ever it was, it is at the same time infinitely easier for a young practical man of ability to obtain an interest in existing firms than it has ever been. The doors are not closed upon ability. Real ability, the capacity of doing things, never was so eagerly searched for as now, and never commanded such rewards.

That portion of Mr. Carnegie's article which will probably attract the widest attention, as it contains a forecast of a possible great impending change in the industrial world, relating to industrial co-operation.

The law of concentration of industries into vast concerns contains within itself, he says, another law not less imperious. These vast concerns cannot be successfully conducted by salaried employes. In the industrial world the days of corporations seem likely to come to an end. The great dry goods houses that interest their most capable men in the profits of each department succeed, when those fail that attempt to work with salaried men only. In every branch of business this law is at work, and concerns are prosperous, generally speaking, just in proportion as they succeed in interesting in the profits a larger and larger proportion of their ablest workers. Co-operation in this form is fast coming in all great establishments. The manufacturing business that does not have practical manufacturing partners had better supply the omission without delay, and probably the very men required are the bright young mechanics who have distinguished themselves while working for a few dollars per day, or the youths from the polytechnic school.

Iron Works for India.—At the Bengal Iron and Steel Company's works near Barrakur, a few miles distant from the junction of the East Indian and Bengal Nagpore railways, arrangements have been made for the production of 30,000 tons of pig iron per annum from the ironstone and coal found in close proximity to the property. In the foundry, preparations have been made for turning out cast-iron water pipes, sleepers and other railway material in very large quantities, the molding being accomplished by hydraulic machines of the latest pattern, at rates which, it is expected, will render European competition difficult, if not impossible. The output of these works will not be confined to pig iron and castings; but as soon as practicable the production of wrought iron and steel, and its manufacture into blooms and bars, will be commenced, and eventually the rolling of rails, girders, joists, and all sections of iron and steel, in common use on railways and for building purposes.

Coke Ovens in the Flat-Top Region.—The following is a list of companies operating coke ovens in the Flat-Top Region of West Virginia (and Virginia), with the number of ovens now at work and under construction: Booth-Bowen Coal and Coke Company, Simmons Creek, W. Va., 91; Buckeye Coal and Coke Company, Simmons Creek, W. Va., 100; Caswell Creek Coal and Coke Company, Simmons Creek, W. Va., 137; Crozer Creek Coal and Coke Company, 214; Elkhorn Coal and Coke Company, Elkhorn Creek, W. Va., 100; Goodwill Coal and Coke Company, Flipping Creek, W. Va., 50; Houston Coal and Coke Company, 100; John Cooper & Co., Mill Creek, W. Va., 150, and under construction, 150; Louisville Coal and Coke Company, Flipping Creek, W. Va., 50; Norfolk (1) Coal and Coke Company, Elkhorn Creek, W. Va., 100; Norfolk (2) Coal and Coke Company, Elkhorn Creek, W. Va., under construction, 120; Powhatan Coal and Coke Company, 100; Shamokin Coal and Coke Company, Elkhorn Creek, W. Va., 100; Southwest Virginia Improvement Company, Pocahontas, Va., 400; Turkey Gap Coal and Coke Company, 100.

The Preparation of Manganese.—A new mode of preparing manganese, by which the metal can be obtained in a few minutes in tolerably large quantities, and almost perfectly pure, is described by Dr. Glatzel, of Breslau, in the current number of the *Berichte*. A quantity of manganese chloride is first dehydrated by ignition in a porcelain dish, and the pulverized anhydrous salt afterwards intimately mixed with twice its weight of well-dried potassium chloride. The mixture is then closely packed into a Hessian crucible, and fused in a furnace at the lowest possible temperature, not sufficient to volatilize either of the chlorides. A quantity of metallic magnesium is then introduced in small portions at a time, the total quantity necessary being about a sixth of the weight of the manganese chloride employed. Provided that the crucible has not been heated too much above the melting point of the mixture of chlorides, the action is regular, the magnesium dissolving with merely a slight hissing. If, however, the mixture has been heated till vapors have begun to make their appearance, the reaction is extremely violent. It is, therefore, best to allow the contents of the crucible, after fusion, to cool down to a low red heat, when the introduction of the magnesium is perfectly safe. When all action has ceased, the contents of the crucible are again heated strongly, and afterward allowed to cool until the furnace has become quite cold. On breaking the crucible, all the potassium chloride and the excess of manganese chloride is found to have been volatilized, leaving a regulus of metallic manganese, fused together into a solid block, about three parts by weight being obtained for every two parts of magnesium added. The metal, as thus obtained, is readily broken up by hammering into fragments of a whitish-gray color, possessing a bright metallic lustre. The lustre may be preserved for months in stoppered glass vessels; but, when exposed to air, the fresh surface becomes rapidly brown. The metal is so hard that the best files are incapable of making any impression upon it. It is so feebly magnetic that a powerful horse-shoe magnet capable of readily lifting a kilogramme of iron has no appreciable effect upon the smallest fragment. It was noticed that the introduction of a small quantity of silica rendered the manganese still more brittle, and caused it to present a conchoidal fracture, that of pure manganese being uneven. The specific gravity of the metal, former determinations of which have been very varied, was found to be 7.3921 at 22 degrees C. This number, which was obtained with a very pure preparation, is about the mean of the previous determinations. Dilute mineral acids readily dissolve the pulverized metal, leaving a mere trace of insoluble impurity. It is also satisfactory that practically no magnesium is retained alloyed with the manganese, and the introduction of carbon is altogether avoided by the use of this convenient method.

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.]

- Des Ingenieurs Taschenbuch.* Part I. By the association "Hütte." Published by Von Ernst & Korn, Berlin, Germany. 1890. Pages 596. Illustrated. 14th edition.
- Electrical Trades Directory and Handbook for 1890.* Published by The Electrician Printing & Publishing Company, Limited, London, 1890. Pages 700. Price 6 shillings.
- Pocket Geologist and Mineralogist.* By Frederick H. Smith, Engineer and Geologist. Published by the author. Pages 208. Price \$1.
- Report of the Department of Mines of Nova Scotia for the year 1889.* By Edwin Gilpin, Jr., Inspector of Mines. Published by the Commissioner of Public Works and Mines, Halifax, N. S., 1890. Pages 48.
- The Geology of Ontario, with Special Reference to Economic Minerals.* By Robert Bell, B. A. Sc., LL.D., Assistant Director of the Geological Survey of Canada, etc. Reprinted from the Report of the Royal Commission. Ottawa, Canada. Pages, 57.
- Ventilation of Buildings.* By Alfred R. Wolfe, M. E. Published by the author. Pages 32. Price 25 cents.

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.

- PATENTS GRANTED TUESDAY, APRIL 15TH, 1890.
- 425,396. Rail-Joint. Reuben M. Agee and Edward Lane, Canton, Mo.
- 425,407. Railway Spike. James Churchward, Brooklyn, N. Y., Assignor to the Dunham Manufacturing Company of Maine.
- 425,408. Hydraulic Railway. Erastus H. Crow, New York, N. Y.
- 425,415. Sectional Boiler. Arthur H. Fowler, Buffalo, N. Y.
- 425,418. Welding Compound. Marcus Garrison, Stone Church, Pa.
- 425,425. Boiler. John J. Hogan, Brooklyn, Assignor to the Hogan Engineering Company, New York, N. Y.
- 425,426. Sectional Boiler. John J. Hogan, Brooklyn, assignor to the Hogan Engineering Company, New York, N. Y.
- 425,434. Machine for flanging boiler heads. Fredrick L. Kollberg, Chicago, Ill., assignor to Joseph Bee, same place.
- 425,443. Safety Car Brake. Edwin W. Luce, Bradford, Pa.
- 425,445. Car-Coupling. Frank C. Miller, Belvidere, N. J.
- 425,465. Clutch controller. David R. Steele, Waterloo, N. Y.
- 425,468. Key-Bolt and Washer for Railway Joints. William Teamer, Evansville, Ind.
- 425,482. Friction Clutch. Christian A. Anderson and John Fogarty, Kaukauna, Wis.; said Fogarty Assignor to said Anderson.
- 425,509. Car Coupling. Quinton J. Hoke, Yorkville, S. C., assignor to himself and Paul R. Bratton, same place.
- 425,517. Ore-Car. Edward W. Mackenzie-Hughes, Chicago, Ill., assignor to the Fox Solid Pressed Steel Company, same place.
- 425,518. Elevated Cable Railway. Waitman M. Morgan, Kansas City, Mo.
- 425,532. Rock Drill. Walter H. Adams, Stamford, Conn.
- 425,538. Apparatus for charging Retorts. Jules H. Du Vivier, Paris, France.
- 425,545. Apparatus for saving Gold, Silver and Quicksilver. Frederic A. Luckenbach, New York, N. Y.
- 425,552. Coal-Elevating Crane. Charles S. Schenck, New York, N. Y.
- 425,556. Machine for Turning and Drilling Metal. William Wattie, Worcester, Mass.
- 425,562. Rotary Engine. Bruno Beck, Chicago, Ill.
- 425,568. Thermo-Electric Battery. John Edelkamp, New York, N. Y.
- 425,569. Journal Box. Thomas Gare, Stockport, County of Chester, England.
- 425,596. Dumping Apparatus. John E. Curry, Boston, Mass., Assignor of one-half to Mary E. Hayes, same place.
- 425,607. Dumping Car. William W. Green, Chicago, Ill.
- 425,610. Rotary Balanced Valve. Charles R. Harkins, Cincinnati, Ohio.
- 425,624. Ejector for Oil Wells. William O'Neil, Glade, Warren County, Pa.
- 425,627. Electric Car-Motor. Edgar Peckham, New York, N. Y.
- 425,653. Motor Truck for Cars. John A. Brill and George M. Brill, Philadelphia, Pa.
- 425,675. Means for Coating Metal Pipes. John D. Hooker, Los Angeles, Cal.
- 425,692. Apparatus for Regulating the Speed of Gas or Oil Motor Engines. Nicolaus A. Otto, Cologne, assignor to the Gas Motoren-Fabrik-Deutz, Deutz-on-the-Rhine, Germany.
- 425,698. Combined Try-Square and Protractor. Franklin E. Roberts, Flint, Mich.
- 425,699. Hoist. Frank A. Rohitaille, Rimini, Mont.
- 425,718. Apparatus for getting coal and other like minerals. William Walker, Salthurn-by-the-Sea, County of York, England.
- 425,724. Means for Transporting Loads. Ferdinand J. Arnodin, Chateaufort-on-the-Loire, France, and Martin A. de Palaco, Bilhao, Spain.
- 425,730. Smoke-Consuming Furnace. Georg F. N. Bergen and Ignatz Doerfler, Milwaukee, Wis.
- 425,733. Ore-Feeder. Cullen B. Bingham, Volcano, Cal.
- 425,737. Rock Drill and Instrument Using Revolving Hammers. William G. A. Bonwill, Philadelphia, Pa., Assignor to the S. S. White Dental Manufacturing Company, same place.
- 425,747. Railroad Tie. Orville W. Brown, Hayt's Corners, Assignor of one-third to George W. B. Neal, Ovid Centre, N. Y.
- 425,773. Hose Coupling. Robert Franken, Pomona, Cal.
- 425,791. Device for Utilizing Elevated Running Streams for Motive Power. Henry T. Hey, Philadelphia, Pa.
- 425,797. Car for Coke. Charles W. Hunt, West New Brighton, Assignor to the C. W. Hunt Company, New York, N. Y.
- 425,798. Driving Mechanism for Endless-Chain Conveyors. Charles W. Hunt, West New Brighton, N. Y., Assignor to the McCaslin Machine Company, same place.
- 425,818. Apparatus for the Reduction of Argenteriferous Ores. Octavius Lumaghi, St. Louis, Mo.
- 425,829. Railroad Track-Laying Machine. George Roberts, Tacoma, Wash.
- 425,846. Casting Ingots. Benjamin Atha, Newark, N. J.
- 425,872. Hydrocarbon Burner. Ernest W. Fellowes, Englewood, N. J., Assignor to Ernest T. Fellowes, same place.
- 425,877. Process of Carburizing Air or Gas. Samuel Hanford, Binghamton, N. Y.
- 425,880. Mill for Rolling Wide Bars or Plates. William G. Howell, Philadelphia, Pa.
- 425,881. Method of Reducing Railway Rails. William H. Howells, Bridgeport, Ohio.
- 425,886. Ore Mill. James S. Kingsland, Flatbush, N. Y.
- 425,907. Railroad Track-Laying Machine. George Roberts, Ellensburg, Wash.
- 425,909. Petroleum Engine. James Roots, Westbourne Park, County of Middlesex, England.
- 425,937. Combination Rail Joint and Rail Tie. John M. Fennerty, Washington, D. C., Assignor, by direct and mesne assignments, to the Safety Spike and Rail Joint Company, Harper's Ferry, W. Va.
- 425,941. Boiler with vertical Sections. John J. Hogan, Brooklyn, N. Y., Assignor to the Hogan Engineering Company, New York.
- 425,942. Water Jacketed Boiler. John J. Hogan, Brooklyn, N. Y., Assignor to the Hogan Engineering Company, of New York.
- 425,945. Compound Boiler. John J. Hogan, Brooklyn, N. Y., Assignor to the Hogan Engineering Company, of New York.
- 425,947. Fire Brick Lining for Furnaces. John J. Hogan, Brooklyn, N. Y., Assignor to the Hogan Engineering Company, of New York.
- 425,951. Metal Boiler-Forging Machine. George W. Marble, Plymouth, Ind., Assignor of one-fourth to William W. Simons, same place.
- 11,070. 11,071. Automatic Valve for Air-Brakes. Herman Guels, St. Louis, Mo., Assignor, by direct and mesne assignments, to the Westinghouse Air-Brake Company, Pittsburg, Pa.

PERSONALS.

Mr. John Heard Jr., M. E., will shortly leave for Montana and Arizona on professional business.

Col. E. D. Boyle, of the Alta Mining Company, of Virginia City, Nevada, has been selected as Superintendent of the Lady Washington Mining Company to fill the vacancy caused by the resignation of Charles Derby.

Mr. Wm. H. Radford, formerly superintendent of the North Bloomfield Mining Co., in North Bloomfield, Cal., has been appointed superintendent of the Lydenburg Gold Mining Co., and has left for the mines at Lydenburg, Transvaal, South Africa, where his future address will be.

Mr. J. R. Holchaugh, mining engineer, has entered into partnership with Mr. Van Ness, mining engineer. The gentlemen have established offices as consulting engineers at Joplin and Kansas City, Mo. Mr. J. R. Holebaugh has been a resident of Joplin for some time and has done much to bring the mineral resources of the surrounding mining districts prominently before capitalists.

The American Society of Mechanical Engineers has succeeded in raising the money required for the purchase of the building, No. 12 West Thirty-first street, as its new headquarters. The building was formerly occupied by the New York Academy of Medicine and is well adapted for the uses of the society. The American Institute of Electrical Engineers will lease a portion of the building.

Hardware is the name of a new bi-monthly trade paper published in this city in the interest of the hardware trade. The paper is edited by Mr. John R. Dunlap, until recently connected with the ENGINEERING AND MINING JOURNAL, and the advertising is attended to by Mr. Archie Mitchell, two very efficient and experienced managers for a paper of this kind, and if we may judge by the great success of the first number, *Hardware* seems to fill "a long felt want." We wish it and its authors the greatest possible success.

Prof. Angelo Heilprin, Robert Le Boutillier, J. E. Ives, Wilmer Houe and Frank C. Baker, representing the scientific expedition of the Academy of Natural Sciences of Philadelphia, have reached the City of Mexico, Mex. They left New York for Progreso, and made a geographical reconnaissance of the northern part of the peninsula of Yucatan, including the first mountain range. It is stated that they discovered that the former supposition that the peninsula was of coral origin was unfounded. Material for illustrating botany, geology and zoology was collected. The party reached Vera Cruz on March 28th, and made a critical examination of the region leading to the volcano of Orizaba. The ascent of Orizaba was made from Chalchicomula on April 6th, 7th and 8th. This is the first ascent of the volcano by scientific men. Barometric measurements made at different intervals show that the height of the volcano is 15,200 feet, or about 2,500 feet less than was generally supposed. Photographs of the mountain and crater were taken.

Mr. Y. Kee, a Chinese engineer, representing a syndicate organized in conjunction with the government to build a new system of railroads in China, visited Pittsburg this week. Of his mission to America he is reported to have said:

"It is the intention to tap by our lines some of the immense coal and ore fields of China. These regions are rich in mineral deposits. Labor is exceedingly cheap, and it is our intention to ship ore and coal to the Pacific Coast and compete with American materials.

I find that, even after the expense of transportation and any duties there may be, we can sell both ore and coal on the Pacific Coast at a much lower figure than you can sell what is mined in this country.

I am now going East to go through some of the locomotive works. I shall also visit Edison's works in New Jersey, as it is just possible we shall use electricity on a part of our railroads, if we find it practicable. Most of the equipments for our roads will come from America, and I expect we will spend over \$1,000,000 in this country.

I shall leave orders for everything we need before I return to China. We shall also do a passenger business, and will have coaches and sleeping cars equal to anything here.

If our project is a success we will give employment to a large number of American workmen."

OBITUARY.

The death is announced of Charles Pryse, an old time placer miner of McClellan Gulch, Montana.

George F. Bemis died at Boston, Mass., on the 17th inst. Mr. Bemis was a doctor in the Tamarack, Osceola and Kearsage Mining Companies of Michigan, and a large stockholder in the Bigelow group.

Andrew Campbell, inventor and manufacturer of printing presses, died of heart failure in the 69th year of his age, on the 9th inst., at his home, Brooklyn. He had resided in that city for 30 years, and was born in Trenton, N. J., in 1821. Mr. Campbell built the first rotary printing machine for printing illustrations and other work,

John Van Nortwick died at his home in Batavia, Ill., on the 15th inst., aged 81 years. He was largely interested in railroad building, having been chief engineer of the Galena & Chicago Union Railway, also of the Chicago, Burlington & Quincy.

William N. Wyth, a well-known wholesale steel and iron merchant, died in Baltimore, Md., on the 15th inst., at the age of 53 years. He was a partner of Ely & Williams, New York and Philadelphia, and president of the Iron Merchants' Association of Baltimore.

Benjamin F. Sturtevant, of Boston, Mass., the well-known inventor, whose "blower" works have sent machines to all parts of the world, died of apoplexy last week. He invented the first pegging machine and also the first machine for cutting continuous strips of wood veneers from logs. Among his minor inventions were the first machine to manufacture wooden toothpicks, and a projectile which was used by the government in the late civil war by the Swamp Angel before Charleston. In 1864 Mr. Sturtevant invented the celebrated blowers and exhausting fans which bear his name and have given him such a wide reputation in the mechanical world.

Rudolph Nyman, for many years identified with the real estate trade in this city, died in this city the 13th inst. He was born in Wurtemberg, Germany, in 1807, and came to this city in 1847. He remained here until the breaking out of the gold fever, and then in 1849 he left for California. He went to San Francisco, then a mere camp, where he became quite prominent. He returned to New York a year afterward, and established himself in the real estate business.

Richard Langdon, a well-known coal operator in the Huntingdon and Broad Top Region, Pa., died on Saturday, the 12th inst., aged about 60 years. Mr. Langdon was a native of Cornwall, England, and the son of a mine owner. He came to this country in his youth, and devoted his life to coal mining interests, being, it is said, one of the pioneer operators in the Huntingdon and Broad Top district. Mr. Langdon had been in good health prior to his last brief illness. Several sons of Mr. Langdon are engaged in the coal business, one of them, Samuel T. Langdon, being President of the Clearfield Consolidated Coal Company.

INDUSTRIAL NOTES.

The Weston Furnace Company has been organized, with a capital stock of \$100,000, to build an iron furnace at Manistiquie, Mich.

The sheet-metal workers in Nashville, Tenn., have gone on strike for nine hours work a day and an increase of 25 cents per day in wages.

The Joseph Dixon Crucible Company, of Jersey City, N. J., has just issued a new circular relating to its traction belt dressing and leather preservative, and it will prove interesting reading to those who use leather belts.

The boiler-makers of the Quintard Iron Works, New York, struck on the 17th inst. for an increase in wages of from \$2.75 to \$3 a day. This strike will delay work on a portion of the machinery designed for some of the new war-ships.

The middle span of the new iron bridge, which is being built across the Black river, at Poplar Bluffs, Mo., fell on the 13th inst., carrying two men down. Both were killed. The accident was caused by the washouts of the past month.

A strike in the Erie Basin Iron Works of Handren & Robbins, Brooklyn, N. Y., began on the 17th inst. among the riveters. Nearly 300 men are on strike against being compelled to drive 300 rivets a day, as they say 250 rivets are as much as a man can well do in a day.

The Southern Iron Company has commenced the construction of its steel plant at Chattanooga, Tenn., under the direction of Mr. Talhott, an English expert, who has been manager of large basic steel works in England. It is proposed for the present to build two 20-ton basic Siemens furnaces.

The business of the late Edward P. Allis, of Milwaukee, Wis., has been reorganized under the form and corporation name of "The Edward P. Allis Company," and the entire plant and assets transferred to the same. Mr. Wm. W. Allis is the President, and Mr. Charles Allis the Secretary and Treasurer of the company.

The Detroit Steel and Spring Company, of Detroit, Mich., has suspended payment, with liabilities said to amount to \$300,000. The works were started twelve years ago by local capitalists for the manufacture of car springs and bar and soft center steel. The plant occupied over five acres, and had an output from \$800,000 to \$1,000,000 a year. The company, it is reported, has reached a compromise with its creditors at 50 cents on the dollar, and the works will not close down for the present.

The Baldwin Locomotive Works, of Philadelphia, Pa., has just completed 16 engines which are among the heaviest in the country. They are of the ten-wheel pattern, with three pairs of driving-wheels coupled and a four-wheeled truck. The

cylinders of these engines are 20 inches in diameter and 24 inches stroke; the driving wheels are five feet in diameter. The boilers are 64 inches in diameter of barrel, have Wooten fire-boxes and plain (not extended) smoke-boxes. These engines are for the Philadelphia & Reading railroad, and are intended to run fast freight trains.

Recent large additions to the force of employes of the Mount Clare shops of the Baltimore & Ohio Railroad in Baltimore, Md., have increased the total number to more than 3,000 men, and that part of the city, which for a while looked desolate, has resumed its wonted prosperous appearance. Eleven locomotives are building, and many old engines undergoing repairs. A year ago the company was about to close the shops entirely and give out at contract all its locomotive and car work, but its policy has been changed, the officials finding that it is more advantageous to keep its own shops in operation. No more carwheels or box-cars are manufactured by the company.

CONTRACTING NOTES.

The Pennsylvania Lead Company, of Pittsburg, Pa., was awarded the contract for furnishing 55 tons of pig lead, at \$3.90 per hundred weight, to the Department of Public Works, of Pittsburg, Pa.

MACHINERY AND SUPPLIES WANTED AT HOME AND ABROAD.

If any one wanting Machinery or Supplies of any kind will notify the "Engineering and Mining Journal" of what he needs, his "Want" will be published in this column.

Any manufacturer or dealer wishing to communicate with the parties whose wants are given in this column can obtain their addresses from this office.

No charge will be made for these services.

We also offer our services to foreign correspondents who desire to purchase American goods, and shall be pleased to furnish them information concerning American goods of any kind, and forward them catalogues and discounts of manufacturers in each line, thus enabling the purchaser to select the most suitable articles before ordering.

These services are rendered gratuitously in the interest of the 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.

GOODS WANTED AT HOME.

765. A tail-ropo plant for a colliery; plant includes coupled high pressure horizontal engines 18' x 30'; two drums 5' diameter; two return tubular boilers, 80 H. P. each, 60' diameter by 16' long, and all other parts of the plant necessary to make an efficient working concern. Bids are to be made f. o. b. cars at colliery in Tennessee, and a competent man is to be sent to superintend erection.

766. Machinery for a chair and furniture factory. Alabama.

767. Cold storage machinery of the most approved pattern. Tennessee.

768. Heating apparatus for two buildings. South Carolina.

769. Water motor, 8 to 10 H. P. Maryland.

770. Hand elevator chain pump and power to bring water out of a well 70 feet deep, with a capacity of 500 gallons per day of ten hours. North Carolina.

771. Complete plant for calcining plaster. Virginia.

772. Windmills to pump water into tanks. Mississippi.

773. Bricks for the construction of several houses. Mississippi.

775. Steam laundry outfit; estimates and full particulars. South Carolina.

776. Address of cotton rope machinery. Louisiana.

777. Flour mill machinery with a capacity of 100 barrels per day; also cornmeal hur. Maryland.

778. Engine, Corliss preferred. Maryland.

779. Addresses of stepladder makers. Louisiana.

780. Marine machinery. North Carolina.

781. Second-hand blowing engine; capacity, 6,000 cubic feet per minute. Full particulars, giving maker and description. New Jersey.

782. Roofing material for large court house and other public buildings. Texas.

783. Addresses of manufacturers of ice machinery. Louisiana.

AMERICAN GOODS WANTED ABROAD.

702. Brick and tile machinery. Mexico.

738. A plant for a tin mine; all machinery necessary: engines, furnace, crusher, huddles and jigs. Mexico.

759. Gas machines for making gas for private residences. Australia.

774. Japanned or nickel music stands for a military band; prices per dozen. Malta.

GENERAL MINING NEWS.

The prices for mining for the coming year have been fixed and the Interstate agreement revived by the miners and mine operators of Ohio and Pennsylvania. This is the result of a decided change in the sentiments of both the miners and operators attending the joint convention held this week at Columbus, O., and concessions were made on both sides. Through a committee of conference the difference between the miners and the operators was reduced to a matter of one cent, the ultimatum of the operators being 70 cents for the Hocking Valley and 79 cents for the Pittsburg district, while the miners demanded 71 and 80 cents respectively for the two districts. After secret deliberation, the miners conceded the price fixed by the operators and the scale was agreed to by the joint convention. The scale is 10 cents lower than the original one proposed by the miners and an advance of five cents over the price paid in the Hocking Valley district the last year, and an advance of six cents over the price paid in the Pittsburg district. It now seems probable that corresponding prices will be fixed in Indiana, Illinois and West Virginia. The operators of those States must now agree to prices satisfactory to the miners or submit to a strike, in which they will have to fight not only the miners of Ohio and Pennsylvania, but the operators as well as the miners of their own State.

ARIZONA.

MARACOPA COUNTY.

PHENIX MINING COMPANY.—This company has decided to add five additional stamps to its mill, making now 25 stamps. Since Mr. Bradstreet has been in charge of the company's mines various improvements have been made, and the recent reports show very favorable prospects.

PIMA COUNTY.

ATLAS COPPER COMPANY.—Mr. J. W. Haskin, the general manager of this company, came to Tucson recently on business connected with that company. He states that the future prospects of the mines are favorable, and feels certain that the mine will become a large copper producer. The only difficulty which has been experienced in the Atlas is securing a bountiful and steady supply of water. The well has been bored to a depth of 700 feet, and will supply from 8,000 to 10,000 gallons per day. This, however, is not sufficient for all purposes, and the work of boring the well will be again begun. An additional 200 feet will be bored, making the well 900 feet deep. At this depth it is confidently expected that an abundant supply can be obtained, but if not, it is the intention to go 1,500 feet.

EL PLOMO MINING AND SMELTING COMPANY.—This company is working the El Plomo and Sampson mines with a force of twenty men. No sinking is being done, owing to the inability of the present machinery to handle the water, but this will soon be remedied, as the new hoisting works are daily expected. When the machinery arrives two shafts will sink to the depth of 500 feet, one on each mine. As soon as the mines are ready for extracting ore readily a tramway will be erected from the mine to the mill, which is being built on the Sonoita Creek, eight miles from the mines. The tram will deliver the ore, it is said, at the mill for 60 cents per ton, while at present by wagons the cost is \$5 per ton. This El Plomo stock figured largely (to the amount of \$42,414) in the assets of John F. Plummer, of New York. The receiver values it as "valueless."

SILVER BELL.—The English syndicate which recently negotiated for this property, and to which we referred in our issue of January 19th, 1890, and March 15th, 1890, Messrs Morton and Geo. Robson, have arrived from England, and in company with Judge N. F. Cleary, of St. Louis, through whom the sale was made, have gone to the mines. It is learned that it is the intention to commence active operations on a large scale at once.

CALIFORNIA.

MONO COUNTY.

BULWER CONSOLIDATED MINING COMPANY.—At the annual meeting of this company, the following officers were elected for the ensuing year: Munroe Thompson, president; Chas. H. Fish, vice-president; Herman Zadig, W. S. Wood, Morris Hoeflich, W. I. Fielding, H. L. Shippy, trustees; L. Osborn, secretary, and the Nevada Bank, treasurer. The financial statement showed a cash balance of \$11,344.

COLORADO.

"Ore shipments from Aspen over the Colorado Midland Railroad have increased from 10 to 20 cars a day. This is due to the mountain roads getting in better condition."

COLORADO COAL AND IRON COMPANY.—The following named gentlemen have been elected directors of this company: Messrs. Edward J. Berwind, New York; Wm. A. Dick, Philadelphia, Pa.; Ernst Thalman, Henry K. McHarg, New York City; Henry S. Grove, Philadelphia, Pa.; Chester Griswold, Fred. K. Lehman, New York; Mahlon D. Thatcher, President First National Bank, Pueblo, Col.; C. S. Morey, Denver, Col.

CLEAR CREEK COUNTY.

The Oro and Oro Extension lodes and the Oro placer were recently bought for \$2,000, it is stated

by Mr. Jacob Crouse, of Syracuse, at a partition sale. A number of years ago some well-to-do New Yorkers located, patented and built works upon this property. They spent some \$30,000 in fitting up the mill, but very little in developing the lodes. When the mill was finished there was nothing to run it on. About that time part of the owners died. During the past year a partition suit was brought in which there were some eighty odd defendants. The property is well located and possesses a good water power, and when properly developed will give good results.

LAKE COUNTY.

MIKE & STARR CONSOLIDATED MINING COMPANY.—As was predicted, the sinking of this company's new shaft has resulted in such an influx of water from sides and bottom of the shaft that all work has been suspended at that point, pending the addition of increased boiler facilities and the purchase of a station pump. There is at present a sinking pump in the shaft, which will be quite adequate to keep the water down below the 360-foot level, at which point the station is understood to be cut. The shaft, which has now attained a total depth of 460 feet, can hardly have reached a point which would be affected by the water from the old workings, and the present trouble probably arises from the fact that the hill appears to be a net-work of water courses.

WOLFSTONE CONSOLIDATED MINING & MILLING COMPANY.—In the Monte Cristo, through the Wolfstone shaft of this company, a strike of lead carbonate ore has been made. At first no bottom to the ore body was found, though it was something over 10 feet in thickness. Since then, however, the bottom has been reached, and is found to be a sheet of intrusive gray porphyry. The ore body just now is stated to be about the height of two sets of timbers, probably in the vicinity of 14 feet, has been opened on its strike for over 50 feet, and a cross-cut of over 40 feet runs through it. Shipments at the rate of 15 tons per day are steadily being made.

OURAY COUNTY.

BRIGHT DIAMOND COMPANY.—This company has made a test of the quartzite of its shaft and for a depth of 10 feet the assay is stated to be from \$3 to \$50 per ton. It is thought the whole body of quartzite at this point will average \$20 per ton. If this is true it will all pay to work, providing machinery is placed on the ground that will treat this rock successfully and economically. Vice-President Badger has gone to Chicago to look into several mill processes for treating the ore of this property, and, as soon as the company is fully satisfied as to the process, will commence the erection of a mill, the site having already been chosen.

PARK COUNTY.

BROWNLOW MINING COMPANY.—A meeting of the stockholders of this company was held in Denver April 15th. The proposition to increase the capital stock of the company from 250,000 shares to 1,000,000 shares was voted upon.

MUDSILL MINING COMPANY (LIMITED).—Evidence has been heard by United States Commissioner Brazee in the case of this company and Walter McDermott vs. Orville Waterhouse and Stewart A. Van Deusen, to set aside a deed to the above mining property by the defendants to the plaintiffs on the ground of fraud and to recover damages. The evidence is to be presented to the United States District Court, and the case has been transferred from the Eastern District Court of Michigan.

DAKOTA.

CUSTER COUNTY.

Mr. Moss, who represents a New York mill and mining company, it is stated, will erect a forty-stamp gold mill at Four Mile, near Custer. Mr. Moss, according to report, expended \$75,000 last year in developing and acquiring gold lodes.

MICHIGAN.

COPPER MINES.

CALUMET & HECLA MINING COMPANY.—This company has produced during the first three months of 1890 9,310 tons of mineral.

TAMARACK MINING COMPANY.—The connection between Nos. 1 and 2 shafts has been made at the twelfth level. A connection was made previously at the ninth level. The mine is now joined in such a way, it is said, as to insure safety and at the same time perfect ventilation. Breast stopping operations are being carried on at different points on the lower levels. Production through No. 2 shaft will not commence for several months. The mine at present is short of drill power to increase its production, and at the same time carry on development. A new 50 drill compressor has been ordered. This will make continuous development and increased production possible.

IRON MINES.

EAST JACKSON MINING COMPANY.—At the annual meeting this week the following officers were elected: Jas. A. Close, president; Dr. J. E. Scallon, vice-president; W. B. Northup, secretary and treasurer, the first two officers named, together with Jas. F. Foley, Chas. Sundberg, and Wm. Condon, to constitute the board of directors. An ore body was reported to have been struck in the mine to the north of the shaft. It has been penetrated 18 feet and no wall struck. The ore is

a high grade of iron carrying 12.95 per cent. of manganese. An assessment of 25 cents per share was called to continue the explorations.

ELBA.—The shaft which is being put down at this mine at Negaunee, has struck the ore. It is coming in at the southeast corner of the shaft. Specimens shown are of a hard Bessemer of fine character.

MISSOURI.

A convention of miners was held in Joplin, Jasper County, on the 10th inst. The delegates, representing nearly every mining city and camp in the Southwest, numbered almost a hundred.

Calling the convention to order, Colonel Gregg said that the convention was called pursuant to instructions contained in a resolution adopted by the representatives of the lead and zinc district of southwest Missouri and southeast Kansas, on the occasion of the opening of the Mining Exchange at Kansas City. The suggestion had come, he believed, from Webb City. The intended organization of a miners' association had the object of advancing the mining interests and of promoting the general welfare of the district by securing concert of action and harmony of feeling on the part of the different mining cities and camps.

The committee on permanent organization recommended and the assembly elected for President, Col. H. H. Gregg, of Joplin; secretary, Bart S. Morrow, of Neosho; assistant secretary, E. St. Geo. Noble, of Galena.

The resolution, as recommended by the committee on constitution and by-laws, through its chairman, Judge O. H. Picher, reads, "There is hereby formed an association, to be called the Southwest Missouri and Southeast Kansas Lead and Zinc Mining Association.

"The object of said association shall be to promote the welfare of the mining industry in Southwest Missouri and Southeast Kansas.

"The officers of said association shall consist of a president, three vice-presidents, a recording secretary, a corresponding secretary, a treasurer, and an executive committee composed of one member from each of the following named places, viz.: Joplin, Aurora, Carthage, Oronogo, Webb City, Cartersville, Granby, Neosho, Seneca, Belleville, Galena, Lehigh, Alba and Empire City. Said officers and executive committee shall constitute the board of directors of said association, and shall be elected by the convention to hold their offices until their successors are duly appointed.

"Regular and called meetings of said association shall be held at such time and place as may be from time to time determined by said board of directors. The basis of representation in said meetings shall be determined from time to time by said board of directors, regard being chiefly had to the relative ore product of the respective localities. Said board of directors shall hold their offices for the term of one year, or until their successors are elected. Any vacancy occurring in the board of directors shall be filled by said board subject to the approval of the association at the meeting next succeeding."

The simplicity of the committee's report Judge Picher ascribed to the desire of vesting as much power as possible in the members of the association and not in the officers.

As officers of the association were elected: President, Mr. J. C. Stewart, of Webb City; first vice-president, Col. W. B. Stone, of Galena; second vice-president, Col. H. H. Gregg, of Joplin; third vice-president, Mr. Al. Cahn, of Carthage; recording secretary, Mr. B. S. Morrow, of Neosho; corresponding secretary, Mr. Ph. Hannum, of Cartersville; treasurer, Mr. A. H. Waite, of Joplin; and members of the executive committee: E. C. Wellep, Galena; John Thielen, Aurora; D. Hopkins, Belleville; S. A. Stuckey, Lehigh; Sam Sanderson, Carthage; T. J. Harrington, Webb City; E. Loyd, Joplin; J. H. Hughes, Granby; Chas. Huber, Seneca; Luke Kelley, Neosho; R. Stultz, Oronogo; J. A. Daugherty, Cartersville; L. B. Ruth, Alba; Jas. Murphy, Empire City.

The organization having been completed, Judge Picher read and moved the adoption of a resolution declaring in favor of an import tax on Mexican lead ores, argentiferous or otherwise. Following is the resolution as adopted.

Resolved, That this association recognizes with alarm the vigorous movement and influence of interesting parties to cause the admission of Mexican lead ores free from duty.

That it is earnestly represented to Congress that the lead ores from this district being pure lead ores and containing no appreciable quantity of precious metals, the mines of this district and the large industrial interests appurtenant thereto are solely dependent upon the lead value thereof.

That the lead ores of Mexico are mined at wages far below those current in the United States and far below those at which a citizen of the United States should be asked or required to receive for the support and education of his family.

That the best information obtainable shows that the extent of the lead ore deposits of Mexico is very great, and that the effect of mining these large deposits at lower wages than those of this country and importing the same free of duty would greatly injure the lead mining industry of this district, and reduce its rate of wages.

That this great industry should be sacrificed neither to the cupidity of a few corporations which are directly interested in the transportation and

treatment of Mexican lead ores, nor to the vague and untried claim of the advantages of reciprocity. That so long as other industries in this country are protected either directly or indirectly we protest against being singled out for injury, and demand the equal justice of being treated as are other protected industries.

That our senators and representatives in Congress be respectfully and earnestly entreated to use their influence, and endeavor to require that all foreign lead ores, whether bearing precious metals or otherwise, shall be admitted only upon the payment of a proper duty, and that, in the light of such information as experience and investigation have furnished, such duty should not be less than one and one-half cents per pound.

The secretary read a communication from L. R. Routh, secretary of the executive committee of the Miners' Exchange at St. Louis.

JASPER COUNTY.
(From our Special Correspondent.)

JOPLIN, April 14.
The weather for the week ending the 12th inst. was certainly all that could be desired for mining operations, and there was a general activity in all the districts with an increasing demand for ore and a slight advance in price, the ruling price being \$23.50@25. The following are the sales as far as reported:

Joplin mines 879,106 pounds zinc ore and 146,005 lead, value, \$13,219.

Webb city mines, 1,277,310 pounds zinc ore and 49,940 lead, value, \$15,576.

Carterville mines, 850,780 pounds zinc ore and 44,876 lead, value, \$11,163.50.

Zincite mines, 213,020 pounds zinc ore and 1,750 lead, value, \$2,583.

Lehigh mines, 185,350 pounds zinc ore, value, \$2,041.90.

All districts total as far as reported, \$44,583.40.

Mr. C. A. Parks, president of the Commonwealth Loan and Trust Company, has been looking over the lead and zinc mines in company with Mr. O. B. Steen; he expresses himself as very much surprised at the magnitude of the lead and zinc mines of this district.

The Bay State mines on the Oswego land turned in 75,430 lbs. zinc ore and 11,630 lead. These mines have been steady producers for several years, and seem good for years to come.

The Brinkerhoff Mining Company has filed articles of incorporation. Its paid up capital stock is \$60,000, and the stock is all held by W. E. Brinkerhoff, Phil. J. Pfening and O. H. Picher. The company will operate the Cave Spring mines, near Galena, Kas.

Buckhart & Co. are down 30 feet with a shaft in the Mahaska land and taking out large chunks of float lead.

Lieutenant-Governor Claycomb and others have made a good strike on the O'Keefe land.

The Empire mines are opening up some very large bodies of zinc ore.

Holibaugh & Van Ness have prepared some very fine longitudinal and vertical sectional maps of the Exchange mine on the Oswego land. The vertical section shows a continuity of ore almost from the surface down to a depth of 124 feet, with the ore confined between walls of chest and dolomite; in fact, the development on this property shows some very strong ear marks of a fissure vein. Your correspondent believes the day is not far distant when deep development will prove the identity of the contact fissure veins in this lead and zinc district. The mining in the past has all been confined to surface deposits, which, as a rule, seem to improve with depth.

Sapp & Holmes, who have six mining lots on the Byers, Murphy & Connor land, adjoining the noted Little Nugget mines, on the east, made during the past week a good strike, from which they sold \$770 worth of zinc ore at a total expense of \$134. They have realized \$4,889 from the sale of ore from their lots between May 1st and Dec. 1st, last year.

MONTANA.

The Agua Fria group of mines in Beaver Creek district has been sold to Charles Clark for \$75,000. The group consists of six patented claims embracing over 120 acres of ground. The surface improvements consist of ten buildings, all of which have been built within the last two years. The underground workings have been directed principally to the Agua Fria claim. There are numerous developments, consisting of tunnels, drifts, shafts and upraises. The character of the ore is oxide and sulphide. Its principal value is gold, but it carries some silver, considerable lead and a large percentage of iron, making it a desirable smelting ore. Under its new ownership work at the mine will be pushed vigorously.

MEAGHER COUNTY.

SNOW CREEK GOLD & SILVER MINING COMPANY.—This company has been incorporated by J. E. Kanouse, E. J. Anderson and John C. Barker. The mine the company proposes to develop is situated on Snow Creek, near Neihart, and is known as the Puck.

NEVADA.

ELKO COUNTY.

COMMONWEALTH MINING COMPANY.—The shipment of \$28,000 recently made is the clean-up at the mill, which will now temporarily close down. Since the mill started the mine, it is stated, has shipped bullion valued at \$53,000.

HUMBOLDT COUNTY.

PARADISE VALLEY MINING COMPANY.—This company has been prospecting its mines to a considerable extent during the winter. In the Wild Goose it sunk shafts and ran drifts in new ground and discovered three chimneys of ore in different levels, one as deep as the 300 level. One of the ore bodies has been opened to a considerable extent, and shows a vein of good ore.

STOREY COUNTY—COMSTOCK LODGE.

CONSOLIDATED CALIFORNIA AND VIRGINIA MINING COMPANY.—The official statement of the production for March shows that the total ore product was 12,330 tons, yielding bullion valued at \$246,148.31, of which \$132,428.94 was gold and \$113,719.37 silver. The average yield in bullion per ton was \$19.96, of which \$10.74 was gold \$9.22 silver. The average assay value of the ore per ton was \$24.47. After deducting March operating expenses and the April dividend the company carries over a surplus of about \$50,000 to the credit of the current month.

HALE AND NORCROSS MINING COMPANY.—The daily ore shipments are now averaging about 150 tons.

PENNSYLVANIA.

COAL.

BIG MINE RUN.—The culm banks at this colliery, at Ashland, were on fire on the 16th inst., and it is feared that the flames will penetrate the workings of the East Colliery, and necessitate the flooding of the mines and a suspension of work. The mine officials are making surveys to ascertain if the North Ashland Creek can be turned on the fire.

CAMERON COAL AND IRON COMPANY.—In the United States Circuit Court, at Pittsburg, Robert F. Cutting, of New York, presented a bill on the 14th inst., asking that a receiver be appointed for the Cameron Coal and Iron Company. Edward M. Parrot, the present receiver, was reappointed to take charge of all the property. Next Monday was named for a hearing on motion for an injunction to restrain the issuance of executions for the sale of any of the property of the defendant. Mr. Cutting, who holds over \$150,000 of the company's paper, charges that Nicholas C. Miller, formerly president of the company, has caused to be purchased by the company a large amount of land in the town of Emporium, costing \$8,000, and to build thereon. This was conveyed to F. E. Miller. It is believed by the plaintiff that the company has other valuable assets within the jurisdiction of the Circuit Court, which cannot be seized and taken possession of by a sheriff acting on execution, since they consist in part of shares in action and of claims against persons who are indebted to the company.

DELAWARE, SUSQUEHANNA & SCHUYLKILL RAILROAD COMPANY.—A charter was issued on the 14th inst to this company; capital, \$400,000. This line will be about 30 miles long, extending from Drifton, Luzerne county, to a point at the junction of Luzerne, Schuylkill and Columbia counties. Eckley B. Cox is President.

LEHIGH VALLEY COAL COMPANY.—The Prospect and Dorrance collieries, at Wilkesbarre, operated by this company, have suspended operations until further orders.

LEHIGH & WILKESBARRE COMPANY.—The Nottingham mine at Plymouth and the Stanton shaft at Wilkesbarre, operated by this same company, resumed work on the 16th inst., after an idleness of several weeks.

PENNSYLVANIA ANTHRACITE COAL COMPANY.—About a year ago A. A. Heim, William Bequery, and other Shamokin capitalists sold to E. A. Packer, of New York, a large tract of coal land known as the Northumberland tract. Mr. Packer, by a deed recorded on the 15th inst., has disposed of this and other adjoining lands, embracing 2,700 acres in Mount Carmel and Coal townships, this county, and Cunningham township, Columbia county, to the Penn Anthracite Coal Company. The consideration was \$100,000 in cash, 2,000 first mortgage bonds at 5 per cent., to run 20 years, payable in gold of the par value of \$1,000 each, and 1,800 shares of stock in the company.

The supposition is that the Delaware, Lackawanna & Western Railroad Company is backing the move.

OIL.

Exports of refined, crude, and naphtha from the following ports, from January 1st to April 11th, were as follows:

	1890.	1889.
	Gals.	Gals.
From Boston	622,246	837,043
Philadelphia	26,246,512	34,165,460
Baltimore	1,205,962	4,720
Perth Amboy	2,684,122	5,790,791
New York	96,282,251	112,065,813
Total exports	127,041,093	152,863,877

UTAH.

A mining exchange was organized on the 5th inst. in Salt Lake City, with 75 members and the following officers: President, R. C. Chambers; vice-president, N. Treweek; secretary, Charles Stevenson; treasurer, J. E. Dooly. A committee was appointed to draft a constitution.

JUAB COUNTY.

BULLION-BECK & CALIFORNIA MINING COM-

PANY.—There was a final settlement on the 9th inst. of this mining suit between the owners of the group of mines in Tintic, formerly known as the Bullion-Beck and Champion, and latterly as the California-Bullion-Beck, to which we referred in our issues of March 29 and April 12. The final papers were completed between Mr. Badlam and associates and Mr. Feck and associates. The facts in the case are as follows: 1. The California-Bullion-Beck Mining Company, or the California Company, transfers to the Bullion-Beck and Champion, or Utah Company, all the mining properties which the California Company now owns; that is, the group of mines known as the Bullion-Beck in Tintic mining district. 2. The California Company surrenders to the Utah company all the stock of the California company to be canceled. 3. The California company, that is, Mr. Badlam and associates, receive one-fourth of the stock in the Utah Company, to whom the mines are conveyed; and the Utah people, who have had possession of the mines, pay to Mr. Badlam and associates one-fourth of the profits which have accrued since last August, amounting to \$20,000. This is all the Californians sued for.

WEST VIRGINIA.

During the last few days the oil excitement in the various fields about Parkersburg has become greatly intensified, owing to the coming in of several very large wells. Press reports state that large tracts of land are leased in neighborhoods that heretofore have never produced oil. In the Mannington field, in Marion County, a gusher known as the Burt well is said to be doing steadily 200 barrels a day. Two tank cars filled with oil from this well have been sent to the refinery. The Hamilton well continues to produce 400 barrels a day, and a long pipe line has just been completed. Owing to the inability to handle the oil both these wells are drilled but a few feet in the sand, but when sufficient tankage is provided they will be drilled deeper, and are expected to produce 1,000 barrels a day. Speculators are in this field in large numbers, and land is selling and leasing for enormous figures. The Furbee tract, which cost \$1,000 a year ago, has just been sold for \$14,000. Land worth but \$10 an acre is being leased at \$100 an acre in tracts of several hundred acres each.

Forty new wells are under contract. Within a radius of only four miles from Parkersburg, 20 wells are being put down. Since the 12th inst. 300 leases have been put on record in Washington county, Ohio. Land in Tyler, Jackson, Wirt, Ritchie and Taylor counties is leased in large tracts for oil purposes, and it is said that 200 new wells are to be put down as soon as possible.

FOREIGN MINING NEWS.

AUSTRIA.

A cable dispatch, dated the 17th inst., states that the riotous coal miners at Ostrau, in Moravia, have compelled a complete cessation of work in the mines. Troops guard the houses of miners who are willing to work. In the Ostrau and Karwin districts there are 30,000 miners out on strike. The men demand a working day of eight hours, and the settlement of minor grievances. The troops in the mining districts have been reinforced.

CANADA.

The Dominion Government will shortly organize an expedition, headed by American experts, to explore the oil regions of the far north, near Athabasca. Professor Dawson, who passed through the territory, says: "If the indications of oil are correct, Canada has the largest oil-bearing district in the world, comprising nearly 150,000 square miles, and as the indications extend down the Mackenzie River below Athabasca, the above area may only be a part of the oil-bearing country. Some of the lakes and rivers in the north are covered to a depth of several inches with oil which has exuded from the banks."

PROVINCE OF NOVA SCOTIA.
(From our Special Correspondent.)
COAL MINING IN NOVA SCOTIA.

The colliers at the Low Point mines have struck at the commencement of the season's operations against the "Billy Fairplays" which have been in use for some time. The strike will, it is expected, be settled in a few days by the men returning to work.

At the other Cape Breton collieries bank coal is being rapidly accumulated for the opening of the shipping season.

The Sydney & Louisberg Coal Company is reopening the Emery Colliery, and expects to ship on June 1st. This mine, which was closed about 1873, yields a very good steam coal, and a considerable bunker trade is expected for it.

In Pictou County, the re-opening of the Ford Pit, Albion mines, which was closed by an explosion in 1881, causing the death of over 40 persons, is proceeding satisfactorily. The working force has penetrated about one-half a mile into the north side, which is found in fair order. The local management is to be assisted in this troublesome undertaking by an English mining engineer, Mr. W. R. Wills, now on his way.

Work at the collieries of the district has been fair during the winter, is dull at present, but in the course of a fortnight, when navigation is fully opened, the prospects are considered promising for a good season's work.

MEETINGS.

Big Camas Gold Mining Company, at the Utah and Commercial Savings Bank, Salt Lake City, Utah, April 21st, at 7.30 P. M.

Consolidated Seaton Mountain Mining and Milling Company, at Idaho Springs, Colo., April 26th, at 10 A. M.

Delaware & Hudson Canal Company, at No. 21 Cortlandt street, New York, May 13th, at 12 o'clock noon.

Evening Star Mining Company, at Room 34, No. 53 Broadway, New York, May 5th, at 2 P. M.

Grand View Mining and Smelting Company, at No. 29 Wall street, New York, May 5th, at 11 A. M.

Iron Silver Mining Company, at No. 23 Broad street, New York, May 6th, at 12 o'clock noon.

Morning Star Consolidated Mining Company, at Room 34, No. 53 Broadway, New York, May 5th, at 2 P. M.

Ouray Union Mining Company, at Room 34, No. 53 Broadway, New York, May 5th, at 2 P. M.

Pleasant Valley Coal Company, at No. 168 South Main Street, Salt Lake City, Utah, April 30th, at 2 P. M.

Russell Reduction and Mining Company, at Room 32, No. 323 Montgomery street, San Francisco, Cal., April 21st, at 10 A. M.

Ward Consolidated Mining Company, at Room No. 34, No. 53 Broadway, N. Y., May 5th, at 2 P. M.

DIVIDENDS.

Boston & Montana Consolidated Silver Mining Company, Dividend No. 10, of \$1 per share, (\$100,000) payable May 20th.

Candelaria Consolidated Mexican Mining Company, dividend of 25 cents per share, (\$30,000) payable on demand at Room 69 Nevada Block, 309 Montgomery street, San Francisco, Cal.

Daly Mining Company, dividend No. 38, of 25 cents per share (\$375,000), payable April 30th, at the office of Lounsbury & Co., Mills Building, New York. Transfer books close April 25th.

Homestake Mining Company, dividend No. 141, of 10 cents per share (\$12,500), payable April 25th at the office of Lounsbury & Co., Mills Building, New York. Transfer books close April 19th.

Ontario Silver Mining Company, dividend No. 167, of 50 cents per share (\$75,000), payable April 30th, at the office of Lounsbury & Co., Mills Building, New York. Transfer books close April 25th.

ASSESSMENTS.

COMPANY.	No.	When levied.	D't'd't in office.	Day of Sale.	Ann't per share.
Alabama, Nev.	1	Mar. 18	Apr. 22	May 13	.08
Alpha, Nev.	4	Apr. 5	May 12	June 3	.25
Andes, Nev.	38	Apr. 10	May 14	June 3	.25
Bailey, Nev.	1	Mar. 18	Apr. 22	May 13	.08
Confidence, Nev.	15	Mar. 12	Apr. 6	May 7	.75
Crown Point, Cal.	3	Feb. 27	Apr. 2	Apr. 21	.05
East Best & B., Nev.	1	Feb. 11	Mar. 14	Mar. 31	.25
Eureka Con., D. Cal.	1	Feb. 24	Apr. 5	Apr. 21	.03
Goodman, Nev.	7	Feb. 15	Mar. 25	Apr. 26	.05
Hale & Norcross, Nev.	95	Apr. 9	May 14	June 5	.50
Hartford, Nev.	7	Apr. 8	May 15	June 6	.02
Holmes, Nev.	11	Mar. 12	Apr. 17	May 8	.25
Humboldt.	1	Mar. 18	Apr. 22	May 13	.08
Martin White, Nev.	23	Feb. 12	Mar. 31	Apr. 30	.25
Mayflower, Cal.	46	Mar. 8	Apr. 10	May 1	.50
North Occidental	2	Mar. 31	May 5	May 26	.06
Ophir.	56	Apr. 2	May 6	May 26	.50
Quaker, Cal.	18	Mar. 8	Apr. 15	May 5	.20
Peerless.	14	Mar. 28	May 6	May 27	.10
Potosi, Cal.	34	Mar. 27	Apr. 30	May 21	.03
Quaker, Cal.	18	Mar. 8	Apr. 15	May 5	.20
Standard Con., Cal.	2	Mar. 4	Apr. 16	May 19	.25
Union Con., Nev.	40	Mar. 5	Apr. 10	Apr. 30	.25
Utah Con., Nev.	9	Mar. 11	Apr. 17	May 5	.25

MINING STOCKS.

For complete quotations of shares listed in New York, Boston, San Francisco, Baltimore, Denver, Kansas City, St. Louis, Pittsburg, Birmingham, Ala.; London and Paris, see pages 463 and 464.

New York, Friday Evening, April 18.

It grows monotonous as, from week to week, we continue to quote an unchanged state of affairs. But what can be said when nothing is done? The only noticeable feature this week is the attitude of dealers in stocks toward the Windom Silver hill.

Mr. J. A. MacPherson, the chairman of the Committee on Mining Securities, in conversation with an ENGINEERING AND MINING JOURNAL reporter, spoke as follows: "Silver mines could be worked at a profit in case of an advance in the price of silver. It will enable them to declare dividends, while as it is now they are barely paying expenses." This, we would remark, depends on the mine. Most of the alleged silver mines dealt in on the Mining Exchange are independent of the market price of the metal, because they do not contain any silver.

Mr. A. Harpending, a familiar figure on the floor, also said: "In case the bill passes, many mines that are not being worked at present would commence operations, and a boom in mining stocks would certainly follow."

That the public holds similar views is evident from the inquiry for the silver stocks. While the volume of business for the week has been neither remarkable nor unusual, yet, as we have said, there seems to be more inquiry. In the absence of actual transactions this pleases the dealers, and all are hopeful. The market this week opened strong and active, but a reaction appears to have taken

place, especially noticeable in the Comstock shares.

A representative of the Rothschilds is said to be here negotiating for the purchase of the controlling interest in a well-known mine. When the agent of the mining company was seen in regard to the matter he would not talk, saying that an investigation is being made by the Englishmen, and until this is ended all information will be withheld from the public.

It is a fact, strange but nevertheless true, that mining companies do not officially notify the Mining Stock Exchange when a dividend is declared or an assessment levied. We suggest that mining companies, and especially those whose offices are in San Francisco, telegraph such information to the secretary of the Exchange. Now the public is dependent on private advices, which are given out only after the California people have had an opportunity to operate. As an instance of the uncertainty prevailing, especially in regard to assessments, the assessment levied by the Hale & Norcross Company was not even today known to many brokers. There were rumors of such a thing, but only a few seemed to have definite information.

A prominent mining man, in talking to an ENGINEERING AND MINING JOURNAL representative, waxed reminiscential, and told the latter of many interesting historical events. Among other things he said: "I remember how we all looked forward to Saturday in the halmy days of 1879 and 1880. The JOURNAL was in great demand, and it was no unusual sight to see the boys clampering over one another in their efforts to secure the first copy. The news stands did a thriving business, and sometimes you could not get a copy by twelve o'clock for love or money"—and then the gentleman sighed as he thought of the old briskness which is so seldom, indeed never, seen now.

The assessment of 50 cents levied by the Hale & Norcross seems to have had the effect of withdrawing all stock from the market, for no sales have been reported since last Saturday, when a few were made from \$3.10@2.95. Consolidated California & Virginia has been active in the beginning of the week, and advanced from \$5.25@5.75; later it declined to \$5.13, at which price the last sale was made. Gould & Curry went from \$2.20@2. Ophir shows one transaction at \$4.90. Savage, at a few at from \$2.40@2.30. Sierra Nevada was on the downward move, going from \$3 to \$2.65. Alta was firm at \$1.30 to \$1.40. Andes at \$1. Best & Belcher shows a decline of \$1.20, the last sale being made at \$2.65. Bullion also showed a downward tendency, going from \$2.10 to \$1.60. Chollar did the same and went from \$4.85 to \$3.90. Exchequer sold at \$1. Julia at 40 and 45 cents. Mexican at \$3.80 and \$4. Overman at \$1.70. Potosi, \$6.38. Scorpion at 45 cents, and Union Cons. went from \$3.30 to \$3. Utah advanced from \$1.15 to \$1.30, and sold to-day at \$1.20.

Comstock Tunnel was largely dealt in, the transactions amounting to \$34,800 shares at prices ranging from 18 to 23 cents. A sale of the bonds was made at \$31, and of the script at 33 cents.

Martin White, a Nevada stock in which little or nothing is being done in this market, sold at \$1. Navajo was quoted at 20 cents; Belle Isle at 30 cents.

Horn Silver continues to be strong, and advanced this week from \$2.30@2.20—at the latter figure sales were made to day. The recently issued report of this company shows a cash balance on hand of \$288,700.83.

Ontario has declared its usual monthly dividend and has now reached the highest figure ever quoted for the stock, \$45. This stock is advancing slowly from week to week, and if this movement continues we would not be surprised to see it up to \$50 within a short time.

Daly has also declared its monthly dividend, but so far the stock has not been listed on this market.

The only thing of interest to report in the Black Hills stocks is the announcement of the usual monthly dividend by the Homestake Mining Company. Scarcely any sales are made in this stock; but one was reported to-day at \$10. Deadwood was neglected and quoted at \$1.50. Caledonia appeared to-day at \$2.15 to \$2.50. Father de Smet remains below the 50 cent mark, and sales were made during the week at 42 cents.

Wall Street Mining and Milling Company is resting, and consequently there is no important change to report in the price, which stood at 65@66c. Moulton was quoted at 45c. and Alice at \$1.35@1.40.

Favorable reports continue to be received from the Phoenix Mining Company, of Arizona, and the price continues strong and shows but little change. It ruled this week at from 84 to 90 cents, the transactions amounting to 8,900 shares. Silver King declined from 55 to 35 on Monday, but later in the week advanced again to 55 cents.

The interest in Colorado stock seems to be centered in Freeman, which again shows large transactions with an upward tendency in the price, going from \$1.05 to \$1.20. Later in the week, however, there was a downward movement in this stock, and it went to \$1.05, at which price it sold every day since Wednesday. Breece sold at 33 and 35 cents. Chrysolite is neglected. A few sales were made at from 20 to 27 cents. Iron Silver is firm at \$2.10. Leadville showed considerable activity, which is rather an unusual thing for this stock, and in consequence the price went from 11

to 17 cents. Little Chief was quiet at 30 and 31 cents. Silver Cord sold at 35 and Ward Cons was quoted at 20 and 25 cents.

La Crosse remains at 7 cents; Monitor at 3 cents.

The copper stocks again made their appearance in this market this week. Calumet and Hecla shows transactions of 10 shares at \$265.25. Quincy was quoted at \$83.75. Boston and Montana was dealt in to the extent of 30 shares, selling at \$50.13 @ \$50.38.

The Amadors have had to give way to Brunswick, for the promoters of these stocks at the present time pay all their attention to the New Brunswick Company, and in consequence they have advanced the price from 61 to 80 cents, the transactions amounting to 10,000 shares. Sutter Creek was not neglected, however. It appeared on the list almost daily, but there was little variation in the price, which stood at \$1.50@1.60. Astoria ruled at 4 and 5 cents. Middle Bar is still withdrawn from public favor.

There is little or nothing doing in the Bodies, in which Standard shows sales at 45 and 50 cents; Bulwer 20 cents, and Bodie Cons., 62 and 65 cents. Quicksilver preferred holds its own at \$27@37.75, and common at \$7.

After a very long absence Plymouth appeared, and some 300 shares sold at \$3.50@4.

El Cristo seemed again to be a stock in which considerable interest centered. The transactions were not large, but the stock was daily quoted, and though it declined from \$1.50 to \$1.35, it was firm all week at prices ranging between these two figures. Mutual Smelting & Mining remained unchanged at from \$1.65 to \$1.70, Rappahannock at 5 and 6 cents, and Kingston & Pembroke at 65 and 70 cents.

Boston.

April 17.

(From our Special Correspondent.)

Copper stocks are buoyant, and continue to be the principal feature of the market. There is a growing disposition to buy this class of securities, especially the dividend paying mines, while those whose prospects are bright for the future are quietly picked up and put away for much higher prices. The buying is not based upon any manipulation of the market, but is the outcome of natural causes. It goes without saying that the legitimate demand for ingot copper is such that, while the companies may be able to supply the demand, there will be no surplus, and the present price for the metal will be fully maintained, if not advanced, during the coming season, thus ensuring good dividends to the stockholders for the year.

The feature of the market this week is the advance of \$17 per share in Calumet & Hecla and \$10 in Tamarack; both of these stocks have been in quick demand, and the advance has tempted some of the holders to realize their profits, although we believe they will be glad to get them back again at higher figures. The output of the Calumet & Hecla last week was 776 tons; stock sold early in the week at \$255 ex-dividend and yesterday touched \$272, reacting to \$270 to-day.

Tamarack advanced from \$160 to \$170, closing to-day at \$167½. The news from the mine is favorable, the report says nothing better has been found in the mine than what is developing at the tenth level.

Boston & Montana advanced from \$49 to \$50½, reacting to \$50. The dealings in this stock are much less in volume than formerly. The stock has found its way into strong hands who hold it for investment, and there is but little offered at present prices.

Quincy is very strong on the probabilities of increased production. The new stamping mill is now running night and day. Stock advanced from \$80 to \$85.

Franklin touched \$16, reacting to \$15½. We hear nothing of interest from the mine. At the annual meeting most of the old officers were re-elected.

Atlantic has been very active this week, and scored an advance from \$13¼ to \$16, losing only half of it at the close to-day.

Osceola touched \$30, reacting to \$29½. Captain Daniell reports the mine as looking materially better. The week's run was 54 tons of mineral, indicating nearly 250 tons for the month.

Kearsarge sold up to \$13, losing ½ to-day. The report from the Kearsarge is, "a sort of Micawber-like feeling prevades us at this end."

Butte & Boston is beginning to feel the effects of the boom, selling up to \$15 to-day, a gain of \$1 for the week. Centennial declined to \$24 and advanced to \$25½, losing \$1½ of the advance to-day, closing at \$24½. There is a large block of this stock held by an estate and efforts are being made to purchase the same, and although the prospects at the mine are of a highly favorable character, indicating a great future, it is doubtful if the stock will sell a great deal higher until this block is out of the market. Alouze advanced to \$4 and is in fair demand at this price.

Santa Fe has been very largely dealt in this week. Sales aggregated not far from 25,000 shares. It continues to be heavy in the face of a rising market, declining from 70c. to 60c. At 60c. per share the property would be valued at \$300,000, with a bonded debt of same amount—\$600,000, which is considered, by those who profess to know, to be cheap for the property, although a great deal of money will be needed to put it in condition to be much of a producer,

Huron advanced 1/8 to \$3 1/2, and National from \$1 1/4 to \$2.
 Bonanza sold up to \$2 1/2.
 Pewabic sold at \$9 and Ridge at \$1 1/2.
 Arnold at 42 1/2 c. @ 40c.
 The silver stocks, in anticipation of the passage of the Silver Bill by Congress are beginning to come to the front, and are more inquired for.
 Dunkin sold at 50c. Catalpa at 25c. Breece at 30@35c., and Napa Quicksilver at \$5.
 3 P. M.—The market closed fairly steady. Butte & Boston sold at \$15. Centennial at \$24 1/2. Quincy, \$86, and Tamarack at \$168.
 By telegraph.—Quincy Mining, \$95; Calumet and Hecla, \$260 1/2; Osceola, \$29 1/2; Boston and Montana, \$49 1/2; Franklin, \$15 1/2; Kearsarge, \$12 1/2; Butte and Boston, \$14 1/2; Santa Fé, 57 1/2 c.; Centennial, \$24.

Colorado.

The annual meeting of the members of the Colorado Mining Stock Exchange will be held at the Exchange Hall, Chamber of Commerce Building, Denver, Colo., April 26th, 1890, for the election of officers and to transact such other business as may come before the meeting.

Denver.

April 18.

Prices and sales during the week ending April 15th.

Company	Open- ing.	H.	L.	Clos. ing.	Sales.
Alleghany, Colo.	29	*30	26	*26	15,800
Amity, Colo.	12	*15	12	13	23,100
Bangkok, C. B., Colo.	18	*18	10	13	51,200
Bates-Hunter, Colo.	20 1/2	*22	20	20	15,700
Brownlow, Colo.	40	*42	39	42	7,700
Calliope, Colo.	47	*48	b15	47	2,700
Cay County, Colo.	41	*45	33	45	6,400
Emmons, Colo.	20	*22	20	21	40,600
Hard Money, Colo.	14	*17	b14	14	38,400
John Jay, Colo.	22a	*24a	20a	21a	1,200
Little Rule, Colo.	52	*57	50	57	1,400
Matchless, Colo.	150	*200	b125	200	200
May-Mazepa, Colo.	117	*122	115	122	33,400
Mollie Gibson, Colo.	42 1/2	*45 1/2	30	40	100
Oro, Colo.	500	b500	400	500	.....
Pay Rock, Colo.	09	*10	08	08 1/2	21,200
Puzzler, Colo.	24	*27	b22 1/2	23	16,400
Reed-National, Colo.	50	*54	50	51	16,800
Rialto, Colo.	14	a14 1/2	b10	14	300
Silver Cord, Colo.	40	*40	b40	50	100
Whale, Colo.	32	*35	b32	35	3,900
PROSPECTS.					
Argonaut, Colo.	15	16	14 1/2	15	18,100
Aspen United, Colo.	15	17	12	13	10,300
Big Indian, Colo.	24	28	22	25	12,200
Big Six, Colo.	22	27	21	21	9,000
Claudia J., Colo.	11 1/2	16	11 1/2	16	10,300
Denver Gas & Oil.	16	16	15	16	.....
Diamond B., Colo.	14	15	12	15	8,500
Golden Treasure, Colo.	24	25	20	20	13,900
Ironclad, Colo.	21	27	21	26 1/2	31,900
Legal Tender, Colo.	09	11	09	10	53,100
Morning Glim, Colo.	43	50	35	50	4,600
Potosi, Colo.	31	33	28	31	6,000

Total for the week..... 474,500
 *Buyer 30. †Buyer 60. ‡Seller 60. §Seller 30.
 a Asked. b Bid.

Minneapolis.

Company.	Bid.	Asked.
Anglo-American Mg. Co.	2.00
Badger Silver Mg. Co.	10.00
Bear View S. Mg. Co.	1.00
Bessemer Consol. I. M. Co.	1.00
Big Ox Mg. & Rec. Co.	2.50
Black Hills Tin M. Co.55
Cent. Mont. Placer M. Co.	1.50
Derwood Consol. M. & Co.10
Getagumee G. & S. Mg. Co.15
Goebie Iron Mg. Co.	12.00
Iron Duke Mg. Co.	4.00
Keystone Mg. Co.	1.00
La Belle Mg. Co.	2.00
Montana Central Placer Mg. Co.	1.00
Mount Aetna G. & S. Mg. Co.	2.00
Northern Belle G. & S. Mg. Co.50
North Pabst I. Mg. Co.30
Thunder Bay G. & S. M. Co.50
United Iron & Land Syndicate	6.50
White Spar Mica Mg. Co.	1.00
York Iron Works	40.00

Prices bid, asked and closing during the week ending April 15th.

Lake Superior Iron and Gold Stocks.

(Special Report by David M. Ford, Houghton, Mich.)

Iron Stocks.—On all the iron ranges in this district there is great activity; shipments of ore being under way from the mines to the ore docks in the lake shipping ports. The Chicago and Northwestern Railway has sixteen ore trains running on the Peninsula division alone. It is thought Lake shipments will be made from Escanaba this week, and from Lake Superior portion early next week. The demand for iron stocks is improving, though there is no material change in prices yet.

Gold Stocks.—The demand for these stocks has been light, with prices weak and nominal, there being no exchange here and none of them being listed. There is no regular established prices which rule over the whole district. The remarkable boom in copper stocks and the present prospect of big dividends on iron stocks this year have caused many holders of gold stocks to throw them on the market for the purpose of investing the proceeds in iron and copper stocks. This has had a depressing effect on the gold stocks. A run of 75 tons of rock through the Michigan mill gives a net yield of \$11.96 in gold and silver and \$1.04 in tailings, showing value of rock to be \$14 per ton. The Ropes Gold and Silver Company have bought a Huntington mill, which will be set up in its new mill in place of the ten stamps as originally designed. There is no doubt in the minds of the

management of the Huntington mill being able to successfully treat the hard rock of this company's mine. The output from this mine for March was the largest in its history. The Huntington mill, it is said, will add considerably to the output and profits.

Name of Company.	Par value.	Lowest.	High.
Gold Lake Mg. Co.	.....	.....	*\$1.00
Grayling Gold & Silver Co.	\$25.00	.....	*1.00
Michigan Gold Co.	25.00	*\$2.00	*2.50
Peninsula Gold & Silver Co.	25.00	.....	.75
Ropes Gold & Silver Co.	25.00	*2.25	*2.75

Name of company.	Par value.	Bid.	Asked.
Ashland Iron Co.	25.00	\$55.00	\$65.00
Aurora Iron Co.	25.00	7.50	8.00
Champion Iron Co.	25.00	\$100.00	105.00
Chandler Iron Co.	25.00	40.00	41.00
Chapin Iron Mining Co.	25.00	30.00	33.00
Chicago & Minn. Ore Co.	100.00	110.00	115.00
Cleveland Iron Co.	25.00	18.50	19.50
Germania	25.00	11.50	12.50
Jackson Iron Co.	25.00	120.00	125.00
Lake Superior Iron Co.	25.00	67.00	68.50
Milwaukee Iron Co.	25.00	6.50	7.50
Minnesota Iron Co.	100.00	83.50	85.00
Montreal Iron Co.	25.00	9.00	10.50
Norrie (Metropolitan)	25.00	75.00	80.00
Odanaah Iron Co.	25.00	20.00	22.00
Pittsburg Lake Anseline Co.	25.00	170.00	175.00
Republic Iron Co.	25.00	48.50	49.50

* Actual sales were made at these prices.

PIPE LINE CERTIFICATES.

(Specially Reported by Messrs. Watson & Gibson.)

The oil market this week has shown rather a bullish tendency, and we believe it will go higher. The price of Ohio oil has been advanced to 35 cents, owing to the competition between Standard and outside parties. The rise in grain and provision prices suggest that Pennsylvania petroleum is a very cheap commodity at ruling prices, and the experience of dealers on the Chicago Board of Trade may be easily related in petroleum, namely, a sharp turn in the short interest.

NEW YORK STOCK EXCHANGE.

Opening.	Highest.	Lowest.	Closing.	Sales.	
April 12.....	80 1/2	81 1/4	80 1/2	81 1/4	155,000
14.....	80 1/2	83 1/2	81 1/2	82 1/2	224,000
15.....	82 1/2	83 1/2	82 1/2	82 1/2	185,000
16.....	82 1/2	83 1/2	82 1/2	82 1/2	47,000
17.....	82 1/2	84 1/2	82 1/2	84 1/2	85,000
18.....	84 1/4	84	84	84 1/2	62,000

Total sales in barrels..... 758,000

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.

Opening.	Highest.	Lowest.	Closing.	Sales.	
April 12.....	80 1/2	81 1/4	80 1/2	81 1/4	63,000
14.....	81 1/4	83 1/2	81 1/2	82 1/2	206,000
15.....	83 1/2	83 1/2	82 1/2	82 1/2	152,000
16.....	82 1/2	83	8 1/2	82 1/2	67,000
17.....	82 1/2	84 1/2	82 1/2	83 1/2	230,000
18.....	84	85 1/4	84	85	427,000

Total sales in barrels..... 1,195,000

The Washington Bureau of Statistics has just furnished the complete figures of the exports of mineral oils and their products for March from all parts of the United States. There is a decided falling off from February, and compared with March a year ago there was a decrease of 15,467,239 gallons, and of \$1,191,308 in value. The government reports for the first three months of 1889 and 1890 compare as follows:

	1889.	Value.	1890.	Value.
January.....	49,384,627	\$4,086,260	39,490,004	\$3,090,067
February.....	42,466,963	3,569,479	39,883,004	3,139,123
March.....	50,737,606	4,086,959	35,270,367	2,895,551
Total.....	142,589,196	\$11,699,698	114,643,375	\$9,124,841
Dec. in 1890.....	.....	.....	27,945,821	\$2,569,857

COAL TRADE REVIEW.

NEW YORK, Friday Evening, April 18.

Statistics.

Mr. John H. Jones, chief of the Bureau of Anthracite Coal Statistics, furnishes us the following statement of shipments of anthracite coal (approximated) for the week ending April 11th, 1890, compared with the same period last year:

Regions.	April 11, 1890.	April 12, 1889.	Difference.
Wyoming Region-Tons	301,783	268,278	Inc. 33,505
Lehigh Region .. "	120,449	116,609	Inc. 3,849
Schuylkill Region. "	182,415	133,462	Inc. 48,953
Total.....	604,647	518,349	Inc. 86,297
Total for year to date..	7,277,266	7,840,555	Dec. 563,289

PRODUCTION OF BITUMINOUS COAL for week ending April 11th and year from January 1st:

EASTERN AND NORTHERN SHIPMENTS.			
Tons of 2,240 lbs.	Week.	Year.	1889.
Phila. & Erie R. R.	1,887	35,439	25,189
Cumberland, Md.	77,500	1,053,005	810,803
Barclay, Pa.	2,965	40,194	36,003
Broad Top, Pa.	10,649	156,990	119,499
Clearfield, Pa.	67,079	1,142,114	857,006
Allegheny, Pa.	26,375	414,952	283,687
Beach Creek, Pa.	39,777	541,982	388,472
Poconahontas Flat Top.	31,750	507,487	429,996
Kanawha, W. Va.	740,543	594,520	485,041
Total.....	208,527	4,436,702	3,436,296

*Week ending April 7.

WESTERN SHIPMENTS.

Pittsburg, Pa.....	20,601	264,991	173,076
Westmoreland, Pa.....	35,979	512,868	446,244
Monongahela, Pa.....	9,713	63,405	47,771
Total.....	66,293	841,264	667,091

Grand total..... 364,820 5,327,966 4,103,387

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending April 11th, and year from January 1st, in tons of 2,000 lbs.: Week, 93,729 tons; year, 1,655,277 tons; to corresponding date in 1889, 1,284,862.

Anthracite.

Very little change during the past week is to be noted in the condition of this market. There is a pretty lively demand for furnace coal and other large sizes owing to the flourishing condition of the iron trade, but the domestic sizes are still neglected, though many of the dealers are taking advantage of the extremely low prices now ruling and are laying in a good supply. A considerable inquiry is reported for coal for future delivery but orders are taken only with the understanding that they are subject to whatever changes may take place in the selling prices. About the only feature of interest is the announcement of the opening prices at Buffalo, which are 25 cents per ton less than those of last year. We continue to quote ruling prices to be: Broken, \$3.50; stove and egg, \$3.50; chestnut, \$3.25, and pea and buckwheat, \$2.80 and \$2.20, respectively.

An exchange says: "The Reading road, in trying to set aside the contract by which it agreed to give the Pennsylvania-Schuylkill Valley line a million tons of coal a year, says in effect that the contract was made because the company had to make it as a condition of reorganization, and that it would now be a very bad thing for the company to carry out. Of course this plea involves the natural sequence that when the contract was made they did not intend to carry it out if they could help it, and now, having obtained the advantages which they hoped to secure from the arrangement, they are not going to carry it out. There are a number of other frivolous pretexts for their non-compliance with the contract, such as the illegal taking of traffic from the Baltimore & Ohio, and opposition to the scheme for a Reading terminal station at Twelfth and Market streets in Philadelphia. The preliminary injunction was granted, but that is about as far as they are likely to get unless the contract is declared to be in violation of the Interstate Commerce act, which is hardly likely."

Bituminous.

The bituminous coal trade offers no new or interesting features this week. Prices continue to be low, and the large orders are now nearly all closed. Early in the season a great many contracts were taken at terms which plainly indicated that there was to be a break in prices. Appreciating this fact, the operators held several meetings, and agreements were entered into that were considered binding enough to hold the trade together; but they were no sooner made than they were violated.

Consumers were quick to realize the condition of affairs and consequently held back their orders, awaiting a still further decline in prices. Thus contracts which are usually closed in a few days were not given until nearly all the competing companies had made their respective bids.

A perusal of this familiar history of the bituminous coal trade will plainly show that there is a lack of any well-defined system in its government. The operators, however, still hope and look forward with more or less confidence to a good trade as general business improves. The threatened strike of the coal miners in the Hocking Valley and Pittsburg districts has happily been averted. At a meeting held in Columbus on the 15th inst. the differences between the miners and operators were amicably settled. The scale of prices agreed upon is 70 cents for the Hocking Valley district and 70 cents for the Pittsburg district. This is lower than the original scale proposed by the miners, but it is also an advance of five cents over prices paid in the Hocking Valley district last year, and six cents over those paid in the Pittsburg district.

It now seems probable that corresponding prices will be fixed in Indiana, Illinois and West Virginia. The operators in these States must now agree to prices satisfactory to the miners or submit to a strike, in which case they will have to fight not only the miners of Ohio and Pennsylvania, but the operators as well as the miners of their own States. They are apparently willing to confer with their miners, and it is believed everything will be satisfactorily arranged.

Boston.

(From our Special Correspondent.)
 The anthracite coal market is fairly active, but business is curtailed because the companies will not sell except for future delivery. On this account the market may be said to be in rather better condition than last week. The Wilkesbarre Company is said to be the weakest of the large companies, but all sellers seem to be in somewhat better shape. Prices continue at \$3.50 for stove coal f.o.b. at New York, which is the bottom price yet touched. Prices are not higher, but terms are stronger.

Bituminous coal is unchanged and rather quiet, as the activity on large contracts is over. The f.o.b. quotation is \$2.50 as an outside figure. Close buyers can perhaps do a little better.
 The freight situation is stronger than last week

about 10 cents. Lowest quotations from New York is 70 cents; Philadelphia, \$1; Baltimore, \$1.10. A strong effort has been made to make Baltimore rates \$1, but they have failed thus far. The tremendous amount of ice tonnage is likely to make vessels plenty.

Retail trade is dull. The retailers met Wednesday and decided unanimously to continue the "combine" another year. About half the members were present. The proposition to make a cash fine of \$150 for proved infractions of rules was passed after some opposition.

Buffalo. April 17.

(From our Special Correspondent.)

The wholesale prices of anthracite coal at Buffalo or Suspension Bridge, to take effect April 15th, are as follows, per 2,240 pounds: Grate, \$4; egg, stove and chestnut, \$4.25, which is a reduction of 25c. per ton from opening spring prices of 1889. The rates free on hoard vessels here are \$4.30 for grate and \$4.55 for egg, stove and chestnut, per gross ton.

Retail prices, to take effect May 1st, will be as follows, per 2,000 pounds delivered: \$4.50 grate and \$4.75 egg, stove and chestnut; the only change from corresponding period last year is an advance of 25c. on egg size.

Mr. John T. Bartlett has been elected a director of the Coal Exchange in place of Col. Howard M. Smith, deceased.

A meeting of anthracite coal shippers was held on Tuesday last, in this city, to confer with certain Western dealers and look over their respective tariff rail rates. Everything was found satisfactory and no adjustments had to be made.

It is too early yet to say anything about the effect of the announcement of prices on the hard coal trade.

Bituminous coal in good demand and quotations firm at unchanged figures. Supply adequate for the requirements of the trade, but no accumulation reported.

A new mammoth trestle for coal is to be built just outside of our city limits. Also a Brown hoist, a 300 foot dock and storage trestle 400 feet long is to be built soon for the Minnesota Dock Company at this port; work has been commenced.

The important consolidation of the Buffalo & Rochester & Pittsburgh Railroad, and the Rochester & Pittsburgh Coal & Iron Company interests and the purchase of the control thereof by the Bell, Lewis & Yates Company of this city and Rochester, is the all-absorbing topic among coal men and others. This company will now represent an output of over 2,700,000 tons of bituminous coal, taking last year's business as a basis, thus making said company the largest producers of bituminous coal in the world. "It was a question of self-preservation" says a member of the company; "the arrangement will enable us, it is hoped, to keep freights and prices steady, and give all consumers an equal show which will be satisfactory and profitable to the general public and the firm itself."

Vessels are arriving here now quite freely, but only a few of the number can get coal cargoes, and most of these are of small quantity. Freights have declined, and many craft have already left light for upper lake ports for ore cargoes.

The Secretary of the Treasury has awarded the contract for fuel during the fiscal year ending June 30, 1891, for vessels and stations in the Tenth Lighthouse District to Selden Munger & Company, of Buffalo.

One hundred and six thousand dollars will be spent during this year by our city government for coal by the various departments, as follows: Water, \$80,000; police, \$4,500; school, \$23,000; fire, \$8,500; poor, \$10,000.

Yesterday several general agents left our city for Chicago, presumably in connection with coal matters. They were William H. Sayre, of Bethlehem; and Col. A. J. Horton, of Buffalo; Chief Accountant H. S. Goodshall, of the Lehigh Coal Company; J. S. Van Epps, local manager at Cleveland of the Delaware & Hudson's coal interests; and E. B. Connell, of Cleveland, president of the Camp Creek Coal Company.

Secretary Thurstone of the Merchants' Exchange received a letter yesterday from Superintendent of Public Works Hannan, in which he says that "it will be impossible for me to open the canals before May 1st owing to the extreme wet weather, which has delayed the work of improvement now under contract. If the Western Division is opened first it would be very difficult to control the water and more harm than good would result. I will be on this division next week." A special delegate at Albany telegraphs later that possibly the Middle and Western divisions may be ready by the 25th inst.

Our Water Commissioners have advertised for 8,000 net tons of grate size anthracite to be delivered by canal at works during the season of navigation. Bids to be sent in by April 29th at 3 o'clock P. M.

A Chicago report says that "the indications are that on May 1st most of the soft coal miners of Indiana, Illinois and Pennsylvania will strike," and that after that date "soft coal will be in limited supply" in consequence. Further that "within 30 hours past dealers have received orders that they could not fill within a month or six weeks."

Navigation at all important lake ports is fully

open. The Sault Ste. Marie River is still ice bound.

From the opening of navigation to April 16th inclusive the shipments of coal by lake from this port aggregate 49,840 net tons, namely: Chicago, 20,040 tons; Milwaukee, 14,600 tons; Toledo, 6,160 tons; Racine, 3,890 tons; Kenosha, 650 tons; Gladstone, 700 tons; Superior, 2,200 tons, and Green Bay, 1,600 tons. The rates of freight were 56¢@40c. to Chicago and Milwaukee; to Toledo, 30c.; to Kenosha and Racine, 50c.; to Superior, 40c.; to Gladstone on contract and to Green Bay on owner's account.

Chicago.

(From our Special Correspondent.)

The Chicago coal market continues without notable change. The supply and demand continue about equal. Dealers, anticipating a prospective "strike" of the miners in several states, including Illinois and Indiana, to occur May 1st, are buying more freely in preparation for that event. This will very materially affect this market as to bituminous coal, advance the price, and reduce stocks that may now be held.

The all round price for anthracite at retail we continue to quote at \$5.75@5.60 per ton.

For large and small egg, \$4.50; range and chestnut, \$4.75 on dock; on wheels 25c. additional.

Bituminous, per ton of 2,000 lbs., Green and Sullivan County Indiana shaft, \$2.25@2.40; Jackson Hill, \$3.10; shaft, \$3.35; Hocking Valley and Ohio Central, \$3; Erie-Briar Hill, \$4.10@4.20; Indiana Block, \$2.25@2.35.

In view of the possibility of the strike many of the railroads centering in Chicago are putting in large supplies of soft coal, a recent purchase of the Atchison, Topeka & Santa Fé Railroad amounting, it is said, to \$75,000.

Pittsburg.

(From our Special Correspondent.)

Coal Trade.—The market is certainly very dull, prices are the same as noted for some time past. The mines have commenced shutting down; three in the first and second pools closed during the week. Others will follow as soon as the empties are loaded. The week's shipments about 1,400,000 bushels.

The nominal prices are:

Per 100 bushels,		Per 100 bushels.	
1st pool	\$4.75	3d pool	\$3.90
2d pool	4.50	4th pool	3.25
Railroad coal, \$5.00@5.50.			

Connellsville Coke.—Matters in coke regions are far from being in a healthy condition, for as soon as one difficulty is settled another one is started. The demand for coke has fallen off, and a large number of ovens have been closed and hundreds of others are preparing to follow. The fact is, labor troubles are springing up all round. Over 1,200 coke ovens were shut down indefinitely on the 15th inst. by the Frick, Schoonmaker, and McClure coke companies. Notice was given last week of their suspension. The entire Trotter plant of 404 ovens, operated by the Frick Company, was among the plants extinguished. Over 1,200 men are out of employment.

The cokers have threatened a general strike if this action was taken. They insist upon having production restricted by closing down all the works in the region one, or if necessary, two days a week, so that all the workers may share equally the burden. Week's output, 13,578; ovens idle, 777; previous week, 13,799 active and 856 idle. Notice has been given that 1,133 will bank down. This will throw out of employment 1,300 men. Shipment for week, 6,340 cars, against 7,125 previous week; decrease, 785 cars.

Current rates: Furnace f.o.b. on cars at works \$2.15; Foundries, \$2.45; Crushed, \$2.65. Freights show no change. Pittsburg 70c.; Mahoney and Shenango Valley, \$1.35; St. Louis, \$3.05; Chicago, \$2.75; Cleveland, \$1.70; Cincinnati, \$2.65; Louisville, \$3.20.

FREIGHTS.

From New York to: Boston, *70; Bridgeport, 50; Fall River, 70; Lynn, *75; New Bedford, 75; Norwich, 75; Norwalk, Conn., 50; Portland, *70; Portsmouth, *75; Quincy, Pt., *75; Salem, *70.

From Baltimore to: Bath, Me., 1.10; Boston Mass., 1.10; Brooklyn, 1.05; Charleston, 80; Fall River, 1.05; Galveston, 3.00; New Bedford, 1.05; New Haven, 1.05; New London, 1.05; New York, N. Y., 1.05; Portland, 1.10; Portsmouth, N. H., 1.15; Richmond, 70; Salem, Mass., 1.10; Savannah, 85¢@90; Somerset, 1.05; Williamsburg, N. Y., 1.05.

From Philadelphia to: Alexandria, t.85; Annapolis, 65; Baltimore, t.60; Bangor, t.100@t.110; Bath, Me., t.105; t.115; Beverly, t.100@t.110; Boston, t.100@t.110; Bristol, t.100@t.105; Brooklyn, 80; Cambridge, Mass., t.100@t.115; Cambridgeport, t.105@t.115; Charleston, 70; Charlesown, t.105@t.115; Chelsea, 1.00@1.10; Com. Pt., Mass., t.105@t.115; E. Boston, t.100@t.110; E. Cambridge, t.105@t.115; Fall River, t.10; Galveston, 2.50; Gardner, Me., t.105@t.115; Georgetown, t.85; Gloucester, t.105@t.115; Lynn, 1.10@t.120; Marblehead, t.105@t.115; Milton, t.115@t.120; New Bedford, t.100; Newburyport, 1.15@t.125; Newberne, 90¢@1.00; New York, t.90; Norfolk, Va., t.70; Portland, t.100@t.110; Portsmouth, Va., t.70; Portsmouth, N. H., t.115@t.120; Providence, t.100; Quincy Pt., t.110@t.120; Richmond, t.70@80; Roekport, t.125@t.130; Roxbury, t.100@t.105; Sac., t.120@t.125; Salem, t.100@t.110; Saugus, t.115; Savannah, t.80; Somerset, t.100@t.105; Washington, t.85; Weymouth, t.110@t.120.

* And discharging. † Alongside. ‡ And towage.

METAL MARKET.

NEW YORK, Friday Evening, April 18.
Prices of silver per ounce troy.

Apr	Sterling Exch'ge	London Pence.	N. Y. Cts.	Apr	Sterling Exch'ge	London Pence.	N. Y. Cts.
12	4.863/4	44 1/4	96 1/2	16	4.861/4	45 3/4	96 1/2
14	4.863/4	44 1/4	96 1/2	17	4.861/4	45 3/4	96 1/2
15	4.863/4	45	96 1/2	18	4.861/4	46 1/4	96 1/2

*97 1/2 to 97%. †99 1/4 to 1.00. ‡1.00 1/2 to 1.01. §1.00 3/4 to 1.02

The United States Assay Office at New York reports total receipts of silver for the week to be 90,000 ounces.

Indian Council Bills advanced 1/8 d. per rupee on Wednesday allotment.

This week has been remarkable for the rapid advance in price of silver in London, as well as speculative bidding in New York market.

The Indian and China exchanges are both favorable to a strong silver market, but the principal factor in the recent rise has been the probable action of Congress favorable to silver.

Silver certificates on the New York Stock Exchange have been largely quoted, but the actual transactions have been small. The nominal transactions were as follows:

	PRICE.	H.	L.	Sales ounces
April 16	100 3/4	100 3/4	100 3/4	32,000
April 17	102	102	102	10,000
April 18	102 3/4	102 3/4	102 3/4	60,000

These silver certificates were brought out in 1887 under the auspices of the Western National Bank. Dealings were fairly active for a short time after they were placed on the regular list on July 21, 1887, but for more than two years they have been dormant. The supporters of the scheme, of whom Conrad N. Jordan, ex-president of the Western National Bank, was the most active, wildly hoped by the listing of the certificates to wrest control of the silver market from London.

The bullion certificates are issued for deposits with the Mercantile Safe Deposit Company, and registered at the Western National Bank. They are for 1,000 ounces each and the charges are 25 cents each for the issuing, and one cent a day for storage. The daily report of the 16th inst. showed that there were 505 certificates outstanding, and that against them the Safe Deposit Company held 504,925 70-100 ounces of silver bullion.

The great advance in the price of silver during the week was due to "boomers," who expect Congress to pass a bill for the purchase of \$1,500,000 a month, and the redemption of the certificates issued therefor in coin, and that when silver reaches \$1.20 an ounce we shall have free coinage. The Secretary of the Treasury wisely insists on redeeming the certificates in bullion at its market value, which certainly is the only stable basis of value for them. We trust Congress will see the wisdom of this, and that the concession of making certificates legal tender will satisfy the silver men. The danger and injury to the country in this case will be quite great enough without increasing it by the free coinage clause or the redemption of the certificates in "coin."

Foreign Bank Statements.

The governors of the Bank of England at their weekly meeting on Thursday reduced its rate for discount from 3 to 2 1/2 per cent. During the week the bank lost \$242,000 bullion, and the proportion of its reserve to its liabilities was raised from 43.90 to 45.30 per cent. against a decline from 41.70 to 40.85 per cent. in the same week of last year, when its rate for discount was 2 1/2 per cent. The bank, on the 17th inst., lost \$140,000 bullion on balance. The weekly statement of the Bank of France shows gains of 5,475,000 francs gold and 675,000 francs silver.

Domestic and Foreign Coin.

The following are the latest market quotations for American and other coin:

	Bid.	Asked.
Trade dollars	.78	.80
Mexican dollars	.78	.79
Peruvian soles and Chilean pesos	Nom'l.	Nom'l.
English silver	4.83	4.88
Five francs	.94	.95
Victoria sovereigns	4.86	4.88
Twenty francs	3.86	3.90
Twenty marks	4.74	4.78
Spanish doubloons	15.55	15.70
Spanish 25 pesetas	4.82	4.88
Mexican doubloons	15.55	15.70
Mexican 20 pesos	19.50	19.60
Ten guilders	3.96	4.00
Bar silver	101 3/4	102 1/4

Copper.—A firm feeling continues to characterize the whole copper market, and Lake brands cannot now be bought below 14 1/2 c., while the quotations for the inferior grades are also well sustained at 13 1/2 @ 13 3/4 c. for refined Arizona, and 12 1/2 @ 12 3/4 c. for casting qualities. The demand for consumption is quite satisfactory, and the present condition and future prospects of the market are encouraging.

Advices from Europe show that in London considerable scarcity exists in the market for Chili Bars and G. M. B. copper, the result being that during the first half of this week prices gradually improved, and on Wednesday the quotations marked #48 10s. @ #48 12s. 6d. spot and #48 12s. 6d.

@£48 15s. three months; but this level was not quite sustained, and subsequently a slight relapse took place, the closing quotations received by cable to-day being £48 2s. 6d. @ £48 5s. spot and £48 7s. 6d. @ £48 10s. 3 months. This slightly easier tendency is doubtless owing to the fact that furnace material has lately been offered at very low prices; sales of some 600 tons Anaconda Matte being reported during the week at 9s. 9d. which, in comparison with other values, must be regarded as a very low figure.

In manufactured and refined descriptions prices remain quite unaltered at £52 10s. @ £53 for English tough, £54 10s. @ £55 for best selected, £60 @ £61 for strong, £58 @ £59 for India sheets, and 6d. per pound for yellow metal.

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

To Liverpool.	Copper matte.	Lbs.	\$10,000
S. S. Chester.....	221 bbls.	224,235	

Tin.—Somewhat higher quotations from London in the beginning of the week led to an immediate response on this side, and prices quickly advanced to 19'80 @ 19'90, at which point we close to-day with a steady feeling.

Of the heavy recent arrivals nothing has been pressed on the market, which is not surprising, seeing that very large quantities have been shipped direct to consumers, and the remainder has gone into the hands of strong holders.

The shipments from the East have been exceptionally light during the first half of April, the totals reported being to the United States, 20 tons; to Great Britain, 400 tons. The present low level of prices naturally attracts a good many orders from consumers.

The London market opened firmer at the beginning of the week and has gradually hardened during the interval, closing to-day at the highest figures, viz.: £89 15s. @ £89 17s. 6d. spot, and £90 10s. @ £90 12s. 6d. futures.

Lead.—The market remains inactive but steady, with no disposition to operate either on the part of buyers or sellers. Consequently business is exceedingly restricted. We quote 3'87½ @ 3'92½.

From Europe rather firmer quotations are reported, and in London to-day the closing prices are: For Spanish lead, £12 15s.; and for English, £13.

The proposed duty on silver-lead ores, as given in the Tariff bill, is drawing out great opposition on the part of all the Colorado smelters with the exception of two, one of which is interested in Colorado carbonate mines, and the head of the other has political aspirations which he thinks would be injuriously affected by advocating free import of silver-lead ores.

They all admit that the shutting out of Mexican fluxing ores would simply close their smelters, and even the serious restriction of imports, necessarily increases the cost of smelting "dry" silver ores. This increased cost must be paid by the silver miners. As these are many times more numerous than the lead miners, the great majority of the Colorado miners are injured that a few rich mine owners may be able to get four or five dollars a ton more for their ore than it is intrinsically worth.

It is stated on unquestionable authority that the last prices paid for Henrietta & Maid ore, to which we referred at the time, is from \$4 to \$6 more than it is actually worth, and it is only by making the dry ores pay this excessive cost that the smelter can run. Yet even the silver miners of Colorado have been induced to shout for their own taxation and demand that they shall have the pleasure of paying the Henrietta and Maid magnificent dividends out of their scanty earnings.

We doubt if there ever before was such an example of hoodwinked ignorance, and Jack's drawing chestnuts from the fire with tabby's histering paws was nothing to it.

Next week we shall quote some interesting opinions on this important subject.

The St. Louis Lead Market.—Messrs. John Wahl & Company telegraph us as follows: "Lead is stationary. The nominal value for common brands is 3'70c. For corroding lead, 3'72 @ 3'75c. Sales continue to be of a hand to mouth character. Neither sellers nor buyers make any strenuous efforts to trade."

The Chicago Lead Market.—Messrs. Everett & Post telegraph us the following report: "Lead opened at 3'67½c. The demand for Eastern shipment has gradually stimulated values, until at the close the market is firm at 3'75c., and with but very little lead offering even at these figures. Sales during the week foot up over five hundred tons, of which only a small part goes to our local consumers."

Spelter is still rather irregular, and, if anything, prices are slightly lower. Values have also given way somewhat out in the West. We quote to day about 5c. New York. Silesian spelter unchanged.

Antimony.—The demand continues very good, with supplies still exceedingly limited. Hallett's is firm at 19 @ 19½c. and Cookson's at 20c.

Quicksilver.—Quotations remain unchanged at \$49.50 for New York, and \$9 10s. for London.

Nickel.—No change either in business or prices. We continue to quote 70 @ 75 cents.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, April 18.

Pig Iron.—A diversity of opinion among iron men is the most noticeable feature of the trade. Some assert that business is gradually picking up and that orders are beginning to come in. On the other hand, there are some who say that the trade to-day is the same as it was a month ago. A better feeling, however, prevails among all. Quotations are: for Northern iron, No. 1, \$18 @ \$19, and \$17 @ \$18 for No. 2. For the Southern product the range seems wider and quotations are given at \$17 @ \$18 for No. 1, and \$16 @ \$17.50 for No. 2, according to brand.

There was a sale of a large lot of No. 2 Southern at \$15, but it appears that it was a soft iron.

Steel Rails.—No sales of any consequence are reported this week, and the market continues weak. There is more inquiry after rails, but this has not thus far resulted in large orders. Rails are nominally held at the mill at \$33.50 @ \$34, but a lower price would probably be acceptable to sellers if accompanied by a good-sized order.

Scotch Pig.—This continues pretty much as previously reported. There have been small lots sold of Eglinton at \$19.50 @ \$20; Dalmellington, \$22 @ \$22.50; Coltness, \$24.50 @ \$25, and Summerlee, \$24.50 @ \$24.75.

Spiegeleisen and Ferro-manganese.—The dullness which has characterized spiegel and ferro for some time past continues unabated. No business is being transacted, and quotations are nominally about \$32.50 @ \$33 for 20 per cent. spiegeleisen, and \$81 @ \$82 for 80 per cent. ferro-manganese on spot.

Merchant Steel.—The healthy tone of this market continues. Manufacturers express themselves as satisfied with the existing condition of affairs. Quotations remain for best English tool steel, 15c. net; American tool steel, 7½ @ 10c.; special grades, 13 @ 20c.; crucible machinery steel, 5c.; crucible spring, 3¼c.; open-hearth machinery, 2¼c.; open-hearth spring, 2¼c.; tire steel, 2¼c.

Structural Iron and Steel.—The market for structural iron and steel continues as described last week. There is very little doing in the way of sales, and dullness prevails. We quote: Universal plates, 2'25; bridge plates, 2'20; angles, 2'20; tees, 2'05; beams, 3'10.

Rail Fastenings.—Exceedingly dull is the only description that can be given to this market. We quote spikes 2'10c., angle plates 1'90c, bolts and square nuts 2'85c. and hex. nuts 3. Buyers demand, and in some cases obtain, lower prices.

Old Material.—We hear of no sales on which to base quotations.

Chicago. April 16.

[From Our Special Correspondent.]

The Chicago iron market is regarded with conflicting views—the prevailing opinion appears to be a more hopeful one as to the future. The labor troubles in this city have attained to such proportions as to impair trade very seriously in such branches of the iron industry in the local market as pertain to structural materials. Fifty thousand men are reported idle, causing a general cessation of building work, with no favorable outlook for any very early adjustment. Founders are taking orders conditionally, providing for the labor trouble reaching them.

A steady inquiry may be reported with more active though generally small sales, but prices remain low, particularly so in Southern irons. Lake Superior charcoal irons are quiet, but are held firmer than last week; trade in this class is mostly small orders for immediate shipments. Ohio softeners show no reduction in prices this week. It is generally conceded that prices have reached bottom, and when this fact becomes realized buyers will take hold, and the indications are this may be expected at an early day. The mills claim that they have ceased to cut rates.

Pig Iron.—We quote to-day for cash, per ton of 2,240 lbs., f. o. b. Chicago: For No. 1 and 2 Lake Superior Charcoal, No. 3 for car wheels, and No. 4 and 5 for malleable, \$21 @ \$21.50; Lake Superior coke, Bessemer, \$22; No. 1 Lake Superior coke, Bay View, \$17.50 @ \$18; No. 2, \$17; No. 3, \$16.50; Southern Coke, No. 1, \$16 @ \$16.50; No. 2, \$15.50 @ \$16; No. 3, \$15 @ \$15.50; Southern charcoal, \$19 @ \$19.50; Standard Southern car wheel, \$24.50 @ \$25; Ohio softener (Hanging Rock), \$18.50 @ \$19.50; Jackson County, \$17.50 @ \$18; Hanging Rock cold blast, \$20 @ \$23; warm blast, \$23 @ \$25; No. 1 Scotch, according to brands, \$25 @ \$26; American Scotch, \$20 @ \$21; Bay View Scotch No. 1, \$17.50; No. 2, \$16.50; Chicago Scotch No. 1, \$17.50; No. 2, \$16.50; Emma, \$19 @ \$19.50; Black band Hubbard Scotch, \$20.50; Hazelton, \$20.50; Soft Silvery, \$18; Wellston No. 1, \$20. No. 2, \$19.50; Hamilton No. 1, \$18; Norton No. 1, \$17.50; Zanesville No. 1, \$18.

Bar Iron trade continues good, with good prospects; a more extensive buying movement is thought to be at hand. \$1.65 @ \$1.70 is continued quoted for half-extras at mill; local mills continue to ask \$1.85 @ \$1.90 for half-extras and \$1.80 for car iron.

Black Sheet Iron.—Inquiry continues to improve, and mills decline to quote prices later than July deliveries. We quote No. 27 \$2.95 @ \$3 at mills

Galvanized Sheet Iron.—Mills are pressed for stock, owing to the increasing demands made upon them; no change in prices has occurred of late; discounts for cheap and standard brands are 60 per cent., 60 and 5 per cent. on Juniata, and 62½ per cent. on charcoal from stove; inferior grades are lower and unsteady.

Old Wheels and Rails.—A dull market and nominal prices are continued reported. Old rails may be a trifle firmer. Wheels range from \$19 @ \$19.50; iron rails, \$23 @ \$24; steel rails, \$19.50 @ \$20.

Nails.—Prices continue unsettled, as reported last week. For steel rails at mill \$2 is about the figure to-day. Wire nails at stores we quote at \$2.55 @ \$2.75, a decline from last week's prices of 20c. per keg.

Plates, Tubes, etc.—A fair business in progress with unchanged prices. Tank iron, \$2.70, tank steel, \$2.90; heavy sheets, Nos. 10 to 14, \$2.90 @ \$3; steel sheets, Nos. 10 to 14, \$3.25 @ \$3.50; shell iron, \$3 @ \$3.25; flange iron, \$4 @ \$4.25; flange steel, \$3.50; shell steel, \$3.25; boiler rivets, \$4 @ \$4.25; fire box iron and steel, \$4.75 @ \$5.50; boiler tubes, 4½-in. and larger, 52½ per cent.; 2 to 4 in., 50 per cent.; 1½-in. and smaller, 45 per cent. In car lots, tank iron, \$2.50; tank steel, \$2.65; iron sheets, Nos. 10 to 14, \$2.60 @ \$2.70; steel sheets, \$2.80.

Structural Iron.—A good demand and unchanged prices. Orders to be given depend for the time being largely upon the continuance of the labor strike now in progress. For car lots f. o. b. Chicago we quote: Angles, \$2.40 @ \$2.50; iron and steel universal plates, \$2.65; sheared plates, \$2.70; tees \$2.90 @ \$3; beams and channels, \$3.20.

Merchant Steel.—The demand is good, maintaining recent prices. We quote as follows: tool steel, \$7.75 @ \$8; specials, \$12 @ \$25; open hearth machinery, \$3; Bessemer machinery, \$2.50 @ \$2.60; open hearth spring steel, \$2.60 @ \$2.65; tire, \$2.50 @ \$2.60; toe calk, \$2.70 @ \$2.80; crucible sheet steel, \$7 @ \$10; crucible spring, \$3.75.

Scrap Iron.—Business light, prices unchanged of late. We quote: Country mixed scraps, \$15.50 @ \$16; according to condition, No. 1 mill \$15 @ \$16; light wrought, \$9.50; horse shoes, \$19.50; axles, \$24.50; cast machinery, \$12.50 @ \$13; stove plates, \$9.50 @ \$10; borings, \$9 @ \$9.25; wrought trimmings, \$12 @ \$12.50; No. 1 railroad shop or forge, \$20; track scrap, \$19.50.

Louisville. April 15.

(Special report by HALL BROS. & Co.)

Inquiries continue to increase both in number and tonnage, indicating that many of the leading concerns have determined upon round purchases while prices are so favorable to them. It is evident that many of them have confidence of an early adjustment of the situation to increased prices, and though the time for the revival is uncertain, yet a number of them have concluded purchases after testing the market thoroughly, which disclosed prices probably as low as they have ever received.

Statistical evidence on consumption and production draws the line of comparison almost to a balance. On this and the general healthful condition of the trade, and the knowledge that iron is being applied in large quantities to new uses, is based a hopeful feeling. The difference between the daily transactions and the views of the different sellers is so varied as not to admit of accurate quotations, and for this reason we make no change in our figures.

Hot Blast Foundry Irons.	
Southern Coke No. 1.....	\$16.00 @ \$16.25.
" " No. 2.....	15.00 @ 15.50.
" " No. 3.....	14.50 @ 15.00.
Mahoning Valley, Lake ore mixture.....	18.00 @ 19.00.
Southern Charcoal No. 1.....	17.50 @ 18.00.
" " No. 2.....	17.00 @ 17.50.
Missouri " No. 1.....	18.50 @ 19.00.
" " No. 2.....	18.00 @ 18.50.
Forge Irons.	
Nentral Coke.....	14.00 @ 14.50.
Cold Short.....	14.00 @ 15.00.
Mottled.....	13.50 @ 14.00.
Car Wheel and Malleable Irons.	
Southern (standard brands).....	22.50 @ 23.00.
(other brands).....	19.00 @ 20.00.
Lake Superior.....	22.50 @ 23.00.

Philadelphia. April 17.

(From our Special Correspondent.)

Pig Iron.—With the exception of an improving demand for Pennsylvania pig iron there is scarcely anything of interest to be mentioned in the iron trade. A good deal of negotiating has been going on since the writing of last report, and several of the leading brokers have to-day closed contracts for No. 1 foundry at \$18.50. A few brands are being offered and selling in a moderate way at \$18; several good-sized lots of No. 2 iron will be sold in a day or two, on a basis of \$17.25 @ \$17.50. Some few brands of forge are held as high as \$17, and a few lots were let go at \$16. Buyers are about ready to close for summer supplies, and a better feeling prevails throughout the market now that anxiety about bottom prices is about over.

Foreign Material.—A few days ago brokers thought they had about closed for two or three good sized lots of spiegel; but the negotiations have been suddenly announced off. Quotations, \$33 @ \$33.50. Anticipated business in ferro-manganese is also off for the present, although 80 per cent. is being offered at \$33.

Billets.—The best offer to-day for a large lot is \$30, and this figure will be accepted. The general asking price is \$30.50@31. Slabs are entirely neglected.

Blooms.—A sale of charcoal blooms was closed yesterday at \$52.50. Cold blast blooms are quoted at \$54.50. For anthracite the usual quotations are \$44@44.50.

Muck Bars.—Sales of between 700 and 800 tons were made this week at \$29.50@29 at mill.

Merchant Iron.—A marked improvement has taken place in the bar iron trade in both city and country mills, but the orders are nearly all for small quantities. There is no difficulty in obtaining a good brand of refined iron at 1'90. There are some brands called refined that have sold at 1'80. The inquiries are quite numerous for medium and common iron for car use.

Nails.—Nails are still at the lower end of the scale, especially in large lots. The extremes are \$1.90@2.10, according to size of order. Makers are endeavoring to work off as many nails this month as persistent solicitation can accomplish.

Skelp Iron.—Skelp is 1'85 for grooved, and 2'05 for sheared. No large transactions have been reported for a few days.

Wrought Iron Pipe.—All kinds of tubing are in very good demand, and at full quotations. Fewer orders for pipe have been booked recently; but the consumption is very heavy, and the manufacturers expect to continue busily engaged all season.

Sheet Iron.—A slight decline, it is rumored, has been forced by the action of one or two large makers. Buyers are certainly refusing to pay the outside prices of a few weeks ago, particularly in large lots. Quotations for best refined, 3'10 to 3'70, according to gauge. The demand for galvanized continues very active, and so far as inquiries show, the prices are firm.

Plate Iron.—Four or five large orders for plate iron for ship purposes have been placed this week on a basis of 2'10 for iron, and 2'35 to 2'40 for steel. Bridge plate is quoted at 2'20 for iron, and 2'50 for steel, but manufacturers are quite accommodating at times. Iron shell is 2'40, and steel, 2'85.

Structural Material.—Nothing new has occurred in the structural iron trade. All the mills are running full time, as usual, and our authorities here, in such matters, give the assurance that from present indications there will be no relaxation of energy. Angles, 2'20 for iron; tees, 2'60; beams, 3'10.

Steel Rails.—Quotations are \$34 for large lots. It is intimated on pretty good authority that contracts for 50,000 tons could be placed in the mills of this State at once, if \$33 would be accepted.

Old Rails.—There would be no difficulty in disposing of two or three thousand tons of old rails in small lots at \$23.50. Brokers are offering lots at \$24.50 for early delivery.

Scrap.—No. 1 scrap is rather dull at \$22@23. Machinery scrap runs from \$16@17. Cast borings are selling at about \$11. The scrap market is dull.

Pittsburg. April 17.
(From our Special Correspondent).

Raw Iron and Steel.—The improvement in the iron trade that has been so anxiously expected has up to the present time failed to put in an appearance so far as actual transactions are concerned. At the same time the inquiries as to what price would be taken for round lots have been more numerous, giving unmistakable evidence that the time is not far distant when consumers will be under the necessity of paying sellers a friendly visit. It is now pretty evident from the time that has elapsed since large sales were made, that consumers had a far larger supply on hand than was supposed. There is pretty reliable information in hand that large as the supply was it is nearly exhausted, and few persons would be in the least astonished to see buyers in the market at any time for a fresh supply of the raw material. Let us hope that the 1st of May will see the iron and steel trade in a flourishing condition.

The general opinion among selling agents is that prices have reached the limit, for various reasons, the principal one being the fact that the furnaces made their contracts for the season's supply of ore at the opening of the year, and at figures that will not permit them to reduce present prices unless at an actual loss. At ruling rates the margin for makers is certainly very narrow, but certain parties argue that it is more economical to keep in blast and sell the product at cost or a small profit, than to blow out and lie idle. A well informed dealer has this to say: "Now that prices are at the bottom and all the announcements made, or to be made, prices will not go below the figures now wanted; don't be alarmed, there is no concern manufacturing pig iron in the United States that can or will announce any greater cut than has been made." This being the case, improvements ought to be in order, but when it will begin or to what extent it will be carried, cannot be determined for the present. Prices of pig iron are as low as they will go, unless something very extraordinary should occur.

With regard to the present prices of mill iron and Bessemer. In conversation with a member of one of the largest firms in the country, he re-

marked: "We have no sales for you this week, we have withdrawn and will not sell a ton of iron at present prices. We propose to wait and will not have to wait long." One thing you can rely on, this firm is abundantly able to do just what it says. Sales reported show a wide range of values, the highest prices being obtained for city furnace-made iron.

Coal and Coke Smelted Lake Ore.	
2,000 Tons Bessemer City Furnace	18.00 cash.
2,000 Tons Bessemer City Furnace	18.50 cash.
1,500 Tons Bessemer City Furnace	18.00 cash.
1,000 Tons No. 1 Mill City Furnace	15.75 cash.
1,000 Tons No. 1 Mill City Furnace	15.75 cash.
1,000 Tons Bessemer	17.75 cash.
650 Tons Grey Forge	15.50 cash.
500 Tons Mill Iron	15.50 cash.
500 Tons Grey Forge	15.50 cash.
300 Tons No. 2 Foundry	17.00 cash.
200 Tons No. 1 Foundry	17.75 cash.
100 Tons Off Bessemer	17.50 cash.
Coke, Native Ore.	
300 Tons Grey Forge	15.50 cash.
200 Tons Grey Forge	16.00 cash.
100 Tons No. 2 Foundry	17.00 cash.
50 Tons White	15.25 cash.
50 Tons Silvery Extra	20.00 cash.
50 Tons Silvery	18.00 cash.
Charcoal.	
100 Tons White and Mottled	24.00 cash.
100 Tons No. 2 Cold Blast	27.00 cash.
75 Tons Cold Blast	27.25 cash.
50 Tons No. 2 Foundry	22.75 cash.
Muck Bar.	
800 Tons Neutral April and May	27.75 cash.
500 Tons Neutral	27.75 cash.
500 Tons Neutral	27.75@28.00 cash.
Steel Slabs and Billets.	
500 Tons Steel Billets	28.25 cash.
500 Tons Nail Slabs	27.75 cash.
300 Tons Billets	28.50 cash.
250 Tons Billets	28.50 cash.
Steel Wire Rods.	
500 Tons American Fives	44.00 cash.
Steel Bloom Ends.	
350 Tons Bloom Ends	22.00 cash.
250 Tons Bloom Ends	22.00 cash.
Ferro-Manganese.	
50 Tons 80 per cent., July seaboard	81.50 cash.
50 Tons 80 per cent., May, f. o. b. Balt	81.50 cash.
Spiegel.	
75 Tons 20 per cent., Pittsburg	36.00 cash.
25 Tons 10 and 12 per cent. Pittsburg	33.50 cash.
Old Iron Rails.	
350 Tons American Ts	24.00 cash.
300 Tons American Ts	24.00 cash.
Scrap Material.	
150 Tons Car Axles, net	28.50 cash.
100 Tons No. 1 Wrought Scrap, net	21.25 cash.
100 Tons Crucible Steel, net	30.00 cash.
50 Tons Leaf Steel, net	23.00 cash.

Coke or Bituminous Pig		Prices.	
Foundry No. 1.	\$18.25@18.50	20% Spiegel at	
Foundry No. 2.	17.25@17.50	Pittsburg	\$36.00@36.50
Gray F. No. 3.	15.75@16.00	Muck-Bar.	27.50@27.75
No. 4.	15.25@	Steel Blooms	28.00@
White	15.00@	Steel Slabs	28.00@
Mottled	15.00@	Steel Crp Ends	21.50@22.50
Silvery	18.25@20.00	Steel Bl. Ends.	21.50@22.00
Bessemer	17.75@18.50	Ferro-Man., 80% seaboard	81.50@82.00
Low Phos.	26.00@	Steel Billets	28.00@28.50
Charcoal Pig		Old Iron Rails.	24.00@24.50
Foundry No. 1.	23.50@24.50	Old Steel Rails.	21.50@22.00
Foundry No. 2.	22.00@22.75	No. 1 W. Scrap.	21.25@21.50
Cold-Blast	25.00@29.00	No. 2 W. Scrap.	17.50@
Warm-Blast	24.00@25.00	Steel Rails	34.00@35.00
10 + 12% Spiegel	33.50@	light sec.	34.00@37.00
at Pittsburg		Bar Iron, nom.	1.90@1.95
		Iron Nails	2.15@
		Steel Nails	2.15@
		Wire Nails	.....@2.60

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, April 18.
Heavy Chemicals.—The trade in heavy chemicals is resuming its normal channel, and prices are considerably lower than those quoted last week. In view of this downward tendency buyers are holding off. Dealers complain of the scarcity of orders, and emphatically state that we shall not see prices ruling as low as before the Liverpool strikes, inasmuch as the cost of production and shipping have increased. There is some stock coming in, but as this is already contracted for, the available supply in first hands is not as large as some would like to see it. The following are the ruling quotations.

Caustic soda, 60 per cent., 3/4@3/4 cents; 70-74 per cent., 2/3@3 cents; 74-76 per cent., 2/3@3 cents. Carbonated soda ash, on the spot, for the 48 per cent., 1/2@2/4 cents; 58 per cent., 1/2@2 cents. Caustic soda ash.—There is none here to speak of. Prices for forward shipments are 1/2@1/4 cents. Sal soda, 1'10@1'25 cents. Bleaching powder is rather unsettled, and may be quoted from 1/4 cents up.

Acids.—Manufacturers continue to report an improvement in the trade as the spring season advances, and the present condition is all that could be reasonably expected, although it is by no means so good but that there is room for improvement. As we predicted in our last issue, some of the manufacturers not included in the "combine" have decided to retaliate in the matter of cutting prices. A circular has been issued by a certain prominent "out," offering 66-degree sulphuric acid at 85 cents per 100 pounds, and 18, 20 and 22-degree muriatic at 90c., \$1 and \$1.15 respectively, f. o. b. in Brooklyn or New York. This is not lower than—indeed, it is not as low as—recent quotations given by the combination. For ex-

ample, 20-degree muriatic at 90c., delivered in the central part of New York State.

The Knickerbocker Chemical Company is emphatic in stating that it was not they who began cutting prices. Yet we have seen letters from customers of "outs" saying that the combination had offered to sell any acid at prices lower than the consumers were paying. We also know of instances where the so-called "trust" has sent a list of prices—lower, of course, than figures of outside manufacturers—to parties who had their acid contracted for with "outs." In such a case the Knickerbocker Company either assumed the aggressive, despite their assertions to the contrary, or else the offers were not of a bona fide nature, and were made with the intention of creating an unpleasant feeling between customers and manufacturers. This action has produced a natural result in lowering the prices all round, and since the "Trust" neither maintains prices nor limits competition, its usefulness, its very *raison d'être*, may well be questioned; thus far it seems rather to have intensified than diminished the ills the trade is heir to.

Cable advices from Liverpool dated the 14th inst. state that, in consequence of the refusal of the dock companies at Birkenhead to accept the terms of the Dock Laborers' Union in regard to the hours of labor, 5,000 men employed on the docks in that town went out on strike to-day. Local dealers say that, as they have not yet received private information concerning this latest difficulty, they are unable to say to what extent the strike will effect shipments of heavy chemicals.

Fertilizing Chemicals.—The regular spring trade in fertilizers is going on quietly, and the market this week shows no features of interest. Ruling quotations are: for high grade dried blood \$1.95@2. For the low grade the price is \$1.80@1.85. Azotine, \$1.95@2. Tankage, high grade, 9 to 10 per cent. ammonia and 15 to 20 per cent. phosphate, \$20@21 per ton, and low grade, 7 to 8 per cent. ammonia and 25 to 30 per cent. phosphate, \$18.50. Fish scrap, \$20.50@21 per ton, f. o. b. factory. Sulphate of ammonia at \$3.10@3.12 1/2 per cwt. Concentrated tankage, \$1.90@2.00. Refine bone-black, guaranteed 70 per cent. phosphate, \$18@19 per ton, and sales at the first figure have been reported. Dissolved bone-black is nominally 95c. per unit for available phosphoric acid, although on large lots prices might be somewhat reduced, and acid phosphate 80c. per unit for available phosphoric acid. Steamed bones, unground, \$20@23; ground, \$25@26.

Charleston rock, undried, \$5.75 per ton; kiln-dried, \$6.50@7 per ton, both f. o. b. vessels at the mines. Freights by sail from Charleston to New York, \$2.50@3 per ton. Charleston rock, ground \$11.50@12, ex-vessel at New York.

We are in receipt of interesting statistics from Mr. Paul C. Trenholm, of Charleston, S. C., which we herewith publish, showing shipments of phosphate rock from Charleston during March 1888, 1889, and 1890.

	1888.		1889.		1890.	
	Crude.	Ground.	Crude.	Ground.	Crude.	Ground.
Domestic	21,603	400	21,786	392	14,606	Nil
Foreign—						
United Kingdom	Nil	Nil	Nil	Nil	5,340	.....
Copenhagen	Nil	Nil	Nil	Nil	1,650	.....
Total	.....	.....	.....	.....	6,990	.....
Domestic and foreign shipments for March, 1890, aggregate	.....	.....	.....	.....	21,596	.....

The market in double manure salts continues pretty much as reported last week. Quotations are for 48 to 50 per cent. sulphate of potash, \$1.12 1/2 per 100 pounds for shipments from date; high grade manure salts, basis 90 per cent. sulphate of potash, \$2.37 1/2 per 100 pounds. There is very little on the spot.

Kainit.—There have been some inquiries for spot lots, but as there is practically no stocks here, there have not been many sales during the past week. Prices are steady at \$9.50 for invoice weight and \$9.75 for actual weight.

Muriate of Potash.—There were about 300 tons arrived, but this went into consumption. The spot supply at this writing is by no means large, and considerable difficulty would be experienced by anyone wanting a large spot lot.

Shipments are coming in and prices remain steady at \$1.77 1/2 for 50-ton lots, and proportionately higher for smaller amounts.

The case of Heller, Hirsh & Co. v. the Collector of the Port of Philadelphia was tried before Judge McKenna in the United States Circuit Court of Philadelphia on the 14th inst., and resulted in a verdict for the plaintiffs.

The suit was brought by the plaintiffs against the Collector of the Port of Philadelphia to recover the amount of duty paid by them, under protest

on an importation of 50 tons manure salt imported by them on the ship "Cuba" in May, 1888. The case is in all respects similar to the one brought by the plaintiffs against the Collector of the Port of New York, and which was tried before Judge Lacombe, on May 22d, 1889, and which also resulted in a verdict for the plaintiffs.

The plaintiffs contend that the manure salt imported by them, and which contains 90 to 98 per cent. sulphate of potash, is entitled to "free entry" under the provisions in the free list for "Guano, manures, and ALL SUBSTANCES EXPRESSLY USED FOR MANURES." The defendant claimed, that under the Treasury ruling of August 2d, 1870 (S. 715), concerning "SULPHATE OF POTASH," this importation of manure salt was dutiable at 20 per cent. ad valorem.

Brimstone.—Buyers are well supplied, and, in consequence, seem unwilling to come into the market. There is a hand-to-mouth trade by those needing sulphur, and the general impression is that consumers are holding off in expectation of lower prices. We quote \$19@19.25 for seconds. There is said to be no thirds here.

Nitrate of Soda.—We are in receipt of the following statistics, issued by Mr. F. B. Nichols, under date of the 15th inst.:

Table with columns for 1890, 1889, 1888. Rows include Stocks in store and afloat in Atlantic ports, Arrivals, Exports, Previously reported, To arrive, Deliveries fortnight ending, Total deliveries to April 15th, Sales spot.

"The market continues heavy, with an unusual supply, but the deliveries continue active and on a larger scale than ever. This is particularly noticeable in Europe, where the deliveries are more than one hundred and thirty thousand tons above the quantity for same time last year. 'Grace Deering' arrived at Philadelphia."

BUILDING MATERIAL MARKET.

NEW YORK, Friday Evening, April 18.

Bricks.—A dull market has prevailed during the week. The supply is greater than the demand, and enormous quantities of brick have come in during the past few days. A prominent brick man estimated the number of bricks received during the week at 18,000,000. Prices are, if anything, slightly lower. We quote for Haverstraws, \$7.25 @ \$7.75 per M.; Uprivers, \$6.50 @ \$7; Jerseys, \$5.25 @ \$6.75; Pales, \$3 @ \$3.25.

Lime.—Business in the lime market remains about the same as previously reported, the supply being fully equal to the demand. The latter, however, is not as great as was expected, because con-

sumers were unable to obtain much lime during the winter. Owing to the rumors of an impending strike among laborers in all branches of the building trade, the building material market appears dull and unsettled.

Prices remain unchanged, and quotations are: For Rockland common, \$1 per barrel; Rockland finishing, \$1.20; St. John common and finishing, 90c. @ 95c.; Glen Falls, common and finishing, 85c. @ \$1.11.

NOTES OF THE WEEK.

We publish in this issue accounts of labor difficulties directly affecting the building trade. From all over the country come threatening rumors of impending trouble between employers and employes. We believe the present state of affairs in the building trade unequaled by any of late years. Whether more serious troubles may ensue cannot be determined, and we can but hope that some measure of settlement of mutual benefit may take place in the future instead of long strikes, which necessarily involve in all cases an expenditure of money and losses that always affect indirectly the prosperity of the people at large.

No strike has ever occurred in the history of Chicago which disastrously affected the interests of so many people as the present carpenters' strike. The recent boom in real estate caused many thousands of new buildings to be contracted for, and more are now in course of erection than at any previous time in the city's history. These are nearly all to be finished by May 1, and have already been let or sold to persons who must vacate their present homes or stores by that date. The carpenters timed their strike in accordance with this emergency, and the stubborn resistance which they have met from the builders was unexpected, to say the least. In the meantime, the people who must vacate their present quarters in a little over two weeks—and they number thousands—are becoming desperate. Several members of the Carpenters' and Builders' Association will start up work tomorrow, and endeavor to complete the contracts that were interrupted by the strike. How many men they will have is a question, but nearly all have advertised for carpenters, those whose contacts were most pressing scattering their advertisements about the country. The masters claim that there are a good many journeymen in the city who are willing to go to work, and they will all be given a chance.

Reports from the strikers' agents at Racine, Wis., and other points where the bosses have sent men to hire carpenters were to the effect that none of these men would come to Chicago to take the strikers' places.

The carpenters won a significant victory when Judge Prendergast ordered Assignee Goodman for the C. J. I. Meyer & Sons Company to pay the carpenters at work on the Rand-McNally building 40 cents an hour and gave them an eight-hour day. This move was made on an application from Andrew McNally, who said that work on the building was being delayed by the carpenters' strike. The judge had a conference with a committee of strikers, and told them that, while he would instruct Assignee Goodman to pay the carpenters 40 cents an hour, he would not compel the men to go to work if they did not want to. It is probable that some men will be allowed to work in view of the decision. The situation is becoming critical. Should the strike continue another week 15,000 bricklayers, plasterers, hodcarriers, lathers, painters and laborers will be thrown out of employment, as

they must all wait for the settlement of the carpenters' strike. Such a calamity will have a bad effect on all branches of business.

Judges Altgeld and Tuttle, of the Circuit Court, will issue a call for a mass-meeting, which it is thought will be held within a few days with a view to arbitration of the differences between the carpenters and the master builders.

The latest reports state that the embargo placed by the striking carpenters on building operations in Chicago continues effective. The official veto on labor extends not only to all of their own craft, but now embraces nearly all trades employed in building. At the close of work on the 15th inst. the great majority of the bricklayers, plasterers, lathers, painters and plumbers were laid off indefinitely. There was no more work for them to do. All lines of work had reached the stopping place, beyond which they could not go without the assistance of the carpenters. Nothing was done on the 16th inst. The "bosses" did not even attempt to start up work. At the strikers' headquarters it was estimated that 25,000 men in the various building trades were idle.

The carpenters' strike in Indianapolis, Ind. continues, and the outlook is for a protracted struggle. The contractors offered 27 1/2 cents per hour as standard price for the best workmen from now until November 10 next, and nine hours' work, and the same wages until the first of April, with eight hours' work. No attention whatever was paid by the contractors to the journeymen's request that a committee be appointed to confer with the union's committee. After signing the agreement the contractors unanimously decided not to take any further notice of the strike, and to not hold any meeting until April 29. The journeymen say they will not consider the proposition of the bosses, and will not accept anything less than the demand of January 20. The organized bricklayers are said to be ready to quit work if necessary to strengthen the carpenters.

The employing carpenters, masons, bricklayers, painters and plumbers at Portsmouth, N. H., on the 15th inst., decreed that 10 hours should constitute a day's work. When the men were informed of the result of the meeting the latter quit work in a body.

It is said in Boston that the Freestone Contractors' Association has found a way of evading the foreign contract labor law by assuring men they are trying to secure in England that they are not authorized to make any contracts in England, but will make legal agreements immediately on their arrival in the United States.

The members of the New England Granite Cutters' Association have decided not to grant their cutters an increase in wages, either in piece or day work, during 1890.

Granite paving cutters at Rockland, Me., in the employ of the following companies have struck for higher wages: Booth Bros. and Hurricane Granite Company, Hurricane Island; Bodwell Granite Company, Smith & Kittredge and J. B. Amherst, Vinal Haven. The men have been receiving an average of about \$22.30 per 1,000 blocks. They want from \$1 to \$2.50 more per 1,000, according to the "chance," some quarries and some rock being harder to work than others.

The stonecutters at Barre, Vt., have settled their difficulties by compromising on a basis of 29 1/2 cents per hour, the arrangement to take effect May 1st, and to continue one year, either party to give three months' notice to break it.

IMPORTS AND EXPORTS OF METALS AT NEW YORK APRIL 5 TO APRIL 12 AND FROM JANUARY 1.

Large table with multiple columns for various metal types (Spelter, Pig Lead, Tin, Steel Blooms, Billets, and Slabs, Scrap Iron, Steel and Iron Rods, Copper, Copper Matte, Spiegel Eisen) and their respective import and export statistics for the specified period.

DIVIDEND-PAYING MINES.

NON-DIVIDEND PAYING MINES

Main table with columns: NAME AND LOCATION OF COMPANY, CAPITAL STOCK, SHARES, ASSESSMENTS, DIVIDENDS, NAME AND LOCATION OF COMPANY, CAPITAL STOCK, SHARES, ASSESSMENTS. Lists 149 mining companies with their financial details.

G. Gold. S. Silver. L. Lead. C. Copper. * Non-assessable. † This company, as the Western, up to Dec. 10th, 1881, paid \$1,400,000. ‡ Non-assessable for three years. § The Deadwood recently paid \$775,000 in eleven dividends, and the Terra \$75,000. ¶ Previous to the consolidation in Aug., 1884, the California had paid \$31,320,000 in dividends, and the Con. Virginia, 240,000. ** Previous to the consolidation of the Copper Queen with the Atlanta, Aug., 1886, the Copper Queen had paid \$1,860,000 in dividends. †† 1,000,000.

NEW YORK MINING STOCKS QUOTATIONS.

DIVIDEND-PAYING MINES

NON-DIVIDEND-PAYING MINES.

Main table of New York Mining Stocks Quotations, divided into Dividend-paying and Non-dividend-paying mines. Columns include Name and Location of Company, dates from April 12 to April 18, and Sales.

*Dividend *Debit in the New York Stock Ex. Unlisted securities Assessment unpaid. Dividend shares sold, 3,765. Non-dividend shares sold, 9,330. Total sales, 13,095.

BOSTON MINING STOCK QUOTATIONS.

Table of Boston Mining Stock Quotations. Columns include Name of Company, dates from April 11 to April 17, and Sales.

Boston: Dividend shares sold, 21,246. Non-dividend shares sold, 39, 82. Total Boston, 60,528.

COAL STOCKS.

Table of Coal Stocks. Columns include Name of Company, dates from April 12 to April 18, and Sales.

**Sales in New York, 22,815; in Philadelphia, 24,778. Total sales, 268,905.

San Francisco Mining Stock Quotations.

Table of San Francisco Mining Stock Quotations. Columns include Company, dates from April 11 to April 17, and Closing Quotations.

STOCK MARKET QUOTATIONS

Baltimore, Md.

Table with columns: COMPANY, Bid, Asked. Lists various coal and mining companies like Atlantic Coal, Balt. & N. C., Big Vein Coal, etc.

Prices bid and asked, lowest and highest, during the week ending April 17th.

Birmingham, Ala.

Table with columns: COMPANY, Bid, Asked. Lists companies like Ala. R. Mill Co., Alice Furnace, Anna Howe, etc.

Prices, highest and lowest, bid and asked during week ending April 14th.

Pittsburg, Pa.

Table with columns: COMPANY, B, A, Closing. Lists gas and oil companies like Allegheny Gas Co., Bridgewater Gas Co., etc.

Prices bid, asked and closing during the week ending April 17, 1890.

Table with columns: COMPANY, Sales, H, L. Lists American Cotton Oil, National Lead, Sugar, etc.

St. Louis, April 16.

Table with columns: COMPANY, Bid, Asked. Lists various commodities like Adams, American & Nettie, Anderson, etc.

Table with columns: COMPANY, Bid, Asked. Lists various mining and coal companies like Carriboo, Central Silver, Cleveland, etc.

Trust Stocks, April 18.

The following closing quotations are reported to-day by C. I. Hudson & Co., members of New York Stock Exchange: CERTIFICATES...

Foreign Quotations.

Table with columns: COMPANY, Highest, Lowest. Lists companies from London, Paris, and other foreign locations.

CURRENT PRICES.

These quotations are for wholesale lots in New York.

CHEMICALS AND MINERALS.

Table listing prices for various chemicals and minerals like Acid-Acetic, Muriatic, Nitric, Sulphuric, etc.

Table listing prices for Sulphur-Roll, Flour, Crude Brimstone, etc.

THE RAREER METALS.

Table listing prices for various rare metals like Aluminum, Arsenic, Barium, Bismuth, etc.

BUILDING MATERIAL.

Table listing prices for various building materials like Bricks, Irons, Portland Cement, etc.

THE ENGINEERING AND MINING JOURNAL will thank

any one who will indicate any other articles which might with advantage be quoted in these tables or who will correct any errors which may be found in these quotations.