

# THE ENGINEERING AND MINING JOURNAL



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

VOL. LIV. DECEMBER 17. No. 25.

RICHARD P. BOWWELL C. E. M. E. Editor.

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

SOPHIA BRAEUNLICH, Business Manager.

THE SCIENTIFIC PUBLISHING CO., Publishers.

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

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

NOTICE OF DISCONTINUANCE.—The ENGINEERING AND MINING JOURNAL is sent to subscribers until an explicit order for its discontinuance is received by us, and all payment of arrearages is made, as required by law. *Papers returned are no notices of discontinuance.*

**THE SCIENTIFIC PUBLISHING COMPANY.**

OFFICERS:  
R. P. BOWWELL, Pres. & Gen'l Mang. | P. O. Box 1833.  
SOPHIA BRAEUNLICH, Sec'y & Treas. | 27 Park Place, New York.

Cable Address: "Rothwell, New York." Use A. B. C. Code, Fourth Edition.

**CONTENTS.**

Mineral Statistics for 1892 .....	Page.	577
A Solution of the Silver Problem .....	577	
The Russell Process .....	578	
The Alabama Geological Survey .....	578	
Books Received .....	578	
New Publications .....	579	
The Mesaba Range .....	T. L. Lammers	579
Abstracts of Official Reports .....	579	
The Silver Convention at El Paso .....	579	
Russell Process at the Marsac Mill vs. Amalgamation at the Ontario .....	W. G. Lamb	580
Mineral Production of the United States for 1891 .....	580	
* The Late Prof. John Strong Newberry .....	581	
The Chemistry of Gossan .....	Stephen H. Emmens	582
* A New Electric Mining Locomotive ..	583	
Alabama Bauxite .....	Henry McCalley	584
* The Kioto Canal, Japan .....	584	
The Alta Mining Company vs. the Benson Mining and Smelting Company .....	585	
* Cancellation of the Survey Patent of the Canon Del Agua Grant, New Mexico ..	585	
* Sargent's Automatic Smoke Preventer .....	587	
* The Q & C. Car Mover .....	587	
Digest of Recent Decisions Affecting the Mining Industry .....	587	
Patents Granted .....	587	
Notes—Soldier for Aluminum, 578—Iron Manufacture in South Australia, 579—Carboid Bearings, 584—Electrical Standards, 586—Aluminum Racing Shells, 587.		
Personals—Obituary—Societies—Industrial Notes—Machinery and Supplies Wanted .....	588	

\* Illustrated.

<b>MINING NEWS.</b>	<b>FOREIGN:</b>	Chicago.....595	Colo. Springs.....600
Arizona.....588	England.....592	Louisville.....595	Baltimore.....600
California.....588	Mexico.....592	Philadelphia.....595	Pittsburg.....600
Colorado.....589	MEETINGS.....593	Pittsburg.....595	St. Louis.....600
Idaho.....590	DIVIDENDS.....593	COAL:	Coal Stocks.....600
Kansas.....590	ASSESSMENTS.....593	New York.....596	London.....600
Michigan.....590	MINING STOCK	Boston.....596	Paris.....600
Montana.....590	MARKETS:	Buffalo.....596	
Nevada.....591	New York.....592	Chicago.....596	
Ohio.....591	Boston.....592	Pittsburg.....596	
Pennsylvania.....591	San Francisco.....592	MINING STOCK	
South Dakota.....592	MARKETS:	TABLES:	
Tennessee.....592	NEW YORK.....593	New York.....598	
Utah.....592	IRON:	Boston.....598	
Wyoming.....592	New York.....594	San Francisco.....600	
	Buffalo.....594	Denver.....600	

THE work of collecting the statistics of the mineral industry of the United States and other countries is progressing rapidly and the book, containing probably 600 large octavo pages, which will appear in January, will be by far the most valuable work of the kind ever published.

Those who have the figures of production, market prices or other valuable information concerning any of the useful minerals or metals are earnestly requested to send them to us without delay whether they have received special letters asking for them or not. Necessary corrections and additions will be made in the plates up to the time of going to press.

It is extremely gratifying to receive, as we do, proofs of the warmest appreciation of our work in foreign countries and enthusiastic co-operation in furnishing us the data necessary to make this volume accurate and valuable.

**A SOLUTION OF THE SILVER PROBLEM.**

We have been asked to give some further details concerning the solution we have proposed for the silver problem. We had outlined the plan, leaving to the intelligent reader to picture its far-reaching aims and consequences. We will even now only refer very briefly to a few of these. The powers of the International Clearing House which the nations would appoint under this plan would require it to do certain things, the chief of which are outlined as follows:

- "1. To ascertain, periodically, the amount of money, that is, of gold, silver and uncovered notes, held by each country during the preceding one or two years. These amounts to form the basis for the proportions in which the several nations will join in the purchase of all silver offered.
- "2. To clear every national transaction in the purchase or sale of money.
- "3. To purchase, for common account, such an amount of silver (say 25 per cent. of their holdings) from each of the silver basis countries as is necessary to put it on the gold or bimetallic basis.
- "4. To issue international certificates, redeemable in gold or silver, at holder's option, for the gold and silver purchased.
- "5. To determine from time to time, say at intervals of 5 to 10 years, what, if any, change in the value-ratio of gold and silver is called for by the changed conditions of production.
- "6. To publish the transactions of the monetary clearing house daily or weekly.

"This clearing house to be composed of one or more representatives of each country and to act through the mints of the several countries as depositories, and to have a central clearing house at one of the capitals."

It must be evident to every one that the object of this plan is to make a common monetary basis for all nations, so that all shall have a common interest thereafter; and surely there can scarcely be a fairer or more easily ascertained basis for securing the co-operation of nations, as of individuals, in such a transaction than the present amount of their money.

In order that there shall be perfect good faith in all the transactions covered by the plan it is necessary that the clearing house should not only ascertain the present holdings of money, but should clear every future national transaction in the purchase or sale of money. Every man is honest when the whole world is looking on.

What more effective and simple device can there be for maintaining peace among the nations than that of having their monetary transactions carried on in the sight of all men? And what could conduce more to the expansion of industry and commerce, to the prosperity of nations and the progress of civilization, than to offer the world an international universal currency, "good as gold" everywhere, without discount or exchange, and, by the use of such a clearing house, to render unnecessary the shipments and reshipments of large amounts of the precious metals?

The modern clearing house has permitted a vast increase in transactions by simply offsetting one against the other and settling only the final balances in money of ultimate redemption. The practical effect of this manner of offsetting accounts is precisely the same as if the quantity of money were increased in the same proportion as its efficiency. Who can measure the limitless increase, the tremendous impulse which the adoption of an International Clearing House would give to the business of the world?

In comparison with the advantages of a uniform currency for the world, the firm establishment of all countries on the gold or bimetallic basis, the multiplication of money by multiplying its efficiency, the guarantees which the closer commercial relations between nations and the publicity of national monetary transactions would give for the maintenance of peace and the economy in administration of governments, how infinitely small would be the loss on the annual purchase of silver to the extent of about one per cent. of the world's money, even if this silver were not needed for coinage, or other useful purpose, or if it were given away in unearned pensions to no longer needed soldiers.

It is true that the adoption of international certificates, circulating everywhere, not by virtue of any nation's "legal tender" fiat, but by the universal desire of men to use a money "good as gold" to the ends of the earth, would do away in a measure with exchange, and even with coin; and it has been suggested that on this account the plan might be opposed by the great financial institutions that make profit out of the exchange business. What, however, would this loss be compared with their profits from the increased business of the world which would pass through their hands, and as compared with the advance which would take place in the securities of the silver countries; aye, of all nations, from uniting them on a stable, universal monetary basis; and, as compared with the profits on the conversion of national debts to securities

bearing the lower rates of interest which the improved financial conditions of the countries would permit.

The great financial houses will not be slow to see where their advantage lies: they, the rich, get always the lion's share in every wave of prosperity, and the adoption of some such plan as that here briefly outlined would bring such an era of prosperity as the world has never seen.

#### THE RUSSELL PROCESS.

The invention of a metallurgical process is simplicity itself, but the successful introduction of it is difficult indeed. Of the thousands patented the greater portion would be forgotten were it not for the records of the Patent Office. But a few are applied and of these possibly not more than one in a 1,000 become successes financially and metallurgically. When a process has survived the test of time and, what is greater, of discouraging failures in certain specific applications, it is safe to assume that it has merit, even if it is not, as the majority of inventors hope, of universal application on the ores of the metal for the extraction of which it is intended.

The Russell process of adding a certain amount of cuprous hyposulphite to a solution of sodium hyposulphite used in lixiviating silver ores was invented in 1883 by E. H. RUSSELL, then assayer for the Ontario Silver Mining Company. The laboratory results were remarkable and these were confirmed by working tests on several ores, particularly those of the Ontario mine. While RUSSELL was experimenting, W. S. GODBE, of Salt Lake, who had secured the old tailings dumps of the Raymond and Ely and Meadow Valley mines near Bullionville, Nev., and who was looking for a method to work these twice worked ores, heard of the new lixiviating process.

He shipped to the Ontario Mill several tons of the tailings, which, unfortunately, as later events proved, were not representative of the large quantity which it was desired to treat. The leaching results on this class of tailings was so good that a plant for treating them raw was built in 1885, at Bullionville, by a company in which RUSSELL, GODBE, R. C. CHAMBERS, and several other officials of the Ontario company were largely interested. It was soon found impossible to successfully treat the raw tailings, and when a Stetefeldt furnace was erected no better results were obtained. Immediately after this, other financial failures, not due, however, to the Russell process itself, were made in Lake Valley and Silver City, New Mexico.

The first introduction of the process in Mexico was at the Cusihiuriachic Mine, Chihuahua. The results here were unsatisfactory as a whole, although the advantage of the Russell process over the Patera process, as at the previous introduction, was clearly shown. In reality the first actual success was not made until November, 1887, when excellent results were obtained at Las Yedras, Sinaloa, Mexico.

Up to this time RUSSELL expected too much from the increased solvent energy of a cuprous hyposulphite solution. Misled by laboratory results he depended upon it rather than a thorough chloridizing roasting. Having proved the fallacy of this and finally recognizing that careful preparation of ore was required in all instances, it was not remarkable that success was met with at the Marsac mill of the Daly Mining Company, where the process was introduced in 1888, or at the Holden mill, Aspen, Colo. which for the past year has been buying dry ores in the open market, regardless of the competition of the lead smelters.

It is now stated authoritatively that the Ontario company is about to adopt the process, having been convinced that the excellent and economical results at the Marsac can be repeated there. A mill is about to be built at Lehi, Utah, to work low grade ore from Tintic, and possibly another will be built at Neihart, Mont.

One of the great drawbacks of this, and any other lixiviation process yielding a base precipitate, the treatment of the sulphides, is now believed to have been overcome. FREDERICK P. DEWEY, controlling a process invented by CABELL WHITEHEAD, having contracted to treat the product for 1½ cents per ounce of silver contained, which is much less, without including the frequent loss, than it has been done for heretofore.

The process is now fairly established. The experience obtained has again shown the fallacy of several unmetallurgical theories, which contributed in no small degree to many of the failures made, and we may expect to hear of repeated success where it is introduced on a sound basis.

#### THE ALABAMA GEOLOGICAL SURVEY.

It is to be hoped that the bill for the abolishment of the Alabama Geological Survey, now before the legislature of that State, will fail to pass. There is, perhaps, no State that needs a geological survey more than Alabama, and certainly no State has had better service or a better return upon the money invested. Even were this not true, if the State could, with justice, say that the pittance it doles out to the survey had not been judiciously expended, there would still be no adequate reason for economising in this direction. It is said that the revenues of the State,

on account of shrinkage in "boom valuations," will be some \$200,000 a year less than they were two years ago. It is to meet a threatened deficit in the State Treasury that stringent economies are to be set on foot, and the survey has been marked for destruction or such curtailment as will seriously interfere with its usefulness. Coming at a time when the U. S. Survey is badly crippled, and therefore unable to supplement the appropriation by the State, the plan is all the more reprehensible. The National Government makes no direct appropriation available for State work, but it has been the custom for some years for the Director of the U. S. Survey to detail men who work in accord with the State Geologists, and in this way the States receive great benefit from the National Survey.

From present appearances, however, this source of help will be cut off, if not entirely, at least in great measure, and the states will have to look out for themselves, as indeed they should do.

Alabama can not afford to dispense with her survey. Not the tenth part of her territory has been examined and mapped by competent men, nor the twentieth part of her wealth brought to public notice. The detailed survey of the Warrior Coal Field has not progressed beyond a reconnaissance, the immense beds of fire and china clay have scarcely been touched, although enough has been done to show their probable extent and quality; the gold fields of eastern Alabama and the magnetic ores of Cleburne and Clay counties have been noticed all too briefly; the brown iron ores and the recently exposed deposits of bauxite demand the most careful examination; in fact, the entire State is not only worthy of an appropriation ten times the paltry \$7,500 that is now available, but such an expenditure would prove an extremely remunerative one in the development of the mineral industry it would promote.

Of recent years the people of Alabama have shown a keen interest in the great currents of industry that are tossing to and fro, seeking new channels, and making them. But, as a State, Alabama has not shown the enthusiasm that was to have been expected. She kept the Geological Survey at \$500 a year for a long time, then advanced to \$5,000, and within the last two years to \$7,500. There are but few men who would have stood in the breach as Dr. SMITH has done, and have managed to do so much with so little. In economy of administration, in untiring efforts to prove the reality of the wealth that many suspected but few knew, in excellence of results from a minimum of capital, the Alabama Geological Survey compares well with that of any other State or with the national survey. We cannot but regard any attempt to interfere with it as extremely unwise.

There is an economy that is wastefulness and there is a liberality in expenditure that is the best economy. Nothing is truer in these days of fierce competition than that *advertising pays*. The standing advertisement of Alabama which her geological survey has given her in calling attention to her great mineral resources, the richness of her soil and the excellence of her climate has increased her taxable values to a degree which has made it the best investment the State has ever entered upon.

Alabama now ranks second in the production of iron ore and probably third in the output of coal, and it was the geological survey that first called the attention of capitalists to the wealth these statements imply.

Without the survey, the official representative of the State's natural resources, a great deal of the interest that now centers around it would flag, and more enterprising, although perhaps no richer, states would secure the investment that capital is constantly seeking.

The usefulness of the survey is not to be measured by the attention it devotes to private interests, however important these may appear to some, but it is measured by the position the State is enabled to occupy through its exertions. It should not be a question of a few thousand dollars, more or less, for the public good is not to be estimated in this way. But it is a question of what the State hopes to do and to be among her sister States, and whether or no she will, for the sake of a few thousand dollars a year, leave the world in ignorance of her resources. There is to be no Alabama display at the World's Fair. This is bad enough, but if the survey is to be wrecked she may well quote what is said to be the significance of her motto, Alabama. Here we rest under a mulberry tree, waiting for some capitalist to come along and remove the moss.

#### 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 a review in another page of the Journal.

*The Woodworkers' Manual.* By C. R. Tompkins, M. E. Published by the John A. White Company, Dover, N. J., 1892. Pages, 60. Price, 50c. Illustrated.

**Solder for Aluminum.**—Mr. Alexis Rader of Christiania, Norway, recommends an alloy of the following composition as a solder for aluminum: Cadmium, 50%; zinc, 20%; tin, 30%. The zinc is first melted in any suitable vessel and then the cadmium is added and afterward the tin in small pieces.

NEW PUBLICATIONS.

**ELECTRICITY AND MAGNETISM.** Being a series of advanced primers. New York. By Prof. E. J. Houston. The W. J. Johnston Company, Limited. Cloth. 306 pages, 116 illustrations. Price \$1.00.

This volume contains 18 primers, originally compiled by Prof. Houston for the benefit of visitors to the Philadelphia Electrical Exhibition of 1884, but since enlarged and modernized so as to appeal to a more ambitious class of readers though with loss of none of the simplicity and clarity which then characterized them. The subjects of the different primers relate to the various sources and phenomena of static and current electricity and of magnetism, with practical deductions and applications. Atmospheric electricity and phenomena of the earth's magnetism receive a particularly interesting treatment, and the primers on the electro-magnet, electro-receptive devices and frictional and influence machines are very practical in their scope. While of great value to the student, it is a handy work for even an advanced electrician to have in his library.

**AN INTRODUCTION TO QUALITATIVE CHEMICAL ANALYSIS BY THE INDUCTIVE METHOD,** a Laboratory Manual for Colleges and High Schools, by Delos Fall, M. S., Prof. Chem. Albion College, pp. 84. Leach, Shewell & Sanborne, Boston and New York, 1892. Price not stated.

There are two methods for the study of qualitative chemical analysis, one in which the teacher does most of the work and the student merely repeats the lecture-room experiments, and the other serves to stimulate independent work. Professor Fall terms this the Inductive method, and in the hands of students who have already had considerable experience it seems to work well enough. But independency of work on the part of chemical students is apt to run onto dangerous ground, and unless each step is explained they are sure to become confused. Professor Fall takes too much for granted. He supposes a degree of knowledge that is possessed by but few students of Qualitative Analysis, and steps at once into the wide expanse of "saturation," "valency," etc., without due preparation. Our experience with students in the Qualitative Laboratory is that they need above everything else practice in manipulation and the carrying out of written instructions.

For advanced students Professor Fall's book may do very well, but a simpler course is required for beginners. There are very few chemical students who can be taken, neck and crop and pitched into the middle of Qualitative Analysis.

CORRESPONDENCE.

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

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

The Mesaba Range.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: It can no longer be doubted that the Mesaba Range will very soon become a great iron producing district, possibly the great iron range of Lake Superior. These iron ore deposits are remarkable in several ways and not least in their magnitude. Indeed, the discoveries of ore made during the fall have astonished even the men who believed most faithfully in the greatness of the range. There are now perhaps a dozen companies which have shown up large deposits of high grade Bessemer ore. Mr. J. T. Jones, who leased part of the Biwabik property, calculates to have in sight capacity of 20,000,000 tons of ore, of which probably three-quarters is Bessemer grade; that is, iron about 64%, phosphorus—about .035 to .040.

The most remarkable mine, however, is probably the Mountain Iron. Test pits had been sunk over an area of about 2,000 ft. x 700-800 ft., all in good ore, when a place was discovered where the soft ore crops up through the overlying drift. A shaft has been sunk on this place to a depth from surface of 40 ft., and considerable cross-cuts and drifts made. I went through all the drifts, and there is nothing to be seen but clean rich ore. They have shipped this fall already, I think, about 2,000 or 3,000 tons. I have not seen any calculation of the quantity of their ore, nor made one myself; but, judging from the test pits, they have an enormous quantity of good ore. I visited some other properties in the same township where the test pits show up excellent deposits of ore.

I think I gave in a former letter the average of the ore at 60% iron and .045% phos. I am glad to say that my view was conservative, and that the ore is likely to be considerably better. I give some of my own determinations as proof: The Mountain iron ore shipped this fall, samples from different days give: Iron, 64.35; phos., .028, 63.88—.027, 63.63—.040, 64.12—.039, 63.53—.032, etc. Samples from Biwabik property in same township: Iron, 68.21; phos., .0299, 65.64—.012. From other properties, such as: 63.20—.034, 62.59—.043, 67.22—.007, 62.44—.055, 65.66—.032, 62.76—.028, 62.87—.029, etc. To be sure there is also some poorer, non-Bessemer ore, but almost entirely in the upper parts of the deposits. As a rule the ore becomes richer in iron and poorer in phosphorus as depth is attained.

The shipments from the range next summer are expected to reach one and a half million tons; if they do it will probably depend on the carrying and shipping capacities of the railroads.

Yours truly,

T. L. LAMMERS.

DULUTH Minn., Nov. 29, 1892.

**Iron Manufacture in South Australia.**—Some twenty years ago enormous quantities of very rich magnetite and hematite were discovered in South Australia, but the absence of any local coal made it impossible to utilize these very valuable deposits of iron ore. Since the discovery of coal in that province a year ago attention has again been directed to these deposits, and the result is that a company has been formed to start mining the ore, and another company is erecting an iron and steel works at Port Victor. The magnetite gives the following analysis: Peroxide of iron, 67.92%; peroxide of iron, 30.25%; alumina, 0.14%; magnesia, 0.61%; sulphur, 0.02%; silica, 1.56%; manganese, 0.12%; lime, trace; total, 100.62; metallic iron constituent, 74.25%. The hematite ore has the following composition: Peroxide of iron, 96.60%; lime, 0.10%; magnesia, 0.30%; silica, 1.07%; water, 1.30%; total, 99.37; metallic iron constituent, 70.00. The steelworks will manufacture Siemens-Martin steel, which will be mostly used in producing railway material, railroads, fencing and telegraph wires.

ABSTRACTS OF OFFICIAL REPORTS.

The Colorado Central Consolidated Mining Company.

The report of this company for the year ended Oct. 31st, 1892, recently issued, shows that in spite of the low value of silver, dividends amounting to \$55,000 were paid and a cash balance of \$89,255.34 carried over, but slightly less than that of the previous year. During the year, however, the company had to struggle with a number of unfavorable circumstances, particularly litigation. The United States Circuit Court of Appeals, at St. Louis, rendered an adverse decision in the Turck case. A petition for a rehearing has been presented to the court, but no decision on it has as yet been rendered. The Nolan controversy is about to be compromised, but the Kirtly litigation remains as it was in 1891.

An increase in value of product was made, with a slightly diminished tonnage; no part of this ore was extracted from any territory in controversy with their neighbors. The output for the year was 1,251 tons, 795 lbs. gross weight, or 1,232 tons, 1,477 lbs. net weight, containing 281,969.7 ounces of silver, for which \$228,494.93 was received. The average assay value of the ore was 228.7 oz. silver per ton, and the average price received per ton was \$185.35, an increase of 44.7 oz. per ton over last year; but owing to the depreciation in the value of silver, an increase of only \$23.05 per ton on the amount received.

For the fiscal year the average price of silver was only 88.4 cents per ounce, the lowest average of any year since the company commenced operations, and 11.3 cents per ounce lower than last year, which made a difference of \$30,269.45 in the value of the ore. Based upon the coinage value of silver and the market value, the loss upon last year's product was \$109,559.32.

The present condition of the mine is not so encouraging as it was a year ago, notwithstanding development has opened up a much larger amount of ground, and the ore stoped was less than in former years. The reserves, however, are not looking so well; the ground opened in the lower levels has thus far not proved as productive or the ore as rich as that found above. During the last two months, however, Superintendent Foster has been considerably encouraged by the appearance of the 1,000-foot level, and has great hopes of developing some rich ore bodies at this point. He believes that the output for the coming year will be a fairly good one, and that unless the price of silver falls still lower than it already is, work will be profitable.

As stated previously the output in cash amounted to \$228,494.93, and receipts from all sources to \$243,240.43. The total expenditures amounted to \$245,672.37, thus decreasing the cash balance of \$49,687.28 to \$47,255.34. The detailed and per ton expenditures were as follows:

	Total.	Per ton.		Total.	Per ton.
Paid to lessees	\$126,606.25	\$101.20	Salaries	\$8,500.00	\$3.79
Dividend expenses	55,245.03	44.16	Real estate and im-		
Labor	29,565.00	23.62	provements	4,684.75	3.74
Supplies	7,968.14	6.30	Miscellaneous	4,808.60	3.84
Timber and lumber	3,411.55	2.72			
Legal expenses	4,883.05	3.91	Total	\$245,672.37	\$196.27

If from the total of \$196.27 per ton, the dividends paid and the receipts from leases and sales of supplies be deducted, the true working cost, \$142.78 per ton, will be found.

THE SILVER CONVENTION AT EL PASO.

During the meeting resolutions were introduced and unanimously adopted favoring the free and unlimited coinage of silver. The official registry shows that over 600 miners were in attendance. Mr. Walter C. Hadley, of Hadley, N. Mex., was the permanent chairman, and H. B. Holt, of Las Cruces, secretary. The next S. W. Silver Convention will be held at Silver City, N. Mex., on July 4th, 1893.

An event of great importance during the Silver Convention, to the Mining Industry of the Southwest and the one that will be of benefit to El Paso was that of the perfection of the organization of the Southwestern Mining Engineers' Association. On December 6th, at 4:30 P. M., at the Franklin Club the meeting at which 30 engineers were present, was called to order by Prof. Chas. Longuemare who briefly stated its object. Mr. A. Munzenburger, of Sabin, Mex., was made temporary chairman and O. F. Heckelmann, secretary. The secretary was called upon to give a review of the preliminary meetings, after which the election of permanent officers was proceeded with. Prof. Chas. Longuemare was unanimously elected president of the association amid applause. He at first declined but he was finally persuaded to accept the honor. O. F. Heckelmann was elected secretary and F. W. Edelman treasurer. The constitution drafted by the executive committee was then read and adopted. The following officers were then elected under the provisions of the constitution:

For directors: Bro. Amian, Sante Fe, N. Mex.; W. F. Staunton, Tombstone, A. T.; B. Salazar, of Juarez, Mex.; Geo. Waring, Silver City, N. Mex.; D. W. Reckhart, El Paso, Tex.; Britton Davis, Corralitos, Mex.

Vice-Presidents: Walter C. Hadley, Hadley, N. Mex.; A. Munzenburger, Sabin, Mex.; J. D. Groesbeck, El Paso, Tex.; J. F. Blandy Prescott, A. T.; John B. Farish, Denver, Colo.; H. J. Clifford, Carrizo, Tex.

On motion of Mr. Hadley, the El Paso Bullion was declared the official organ of the association. A committee of three was appointed on a proposed plan of excursion to the Grand Canyon of Colorado. Mr. Roberts, of Albuquerque, was made a committee of one on transportation in reference to the excursion. Messrs. Carrera and Hampton were appointed a committee on incorporation and reported after legal consultation that it would be to the interest of the association to incorporate under the laws of New Mexico. This report was adopted and Bro. Amian, of Sante Fe, was added to the incorporation committee, with full power to act in the matter of incorporation.

A committee of three, consisting of Messrs. Groesbeck, Herbert and Carrera were appointed to select the name for the association, and, after consultation recommended the name of "The Southwestern Association of Mining Engineers," which was adopted. Professor Carrera gave notice that at the next meeting he would read a paper on the important subject of the supply of water for the Southwest. The meeting then adjourned, subject to the call of the Board of Directors.

**RUSSELL PROCESS AT THE MARSAC MILL VS. AMALGAMATION AT THE ONTARIO.**

Written for the Engineering and Mining Journal by W. G. Lamb.\*

The Russell process has now been in continuous use at the Marsac for nearly four years, starting January 1st, 1889, superseding amalgamation at the end of that year. The statistics of amalgamation here given are from the Ontario Mill, located in the same camp. In that mill amalgamation has been in continuous use since its start in January, 1877. Owing to this long experience, as good results by this process as are possible, are obtained at the Ontario.

As the wages and prices of fuel and supplies are the same for the two mills, a comparison of statistics is of value in determining the general efficiency and economy of the two processes. The figures here given are taken from the books and reports of the two companies, and are published by the permission of the managements. The properties of the two companies, the Ontario and Daly, adjoin and are on the same vein.

The equipment of the two mills and mill men employed, is as follows: Ontario: 2 rock crushers, 2 rotary driers, 40 ore stamps, 10 salt stamps, 2 Stetefeldt furnaces, 24 pans, 12 settlers, 71 mill men.

Marsac: 1 rock crusher, 2 rotary driers, 30 ore stamps, 5 salt stamps, 1 Stetefeldt furnace, 6 16½-ft. ore vats, 8 9-ft. precipitating tanks, 51 mill men.

The analyses and values of the ore treated at the Ontario and Marsac mills for 1891, are as follows, the samples on which these analyses were made being composed of all the battery samples taken each day during the entire year.

	Ontario.	Marsac.
Silica.....	75.0	76.60
Zinc.....	5.73	5.30
Lead.....	1.80	3.50
Iron.....	2.80	1.65
Sulphur.....	2.23	0.70
Lime (CaO).....	1.76	1.32
Magnesia (MgO).....	0.23	trace
Copper.....	0.29	0.39
Silver (oz.).....	39.50	39.10
Gold (oz.).....	0.044 (\$0.91)	0.041 (\$0.91)

The following table gives the crushing statistics for 1891:

Mill.	Ore. Tons.	Time battery run. Days.	Mesh of screen.	Rate of crushing per day. Tons.	Rate of crushing per stamp per day. Tons.
Ontario, 40 stamps.....	25,650	341.8	26	75.0	1.87
Marsac, 30 stamps.....	24,214	347.0	20	70.0	2.33

The above difference in rate of crushing per stamp is probably not due entirely to difference in mesh of screen, as Ontario ore may not crush so fast as Daly, even in the same battery and with the same mesh of screen.

The Ontario product in bars of bullion averaged 425 fine in silver and 0.25 fine in gold; it contained also 57.5% copper. The Daly precipitates including those from the wash water, but not the lead carbonate, product averaged 313 fine in silver and 0.26 fine in gold; they contained 15 3-10% copper.

The cost of marketing the product was 3.47 cents per ounce for Ontario bullion and 3.45 cents per ounce for Marsac sulphides. The price obtained was 97.55 cents per ounce for silver in Ontario bullion and 97 cents for that in Marsac sulphides.

While the Marsac sulphides were shipped, \$20 per ounce was received for the contained gold, against nothing for that in Ontario bullion. Since shipments were suspended and refining began, no payment has been made for the gold in the Marsac bullion, which runs 923 fine in silver and 0.07 fine in gold.

The following is the consumption of water chemicals, iron and power per ton of ore at the Ontario and Marsac mills:

	Water. Cu. ft.	Chemicals and mercury (cost.)	Iron (lbs.)	Power.*	Machinery expenses.
Ontario.....	400	\$1.315	5.5	108 H. P.	\$0.31
Marsac.....	56	0.924	0.05	8 H. P.	0.07

\* This is for power for driving pans, and settlers at the Ontario, and for stirring and handling solution and grinding sulphides at the Marsac.

The consumption of chemicals has increased since 1890, owing to the adoption of hot solutions. The production increased 2 8-10%, however, and while the total cost was increased \$7,339.98, the net gain in extraction, after deducting the extra cost, amounted to \$18,478.92.

Following are some additional details of work at the Marsac and Ontario mills in 1891, when the 30-stamp Marsac mill crushed 24,215 tons of ore through a 20-mesh screen, against 25,650 tons through a 26-mesh screen at the 40-stamp Ontario mill:

	Fuel per ton.	Salt used in roasting. Per cent.	Labor.*	Extraction of silver. Per cent.
Ontario, cords of wood.....	153	13.9	\$0.46	90.8
Marsac, tons of coal.....	0.87	8.26	0.31	91.8

\* Labor includes that on the pans, amalgam and bullion at the Ontario, and on the vats and shipment of sulphides at the Marsac.

During 1892, up to Dec. 1, the percentage of salt used at the Ontario has been increased to 14.2%, and that at the Marsac 9.5%. The extraction at the Ontario mill remained at 90.8%, and that at the Marsac 91.0%. It is probable that the extraction at the Marsac would be increased if the cooling floor space was increased so as to allow the ore to cool without wetting down. This would increase the expense, it is estimated, but 13 cents per ton.

The following is the detailed annual cost of the lixiviation department at the Marsac Mill.

\* Superintendent of the Leaching Department, Marsac Mill, Park City, Utah.

	Total annual cost.	Per ton
Labor.—1 foreman at \$5.00, 3 leachers at \$4.00, 3 shovelers at \$3.00, 1 pressman at \$3.50, roustabout at \$1.50.....	\$16,790.00	\$0.6934
Chemicals.—Hypo-sulphite.....152,808 lbs. @ .0362 = \$5,531.64		
Bluestone.....78,569 lbs. @ .0641 = 5,036.27		
Causic.....119,741 lbs. @ .0555 = 6,645.62		
Sulphur.....80,486 lbs. @ .0257 = 2,068.49		
Soda Ash.....22,369 lbs. @ .0317 = 707.19	19,989.00	0.8255
Repairs.—One machinist at \$4.00, materials and supplies at \$2.50 a day.....	2,372.50	0.0979
Power.....	3,139.89	0.1297
Assay Office.....	2,008.82	0.0830
Total.....	\$44,350.21	\$1.8295

Figures for the following comparison of the Ontario and Marsac, results for 1891, are taken from the respective reports of the Ontario and Daly Mining Companies:

Ontario.—Cost of milling per ton.....	\$8.93	
Product expense.....	1.23	
Total.....	\$10.16	
Marsac.—Cost of milling per ton.....	\$6.37	
Product expenses.....	1.23½	
Total.....	7.50	
Difference in favor of Marsac.....	\$2.65½	
Ontario.—Mill extraction.....	91.0	
Marsac.—Mill extraction.....	91.57	
Difference in favor of Marsac.....	0.57% = 0.21½	
Ontario, realized from gold.....	00	
Marsac, realized from gold per ton.....	63½	
Difference in favor of the Marsac.....	0.63½	
Total difference in favor of the Marsac and the Russell process.....	\$3.50½	

This total difference of \$3.50½ would have made a saving of \$91,057 had the Ontario ore, amounting to 25,650 tons in 1891, been treated by the Russell process.

To treat about the same number of tons of ore per day, of approximately the same composition as at the Marsac, the Ontario (amalgamation) requires more power, 39% more labor, 30% more stamps, twice the number of furnaces, 48% more salt, and 40% greater cost of chemicals, and yields a less per cent. both of gold and silver than the Marsac Mill, using the Russell process.

**MINERAL PRODUCTS OF THE UNITED STATES FOR 1891.**

The United States Geological Survey, Division of Mining Statistics and Technology, has sent us an advance proof of the next edition of the chart showing the total mineral products of the United States, which will be issued in a short time. The figures for 1891 are here reproduced:

PRODUCTS,	Quantity.	1891.	Value.
Metallic:			
Pig iron, value at Philadelphia.....long tons	8,279,790		\$128,337,985
Silver, coining value.....troy oz.	58,300,000		75,416,565
Gold, coining value.....troy oz.	1,604,840		33,175,000
Copper, value at New York City.....lbs.	295,810,076		38,455,300
Lead, value at New York City.....short tons	202,406		17,604,322
Zinc, value at New York City.....short tons	80,537		8,033,700
Quicksilver, value at San Francisco.....flasks	2,904		1,036,386
Nickel, value at Philadelphia.....lbs.	118,498		71,099
Aluminum, value at Pittsburgh.....lbs.	150,000		104,000
Tin.....lbs.	125,289		25,058
Antimony, value at San Francisco.....short tons	278		47,007
Platinum, value (crude) at San Francisco.....troy oz.	100		500
Total value metallic products.....			\$302,307,922
Non-Metallic (Spot Values).			
Bituminous coal.....long tons	105,291,721		\$117,106,483
Pennsylvania anthracite.....long tons	45,236,992		73,944,735
Building stone.....			47,294,746
Petroleum.....bbls.	54,291,980		32,575,138
Lime.....bbls.	60,000,000		35,000,000
Natural gas.....			18,000,000
Cement.....bbls.	8,222,792		6,680,951
Salt.....bbls.	9,987,945		4,716,121
Phosphate rock.....long tons	587,988		3,651,150
Limestone for iron flux.....long tons	5,000,000		2,300,000
Mineral waters.....gallons sold	18,392,732		2,996,259
Zinc white.....short tons	1,000,000		1,000,000
Potters' clay.....long tons	400,000		900,000
Mineral paints.....long tons	47,652		658,478
Borax.....lbs.	13,380,000		869,700
Gypsum.....short tons	208,126		628,051
Grindstones.....			476,113
Fibrous talc.....short tons	53,054		493,068
Pyrites.....long tons	119,320		338,880
Soapstone.....short tons	16,514		213,981
Manganese ore.....long tons	23,416		239,129
Asphaltum.....short tons	45,054		242,264
Precious stones.....			235,300
Bromine.....lbs.	343,000		54,880
Corundum.....short tons	3,247		88,430
Barytes (crude).....long tons	31,069		118,363
Graphite.....lbs.			110,000
Millstones.....			16,587
Novaculite.....lbs.	1,375,000		150,000
Marls.....short tons	135,000		67,500
Flint.....long tons	15,000		60,000
Fluorspar.....short tons	10,044		73,330
Chromic iron ore.....long tons	1,372		20,580
Infusorial earth.....short tons			21,988
Feldspar.....long tons	10,000		50,000
Mica.....lbs.	75,000		100,000
Ozokerite, refined.....lbs.	50,000		7,000
Cobalt oxide.....lbs.	7,200		18,000
Slate, ground as a pigment.....long tons	2,000		20,000
Sulphur.....short tons	1,200		39,600
Asbestos.....short tons	65		3,960
Ituile.....lbs.	300		800
Lithographic stone.....short tons			
Total value non-metallic products.....			\$356,216,615
Total value metallic products.....			302,307,922
Estimated value mineral products unspecified.....			10,000,000
Grand total.....			\$668,524,537

## THE LATE PROF. JOHN STRONG NEWBERRY.

The sad announcement was made in our issue of the 10th inst. of the death, on the 7th inst., of Prof. J. S. Newberry, who has held, since 1866, the chair of geology and palaeontology at the Columbia School of Mines. Dr. Newberry was born in Windsor, near Hartford, Conn., Dec. 22, 1822. His ancestors were among the founders of Windsor, and helped to settle it in 1635. Dr. Newberry's grandfather, the Hon. Roger Newberry, was a director in the Connecticut company that purchased the tract in northeastern Ohio, known as the Western Reserve, and thither his father removed in 1824. The family settled at Cuyahoga Falls, south of Cleveland, and here the elder Newberry became actively engaged in opening up the coal resources of eastern Ohio, and, obtaining an outlet for them to Lake Erie. After preparations for college, Dr. Newberry entered the Western Reserve University at Hudson, O., and was graduated in 1846. He next studied medicine in the Cleveland Medical School, and received his degree of M. D. in 1848. The attractions of European study led him shortly after to Paris. Returning to America, he began in 1851 the practice of medicine in Cleveland, and soon gained a wide clientele, but his tastes for natural history kept making his profession more and more irksome, and finally he abandoned Cleveland and active practice. He became in May, 1855, assistant surgeon and geologist to the exploring party that was sent out by the War Department under Lieut. R. S. Williamson to traverse the country between San Francisco and the Columbia River.

Dr. Newberry next became geologist to the "Ives Expedition." This party was sent out to explore the Colorado River in 1857-58. In 1859 he was again in the field as naturalist to an expedition under Capt. J.

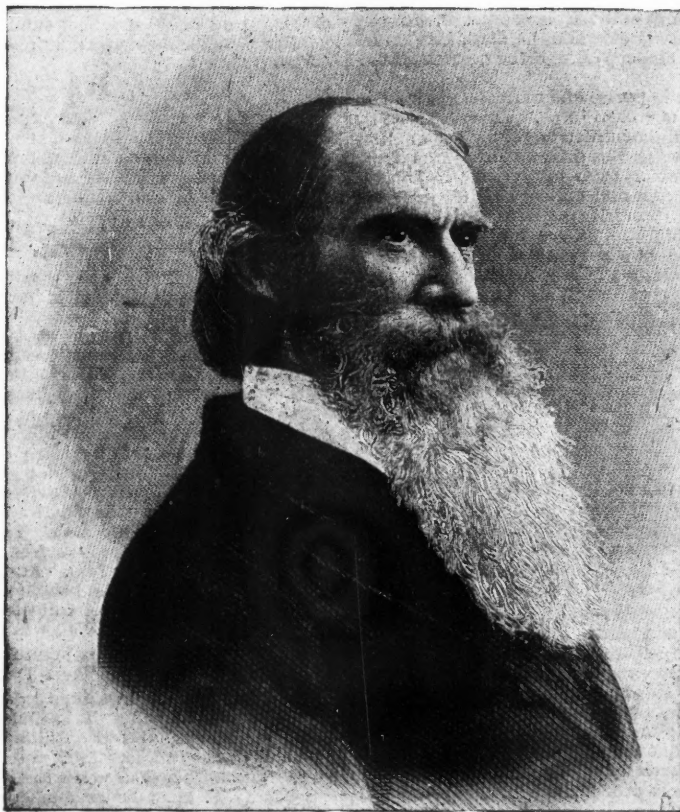
he was chosen president of the New York Academy of Sciences. For twenty-four years Dr. Newberry remained president of this body, and during the last year of his life, and at the time of his death, was its honorary president. Dr. Newberry also became president of the Torrey Botanical Club, and occupied the position from 1880 up to 1890, a period of ten years.

Largely in immediate recognition of his palaeontological works, the Geological Society of London conferred on Dr. Newberry in 1888 the Murchison gold medal, awarded for distinguished services in geology. The crowning honor of his life came, however, in 1891.

In the late seventies the subject of an international congress of geologists was broached in the American Association, and Dr. Newberry was appointed one of the committee to carry the matter through. The movement led to the organization of the congress, which has now had four meetings, at intervals of three years, and in several countries. The last was in Washington in August, 1891, which chose Dr. Newberry for its presiding officer. The honor was the crowning one in a long and fruitful life, but it came after its recipient was too weakened to take the chair.

It was in the winter of 1889-90 that exhausting labor began to tell heavily on a constitution which had seemed proof against fatigue. In the winter of this year a heavy cold and attendant weakness culminated in the following December with a paralytic stroke, from the effects of which he never recovered.

His skilled touch has been felt upon almost all lines of geological work, and in almost all departments of natural history. He represents a generation of scientific men, now fast passing away, who felt, in the words of John Wesley, that the world was their parish. What-



THE LATE PROF. JOHN STRONG NEWBERRY.

N. Macomb, which explored the San Juan country of southwestern Colorado, and the neighboring parts of Utah, Arizona and New Mexico.

Shortly after the trip was completed the civil war broke out, and Dr. Newberry was summoned to the newly organized Sanitary Commission, in which, on June 14th, 1861, he took his place, although to the time attached to the War Department. But the work of the Commission was imperative, and in September Dr. Newberry resigned from the War Department and became secretary of the Western branch, making his headquarters at Cleveland. All the operations in the Mississippi Valley and its tributaries were under his direction, and distributing depots were quickly established at many points. At times Dr. Newberry followed the army and was himself present at the battle of Chattanooga, overseeing the work of his organization. At the close of the war he made his final report. Dr. Newberry then returned to Washington and became attached to the Smithsonian Institution. He also held a professorship in Columbian University, Washington, to which he had been called in 1857. In 1864 the School of Mines of Columbia College, New York, was founded, and in 1866 the chair of geology and palaeontology was created, and a call was extended to Dr. Newberry. He accepted it and remained in the uninterrupted discharge of his duties until a stroke of paralysis, Dec. 3, 1890, made work impossible.

When the National Academy of Science was established, Dr. Newberry was named by Congress as one of the incorporators, and became one of the familiar figures at its meetings. In 1867 his alma mater honored herself and him by bestowing the degree of LL. D. In the same year Dr. Newberry was president of the American Association for the Advancement of Science, and delivered the annual address at Burlington, Vt. Likewise in 1867, soon after his coming to New York,

ever criticism might be made of his work must take this line, that in later years it has been practically impossible for any one to cover so wide a field.

Dr. Newberry had also a strong passion for music. He was likewise gifted with skill in sketching, and many illustrations of fossils and of scenery in his reports are from his own hand. He had a charming literary style, and in descriptions of the grand phenomena of the West, often manifested a highly artistic use of words. In his scientific work he was gifted with the power of a seer, and has shown in several instances an almost prophetic instinct in indicating the results at which investigations later made would arrive. His determinations of strata in the West, though based on the hasty utterances of exploring parties, have been quite without exception justified by later and more deliberate work.

With his students his relations were marked by great kindness, and among them he was universally beloved. There are no School of Mines' graduates who do not preserve a tender feeling for one whom among themselves, and with no feeling of disrespect, but rather as a mark of affection, they called "Uncle John."

Dr. Newberry numbered among his friends and correspondents scientific men in all parts of the world. In New York he was a member of the Century Club, the New York Yacht Club and several minor societies.

He was married in Cleveland in 1848 to Miss Sarah B. Gaylord, who with six of their seven children, five sons and one daughter, survive him. To the family of so eminent and honored a husband and father, the sympathies of all friends may be extended.

J. F. KEMP.]

## THE CHEMISTRY OF GOSSAN.

Written for the Engineering and Mining Journal by Stephen H. Emmens.

Cornish miners have a saying that "gossan rides a high horse," and the German miners declare

"Es ist nie ein Gang so gut  
Der trägt nicht einen eisernen Hut."

The gossan or gozzan, or *eisernen Hut*, or *chapeau de fer*, as the French miners call it, is the iron cap that surmounts so many mineral veins in the form of a more or less porous, cellular and reticulated mass of hydrated ferric oxide mixed with rocky matter. It is usually regarded as a promising indication, and in the majority of cases a body of ore is found underlying the gossan. This arises from the fact that gossan itself is the residue or skeleton, as it were, of a whilom mass of ore that has decayed and partially disappeared through the action of the atmosphere and moisture. If, then, the original body of ore extended to a depth below the region of atmospheric action, or if the outcrop of the vein has not been exposed to such action for any relatively long period, the gossan will be found surmounting unaltered ore. If, on the other hand, the original body of ore were of comparatively small dimensions, the gossan indication may not lead to any discovery.

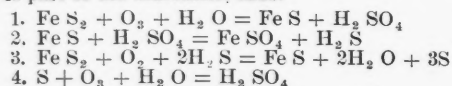
The "brown ores" of the Southern gold mines and other districts are the best known representatives in this country of the "gossans" of Cornwall. They have been produced by the same natural forces acting in the same way; and as the industrial future of the South will be greatly influenced by the attention or inattention given to her gold mines, the study of the natural philosophy of gossan becomes a matter of national importance, it thereby the intelligence of capitalists can be awakened to the facts and probabilities of the case.

Let us suppose that the outcrop of a mineral vein is composed of rocky matter (gangue), carrying crystals and specks and patches, and larger bodies of pyrite, marcasite, pyrrhotite, chalcocopyrite, blende, galena, chalcocite, bornite, millerite and folgerite.

It is known that part of the sulphur in pyrite and marcasite is held in combination by a comparatively feeble chemical force. This is proved by the ease with which one half of the sulphur is driven off by the application of very moderate heat, while the balance is difficult to separate from the iron. In marcasite the union is feebler than in pyrite. In pyrrhotite, chalcocopyrite and bornite also, there is a molecule of sulphur in excess of iron monosulphide, and this extra molecule is removed with comparative ease. But in blende, millerite, folgerite, galena and chalcocite the constitution is that of either a monosulphide or subsulphide. It follows, therefore, that the oxygen of the atmosphere will, on the principle of producing the most heat, attack the respective sulphides in the following order:

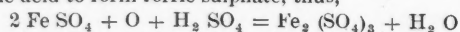
- |                    |                |
|--------------------|----------------|
| 1. Marcasite.      | 6. Folgerite.  |
| 2. Pyrite.         | 7. Millerite.  |
| 3. Pyrrhotite.     | 8. Chalcocite. |
| 4. Chalcocopyrite. | 9. Galena.     |
| 5. Bornite.        | 10. Blende.    |

In nature all the minerals would be attacked simultaneously, because the surface of each would be more or less exposed independently to the atmosphere; and the selective action of the oxygen would be manifested by the varying speed and extent of the attack. For the purpose of the present discussion, however, we may consider the attack to begin with the oxidation of part of the marcasite, thus:



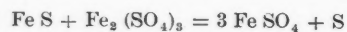
That is to say, the oxygen of the atmosphere and the moisture of the ground and air convert part of the sulphur into sulphuric acid and leave a residue of iron monosulphide, which is then attacked by the sulphuric acid with formation of ferrous sulphate and evolution of sulphuretted hydrogen. This latter reacts with the sulphurous anhydride formed (together with sulphuric acid) by the oxidation of the sulphur in the marcasite, and produces water and free sulphur, the latter of which is in its turn oxidized and produces a further quantity of sulphuric acid, and so on. Hence, as the result of the first attack on the ores we should expect to find ferrous sulphate, sulphuretted hydrogen, free sulphur and sulphuric acid.

Now, a solution of ferrous sulphate eagerly absorbs atmospheric oxygen and sulphuric acid to form ferric sulphate, thus,



and therefore, although I have spoken of ferrous sulphate and free sulphuric acid as amongst the first results of the gossan-forming action, they are rapidly converted into a solution of ferric sulphate; and it is in this latter form that they are usually found in mine-waters and the like. In some cases, however, where local circumstances impede peroxidation, ferrous sulphate remains in considerable quantity, as, for example, in the manufacture of copper by exposing large heaps of pyrite to the action of the atmosphere and moisture.

Let us next consider what will be the action of the ferric sulphate upon the remaining ferrous sulphide. This is shown by the following equation:—



or, in other words, one molecule of ferric sulphate will abstract one molecule of iron from ferrous sulphide, forming 3 molecules of ferrous sulphate and setting free the sulphur. That this change is feasible and, indeed, necessary (if we accept the Law of Maximum Work), may be shown by a consideration of the forces concerned as measured by their heat equivalents.

The heat produced is that corresponding to 3 molecules of ferrous sulphate, viz .....	3 × 93,200	279,600
The heat absorbed is:		
1 Molecule of ferrous sulphide.....	23,780	
1 Molecule of ferric sulphate.....	224,970	
		248,750
Gain.....		30,850

We see that the ferric sulphate becomes reduced to ferrous sulphate again. This latter absorbs a fresh quantity of oxygen from the air and

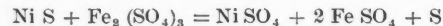
changes to ferric sulphate which, in its turn, attacks additional ferrous sulphide, and this process goes on until all the marcasite is dissolved away from the vein.

Next comes the turn of the pyrite, which, by precisely similar actions and reactions, is dissolved. The pyrrhotite follows in like manner.

We now arrive at the chalcocopyrite. The mineral when analyzed shows a composition corresponding to  $\text{Cu}_2\text{Fe}_2\text{S}_4$ . What may be the precise arrangement of these molecules none as yet know; but it is customary and convenient, and, for the purpose of this discussion, not misleading, to consider the structure as a combination of one molecule of cuprous sulphide (chalcocite) with one of ferric sulphide, thus,  $\text{Cu}_2\text{S} \cdot \text{Fe}_2\text{S}_2$ . Here, then, part of the mineral consists of an iron sulphide, which, of course, is attacked and dissolved by the ferric sulphate left from the destruction of the sulphides previously dissolved.

The bornite ( $3\text{Cu}_2\text{S} \cdot \text{Fe}_2\text{S}_2$ ) and folgerite ( $\text{NiFeS}$ ) are then robbed of their contained iron sulphides; and the ore in the vein is reduced to an aggregation of millerite, chalcocite, galena and blende. These minerals, we have already seen, are subject to attack by the atmosphere in the order here given; and we must now enquire whether they can also be attacked by ferric sulphate; and, if so, whether in the same or any other order.

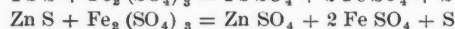
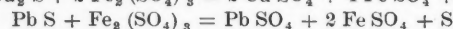
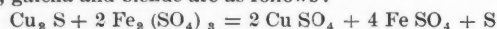
In the case of millerite the equation of attack, if attack be possible, will evidently be



the heat balance sheet of which is:

Cr.	1 molecule of nickel sulphate	86,950
	2 molecule of ferrous sulphate	186,400
		273,350
Dr.	1 molecule of nickel sulphide	19,400
	1 molecule of ferric sulphate	224,970
		244,370
	Gain	28,980

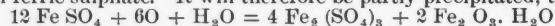
from which we see that one molecule of ferric sulphate will dissolve one of nickel sulphide producing one molecule of nickel sulphate, two of ferrous sulphate and one of sulphur. In like manner, the reaction with chalcocite, galena and blende are as follows:



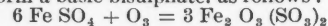
while the respective gains of heat are: chalcocite, 14,510; galena, 14,800; blende, 25,940.

The conclusion we arrive at is, therefore, that ferric sulphate will attack all of the remaining ores in the following order: 1. Millerite; 2. Blende; 3. Galena; 4. Chalcocite; and as the reaction is of the same character as in the case of the iron sulphides, it is evident that in the course of time the whole of the ores will be dissolved away and the gangue of the vein will alone remain.

But gossan consists of ferric hydrate in addition to gangue, while the reactions above set forth do not show any separation of that substance. Some further explanation is therefore needed. In the first place, it must be remembered that after the disappearance of the ore a certain quantity of ferrous sulphate will remain. This will absorb oxygen from the air but will have no further supply of free sulphuric acid or free sulphur capable of being converted thereinto. Accordingly, part of the ferric oxide produced will be unable to find enough sulphuric acid for the production of normal ferric sulphate. It will therefore be partly precipitated, thus,

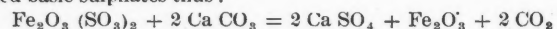


and it will partly form a basic bisulphate, as follows:

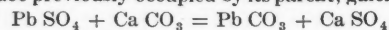


This bisulphate forms an insoluble yellow substance, and is precipitated with the ferric hydrate. It is found, together with coquimbite (a solidified form of normal ferric sulphate), in considerable quantities in the province of Coquimbo, Chili, and is regarded as having been produced by the weathering of iron pyrites.

Secondly, it must be remembered that carbonic acid gas is present in the atmosphere, and that water falling through or exposed to the air becomes more or less charged with it. This carbonated water has a powerfully solvent action upon limestone, which is present to a greater or less degree in most rocks and soils. Hence, among the chemical influences to which the outcrop of a mineral vein are exposed must be reckoned that of water charged with carbonate of lime. This acts upon the precipitated basic sulphates thus:



forming a deposit of sulphate of lime (*anhydrite* when anhydrous, and *gypsum* when containing water) and ferric oxide, and setting free the carbonic acid. If other sulphates be present and be decomposed by the carbonate of lime, the tendency is to form carbonates of their metals rather than for the carbonic acid to escape. Thus, in the case of sulphate of lead (*anglesite*), which is virtually insoluble in water, and therefore remains in the place previously occupied by its parent, galena, the reaction is



The lead carbonate (*cerussite*) thus formed is soluble in water charged with carbonic acid gas, but is much less soluble in the same water if containing carbonate of lime. Accordingly, the tendency will be for the lead to be carried away from the outcrop and to be deposited in the form of carbonate wherever the transporting water comes into contact with limestone.

Copper sulphate is in like manner converted into copper carbonate, which is found in the form of *malachite* and *azurite*; zinc sulphate furnishes zinc carbonate (*smithsonite*), and nickel sulphate takes the form of a hydrous basic carbonate known as *zaratite*.

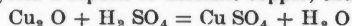
Copper, however, in addition to the normal sulphate, is capable of forming a basic sulphate,  $\text{CuSO}_4 \cdot 3\text{Cu}(\text{OH})_2$ , which, under the name of *brochantite*, is frequently found in nature associated with malachite and native copper, and has been artificially produced by Meunier (*Compt. Rend.* 86, 686, 1878) by the action of a solution of normal copper sulphate

upon galena for 11 months. In the case I have supposed, therefore, a formation of brochantite will occur, and this, when acted upon by a solution of carbonate of lime, will produce malachite or azurite, together with cupric hydrate  $\text{Cu}(\text{OH})_2$  or  $\text{CuO}$ ,  $\text{H}_2\text{O}$ , which is the ordinary tenorite or black copper of the miners, a soft, pulverulent, black, earthy mass, always found in the upper parts of veins that have contained chalcocopyrite.

Again, it must be borne in mind that the first stage of oxidation of sulphur is the formation of  $\text{SO}_2$ , which is capable of combining with bases to form sulphites. Hence, calcium sulphite is one of the agents to whose influences our supposed vein outcrop will be subjected. The combined effect of this and calcium carbonate upon copper sulphate is as follows:

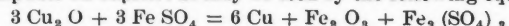


or, in other words, we have a production of free carbonic acid, *anhydrite* (or *gypsum* when hydrated), and *cuprite* ( $\text{Cu}_2\text{O}$ ), the ordinary "red oxide" so frequently found in mines. And this cuprite, when acted upon by sulphuric acid, will yield a deposit of metallic copper, thus:



so that the occurrence of particles and flakes of native copper may be looked for in our gossan.

This separation of native copper may also be effected by the action of ferrous sulphate on cuprite, as may be seen by the following equation:

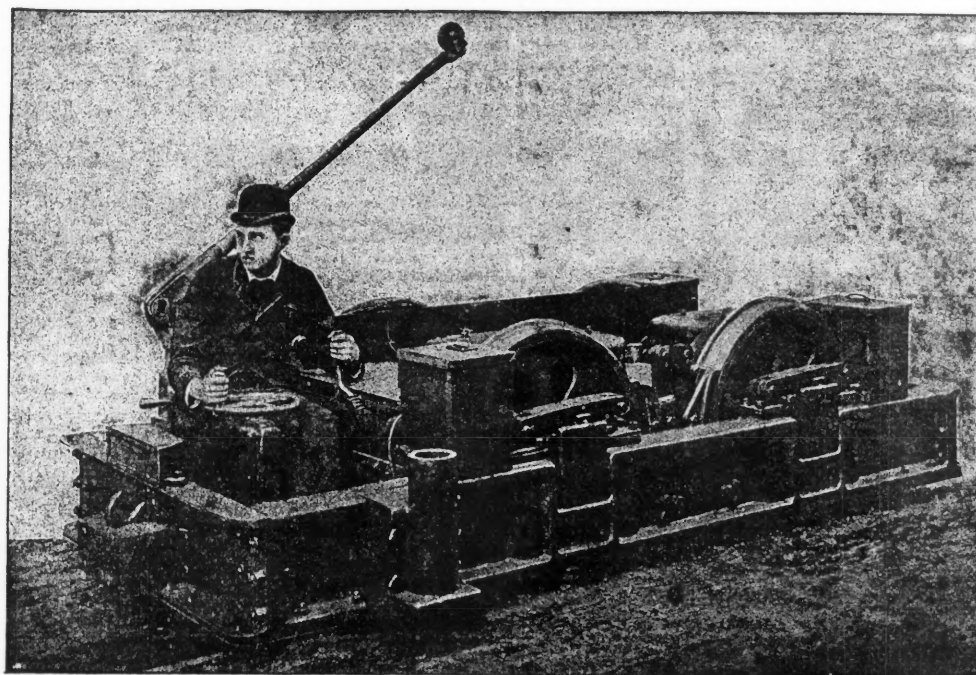


so that in this case a deposit of ferric oxide would take place in addition to the formation of native copper.

No similar reaction takes place with nickel or zinc compounds, and therefore we should not expect to find these metals in our gossan in the native state. Lead, however, is occasionally found native in small quantities; and as it is capable of forming a sub-oxide  $\text{Pb}_2\text{O}$ , which, by the action of  $\text{H}_2 \text{SO}_4$ , is decomposed into lead sulphate and metallic lead, the

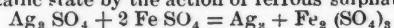
rule, almost entirely disappear, being the first, and most easily, attacked by ferric sulphate. Accordingly, we are justified in deducing the following conclusions from the examination of a gossan:

1. It proves the prior existence of a body of sulphuretted ore.
2. If we see that it is the outcrop of a vein or lens, and not an isolated fragmentary mass, we know that in depth it will, if it continue, change to unaltered sulphides.
3. If we find it to contain particles or patches of copper, lead or zinc compounds we know that in depth the mineral deposit will yield chalcocopyrite, chalcocite, bornite, galena or blende, with a probability of these being the predominating ores.
4. If we find it practically free from copper, lead or zinc compounds, we are warranted in regarding the unaltered ore in depth as composed mainly of iron sulphides.
5. If we find residual particles of iron sulphides, some or all of which are pyrrhotite and on analysis show traces of nickel, we may infer that the gossan will at no great depth lead to bodies of nickeliferous pyrrhotite.
6. If we find silver or gold or both, and also copper, lead or zinc compounds, we expect to find the deposit in depth to carry argentiferous sulphides.
7. If we find gold without any appreciable copper, lead or zinc, we may properly infer that the deposit in depth will consist mainly of auriferous pyrite.
8. Whatever may be our deduction as to the character of the vein in depth, we must not expect the vein, as a whole, to be so rich in the precious metals as is the gossan; for the latter, while being much lighter, bulk for bulk, than the unaltered vein, carries an equal average weight of gold and silver, and will, therefore, yield a larger number of ounces per ton.
9. On the other hand, the *concentrates* from the unaltered vein in depth will almost certainly be richer in precious metals than an equal weight of the gossan.



A NEW ELECTRIC MINING LOCOMOTIVE.

formation may be similar to that described in the case of metallic copper. It is, however, customary to regard native lead as having probably been found by the deoxidizing action of arsenious anhydride  $\text{As}_2\text{O}_3$ . Gossans rarely, if ever, contain it. With gold and silver the case is different. The first-named of these metals is a frequent constituent of pyrite, while the latter is an equally frequent constituent of galena and blende. Whether, when thus occurring, they exist in a free state as metallic particles mechanically included in the surrounding ore, or whether they are in chemical combination with some other element or elements, is a moot question. If they be native, they will for the most part remain in the gossan, by reason of their being comparatively inoxidizable and insoluble. And if they exist as sulphides and pass into solution, they are at once precipitated in the metallic state by the action of ferrous sulphate, thus:



Accordingly, it may be expected that whatever gold and silver the original vein matter contained will ultimately be found in the gossan, an expectation which is always completely realized.

If we review the preceding observations and summarize the facts therein set forth, we shall see that the outcrop of a mineral vein containing sulphuretted ores must inevitably, by the combined action of air, moisture and iron, pass into the condition of gossan; that is to say, it must become a porous, honeycombed mass of gangue and ferric hydrate. We shall also see that this gossan must, as compared with the original outcrop, be very much poorer in copper, zinc, nickel and lead, and very much richer in gold and silver. I say "very much poorer" in the case of the base metals, because it can rarely happen that these are entirely dissolved and washed away. The iron remains as ferric oxide. The lead, which in the first place forms an almost insoluble sulphate upon the surface of the galena, becomes largely protected, in the form of residual galena, against further attack. The zinc and copper, by secondary reaction with carbonic acid, sulphurous anhydride and lime, will, to some extent, form comparatively insoluble oxides or carbonates; and part of the copper will assume a metallic condition. The nickel alone will, as a

A NEW ELECTRIC MINING LOCOMOTIVE.

We illustrated and described recently a new mining locomotive, constructed by the General Electric Company—the C. L. M. type. We now show a new mining locomotive, also designed by them, to meet the growing demand for small, substantial, low-priced machines of this character. It will be known to the trade as the T. M. M. type, and consists principally of two standard railway motors, mounted upon a heavy iron truck frame. The truck frame is built of cast-iron side frames, bolted to heavy steel channel beams, which are securely fastened together by a wrought iron angle plate. The axle boxes are small and solid in construction, easy of access for oiling and replacing the brass linings. The frame of the locomotive is hung from the axle boxes by means of steel springs, so that there is little pounding upon the track. By this method of construction it is possible to take the motors, together with the wheels and axles, entirely out of the frame. The motors used are of the standard railway type, either the W. P. 30 or W. P. 50, as required. For gauges narrower than three feet, special four-pole motors have been designed, which will run on gauges as narrow as eighteen inches. The controlling mechanism used is the standard series parallel controller. The brake is a powerful form of steel screw and lever. No adjustment is necessary for the wear of the brakes used, as the steel screw takes up the lost motion until the shoes are worn out. The trolley is of the single arm insulated type, and may be moved from one side to the other of the machine, as occasion may require. As the motors are self-protected, no cover for the locomotive is considered necessary, but one can be easily supplied. The cover increases the total height of the machine four inches. Sand boxes are provided for both front and rear wheels. All of the controlling levers are placed on the platform of the machine, within easy reach of the operator.

The General Electric Company is now making a specialty of electrically driven mining machinery.

## ALABAMA BAUXITE.\*

By Henry McCalley, Assistant Geologist, Alabama.

The discovery of bauxite, hydrated oxide of aluminum, was made in 1821, at Baux, France, but the mineral did not come into use commercially till 1868. It occurs also in Ireland, Austria and Asia Minor, and in this country in Georgia, Alabama, Arkansas and North Carolina. [In this latter State in McDowell County.—Ed. E. & M. J.] In Georgia the known deposits do not cover much area, and are of unknown depth; in Arkansas they are said to occur over about 160 acres and to be of an average thickness of 15 ft.

The first discovery of bauxite deposits in this country seems to have been in 1887, in Pike County, Ga.; then in 1889 in Cherokee County, Ala., and in 1891 in Pulaski County, Ark. In Alabama it was discovered by J. R. Trotter, Superintendent of the brown ore banks of the Bass Furnace Company, Cherokee County. It was afterward discovered at the Walker brown ore banks, near Jacksonville, Calhoun County, and at the Laney manganese banks, in Cleburne County. Two other deposits have been found near Anniston in Calhoun County.

So far as is known all the Alabama deposits occur in the lower part of the lower Silurian formation. The Cherokee and Calhoun County deposits are near the bottom of the Knox dolomite, possibly to be put now in the upper Cambrian. The Cleburne County deposit is in the upper part of the Weizner quartzites (Chilhowee sandstone of Safford).

Dr. Branner, State Geologist of Arkansas, thinks that the Arkansas bauxite is of Tertiary age, possibly related in its origin to the contiguous granite. The mineral is not confined to any geological horizon. The district in which the Alabama bauxite occurs has been badly broken up by sharp folds and great thrust faults; it occurs as pockets in close association with brown ore (limonite) and clay. In Cherokee county the deposits appear to be along two parallel 'leads,' or lines of outcrop, that run in a general N. E. and S. W. direction, and are from 150 to 200 yards apart. These lines

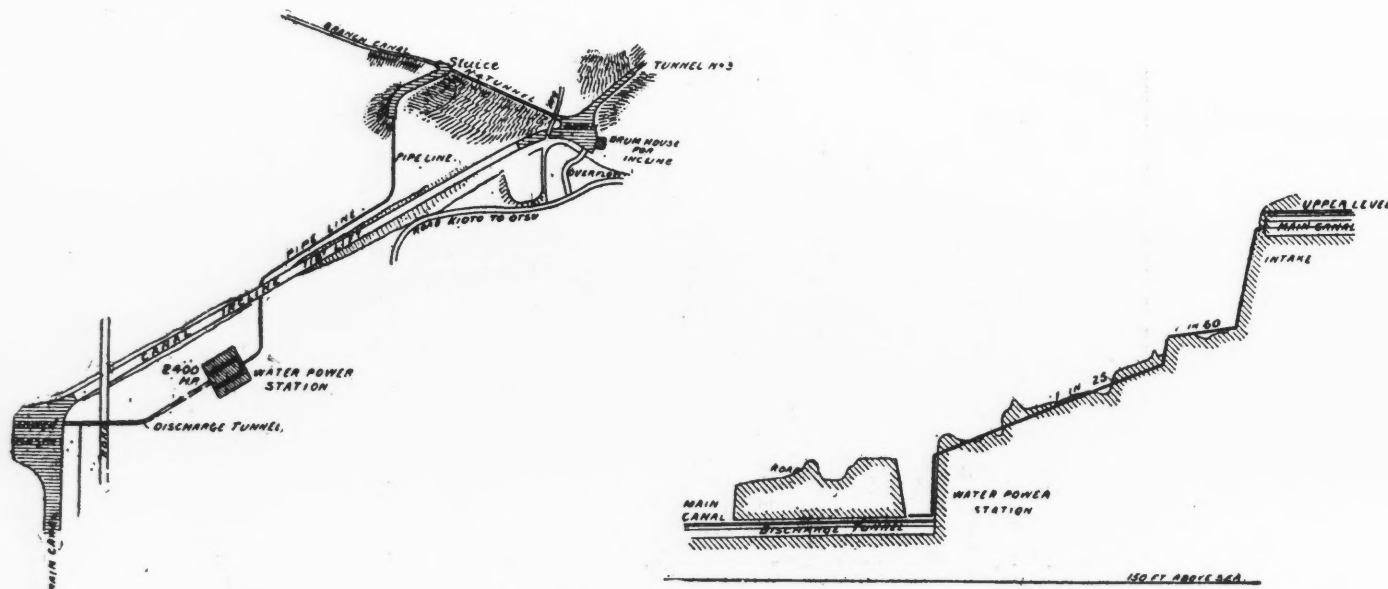
The average composition of the Cherokee County bauxite, as per car-load sample, is as follows:

Alumina.....	56 to 60%
Oxide of iron.....	2.75%
Insol. silic. matter.....	7.00%
Titanic acid.....	2 to 3%
Water.....	25 to 30%

No great amount of the ore has yet been mined as there are but two companies engaged in the business, and neither is ready to begin large shipments. The first miners and shippers of the Cherokee bauxite were the Southern Bauxite and Manufacturing Company, which began operations in November, 1891, and have shipped to date 3,500 tons. The Republic Mining and Manufacturing Company, the pioneers in the bauxite business, have shipped since July 1,300 tons, and have several tons now drying under cover. The ore is hauled in wagons three miles to Rock Run and then three miles more over the private railway of the Bass Furnace Company to Rock Run station, on the East Tennessee, Virginia & Georgia Railway. It is shipped to Philadelphia, Natrona, Pa., and to Syracuse, Buffalo and Brooklyn, N. Y. It is used principally for the manufacture of alum, for which purpose the insoluble matter should not exceed 7% nor the oxide of iron 2.75%. Alabama bauxite is slowly but surely making its way against foreign ore, and on account of its easy solubility is preferred to the ore which carries alumina in part as insoluble silicate.

## THE KIOTO CANAL, JAPAN.

We have already referred to the construction of the canal in Japan between Lake Biwa and Kioto. We now give an illustration of the very novel expedient employed in place of a lock for transferring boats down from one level to another at a certain point on the canal. The total length of the canal is 6 $\frac{1}{2}$  miles, and in its short course it passes through three tunnels, 2,680, 137 and 934 yards long, respectively.



PLAN AND PROFILE OF THE KIOTO CANAL, JAPAN.

of outcrop follow the crests of two sharp anticlinal folds, and it is likely that they extend under the surface across the synclinal, separating the ridges. So far as present indications show it is probable that the greatest amount of bauxite will be found in this synclinal.

In places it overlies a white or yellow sandstone for the most part friable, but sometimes hard and cherty, and underlies an unctuous clay in the upper part of which the brown ore occurs. Thus we may have from the surface down a white or mottled clay carrying brown ore, then the same clay carrying bauxite, and then the sandstone.

In the northeast end of the dikes' brown ore bank, the bauxite shows as an irregular seam of about 60 ft. in thickness. The excavation here is about 75 ft. deep, and the bauxite shows from near the top to the bottom. Here the seam is vertical, but about 200 yards to the northeast it dips 60° southeast, where it has been exposed for 15 ft. with the bottom still in ore. To the southeast of the dikes' bank, some 200 yards, is the bauxite deposit owned by the Republic Mining and Manufacturing Company, of Hermitage, Ga. Here the mineral occurs in two irregular seams, separated in places by a band of unctuous clay of 15 ft. in thickness, but cutting out to a mere selvage. The upper seam is about 30 ft. thick, the lower 20 ft., although at the date of visit (September 29th) it had not been penetrated and is doubtless thicker.

To the northeast of the dikes' bank is the bauxite owned by the Southern Mining and Manufacturing Company, of Piedmont, Ala. The deposit had been tested to a depth of 20 ft., and was still good. Still farther towards the northeast, half a mile, is the Warwhoop bauxite deposit of this company, tested for 20 ft. and still good. The Carr banks are half a mile northeast of the Warwhoop, which, however, have not been tested.

There is no reasonable doubt of the extent of the bauxite deposits in this district, the dikes, for they have been tested over about two miles, and have not been found to be less than 15 ft. in thickness, and at places from 20 to 30 ft.

\* Abstract of paper read before the Ala. Indust. and Sci. Soc., Birmingham, Ala., November 16th, 1892.

At a distance of 5 $\frac{1}{4}$  miles from Lake Biwa the canal is divided into two parts, one being practically continuous at the same level as the main portion, and the other being at a level of 118 feet below. The upper branch is used entirely for irrigation purposes, while the lower branch receives all the boat traffic from the upper main canal. Instead of having a succession of locks from the upper to the lower levels, a cable railroad has been built to connect them. This road is at a slope of 1 in 15, and descends 118 feet vertically in a distance of 1,800 feet. The boats at top and bottom are placed in the wheeled cradles shown, and they are hauled up or let slide down by the cable power. The water from the upper canal is led through three 36-inch pipes, 1,300 feet long to the power-house, and is delivered to a set of Pelton water-wheels at a head of 100 feet. These wheels supply the power for the cable road, and also drive dynamos which supply current in Kioto for all sorts of purposes. Our illustrations have been taken from "Industries."

"Carboid" Bearings.—A form of oilless bearing is being introduced with considerable success in Great Britain. It consists of a mixture of graphite and soapstone, hydraulically compressed, baked and turned to the shape of an ordinary brass. The admixture of steatite makes it possible to mold the graphite to any desired shape, and adds considerable toughness to it and capability of withstanding shocks. Carboid bearings are useful in places where constant attention to lubrication is inconvenient, as in cable car lines, and where accidental inattention to lubrication is productive of dangerous results, as in machinery used in the manufacture of explosives. They have been tested very thoroughly and with success in the bearings of cable cars and in the cable pulleys in the system of cable tramways in Edinburgh, and they have been adopted by Nobel's Explosives Company in machines where hitherto there has been danger from heating. The coefficient of friction of carboid is constant and does not vary in the way the friction of an old bearing varies with the state of lubrication. Carboid is the invention of Mr. Killingworth Hedges.



**THE ALTA MINING COMPANY VS. THE BENSON MINING AND SMELTING COMPANY.**

On July 25th, 1884, the plaintiff commenced action in the District Court of Arizona, to recover the sum of \$25,000 for 210 tons of silver ore extracted from the Alta mine in Harshaw district, Pima County, Arizona. Judgment was entered for the plaintiff on March 22d, 1886, in the sum of \$4,590.06. The defendant took the case to the Supreme Court of the Territory, which affirmed the judgment, and the defendant appealed to the present court.

It appears that in 1879, Messrs. Fagan, Harshaw and others, the owners of the Alta mine, made application for a United States patent to the Land Office, and after the process required by law, received an ordinary certificate of purchase. Thereafter they sold and conveyed the property to the plaintiff, who did a considerable amount of work up to the year 1882, but failing then to do the assessment work, the property was relocated about June 1st, 1883, by one J. K. Luttrell, who called it the Ben Butler Mining Claim. It was under this relocation that the ore in the controversy was mined and removed. The patent, which in the meantime had been pending, was issued on January 10th, 1884, to the original locators, Messrs. Fagan, Harshaw and others. The Benson Mining and Smelting Company bases its recent appeal upon the facts that, although the mine was paid for by the locators in 1879 and the certificate of purchase received, inasmuch as the patent was not issued until January 10th, 1884, and because the plaintiff failed to do the necessary assessment work in the year 1882, its right ceased and the relocation by Luttrell was valid.

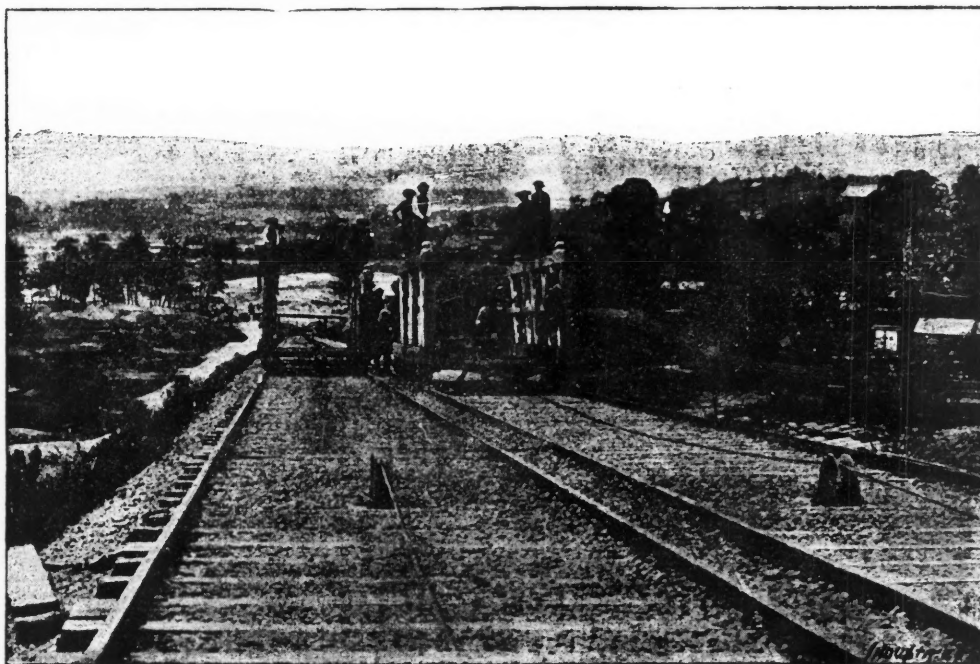
Mr. Justice Brewer reviewed a number of precedents in decisions and in the opinions of the Secretary of the Interior, substantially holding that when the price of a mining claim has been paid, the equitable

**CANCELLATION OF THE SURVEY PATENT OF THE CANON DEL AGUA GRANT, NEW MEXICO.**

The San Pedro and Canon del Agua Company, Appellant, versus the United States.  
Appeal from the Supreme Court of the Territory of New Mexico.

On February 12th, 1844, José Serafin Ramirez, a citizen of the Republic of Mexico and a resident of Santa Fe, New Mexico, petitioned the Governor of that Department, in the name of the Donation Laws of 1813 and 1824, for a grant of a tract of land known as the Cañon del Agua, together with the confirmation of the title to a mine claimed as an inheritance from his great grandfather, Don Francisco Dias de Moradillos, who obtained title to the mine in 1776. The boundaries solicited were, on the north the road leading from the placero to the Palo Amarillo; on the south, the northern boundary of the San Pedro grant; on the east, the spring of the Cañon del Agua; on the west, the summit of the mountain of the mine known as the petitioner's property. Ramirez represented that the land was vacant and without an owner, and that the Mexican nation was indebted to him for actual services rendered. The petition was granted by the Departmental Assembly and the Governor of New Mexico in 1844. The grant included the tract asked for and the revalidation of the title to the mine. Juridical possession of the tract was given according to the boundaries heretofore described and according to the colonization laws of the Republic of Mexico.

By the treaty of Guadalupe Hidalgo in 1848 the territory of New Mexico was transferred to the United States. In 1859 Ramirez filed with the Surveyor-General of New Mexico his petition, asking official recognition by this government of this grant. The description in this petition was: "The quantity of land claimed is 5,000 varas square, making one Castil-



CANAL BOAT RAILROAD ON THE KIOTO CANAL, JAPAN.

rights of the purchaser are complete, and there is no obligation on his part to do further annual work; the delay in issuing the patent being a mere matter occurring in the administration of the Land Department, and the patent, when issued, taking effect as of the date of the purchase. It was held that the certificate of purchase issued to the original locators was equivalent to a patent, so far as the acquisition of title by any other party was concerned. The Court, therefore, held the decision of the trial court to be correct. The only other question was as to the amount of damages. The trial court found that the value of the ore at the time of its conversion by the defendant, was \$11,716.65; that, after the ore had been mined, there had been expended by the defendant and others, in removing the ore from the mine, assorting the same from worthless rock, and freighting to smelter, the sum of \$7,985.83, and gave judgment for the difference, \$3,730.82 and interest. The appellant claimed that there was an error of not allowing for the cost of mining the ore, but the Court held that as it was received and converted by them with the knowledge that it belonged to the plaintiff, the ruling of the trial court was as liberal as the appellant had a right to expect. The previous judgment was affirmed.

**The Coal Consumption of Paris.**—There is no city in the world that keeps such accurate records of the entry of food and fuel supplies within its borders as Paris. This is due to the fact that a high import duty is levied on almost every article of domestic use which is brought to this city. During 1891 the total amount of coal consumed in Paris was 3,279,000 gross tons, of which 1,512,000 gross tons were brought to the city by river and canal; 1,767,000 gross tons were of French origin, 647,700 gross tons came from Belgium, 418,500 from England and 129,900 from Germany. The small amount of charcoal used as fuel in Paris will bring the total consumption of fuel to 3½ million gross tons. The yearly consumption of coal in London is 12 million tons.

ian league, and bounded on the north by the placer road that goes down to the yellow timber; on the south, the northern boundary of the San Pedro grant; on the east, the spring of the Cañon del Agua; on the west, the summit of the Mountain of the Mine, known as the property of your petitioner, as appears by the original title deeds accompanying the notice." A hearing was held on this application on the 10th day of January, 1860. The Surveyor-General reported in favor of the grant, and on June 12th, 1866, Congress passed the following act of confirmation:

"An act to confirm the title of José Serafin Ramirez to certain lands in New Mexico."

"Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled that the grant to José Serafin Ramirez of the Cañon del Agua, as approved by the surveyor or general of New Mexico, January 20th, 1860, and designated as number seventy in the transcript of private land claims in New Mexico, transmitted to Congress by the Secretary of the Interior, January 11th, 1861, is hereby confirmed, Provided, however, that this confirmation shall only be construed as a relinquishment on the part of the United States, and shall not affect the adverse rights of any person whatever." Approved June 12th, 1866.

On August 9th, 1866, a survey was made by a deputy surveyor, under the direction of the surveyor general of New Mexico. This survey after approval by such surveyor general, was forwarded to the Land Department at Washington, and on July 1st, 1875, a patent was issued granting the land with boundaries as established by this survey. A plan of the property as surveyed and patented is given herewith.

A glance at this map shows plainly, that the survey does not correspond with the landmarks and boundaries as given in the description of the grant.

The eastern landmark "the Cañon del Agua Spring" is made the southern boundary in the survey, the Palo Amarillo Road forming the north boundary in the description, is in fact north west. The western

landmark "the highest summit of the little mountain of El Tuerto adjoining a mine" has been made by the survey. to be the eastern landmark, by taking the "Oroque" as highest summit and adjoining the valuable copper mines situated three miles from such summit to it, etc.

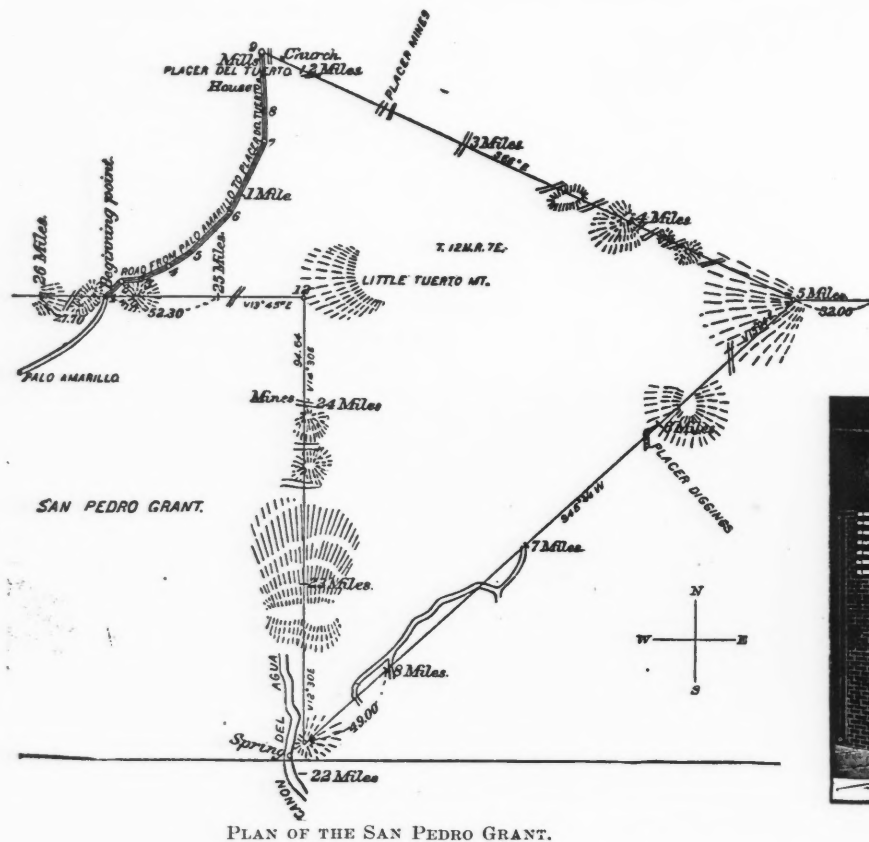
The statement of facts finds, that this was done to obtain possession of the copper mines situated within the lines of the survey of the grant fraudulently extended by Ramirez and his confederates among which the complaint named as co conspirators Surveyor-General Clark, his deputy Griffin, his clerk Miller, H. B. Denman, who was one of the original projectors of the scheme and afterward a director and stockholder of the San Pedro and Cañon del Agua Company. It was claimed, that the company paid \$500,000 cash to the conspirators, for this extended grant, and that President Ballou was notified of the discrepancy between survey and description of the grant before his company organized and took hold of the property.

In 1866 Ramirez conveyed the property to Cooley, Denman and others, from whom in 1880 it passed to the present defendant. Thereafter and on September 15th, 1881, this suit was commenced by the United States in the District Court of the First Judicial District of the Territory of New Mexico to set aside the patent and annul the title conveyed thereby on the ground of "fraud in the survey." An answer was filed, proofs were taken and the case went for final hearing before the District Court. By that Court on February 16th, 1885, a decree was entered in favor of the defendant, dismissing the bill. From such decree an appeal was taken to the Supreme Court of the Territory, which on January 28th, 1888, reversed the decision of the District Court and entered a decree in favor of the Government, setting aside and annulling the patent and the survey upon which it was based; from which decree the defendant has appealed

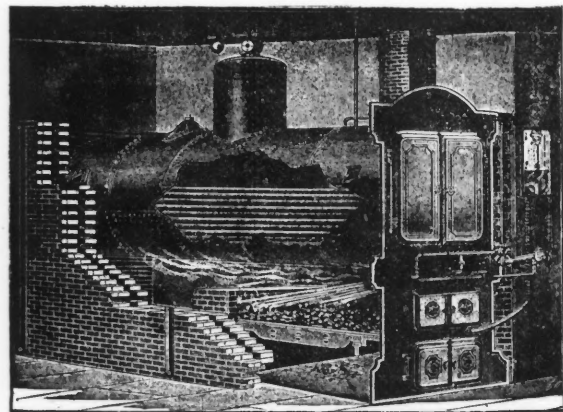
tion of a few hundred, perhaps thousands of people was in existence before the application of Ramirez for the grant, at the date of the annexation of New Mexico to this country, and at the time of the survey and patent. The inhabitants held their possessions by the indefinite and unrecorded titles of dwellers in Mexican villages. By the treaty of cession, as well as the general law in respect to the acquisition of foreign territory, the United States was bound to respect all existing rights, and among them the rights and titles of these inhabitants. Yet the survey and patent included the town. In answer to the second point made by the appellant that the prosecution of this suit is barred by laches, it is well settled that when the government has a direct pecuniary interest in the subject matter of the litigation the defences of State claim and laches cannot be set up as a bar.

The third point of appellant is that certain testimony of John B. Treadwell, the special agent and examiner of the surveys for the Land Department, should have been excluded as incompetent, was not sustained, because the defendant's territorial counsel failed to take exception, at the time the District Court overruled counsel's motion to strike out the entire deposition of Treadwell and his witnesses.

Finally it is insisted that the defendant was a bona fide purchaser, but the findings of the fact do not warrant this conclusion. The President of the Cañon del Agua Company, and a large stockholder, together with others interested, visited the property before the purchase. They were warned of the adverse claims. They examined the land and could easily perceive the situation of some of the points named in the description, and also the presence within the limits of the patent of this town of San Francisco. Indeed it is distinctly stated in the findings that "the said defendant, through its company, had notice, in fact, by the means aforesaid, of



PLAN OF THE SAN PEDRO GRANT.



THE SARGENT SMOKE PREVENTER.

to the Supreme Court of the United States, which has affirmed, on November 14th, 1892, the decision of the Supreme Court of the Territory in favor of the Government as against the Cañon del Agua Company, finding no error in its decree. The opinion of the Supreme Court of the United States was delivered by Justice Brewer.

The act of April 7th, 1874, providing in Section 2 for the exercise of the appellate jurisdiction of the Supreme Court of the United States over the judgment and decrees of territorial courts reads: "That on appeal, instead of the evidence at large, a statement of the facts of the case in the nature of a special verdict, and also the rulings of the court on the admission or rejection of evidence when excepted to, shall be made and certified by the court below and transmitted to the Supreme Court together with the transcript of the proceedings and judgment or decree." Hence notwithstanding the large volume of testimony taken and used in the court below has been incorporated into the record sent to us, we are not at liberty to review that testimony for the purpose of ascertaining whether the findings in the statement of facts are or are not in accordance with the weight of the evidence.

Appellants' (the Cañon del Agua Company) first proposition is, that the United States had no interest in the controversy. Among other reasons why this claim could not be sustained is chiefly the statement made by the Supreme Court, that in fact there were parties to whom the United States were under obligation in respect to the relief invoked: and also that the government had a direct pecuniary interest in the relief sought. The application for a grant described a tract of vacant land near the placer of San Francisco called Placer de Tuerto, and distant from that town about one league, more or less. This town, with a varying popula-

tion of a few hundred, perhaps thousands of people was in existence before the application of Ramirez for the grant, at the date of the annexation of New Mexico to this country, and at the time of the survey and patent. The inhabitants held their possessions by the indefinite and unrecorded titles of dwellers in Mexican villages. By the treaty of cession, as well as the general law in respect to the acquisition of foreign territory, the United States was bound to respect all existing rights, and among them the rights and titles of these inhabitants. Yet the survey and patent included the town. In answer to the second point made by the appellant that the prosecution of this suit is barred by laches, it is well settled that when the government has a direct pecuniary interest in the subject matter of the litigation the defences of State claim and laches cannot be set up as a bar.

Undoubtedly, upon the facts as found and stated by the court that the defendant was not entitled to hold as a bona fide purchaser.

**Electrical Standards.**—In the report of the committee on electrical standards, presented by Mr. R. T. Glazebrook, F. R. S., at a recent meeting of the British Association, the testing of resistance coils and also of Clark cells is dealt with. The cells set up by different persons at different places and times gave almost identical values for their electro-motive force, proving the adaptability of this cell as a standard one. During the year the committee had passed the following resolutions, with a view to their adoption internationally: "(1) That the resistance of a specified column of mercury be adopted as the practical unit of resistance; (2) that 14.4521 grammes of mercury, in the form of a column of mercury 106.3 centimetres long, at 0° C, be the specified column; (3) that standards in mercury or solid metal, having the same resistance as this column, be made, and deposited as standards of resistance for industrial purposes; (4) that such standards be periodically compared with each other, and also that their values be re-determined at intervals, in terms of a freshly-set-up column of mercury." With regard to the units of current and electro-motive force, it was agreed that the number 0.001118 should be adopted as the number of grammes of silver deposited per second from a neutral solution of nitrate of silver by a current of one ampère, and the value 1.434 as the electromotive force in volts of a Clark cell.

SARGENT'S AUTOMATIC SMOKE PREVENTER.

Mr. James Sargent, of Sargent & Greenleaf, Rochester, has invented a new form of smoke preventer for boiler furnaces. As is the case with many others of its kind, its action depends on the introduction of a current of dry steam and an induced current of air over the grate during firing, but unlike the others, a special apparatus is used for determining the exact intervals that shall elapse between each two firings. This is done by the application of the principle of the time lock, of which Mr. Sargent is the well known inventor. An instrument specially designed on this principle opens the steam cocks over the front of the furnace at regular intervals and a thin horizontal sheet of steam is forced therefrom across the top of the furnace toward the firebridge. Upon the fire-door being opened a current of air is drawn in, and during firing, and for a short time after, this current prevents the formation of the dense cloud of steam which usually comes away during firing. The opening of the door winds up the time regulating instrument and thus keeps it constantly in action. The interval between stockings can be easily altered on the instrument to suit the quality of the coal and the period of the year. This fixing of the times of firing is an extremely important improvement, as the reduction of smoke is most easily effected by regular and frequent firings. The stoker is always inclined to crowd the furnace and to reduce the number of firings in order to save himself labor and constant attention, and Mr. Sargent's device, as much as the steam and air injection, will effect the desired end and the reduction of smoke.

The apparatus also economizes fuel considerably. At the lock factory of Sargent & Greenleaf the boilers were fired without it on Oct. 5, when 2,572 lbs. of coal were burned in ten hours; 20,430 lbs. of water were evaporated at 79.3 lbs. pressure; this gave a production of 7.94 lbs. of steam per pound of coal. On Oct. 7 the boilers were tried with the preventer; then 21,312 lbs. of water were evaporated in ten hours, at a pressure of 83.5 lbs. with a consumption of 2,316 lbs. of coal; this gave a production of 9.2 lbs. of steam per pound of coal. The amount of steam used in the jet in the furnace was 600 lbs. This test shows that the preventer is also an efficient economizer.

THE Q & C CAR MOVER.

The car mover here illustrated is made by the Q. & C. Company of Chicago, who are the makers of many railroad specialties. It will be seen that it can be fitted to an axle of any diameter and that the greater the pressure put on the handle the greater is the grip. The grip can be re-



leased by a simple backward movement, and the curved jaw can be easily jerked into a new position, so that with a little practice a practically continuous turning movement can be applied to the axle shaft. One man can keep a loaded car in motion with very little effort by the use of this mover. On the Pacific coast the mover has been thoroughly tested by several railroads and great satisfaction has been expressed. The instrument weighs 30 lbs. only.

LIGEST OF RECENT DECISIONS AFFECTING THE MINING INDUSTRY.

United States Circuit Court Decisions.

PUBLIC LANDS—CANCELLATION OF PATENT—MINERAL LANDS—FRAUD—PURCHASE IN GOOD FAITH.

WASHINGTON, D. C., December 14th, 1892.

1. Sec. 2,318 of the Rev. Stat. (U. S.) provides that in all cases lands that are valuable as containing minerals shall be reserved from sale, except as otherwise expressly directed by law.

2. If the lands are valuable for their mineral contents and the same were purchased by defendants as agricultural lands, with the knowledge that they were mineral lands, the patent issued by the Government would convey no title, because issued unadvisedly, or by mistake of an officer of the Government while acting ministerially. In such a case the parties purchasing the land in question are guilty of fraud, and upon that ground a court of equity will declare the patent void.

3. Although there may be no fraudulent concealment by purchasers of the public land at cash entry, yet, if, under the law, the lands were reserved from sale, it is the well settled rule that purchasers obtain no title by their purchase; the sale is absolutely void. *The United States vs. Culver et al.* [Parker, D. J. decision, June 29th, 1892, promulgated November, 1892.]

MINING CLAIM—MILL SITE LOCATIONS—PRACTICE.

1. Sec. 2,337 Rev. Stat. (U. S.) must be construed to authorize location of mill sites prior to the application for patent, because it specially insists upon "the same preliminary requirements and notice as are applicable to veins and lodes," and restricts future locations to five acres, and requires "payment for the same at the same rate as fixed by this chapter for the superficies of the lode."

2. The basis of a mineral claim is the due location thereof, and the practice of the land department (U. S.) has uniformly been to require evidence of the due location of the mill site prior to the publication of notice of application of a site therefor.

3. Concurring decisions of the local office and the General Land Office when the evidence is conflicting will not be disturbed on appeal unless clearly wrong. Appeal of Robert R. Hargrove from Commissioners' decision of January 18th, 1892, dismissing his contest against mineral of "John Arthur Mill Site," at N. Yakima, Wash., local office, by James C. Robertson, November 26th, 1888.—[Secretary's decision affirming General Land Office decision. Nov. 25th, 1892.]

MILLING CLAIM—EXCLUDED LANDS—MILL CITE—LOCATIONS.

1. A mineral land entry should not be allowed for a lode claim when the same includes land that is embraced within a senior location or which is intersected by an excluded mill site

2. Mill sites must be located upon the public domain.

3. Mill sites must be located upon non-mineral land.—*Ruling of Commissioner of Gen. Land Office in case of Michael Howard, involving mining claims "Howard No. 1" and "do. No. 2" and "do. No. 3 lode," in Montana M. Dist., Clear Cr. Co., Colo., affirmed.* [Secretary's decision, Nov. 26th, 1892.]

CENTRAL PACIFIC RAILWAY GRANTS OF JULY, 1862, AND JULY, 1864—MINERAL CHARACTER OF LAND IN QUESTION—RESERVATION OF HOMESTEAD ENTRY—EXEMPTION—"KNOWN MINES."

1. The location of a mine on a tract prior to a railroad grant does not establish the fact of its mineral character, and operate to accept the same as such from the grant where it appears that mineral does not exist in paying quantities, and that mining operations have been consequently abandoned.

2. The statute does not reserve any land from entry as a homestead simply because someone is visionary enough to claim or work some portion of it as mining ground, without any reference to the fact whether there are any paying mines in it or not. Nothing less than "Known Mines," on the land, capable, under ordinary circumstances, of being worked profitably, as compared with any gain or benefit that may be derived from the same when entered under the Homestead Law, is sufficient to prevent such entry.

3. The exception of mineral lands from grants in aid of railroads is not held to exclude all lands in which mineral may be found, but only those where mineral is found in sufficient quantity to add materially to their richness and value and to justify the expenditure of time and money for its extraction.

4. The mere fact that portions of the land contained particles of gold, or veins of gold-bearing quartz rock, would not necessarily impress the same with the character of mineral land within the meaning of the Acts of Congress of July 1st, 1862, and July 2d, 1864. It must, at least, be shown that the land contains precious metals in quantities sufficient to render it available and valuable for mining purposes. Any narrower construction would operate to reserve, from the uses of agriculture, large tracts of land which are practically useless for any other purposes, and we cannot think this was the intention of Congress.

5. To constitute the "exemption" contemplated by the Pre-emption Act under the head of "Known Mines," there should be upon the land ascertained mineral of such an extent and value as to make the land more valuable to be worked for mineral under their existing conditions than for farming purposes. The mere circumstance that there are surface indications (outcrop, float, etc.) of the existence of mineral, does not constitute a mine. They do not even prove that the land will ever be, under any conditions, sufficiently valuable on account of its mineral deposits to be worked as a mine. Any matters in question in that direction must be determined according to the facts in existence at the time. If upon the premises at that time there were not actual "Known Mines," capable of being profitably worked for their product, so as to make the land more valuable for mining than for agriculture, a title to these acquired under the Pre-emption Act cannot be successfully attacked.

The case in question, *Berry et al. v. Central Pacific R. R. Co.*, involves 20 acres of land, included in the Sacramento Land District of California, and within the primary limits of the grant to the company under Acts of July 1st, 1862, and July 2d, 1864, and is decided on appeal to the Secretary from the General Land office.—[Decision Nov. 19th, 1892.]

**Aluminum Racing Shells.**—Daniel J. Galanaugh, the Philadelphia boat builder, is constructing the first eight-oared racing shell ever built from aluminum. It is intended for the use of the Cornell College crew and will be finished the latter part of March. The boat will be 63 ft. in length over all, 23 ins. beam amidships, 8½ ins. deep amidships, 6½ ins. deep forward, and 5½ ins. deep aft. The shell will be composed entirely of aluminum, with the exception of the wash-box, which will be of wood, and the outriggers, which are to be of steel tubing, cold drawn. The shell will weigh 175 lbs. all told. Ordinary paper and cedar shells weigh about 225 lbs. The aluminum shell will be built in two pieces, being divided fore and aft and then joined together amidships. It is designed to carry an average weight of 175 lbs. per man. The aluminum from which this shell is being made is one-twentieth of an inch thick and weighs about 7 ounces to the square foot.

PATENTS GRANTED BY THE UNITED STATES PATENT OFFICE

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

TUESDAY, DECEMBER 13TH, 1892.

- 487,763. Cleaning Tin-Plate or Metallic Sheets. Edwin Norton, Maywood, As signor to himself and Oliver W. Norton, Chicago, Ill.
- 487,835. Coal-Storage Conveyor. George H. Hulett, Cleveland, O.
- 487,883. Centrifugal Blower. Martin R. Ruble, Newark, N. J., Assignor to the Ruble American Blower and Injector Company, same place.
- 487,936. Electrolytic Apparatus. Thomas Craney, Bay City, Mich.
- 488,025. Machine for Drying and Fluxing Metal Sheets. Edwin Norton and John G. Hodgson, Maywood, Assignors to said Norton and Oliver W. Norton, Chicago, Ill.
- 488,064. Magnetic Separator. Harvey S. Chase, Boston, Mass., Assignor, by mesne assignments, to the International Ore Separating Company, of New Jersey.

## PERSONALS.

Mr. John B. Farish, mining engineer of Denver, has returned from a professional visit to Montana.

Mr. E. F. Eurich, of the Aurora Smelting and Refining Company, of Aurora, Ill., has been visiting Deadwood, S. Dak.

Mr. E. P. Eddy, of San Francisco, has succeeded Victor M. Clement as general manager of the Bunker Hill & Sullivan Mining Company of Gardner, Idaho.

Mr. Richard Pearce of the Boston & Colorado Smelting Company, has visited recently the Colorado Mining and Smelting Company's property at Butte, Montana, in which he is interested.

Mr. Henry Clausen accompanied by Mr. L. Weber and Henry W. Schmidt, of this city, who are interested in the Harney Peak tin mines, have recently visited that property in South Dakota.

Geo. B. McAuley and Van B. De Lashmuth, of Portland, Ore., have disposed of their interests in the Sierra Nevada mine of Gardner, Idaho, and a new company has been formed by G. B. Markel and B. Goldsmith.

Mr. R. A. F. Penrose, Jr., mining engineer, lately connected with the Geological Survey of Arkansas and whose articles upon manganese have attracted great attention, has formed a partnership with Mr. D. M. Barringer, geologist and mining engineer, and opened an office in the Bullitt Building, Philadelphia, Pa.

Mr. A. R. West, formerly of Fraser & Chalmers, whose obituary we published last week, assures us that he is still very much alive, although recovering from a serious illness. Did we not know Mr. West we might take some exception to his unsupported contradiction of his own obituary, but as we do, we are sincerely glad that we are able to have his name in our personal column this week, and must congratulate his firm, the Chicago Iron Works, on his recovery.

At a meeting of the Alumni Association of the School of Mines, Columbia College, held November 11th, it was decided to commemorate the important services of the late Prof. Wm. P. Trowbridge in developing the engineering courses of the School, by founding a Trowbridge Fellowship for the encouragement of original experiment and research in engineering. The amount required is \$10,000. The alumni are urged to come forward with their subscriptions.

## OBITUARY.

Thomas Lamar, the owner of kaolin deposits at Langley, S. C., was killed on the 12th inst.

George P. Hasbrouck, died on the 15th inst, at Cornwall-on-the-Hudson, N. Y., aged 49. He was at one time associated in mining operations at Georgetown, Colo., with Gen. Fitz John Porter.

George Stead, a pioneer of California and Nevada, died in San Francisco, Cal., on the 5th inst. aged 85 years. He was a native of England and he came to this country in 1832; early in 1850 he arrived in California, where he has since been identified with mining and other enterprises.

Mr. Samuel F. Haddock, who was formerly connected with Messrs. Haddock, Shonk & Company, and was a brother of Mr. John C. Haddock, of the above named firm, died at his home in Boston, after a brief illness, on the 29th of last month. Mr. Haddock was well known among the trade and by his many amiable qualities had acquired a circle of warm personal friends.

John T. Knight, for many years treasurer of the Thomas Iron Company and recently elected president of that large corporation, died suddenly at his home in Easton, Pa., on the 15th inst. He was one of the most prominent and enlightened iron men in Pennsylvania. Only a few days before his death Mr. Knight sent to the Engineering and Mining Journal for publication in their forthcoming statistical volume an extremely valuable itemized statement of the cost of making iron at the Thomas Iron Company's works from their commencement to date.

## SOCIETIES.

The Engineers' Club of St. Louis, held their 373d meeting on the 8th of December. After the annual reports were read, Mr. B. J. Arnold read a paper on "The City Electric Railway Power Station of Little Rock, Ark., and Its Record." The road was constructed in 131 days, or 99 actual working days. During this time the entire system of about 20 miles of road was either taken up and new rails and ties laid or the track narrowed from broad to standard gauge. At the power station there were 1,000 cu. yds. of solid slate excavated, over 1,000,000 brick laid, 333,000 ft. of lumber erected on the structure and 1,000 horse power of engines, boilers and condensing machinery put in place during this period. The questions governing the location of the power house and the obstacles met with were discussed. At

certain seasons of the year the river water is exceptionally bad and special filters were necessary. Some of the special features of the building on a hillside. Second, the utilization of a short story for a pit room under all the cars. Third, providing for a washing pit under each track. Fourth, placing the line shafting on top of the partition walls. Fifth, the location of the car barn on top of the power house. Sixth, the placing of a summer theater on top of the structure. Seventh, inclining the tracks for convenience in case of fire.

## INDUSTRIAL NOTES.

The difficulty between the heaters in the nail plate mill of the Pottstown (Pa.) Iron Company and the company has been adjusted.

The Hamburg Rolling Mill, at Hamburg, Pa., employing nearly 150 hands, suspended operations on the 10th inst. for an indefinite period.

The upper mill of the Lackawanna Iron and Steel Company, at Scranton, Pa., has shut down on account of lack of orders, and 600 men are thrown out of employment.

The Philadelphia & Reading Company has advanced the wages of its machinists in the shops at Reading, Pa., who have just completed three years' service as journeymen. They were getting \$2 a day, and will hereafter receive \$2.10. About 60 men are affected.

A bill has been introduced in the Mexican Chamber of Deputies authorizing the President during the next five years to make contracts and grant privileges and concessions to parties introducing new industries into the country.

The new catalogue of the Jeffrey Manufacturing Company, of Columbus, O., will be ready for distribution January 1st, 1893. It will be the most complete yet issued by the firm and will consist of 256 pages, profusely illustrated. It will be valuable to all interested in machinery and may be had on application.

The New Pittsburg Coal Company, of Columbus, O., has contracted with the Jeffrey Manufacturing Company, of the same place, for a second plant of its coal mining machines. The New Pittsburg Company has used the Jeffrey mining machines for over eight years. The above order is for an electric plant.

The Lithanode Company, of London, are introducing a miner's electric lamp into this country. The standard pattern weighs 4½ lbs. and when fully charged will give a light of one candle power for twelve hours. The weight for the lamp is of course very great, but the claim for the lamp is absolute safety in dangerous mines.

A new imitation of leather is being introduced under the name of "pantasote" by Clarence, Whitman & Co., of this city. It is intended for a variety of uses, particularly for covering seats and for window shades. It has no india-rubber in it and it does not harden, crack or get sticky. If it proves durable it will be a very useful article.

A reduction of 10% has been declared by the Phoenix Iron Company, of Phoenixville, Pa., in all the mills and shops of the plant except the puddling mill, where wages have been reduced from \$3.25 to \$3 per ton. The reduction is to take effect December 26th. Common laborers will hereafter receive 95 cts. instead of \$1.02 per day. The reason given is "depression in business."

According to a telegram from Steubenville, O., the leading iron and steel manufacturers in that section of Ohio have formed a combination to make war upon the Amalgamated Association. "The defeat of the association in the Homestead strike has encouraged the manufacturers to begin the conflict, and they urge that, unless they do force a reduction of wages, they will be driven out of business by the competition of the Carnegie firms. The Amalgamated Association has more than 100,000 members in the Ohio Valley."

The U. S. Court of Appeals has granted the injunction asked for by the Edison General Electric Company against the Sawyer-Man Company (Westinghouse). The injunction is a permanent one forbidding the latter company to manufacture incandescent lamps infringing the Edison patent. The court imposes the condition that the Edison company must sell lamps for use with Westinghouse apparatus installed prior to Judge Wallace's decision of July 14th, 1891, "Upon terms reasonable under the circumstances of the particular case." No provision whatever is made for supplying lamps to Westinghouse apparatus installed since July 14th, 1891, or that may be hereafter installed and the question of terms, prices, etc., for lamps for use with apparatus installed before that date is left open, except that they must be reasonable under the circumstances of the particular case."

## 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, and his address will be furnished to any one desiring to supply him.

Any one wishing to communicate with the parties whose wants are given in this column can obtain their address at 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 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.

All these services are rendered gratuitously in the interest of our subscribers and advertisers; the proprietors of the Engineering and Mining Journal are not brokers or exporters, nor have they any pecuniary interest in buying or selling of goods of any kind.

## Goods Wanted at Home.

2,842. Road engine for drawing loaded wagons over ordinary country roads; capacity 20 to 30 tons. Delaware.

2,843. Six to ten flat cars, second-hand, standard gauge not less than 30 ft. and any capacity over 15 tons. Alabama.

2,844. Circular saw mill and mill stones for grinding corn. North Carolina.

2,845. A 12x20 engine and a return tubular boiler. South Carolina.

2,846. A double circular saw mill, shingle and lath mills, and bolter. South Carolina.

2,847. Good second-hand planing mill machinery. Texas.

2,848. Good second-hand steel rails. Texas.

2,849. 240 kegs track spikes 5 in. x ½ in. Alabama.

2,850. Wheat threshing machine with engine. Georgia.

## Goods Wanted Abroad.

2,840. A good luminous paint that will show in darkness. Australia.

2,851. Coke crushing machinery that will turn out different sizes to correspond with those of anthracite coal, the capacity to be 2 or 3 cars daily. Maryland.

2,852. A gymnasium outfit for a small town. South Carolina.

2,853. A second-hand typewriter. South Carolina.

2,854. A plant for washing, rinsing and roasting phosphate rock. Florida.

2,855. 500 tons 35-lb. T steel rails, or 550 tons good 40-lb. iron; also straight plates, bolts and spikes to lay the same. Georgia.

2,856. A good second-hand 26 or 30-ton standard gauge 4 to 8½ ft. engine. Georgia.

2,857. A good second-hand combination coach. Georgia.

## GENERAL MINING NEWS.

## ARIZONA.

The following mining companies listed on the San Francisco Stock Exchange report having had balances on hand December 1st., as follows: Crocker, \$1,816.16; Peer, \$1,026.18; Peerless, \$2,488.33; Silver King, \$5,007.79.

## Gila County.

(From our Special Correspondent.)

The Klein mill, formerly known as the Centennial, started up this week for a trial run on tailings of which is there is a large quantity on hand. Every part of the mill has been overhauled, concentrators put in order, and the capacity is now 20 tons per day. As it is expected that \$30 ore will be worked at a profit the mill will be kept constantly running.

## Maricopa County.

A press dispatch says that the Cave Creek onyx mines, near Phoenix, have been indefinitely closed. The owners state that work will remain suspended until it is known what action Congress will take on the tariff. The company owns large onyx property in old Mexico. If the duty on onyx is removed, the properties there can be worked on a large scale, and the works in Arizona be abandoned.

## Yuma County.

The Tucson correspondent of the New York "Sun" writes: Hitherto the mines at Harqua Hala, have been mere prospects and surface workings, and though they produce well, they grow richer as they are worked deeper. The output of the Bonanza last month was a little more than \$78,000. John Agard and his companions are taking out good ore in their mine in the Hermosa. This mine was discovered by a stranger in an old worked-out Mexican mine, and Agard, it is said, has refused \$20,000 for his interest.

## CALIFORNIA.

## Amador County.

Bunker Hill Gold Mining Company.—Judge Dallas, in the United States Circuit Court, at Philadelphia, Pa., on the 14th inst., refused the application of Benjamin F. Fisher, receiver of the Spring Garden National Bank, for leave to expend some of the receivership moneys to obtain possession of the Bunker Hill and Mayflower mines. Receiver Fisher desired to lay out \$500 to purchase title to the Bunker Hill and Mayflower lodes; \$609 to purchase tax title to the same, and \$7,328.63 to buy the Sheriff's title to the mining and mill properties. It was stated in the petition that was pre-

sented that when the bank went into the hands of the receiver, it held as collateral for loans \$133,700 in first mortgage bonds of the Bunker Hill Gold Mining Company, and a large amount of stock of that company. The receiver made an investigation of the property and thought it for the best interests of the depositors that possession of the mines should be obtained. The judge holds, however, that the court has no jurisdiction in the matter.

(From our Special Correspondent.)

Clinton Consolidated Mining Company, Willard.—Since the consolidation of the Clinton, Clinton Peak and Macato mines large sums of money have been expended in improving the plant and developing the mines and a surplus of \$80,000 has been distributed in dividends. The first assessment, recently levied, of 5 cts. per share, aggregating \$5,000, has been rendered necessary by the mill having been closed down for some weeks owing to the lack of water. It started up, however, this week.

Kennedy Mining Company, Jackson.—The mine belonging to this corporation, which is one of the richest in the State and one of the standard dividend payers, is reported as looking better than ever. The mill has 40 stamps, each weighing 850 lbs., working  $2\frac{1}{4}$  tons each 24 hours. The ore now in sight is said to be sufficient to keep the mill running for three years. To each five stamps there are two Frue concentrators, or 16 in all. The lode occurs between formations of slate and diorite, the quartz containing from  $1\frac{1}{2}$  to 2%; sulphates assaying from \$130 per ton upward. The vein varies in width, becoming better at depth and is developing mainly in a northerly direction. This is regarded as an additional encouragement, as the ground embraced in the claim is mostly north of the shafts, one being near the south line and the other 550 ft. north of it. If developments continue favorable the old Oneida, the adjoining claim on the north, and which has never been prospected on its southern boundary, may be reopened. Up to 1888 10 stamps at the Oneida mill were kept running on the old gangue pile, and good ore was in the bottom when work was suspended. The bad ground and large quantity of water flowing in make it, in these days, very expensive to work. For years, however, the mine was famous and kept a 60-stamp mill running.

The Zeile Mine, Jackson.—This is one of the oldest locations in the district, the claim being 1,600 x 500 ft., with additional ground of twenty acres. The mill has been closed down for extensive repairs and the old pipe, nearly half a mile long, which supplied the mill is being replaced with a new one which is now on the ground.

#### Fresno County.

The mines of Grub Gulch, have been lying idle for some years, but there seems to be a revival of interest in the possibilities of that district. A new company has taken the Crystal Springs mine and put in new machinery, and development work is being done on the Logan claim. Ex-Marshall Peole has a claim in the same district that prospects well.

#### Inyo County.

Goller.—Messrs. Mack and Kimball have just returned from the Death Valley country, where they have been doing assessment work on their group of mines, says the Redlands "Citrograph." The mines are what have been known in former times as the Goller mines. They have been prospected in a desultory sort of way. Dr. Mack has become interested with Mr. Kimball, and more thorough exploration has revealed many ledges that are said to be rich in gold, silver and tellurium. Assays from the rock run high. Shipments have been made as tests which are highly satisfactory, and steady work is now expected to be done. This group of mines is situated about 150 miles directly north of Redlands and about five or six miles over the line of San Bernardino County in Inyo. They are 80 miles from Daggett by the road. The two best prospecting locations are called the Queen of Sheba and the Belmont. They are on the south of Goller Canon, and far up the hill, at the base of which is Mesquite Springs, which afford plenty of water.

#### Kern County.

Bright Star.—It is reported that this mine on Piute Mountain, is now being reopened by a St. Louis and San Francisco company. The mine yielded well some years ago. There are thousands of tons of tailings below the mill, which can be worked profitably by the cyanide process.

#### Mono County.

The following Bodie mining companies report having had balances on hand December 1st, as follows: Benton Consolidated, \$28,474.08; Bulwer Consolidated, \$8,330.70; Bodie Consolidated, \$8,488.16; Mono, \$6,770.16; Syndicate, \$1,248.97; Standard Consolidated, \$40,330.79.

(From our Special Correspondent.)

Bulwer Consolidated Mining Company.—Some bunches of fair grade ore are being found in the north drift from the upraise on the 200-ft. level of the Bulwer mine.

Standard Consolidated Mining Company, Bodie.—The product of the mine during the month of November amounted to \$21,000, which has been shipped to San Francisco.

#### Monterey County.

A strong presentation in favor of the claimant in the famous McGarrahan case was made in the United States Senate on the 15th inst. by Mr. Hunton of Virginia. The chief point made by him was that after a hearing before President Lincoln, in which both sides were represented by counsel, Mr. Lincoln decided in support of the claim, and directed the issuance of a patent; that the patent was actually filled out and signed, and that it was afterward (before McGarrahan knew of its existence) mutilated in the Land Office of the Interior Department. The morning hour expired before the argument was concluded, and the bill went over without action until the 19th inst.

#### Nevada County.

(From our Special Correspondent.)

North Banner Consolidated Tunnel Company, Nevada City.—An assessment of 2 cts. per share has been levied on the stock of this corporation, falling delinquent on January 10th.

#### Placer County.

(From our Special Correspondent.)

The Dardanelles Drift Gravel Mine, Forrest Hill.—A contract has been made for introducing an electrical plant for lighting, pumping and general power purposes.

Mayflower Gravel Mining Company, Forrest Hill.—A further bullion shipment, valued at \$3,200, has been made. The company has declared a dividend of 25 cts. per share, payable on the 15th inst.

#### Plumas County.

(From our Special Correspondent.)

McGill & Standard Consolidated Quartz Mine, Greenville.—Active work is being carried on at this property and next season the output will be quite important. The property consists of five patented locations and connected with it are 640 acres of timber land. Ore from No. 2 tunnel has been taken out throughout the past summer and hauled for half a mile to the Kettle mill, at a cost of 30 cts. per ton. The expense of mining has been very cheap, only three men having been necessary to break sufficient ore to keep the 20-stamp mill running; it crushing 30 tons per day. No. 2 mill has been carried 1,500 ft. in, and the good ore in its face is said to be sufficient to keep the mill running for a couple of years. No. 3 tunnel is now in the mountain 800 ft., and a chimney 80 ft. long containing \$20-ore has been run through. In consequence of the mountain's declivity this ore cannot be taken to the Kettle mill, and it is intended early next spring to erect a 20-stamp mill below the mouth of the tunnel.

#### San Bernardino County.

(From our Special Correspondent.)

The Goodhope Mine.—Telegraphic dispatches tell of the bonding of this mine by the Waters brothers and W. Weston, of Denver, Colo. The mine has upward of \$1,000,000 net profit in sight, and it is said to have an unbroken shoot of free milling gold ore 2,500 ft. in length. While the mine is one of the greatest in southern California, it is more than probable that these figures are somewhat in excess of the actual facts. Mr. Waters has left for Europe to confer with foreign capitalists with whom negotiations had previously been opened.

#### Shasta County.

Rich Gulch Gold Mining Company.—This company, with a capital of \$1,000,000, has been organized in St. Louis, Mo., to work the Old Diggings claim in Shasta.

Texas Consolidated Mining Company.—Work is now being done in the fourth level, 700 ft. below the summit. Another level will soon be commenced 200 ft. farther down. On the surface and in the two upper levels the formation is an auriferous slate. This changes as depth is gained to a dark talcose slate, richly mineralized in the walls. There are three parallel ledges; the east ledge pitches 65° east; the middle and west ledges have a pitch of 50° east, and there is every indication that they will come together as depth is gained in the workings. The walls are perfect, carrying no unvaried gouge of a slaty nature. The metal is well distributed through the quartz, that is of a ribbon character, from wall to wall. The direction of the lode is 9° east of north. Cross-sections on all of the ledges show that the ore shoots commence at the apex of the mountain through which the ledges pass, and these shoots gain in length with the trend of the ledges. In the fourth level the ore shoot is almost continuous. This level was commenced in June, 1890, and has been driven for a distance of 800 ft. on the east ledge, it, as well as the other tunnels, following the direction of the lode. The walls are well defined on the mountain side, and for 300 ft. there was nothing met with but decomposed rock. Soon, however, the ore body was struck, and as work has been carried forward, a proportionately larger and richer body of ore has been brought to sight. The ore is of the character known as "ribbon rock," and is stained with tellurides, the sulphurets being arranged in streaks through the ore. Ore is also being taken out of levels 2 and 3. A gravity tram conveys the ore from of the vein in this level is 12 ft. The ventilation

is good, as the upraises have been carefully planned; timbering good, but only necessary in connection with stoping work. The stope in tunnel No. 4 is 200 ft. long and opens up a fine body of ore. Ore is also being taken out of levels 2 and 3. A gravity tram conveys the ore from the second to the third level, a wire rope-way takes the ore from No. 3, passing No. 4, and taking it from there to the mill. There is 627 ft. fall from No. 3 to the mill, and the cable is 10,400 ft. long. The buckets carry 125 lbs. of ore, and the cost of running is trifling. Level No. 1 is 330 ft. below the summit and is 300 ft. long. Level No. 2 is 85 ft. lower, length 600 ft. Level No. 3 is 120 ft. lower than No. 2, length 1,100.

#### COLORADO.

##### Custer County.

Bassick Mining Company.—According to the Silver Cliff "Rustler" the Bassick mine will start up on January next. Messrs. C. S. Thomas and Dennis Ryan, will go to Silver Cliff to settle up the delinquent tax matters and make the necessary arrangements for starting operations again. It is estimated that it will cost about \$50,000 to pump the water and put the mine in working shape.

##### El Paso County.

Elda Mining and Milling Company.—This company has been organized in Cripple Creek. It owns the Jacob, Jr., Luck Sure, Lizzie and four other claims, about three miles north of the Pharmacist. A shaft house is being constructed and work will be continued through the winter months. This group lies in a granite formation.

Lawrence Gold Mining and Milling Company.—The machinery for this property is all on the ground for the new stamp mill and will be ready to treat ore by January. Both the Woodbury concentrator and the Gilpin gild edge tables will be used.

Smuggler Mining Company.—This company owns the Smuggler and other claims. A 3-ft. vein of well defined mineral has been struck which yields on a mill run, says the Colorado Springs "Gazette," 14 oz. of gold and 37½ oz. silver. The Smuggler lies between the Victor and Buena Vista end lines.

Work Mining Company.—This company recently shipped 35 tons of high grade ore to the Denver smelters.

##### Gilpin County.

Running Lode Mining Company.—Stoping and drifting is going on in the fifth and sixth levels west, and stoping is in progress between the second and third levels as well, and between the tunnel level and the surface near the old Fisher shaft. The tunnel level has been driven in 1,158 ft. The second level is in 600 ft. west, the third is driven west 827 ft., east 298 ft., the fourth level is 707 ft. west, the fifth level is 351 ft. west and 40 ft. east, the sixth level is 158 ft. west and 50 ft. east. In the fourth level at a point 700 ft. from the shaft west a winze has been sunk 20 ft. that shows the ore to be 3 ft. wide, mostly mill dirt. These levels are run on an average from the surface down to the fourth level, 80 ft. apart, and from the fourth to the sixth levels, 60 ft. The reserve ore between the third, fourth and fifth levels west averages 15 ins. wide, says the "Gilpin County Observer," but on the east little ground has been opened up. In the back stope, between the fourth and fifth levels, the ore body is nearly 3 ft. wide, composed of 2 ft. of mill dirt and 10 ins. of smelting ore. In the back stope in the sixth level the smelting ore averages 15 ins. wide and is worth \$100 a ton. All the winzes show an average width of ore of 3 ft., 2 ft. being mill dirt and one foot of smelting iron. The mill dirt averages 2½ oz. of gold to the cord, making 3,000 lbs. of tailings, worth \$33 a ton. The smelting iron in the fifth level and stope contains 2 4-100 oz. of gold and 29 oz. of silver and \$17 of lead to the ton, or a total of \$82.70 a ton. The average value of the ore in the fifth level is \$82.50 a ton and in the sixth \$100, the latter running higher in silver and lead. The ore appears to be increasing in value as depth is attained in both gold and silver. The property is now thoroughly ventilated and is well timbered throughout. For some years past the mine has produced enough mill dirt to keep 10 stamps going steadily night and day, the shipments of smelting ore averaging 60 tons a month.

##### Hinsdale County.

An increase in output is noted at Lake City. During the past month nearly 100 car loads of ore were shipped to Denver. The aggregate value of the output from Lake City mines is computed at over \$50,000 a month.

Champion.—This mine at Burrows Park has been purchased by J. C. Bender and Geo. P. Fesler of Salina, Kans. The property is reported to be one of the biggest copper mines in Burrows Park and it will be developed extensively. A contract will be let to sink this shaft 200 ft. deeper. At the bottom of this shaft the vein is about 26 ft. wide. The shaft is sunk on the hanging wall, which shows about 20 in. of gray and yellow copper. The vein was crosscut to the foot wall, and on this side is a streak of galena 30 ins. wide which carries considerable silver. They will continue sinking the shaft on the hanging wall and crosscut the vein every 50 ft.

Ute & Ulay Mines, Limited.—The Corliss engine, 150 H. P., which is being put in at the Ute

and Ulay mines, will be all ready to start up this week, when both sides of the mill will be run and operations again resumed on the Ute. These mines are employing about 175 men and their shipments aggregate from two to three carloads of concentrates daily. During the past two years, says the Lake City correspondent of the Denver "Republican," no less than four different superintendents have had charge of the mines, all of whom had different ideas regarding development, and in every instance where a change was made new machinery was put in and also entirely new ideas for work carried out. A few weeks ago Alexander Harrison, who has been the company's resident financial agent here for the past two years, was put in charge. Recently, he stated that their entire attention would be turned toward taking out ore. There are 10,000 tons of lead ore already broken in the Ute which will be concentrated and shipped as soon as the mill is running in full blast.

#### Onray County.

At Ouray a number of gold discoveries have been made on adjoining mountains by prospectors. Recent exploration at the Tempest has brought to light a seam of ore. The Virginius has 160 men at work. A strike of some importance has been made in the Bachelor; a 6-in. seam of good material is exposed, and a car load will be shipped shortly. At the Iowa, a crosscut is being run which will cut the vein 300 ft. below the upper level.

National Belle.—This mine at Red Mountain, is shipping 15 cars of ore per day, being largely composed of copper. High grade ore, it is reported, has been discovered in the Black Diamond. Operations on the Galena Queen have been suspended.

#### Pitken County.

Miner's Dream and Mineral Farm.—The following description is taken from the "Rocky Mountain Sun," of Aspen. The mine is working 26 men and there are six about the mill, three on each shift. The mill has 20 stamps and handles from 35 to 40 tons daily. Besides the concentrates from 30 to 40 tons of ore are shipped each month and about 15 cars of concentrates during the same period.

The ore is crushed through a 20-mesh and from there is carried on to the Spaulding bumping or roughing tables where the heaviest and coarsest mineral is saved. There are 8 of these Spaulding concentrators in use. The other product is elevated to the sizers where it is divided into five portions, the coarsest being from a 30 to 40-mesh and the finest from 100 to 150-mesh. At present all but the finest is being treated by the Frue vanners, of which there are six, though only four are now thus operated. The other two are making a comparative test with the Luhrig vanners. One of the most complicated problems in concentration is here met with on account of the large amount of heavy spar in the gangue. Each Frue handles from three to four tons in 24 hours, and with the air attachment, a device of which Manager J. H. McCoy and W. B. Cunningham are the originators, clean work is done. The waste or tailings give from 4 to 5 oz. of silver and a small per cent. of lead and copper. Before the air attachment was applied the concentrates averaged \$80 and now from the same grade of ore they go \$90 to \$95 to the ton by the car lots. All know that the most difficult proposition in concentration is in the case of fine material from 90 to 150-mesh. Here is where the Luhrig has shown its marked superiority. At present the Luhrigs are handling only this fine material and they do excellent work. Comparative tests made with them and the Frues under identical conditions have shown a saving in favor of the Luhrig of more than 100% in amount of the shipping product. In other words from the same quantity of ore the Luhrig makes two tons of concentrates to the Frue's one, and the product from both is of the same value. Tailings from the Luhrigs do not go more than 2 oz. silver, a trace of lead, copper and gold, while those from the Frues run 5 to 8 oz. silver and a like increased proportion of lead, copper and gold. The air attachment consists of fine jets of air directed on the surface of the water about 18 in. behind the feed on the Frue. This air comes from an air pipe directly across the vanner, and forces the floating mineral forward on to the belt, thus effecting a saving. In the case of the Luhrig the air pipe is placed diagonally across the belt, below the feed, and the air jets so arranged as to hold the very fine mineral until it secures firm lodgment on the belt and is thus secured from loss. Like satisfactory results are obtained by the air attachment with the Luhrig as with the Frue.

#### Saguache County.

According to some Denver correspondence Mr. L. D. Roubush has succeeded in forming a company, composed of New York capitalists and others, with a capital of \$8,000,000, to secure a number of Creede properties which he held under option. The options expire on January 1st. The mines are the Amethyst, the New York, which lies south of the Last Chance, which in turn is south of the Amethyst; the Hillside, which adjoins the Amethyst on the west; the Gold Eagle, which adjoins the Hillside on the west, and the Cuba, which lies west of the Gold Eagle and the Hidden Treasure, which starts on the westerly side of the Amethyst, and runs across the Hillside and Gold

Eagle into Cuba ground. The great vein is thus covered for the whole of its known length by the new company, excepting that part inside the lines of the Last Chance, which remains in the hands of its present owners.

At Creede constant strikes are being reported in the Cleopatra mine. It is on the Amethyst, which mine has shipped 3,800 tons during the past month. The Kreutzer Sonata is making great progress. Work has been commenced upon extending the Nelson tunnel a distance of 200 ft. The 40 H. P. engine and hoister for the Park-Regent have been placed on the Best Friend lode. Considerable work is being done above ground on the Happy Thought. A shaft and bunk house have been erected, while work is commencing on the development of 8 ft. of quartz now at the bottom of the 120-ft. shaft.

#### San Miguel County.

Shipments of ore and concentrates from Telluride for the week ending December 9th: Smuggler-Union, 143 tons; Sheridan Consolidated, 209 tons; Hector Mining Company, 11 tons. Total since January 1st, 32,344 tons.

### IDAHO.

#### Idaho County.

(From our Special Correspondent.)

Red River Placer Company.—Mr. M. D. Pettybone, of Elk City, favors us with the following account of the workings of the Red River Placer Company in whose employ he has been during the past summer. Their dredge was complete and made a three days' run handling one cu. yd. of gravel per minute. On cleaning up they found their savings of gold had not been as large as expected through some imperfections of the machinery. It was only 18 cts. per cu. yd. being only about one-half the fold in the dirt. An examination of their tailings showed that considerable gold went out with the gravel. They will therefore rearrange their sluices and make other improvements which will enable them to make a greater saving. Their plant worked satisfactory in all other respects and they feel confident that they have adopted the right system. They have shut down for the winter and will make another run early in March when, if the clean-up is as satisfactory, they will put in two more similar plants. They employ 12 men to run their steam dredge 24 hours, five are employed at night and seven in the day, at an average expense of \$3.50 per day to the man. A new mining district has been opened up with headquarters at the Red River Mining Company's works, which is seven miles southeast of Elk City, at which place next spring a postoffice will be established and will be called Raymond. While the placers have been the chief source of income of this section of the country, there are also many gold ledges that have been located and on some of which there has been considerable work done. Among the most prominent of these is the Blanco, a ledge measuring 60 ft. wide on the surface. The owners have run a tunnel in 650 ft. to strike the ledge. The ledge averages \$20 in gold and is located 4 miles from the Red River company's placer works. Two miles below the meadows Mr. Coverly has a fine ledge and has run a tunnel 85 ft. on the vein, which is 3½ ft. wide and the rock assays on the average \$25 a ton. In the spring he expects to put up a mill to extract the same.

#### Shoshone County.

Representatives of an English company have been examining the mines about Osburn during the last week and it is stated that they have selected a site for a smelter at a point about a mile below Osburn, on the Coeur d'Alene River. The smelter will be a first-class concern and will cost in the neighborhood of \$1,000,000, says the Helena "Independent."

Helena & Frisco Mining Company.—On this mine 140 men are now working. Three tunnels have been run, making the lower tunnel 700 ft. from the surface. No. 3 tunnel runs in 1,200 ft., striking the vein, which is crosscut 30 ft., and no hanging wall is as yet encountered, the vein widening as depth is attained. The ore averages \$62 in silver and 72% in lead and costs about 41 cts. per ton to concentrate four tons into one. There are 12 machine drills. A new electric plant is just completed, consisting of 21 arc lamps for the outside and incandescent for the interior of the mill.

### KANSAS.

#### Cherokee County.

During the week ending Dec. 10th, the output of ore from the mining districts of Galena and Empire City was: Rough ore, pounds milled, 2,393,510; rough ore, pounds sold, 2,438,280; zinc ore, pounds sold, 818,540; lead ore, pounds sold, 251,350. Sales aggregated a total value of \$13,429.

### MICHIGAN.

#### Copper.

Atlantic Mining Company.—The Atlantic reports a product of 208 tons for November. There is some talk among the Boston papers of a dividend from this mine early in the new year.

Central Mining Company.—This mine is again looking well, it is said. Considerable profitable ground has recently been discovered and opened up.

Franklin.—The product for November was 162 tons 385 lbs. of mineral.

Huron Mining Company.—The product for November was 40 tons of mineral.

Quincy.—With four heads in operation the Quincy made 900 tons of mineral in November. The fifth head is ready. When the five heads are in operation the product, it is estimated, will be fully 1,000 tons of mineral per month. Quincy mineral runs high in ingot, going about 82%. Reports are heard that quarterly dividends will be paid in 1893.

Tamarack Junior Mining Company.—Nothing of value has yet been discovered in No. 2 Tamarack Junior. The south end of the mine shows some bunches of good copper ground, but not enough to warrant any great prospects. The openings are now getting down to a place where a change for the better may set in any time.

Wolverine Mining Company.—This company will start its mill in April, 1893, and before that time the stamping facilities are to be increased about 60% and facilities provided for more economical handling of the rock. These facilities are being provided at an expense of some \$16,000. Since the mill was closed, some very good rock has been uncovered in the mine, and if the quantity is sufficient the management expects the property to do very well when production is resumed. The management is advancing money to carry the work along, and will soon call for an assessment of 50 cts. per share, or \$30,000.

#### Iron—Marquette.

Blue.—The sheriff-elect of Marquette County, Josiah Broad, resigned his position as mining captain at the Blue mine on the 1st of the present month. He has been succeeded by Mr. Thomas Maker, who has held the position of shift boss under Captain Newcombe at the Negaunee mine for some time past. Mr. Maker is an old resident of Negaunee and has had a life-long experience in mining which thoroughly qualifies him for the position to which he has been promoted. Mr. Broad will remain in Negaunee until January 1st, during which time he will enjoy a short rest.

Iron Cliffs Tin Company.—The contracts relative to the lease of the Pioneer furnace by the Iron Cliffs company to Messrs. P. H. Carroll and Samuel Redfern, of Negaunee, have been approved. Only one stack (No. 2) will be put in blast at present, and the approved furnace will make its first cast in about 10 days. About 40 men will be employed. Between 50 and 60 tons of pig iron per day will be turned out.

### MONTANA.

Granite Mountain Mining Company.—The regular annual report of this company for the year ending July 31st, 1892, has been issued. President L. M. Rumsey in submitting the report covers almost everything of interest contained in the superintendent and treasurer's report, and says: "During the fiscal year ending July 31st, 1892, the mills at Granite and Rumsey crushed and treated 81,264 dry tons of ore, of an average assay value of 37.69 oz. of silver per ton and at a saving of 91.2% of the assay value of the ore treated, producing 2,794,455 oz. of fine silver, and 3,566 oz. of fine gold. There was received for the silver and gold sold during the fiscal year \$2,799,764." The average price per oz. received for each ounce of fine silver sold during the year was \$0.9308; price received for each oz. of fine silver sold the previous year was \$1.0406. Decline in receipts for oz. of fine silver sold this year, \$0.1098; loss by the decline on the 2,794,455 oz. of silver produced, \$306,831. Dividends paid during the year ending July 31st, 1892, \$1,020,000. Dividends paid since April 8th, 1885, \$12,120,000."

#### Deer Lodge County.

Combination and Black Pine Company.—It is learned that this company contemplates some very extensive improvements to its property. The capacity of the mill will be increased from 20 to 40 stamps and important improvements will also be made in the roasting facilities. A new and improved pump costing \$5,000 was recently placed in the mine and a number of other improvements will be made by spring. About two years ago the company prospected considerably with a diamond drill. About 1,500 ft. from the present shaft a rich body of ore was discovered, it is said, and it is rumored that the sinking of a new shaft at that point will be commenced at a very early date. The mine is yielding very rich ore, in fact, it is yielding more than can be worked by the mill at present, and in consequence a number of the night force were laid off.

#### Jefferson County.

Geo. Casey, of Butte City, has secured a patent to a mineral location which includes the right-of-way of the Northern Pacific Railroad, through Jefferson canyon, the passage way across the mountains, where the Union and Northern Pacific hands had a pitched battle for possession about three years ago. Mr. Casey filed his location there prior to the date of the filing of the map of definite location by the Northern Pacific. The Northern Pacific contested his application for patent. He says he has spent about \$15,000 down there and now owns about 2½ miles of the canyon.

Neipsic.—This mine is under bond at present to J. W. Carpenter. He has a shaft 120 ft. deep with 3 ft. of ore in the bottom and ore from the 60ft. level down. He has just completed his shaft and whim house and is now prepared for the winter. About one mile and half northeast of here is the

Red Fox, owned by Frank Stradling and partners, where they are getting good free milling gold ore, which they are working with an arastra. Having just completed the building over the arastra, which is run by steam, they are now ready for the winter. About two miles southeast lies the Mayflower group, owned by F. E. Willard and partners, consisting of four claims. Mr. Willard has had several opportunities to bond the group this fall, but not being satisfactory he has about decided to work them himself. His last shipment netted him over \$60 per ton, running \$38 in gold.

Missoula County.

Nine Mile Mining Company.—The new mill of this company at Martina is now running. Development work in the mine is going steadily on and showing up large bodies of good paying ores. There is a tramway 1,200 ft. in length running from the mouth of the tunnel to the mill. There is at least 15,000 tons of ore now on the dump and enough in sight in the mine to keep the mill running at least two years. It is a model mill in every department. Four Frue vanners have arrived from Chicago and will be placed in position at once.

Park County.

Poorman Mining Company.—A crosscut has been run a distance of 80 ft. and has struck three lodes. At a depth of 80 ft. the same vein was struck. An assay has not been made of the new discovery, but the ore is very rich and shows a large amount of free gold.

Silver Bow County.

Anselmo.—Recently considerable work has been done in the east shaft. At the time the leasers took hold of the property this shaft was down to the 100-ft. level. By the terms of the lease the owners of the property required this shaft to be developed to the 250 ft. level. At the 200-ft. level a station was cut and a crosscut of 80 ft. was driven to tap the main lead on the north wall. At the same time work on the west shaft was being prosecuted vigorously, the leasers being convinced that the rich ledge which was known to exist, was situated on the north side of the shaft instead of on the south side as had been claimed by former partners of the lessees. Two weeks ago, as stated, when a ledge averaging 3 ft. in width was discovered in two distinct portions of the workings 100 ft. apart. Assays taken in the rough then averaged 192 oz. in silver and \$25 in gold, but continued working since has developed the fact that the vein all through will average fully 290 oz. in silver and from \$50 to \$70 in gold. During the week six additional men were put to work and in a few weeks about 50 men will be employed. The lessees have 20 ft. more to sink, which will bring the shaft to the 250-ft. level. At this level they expect to be within 6 ft. of the ledge.

NEVADA.

Churchill County.

Victor.—The Nevada "New Era" has the following relating to the Victor lode, which is situated in the Arabia Trinity Mining District, three miles from the Central Pacific railroad and 14 miles northeast of Lovelocks. The mine was discovered in early days and was then known as the Chloride. Large flakes of horn silver an eighth of an inch thick were found in the seams of the rock in the vein. The property was sold by George Lovelock to A. Scielmore and John Bridgford, of Albany, N. Y. "Immediately the new owners set about to determine the extent and value of the vein. Open cuts were made, drifts run and the ledge shown at least 125 ft. wide, without the footwall in sight, and indications that the formation is at least 200 ft. in width, traceable the length of the claim—1,500 ft. The strength of the mineral body is shown by the ledge cutting through Arabia mountain, the same character and size of formation existing on both sides. Several hundred assays made of the quartz, gathered both systematically and indiscriminately from the lode, gave an average of \$52 per ton, \$6 of which was gold. The ore body lies in such a position as to be quarried to a considerable depth.

Esmeralda County.

Indian Queen Mining Company.—This company has been re-incorporated, and is now known as the Phoenix Mining Company. The company's property is reported to be in good condition, and about 15 men are on the pay roll. They are drifting in Poorman tunnel preparatory to sinking a winze.

Mount Diablo Mining Company.—This company last week made a shipment of 8,439 oz. of fine silver.

Eureka County.

The Eureka "Sentinel" says that owing to stormy weather the teams have not been able to haul as much ore as usual, and there has been a falling off in the November shipments from Eureka of about one third of the usual amount. During the month the E. & P. R. Co. received for transportation a total of 1,498 tons, consigned to Salt Lake and other points as follows: Eureka District—Diamond mine, 690 tons; Eureka Cons., 299 tons; Jackson, 146 tons; Richmond, 128 tons; Hamburg, 33 tons; Phenix, 15 tons; Dunderberg, 15 tons; McGarry, 11 tons; Remington, Johnson & Co., 6 tons; Bowman, 6 tons; Thomas Robinson, Newark, 37 tons and Sada Lindsay, Union, 17 tons. White Pine—From Rocco Kragnazo, 50 tons; C. A. Mathewson, 22 tons; S. Paul, 12 tons and Zoanni Brothers, 11 tons.

Lincoln County.

Keystone.—This mine was located in 1888 by Jonas Taylor, who never suspected its value. Last June S. T. Goodbe examined the claim and paid \$20,000 for an interest in it. The ore is a brown iron oxide, which is said to assay \$30,000 to the ton in spots. A shipment of 10 tons of average ore brought \$7,160 in Pueblo.

Storey County—Comstock Lode.

The Comstock mining and milling companies disbursed a total of \$155,423 for labor during the month of November. The amount was \$11,102 less than that for the previous month.

The Comstock Pumping Association, composed of the Gold Hill and some of the middle companies for the purpose of draining the lower levels of the Gold Hill mines, has just leveled its eighteenth consecutive assessment of \$25,000, apportioned among the companies according to the number of feet occupied by the mines, etc.; Belcher's portion of the assessment will be \$4,750. This eighteenth assessment makes a total of \$450,000 levied upon the companies for pumping purposes since pumping operations began.

Belcher Mining Company.—The latest official weekly letter says: "Have started an upraise from the south end of the south drift, on the 350-ft. level. It is up 17 ft., and has cut the same ore on which the stope has carried south on the fifteenth, sixteenth and seventeenth floors. The raise will be connected, after which explorations further south will be continued. Have shipped to the Brunswick mill for reduction during the past week 315 tons and 290 lbs. of ore, the average battery sample of which was \$36.44 per ton."

Confidence-Challenge Mining Company.—The joint Confidence-Challenge west crosscut No. 7, from north drift, on the surface level, is out 98 ft.; the face shows quartz of no value. The joint Challenge-Confidence west crosscut No. 6, on the same level, is out 110 ft. Its face shows quartz of no value. The joint Challenge-Confidence west crosscut No. 3, on the 100 level, is out 100 ft., and crosscut No. 4, on the same level, is out 56 ft. The face is in quartz of no value. Some ore is being taken out and sent to the Brunswick mill for reduction.

Consolidated California & Virginia Company.—The total shipments of bullion from this company's mines for November were valued at \$68,147. The total product for the previous month was \$70,685.09. The official statement for November shows that there was worked at the Morgan Mill 4,150 tons of ore, which yielded bullion of the gross assay value of \$68,147.16, of which \$41,406.42 was gold and \$26,742.34 was silver. The yield of the ore in bullion per ton was \$16.42, and the average assay value of the battery samples of the ore per ton was \$23.17. The averages for the previous month were as follows: In bullion, per ton, \$16.24; battery samples, \$22.87 per ton. The indebtedness of the company is now said to exceed \$40,000.

Crown Point Incline.—Following is the official report of the pumping operations in the Crown Point Incline for the week ending December 3d: "The pumps have been working continuously during the past week. The flow of water is the same as at last report. The drain tunnel continues hot. We have now two blowers running steadily, which have reduced the temperature of the tunnel somewhat, but we think it will be necessary to increase the size or number of blowers in order to keep the current of air drawing in the right direction."

Crown Point Mining Company.—The latest official weekly letter says: "The west crosscut from the southwest drift 150 ft. south of the shaft 400 level is now out a distance of 60 ft. and the face is in a mixture of low grade quartz and porphyry. On the 160 level have raised from the south drift in the west stope and connected with the third-floor drift. The south drift on the fifth floor has been continued following the ore streak, which, though quite small, is of good grade ore."

Hale & Norcross Silver Mining Company.—The San Francisco "Report" of the 5th inst. says: In the Supreme Court this afternoon argument was begun on the motion for leave to proceed on judgments in the suit of M. W. Fox against the Hale & Norcross Silver Mining Company. The motion states that judgment was rendered June 11th, 1892, against the defendants, notwithstanding the undertaking on appeal filed in the action given to stay the execution of the judgment. The motion was made on the ground that the undertaking was insufficient to stay the execution of the judgment, because the sureties had not sufficient property. Attorney W. T. Baggett began the argument for the plaintiff. He proceeded to argue that the undertaking filed was worth just about one-tenth of what the judgment amounted to. Furthermore, it had not been properly executed. An answer of Judge J. C. B. Hebbard, who rendered the judgment, to the effect that he had jurisdiction over the case was presented. That closed Baggett's preliminary statement, and W. F. Herrin began the argument for the defendants. He said that in the lower court the judgment against his clients was for over \$1,000,000. To stay the judgment the defendants had given a bond through the Western Surety and Guarantee Company, an incorporation formed for that purpose. This incorporation was fully able to give such a bond. As to the property qualifications of the sureties, it was for the courts to pass on them.

Justice Beatty—I would like to have the attorneys in this case present it on its merits. As there is no disagreement as to the findings of fact, I think they can finish it in one argument.

Herrin then went on to answer the assertion by the plaintiff that the Supreme Court had no jurisdiction in the case, as the Superior Court had full jurisdiction. Herrin alleged that this contention was absurd. The Supreme Court most assuredly had jurisdiction on a stay of proceedings in a case pending before it on appeal. The jurisdiction of the Supreme Court excluded that of the Superior Court.

Justice Mining Company.—The latest official weekly letter says: "The south drift from the north stope, 822 level, has now a total length of 59 ft. The face shows from 4 to 5 ft. of ore in width that assays about \$25 per ton. We have started a north drift from the raise on this level, which is now out 7 ft. The face is in quartz that assays from \$10 to \$20 per ton. We are taking out about four tons of ore per day, the car samples of which average \$25 per ton."

Mexican Mining Company.—At the annual meeting of this company 79,164 shares were represented, and the following officers were elected: Charles H. Fish, president; A. W. Havens, vice-president, and C. O'Connor, Charles Hirschfeld and H. Zedig, directors. C. E. Elliott was re-elected secretary and D. B. Lyman, superintendent. The secretary's financial statement showed a balance on hand of \$20,468.82.

Savage Mining Company.—The latest weekly letter says: "The upraise from the sill floor of the 1,100 level, 300 ft. from our south boundary, is advanced 40 ft. Top in quartz giving low assays."

Sierra Nevada Mining Company.—The Virginia Enterprise says: "From the wording of the last weekly report of the Sierra Nevada mine some people got the impression that work had been suspended in the Kenosha tunnel owing to the demolition of the blacksmith shop at the mouth of the intermediate tunnel by a snowslide. The accident to the shop caused work in the latter tunnel to be suspended. Work in the Kenosha tunnel is proceeding as usual."

(From our Special Correspondent.)

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

Mine.	Tons hoisted.	A. v. car s. p. c. as y.	Tons milled.	A. v. ret. at-tery assay.	Bullion product for week.	Bullion shipped.
Belcher.....	70	24.79	315	36.44	.....	121,398.69
Con. Cal. & Va.....	963	40.00	980	20.33	.....	217,904.10
Con. New York.....	28	25.00	.....	.....	.....	.....
Justice.....	22	87	407	18.60	.....	.....
Ophir.....	118	21.54	.....	.....	.....	.....
Overman.....	492	23.05	512	23.44	.....	.....
Potosi.....	425	21.23	450	19.49	6,138.00	5,418 lbs.
Savage.....	.....	.....	.....	.....	.....	.....

<sup>1</sup> Total amount for November, \$36,657.05. <sup>2</sup> Total amount for November, \$68,147.16. <sup>3</sup> Cars. <sup>4</sup> Crude bullion.

Consolidated New York Mining Company.—The mining test of ore having given satisfaction to the powers that be, shipments to this mine will be continued. The ore developments on the 600 and 700 levels show improvements and the ore body is now 3 ft. wide and of good grade. The ore now being extracted is from the stope above the 650 level and assays \$40 per ton.

Kentuck Consolidated Mining Company.—The work of stoping on the streak of ore above the 160 level, seventh floor, continues.

OHIO.

The coal operators of the Hocking Valley, in session at Columbus on the 13th inst., took steps toward the formation of a trust company for the commercial handling of the output of all their mines. It was decided to form a company under the incorporation laws of the state, to which all the output of the coal mines along the Columbus, Hocking Valley and Toledo Railway shall be turned over for sale, the proceeds to be divided among the operators according to an equitable rule. The new company will employ all traveling men and attend to all contracts, and the individual operators will have nothing whatever to do with the sale of the coal. Some of the results of this arrangement will be the discharge of a number of salesmen in the employ of operators, and a large reduction in the expense of placing the coal on the market. The Hocking Valley operators along the lines of the Baltimore & Ohio, Columbus, Shawnee & Hocking, and Toledo & Ohio Central railroads, are, it is said, to become members of the new trust company.

Columbiana County.

Ohio & Pennsylvania Coal Company.—One hundred miners at this company's slope mines at Salineville, O., have struck a disagreement with the company over the size of screens having arisen.

PENNSYLVANIA.

Coal.

The Lytle Colliery fire, near Pottsville, was extinguished on the 12th inst.

The miners employed by J. D. O'Neil, of Elizabeth, have decided to go to work at the reduced rate. Operations were resumed on the 12th inst.

On the 12th inst. the surface of the ground 300 yards east of Packer Colliery No. 2, near Lost Creek, began to crack, and several minutes after a freight train and a coal train had passed over the spot the ground gave way, carrying with it both tracks of the Lehigh Valley Railroad. The cavity thus made is 75 ft. deep and about 40 ft. in diameter.

The miners employed in the Aurora Colliery, at Lafin, who went on a strike on the 9th inst., complaining of too much dockage for dirty coal, held a meeting on the 11th inst. and discussed their grievances. On learning that Charles Parrish, the operator, desired to treat with them fairly, they agreed to return to work on the following morning.

A press despatch from Wilkes-Barre says that the northern boundary of the anthracite coal field has been extended. A vein of good anthracite 6 ft. thick, has been discovered at Uniondale. The farmers are excited over the discovery. Farm land could be bought in the vicinity for \$50 per acre a short time ago. It has gone up in one jump to \$400 per acre.

Delaware & Hudson Canal Company.—The strike of the runners and drivers at this company's collieries came to an end on the 14th inst. It lasted only 24 hours, the strikers having returned to work.

Delaware & Hudson Canal Company.—The runners and drivers employed at this company's three collieries, in Olyphant, struck on the 13th inst. for increased wages, and the collieries were shut down, throwing 1,500 men out of work. The miners disapprove the action of the boys and propose to supply the places of the strikers.

Philadelphia & Reading Coal and Iron Company.—This company has decided to wash out the large culm banks at the old Keystone colliery at Locustdale and thus secure the coal that is in them. Some of these banks were dumped many years ago, when the advantage of securing the smaller sizes of coal were not considered, and thousands of tons of coal can be secured from them. It is thought that doing this will not necessitate the flooding of the country with coal dirt, as is the case generally where washeries exist, as shutes will be built to catch the waste and it will be hoisted up and dumped again. The place will be ready for operation in a few weeks, and it is expected that at least 200 men and boys will find employment at the colliery.

#### OIL.

The Chief of the Bureau of Statistics reported the total value of the exports of mineral oils from the United States for the month of November, 1892, and during the eleven months ending November 30th, 1892, as compared with similar exports during the corresponding periods of the preceding year as follows: November, 1892, \$3,910,550; eleven months ending November 30th, 1892, \$38,644,624; November, 1891, \$3,506,565; eleven months ending November 30th, 1891, \$41,474,135.

#### SOUTH DAKOTA.

##### Lawrence County.

Atlas.—This property shows much work upon it, the most of which, however, is dead work and was done in searching for the ore body supposed to exist at the point where the first discovery was made. The body lay fully 100 ft. below this, as was ascertained a few days ago when, after sinking and cross-cutting, the owners struck a handsome body of ore showing a 7-ft. face.

##### Pennington County.

Harney Peak Tin Mining Company.—As was expected, considerable difficulty is being experienced in the concentration of tin by the Harney Peak mill during the first run. Operations upon Gertie ore have been suspended, owing to the fact that tin crystals were too fine to be saved by the jigs in use. The mill is now running on ore from the Cowboy mine, which contains the coarsest crystals of tin found in the Harney Peak region. The company is as yet undetermined as to what method and machinery will be required to separate the finer tin crystals in Gertie ore. The new plant of the Harney Peak company, in the main, however, is accomplishing all that has been expected, and the results thus far are promising and satisfactory. The company will separately test ore from each of the five properties more largely developed—the Gertie, Cowboy, Coats, Tenderfoot or Japany group and Addie—and thus expects to gain a knowledge of the average value of the tin rock of the entire district, before commencing operations on the ore unassorted. Increase of hoisting capacity at the Gertie mine, and the introduction of new machinery at the Tenderfoot group, where diamond drills have been used in prospecting, will shortly be necessary, and it is understood that the company is making preparations to secure this new machinery. Superintendent Childs was interviewed by a reporter of the "Black Hills Times," and said they will commence shipping concentrates east for refining about January 1. The company has no smelting plant. It has not yet been decided whether the concentrates will be shipped to Omaha, Aurora, Ill., or Jersey City.

#### TENNESSEE.

##### Marion County.

Inman.—This coal mine, at the foot of Cumberland Mountain, near Jasper, caved in on the 14th inst. It is thought two convict guards are imprisoned.

#### UTAH.

##### Salt Lake County.

Utah Mining Company.—The main shaft of the Utah is down 264 ft. and assays 300 oz. of silver and 55 per cent. lead. A 9-foot cross-cut, all in ore from the winze to the shaft, has been run, but all work is stopped just now to enable connections with the new winze to be made. Regular shipments will be continued the balance of the month, the total shipments up to December amounting to \$201,446 sold alone in Salt Lake.

##### Summit County.

Crescent Mining Company.—The company's assessment of 10 cents per share was delinquent December 19th, and 24,000 shares were declared delinquent. It was rumored that the 10 cents per share was levied solely to freeze out some small holders, but Major Baskin, Joseph Lippman and other heavy owners deny this. The company is building a long drain tunnel at a large expense to drain the lower levels of the mine.

#### WYOMING.

##### Carbon County.

Mine No. 2, at Hanna, which has been idle for the past two years, is preparing to start work again, which will probably be about the first of the year.

#### FOREIGN MINING NEWS.

##### ENGLAND.

A fearful explosion occurred on the 14th inst. at the Bamfurlong colliery, Wigan. Many lives have been lost and it is stated that 100 men remain in the mine with their lives endangered, being unable to get out owing to the fire which followed the explosion and which is raging fiercely in the mine, making it difficult for rescuers to get at the imprisoned miners. The rescued miners believe that the explosion was caused by sparks from the engine house, which, it is said, caught fire a few minutes before the explosion.

##### MEXICO.

##### Durango.

Bacis Gold and Silver Mining Company, Limited.—The directors of the company are Lieut.-Col. R. H. Lloyd Austruther, Edward Dicey, C. B.; J. T. Henderson and Robert McIlwraith. The company is formed to acquire and work extensive gold and silver mines, situated on a slope of the Sierra Madre Mountains, near the ancient city of Bacis, on the Tuila River, in the State of Durango. The property includes the following mining claims: The Herrero, La Luz, and the Tajo, each of 800 meters, or 2,624 ft. in length. The altitude of the mines is from 4,000 to 5,000 ft., and it is expected that the extension of the Mexican International Railroad to Mazatlan will pass within a few miles of the claims. Water and timber are abundant, and the ore is free milling. Herrero lode, reaching in width 50 ft. or more in places, is considered to be a true fissure vein, the average assay value of the samples of ore taken being from \$28 to \$30 per ton of 2,000 lbs. The Luz lode, about 8 ft. wide, forms a junction with the Herrero lode. The average of six assays gave gold 6 dwts., and silver, 28 oz. per ton.

#### MINING STOCKS.

##### NEW YORK, Friday Evening, Dec. 16, 1892.

[For complete quotations of shares listed in New York, Boston, San Francisco, Aspen, Colo.; Baltimore, Pittsburg, Deadwood, S. Dak.; St. Louis, Helena, Mont.; London and Paris, see pages 588 and 600.]

##### General Stock Market.

Generally speaking, the "bears" are on the ascendant in the stock market. In the early part of the week there was a reaction in favor of the Gould stocks, and an advance took place which, however, was lost later, when almost the entire market ruled lower. The decline has been the greatest in the "Industrials," but railroad stocks have suffered as well. There is a feeling of uncertainty in financial circles owing to the gold shipments of the past week and the uncertainty as to their continuation next week. The money rate to day advanced to 25 per cent. A further tightening in the money market was the consequence.

During the past week the mining market has been quiet and dull. No particular improvement can be noted; indeed there has been a decline in the prices of some of the Comstocks.

The stock of the Monte Cristo Gold Mining Company was listed at the Consolidated Stock & Petroleum Exchange this week. The company was incorporated on May 13th, 1892, under the laws of the State of Kentucky with a capital stock of \$500,000 in 500,000 shares of \$1 each. From the papers submitted by the company to the Exchange we gather that the company owns about 1,000 acres in the State of Tolima, Republic of Colombia. The ore is an auriferous gravel. The mine was never worked, but \$10,000 are now being expended in development and 50 men are employed. Hydraulic mining will be inaugurated there. The stock is full paid and not assessable, and 50,000 shares were originally set aside for working capital. The officers are as follows: President, Lee R. Shyrook; Secretary, Valentine A. Lewis. Directors: L. R. Shyrook, V. A. Lewis, S. W. Blakely, J. A. Harpending, Frank A.

Haight, Charles F. Vincellet and Joseph V. Clark. The majority of the stock is held by these gentlemen.

The Comstocks with but few exceptions have undergone a marked decline during the week. Consolidated California & Virginia opened at \$2.70 and closed at \$2. The total number of shares sold was 500. In our mining news columns will be found news of importance relating to this company. Crown Point declined from \$1.05 to 89c.; only 200 shares were sold. Of Comstock Tunnel stock 2,700 shares were sold at 8c. Other sales were as follows: Gould & Curry, 200 shares at 70¢@85c.; Hale & Norcross, 250 shares at \$1.30@1.55; Savage, 100 shares at \$1.20; Sierra Nevada, 150 shares at \$1.40; Yellow Jacket, 200 shares at 70¢@75c.; Best & Belcher, 250 shares at \$1.25@1.55; Bullion, 700 shares at 90¢@1.05; Mexican, 600 shares at \$1.35@1.55, and Union Consolidated, 200 shares at \$1.30. The financial statements of the various Comstock companies will be found elsewhere in this issue.

Of the California stocks Bulwer shows sales of 900 shares at 20c. There was a single sale of 100 shares of Bodie Consolidated at 20c. Quicksilver, preferred, was dealt in to the extent of 400 shares at \$18@18.50. There was a sale of 100 shares of Plymouth at 75c. and another of an equal number of shares of Standard Consolidated at \$1.50. Sales of Brunswick Consolidated aggregated 2,400 shares at 12¢@13c.

Of the Colorado stocks Leadville Consolidated continued the most popular; 6,000 shares changed hands at prices ranging from 12 to 24c. There was a sale of 100 shares of Enterprise at \$1.50, and an equal number of shares of Lacrosse at 4c.

Of the Utah stocks Horn Silver was in good demand and this week shows sales of 1,750 shares at \$3.30@3.50. The notice of the dividend declared by this company will be found elsewhere in this issue. The transactions in Ontario aggregated 617 shares at \$15@17.

Phoenix of Arizona continues in good quest. During the week 4,800 shares were sold at \$8@63c.

On the 14th inst. there was listed on the New York Stock Exchange \$2,000,000 preferred stock and \$9,500,000 common stock of Colorado Fuel & Iron Company.

##### Boston.

Dec. 15.

(From our Special Correspondent.)

The market has ruled extremely dull the past week, and prices with few exceptions have tended downward. There is no disposition to load up with stocks at this season of the year and it is quite possible that lower prices will prevail ere the year closes. At same time the outlook for copper is good and a higher quotation for the metal will doubtless induce better buying of the investment stocks, as well as stimulate speculate.

The Montana stocks have been exceptionally quiet, with very little change in prices.

Boston & Montana sold at \$34½, as the highest point, and declined to \$23¾. Less than 1,000 shares were dealt in.

Butte & Boston has been very steady at \$11¼ @ \$11¾, on sales of about 500 shares.

Calumet & Hecla advanced from \$290 to \$295 on small lots.

Tamarack was also little firmer, selling at \$157 @ \$153, and Quincy strong at \$145 @ \$145½. Centennial & Kearsarge have ruled dull and neglected; the former declined to \$7½ and the latter to \$11¾.

Osceola declined early in the week to \$35½, rallied to \$37, with later sales at \$36.

Franklin sold at \$13¾, later it was in better demand, and on good buying orders advanced to \$14½—a dividend of \$2 per share is expected next month.

Atlantic sold at \$10 for small lots, and \$9¾ for 100 shares.

Tamarack, Jr., lost the advance of last week and sold down to \$22 per share.

Wolverine, sold down to \$1½, a decline of ¼, an assessment of 50c. per share is talked of. Napa Quick silver sold at \$6 same as last week.

##### San Francisco.

Dec. 9.

(From our Special Correspondent.)

The mining stock market has shown during the week just closed a decline on the ruling rates of the last week, with a total volume of trade also showing a shrinkage. The only exceptions to this have been certain of the stocks which have been regarded as favorites for some time past, but which daily in the coming year will also figure on the assessment list.

The north end Comstocks, while selling at lower rates than a week ago, have been in rather better demand, Consolidated California & Virginia selling early in the week for \$2.50 and to-day at \$2.70, 5 cents off at the close. Ophir, at \$2.55, to-day shows a decline of 20 cents on the week's trading, and Mexican, at \$1.65, is also a point below last week's ruling rate. Sierra Nevada has sold steady at \$1.10 and Union Consolidated at \$1.20, closed this afternoon advanced a point.

The middle group of Comstocks have without any exception, declined from one to four points. Chollar sold to day at 85c., a 10c. decline; Best & Belcher for \$1.55, a 5c. decline; Gould & Curry for 80c., a 5c. decline; Hale & Norcross for \$1.45, a 20c. decline; Savage for \$1.20, a 15c. decline, and the whilom favorite Potosi for \$1.95, decline of 15c.

The South End and Gold Hill stocks have barely held their own, Belcher being the only stock that has been in any way active, selling for \$1.80; Alpha at 30c.; Confidence at \$2.35; Crown Point at \$1.00; Kentuck at 25c.; Occidental at 45c.; Exchequer at 25c.; Overman at 60c., and Yellow



Jacket at 70c., with a 30c. assessment just levied, show better alteration in values since last week.

It is not, however, at all improbable that the market will take a little spurt before Christmas, for glowing reports from certain of the mines are being circulated, but for this there will be no warrant in fact; and if such a rally should take place it will be simply for the purpose of saddling the public with a final lot of stocks before the year closes. As a matter of fact the vast bulk of the shares are in the hands of the public, and the inside operators will commence a new year with bands free for a new deal.

Of the outside stocks nothing can be said save that a bare quotation is being obtained, with sales nil. Bodie is quoted at 20 cents; Bulwer Consolidated at 15 cents, and Mono at 20 cents.

In the Tuscarora group Belle Isle at 15c.; Common Wealth, Grand Prize and North Belle Isle at 5c.; Del Monte, Nevada, Nevada Queen and North Commonwealth each at 10c., have all sagged heavily and sales have only been made to make a rate.

Of the Quijotoa stocks Central has sold for 5c.; Crocker for 5c.; Peer for 15c., and Peerless for 5c., with sales exceedingly light.

Eureka consolidated at \$2.00 and Mt. Diablo at \$1.00 have held steady.

At the close there were trifling advances in the Middle Comstocks, the general market closing with a stronger tone.

**San Francisco, Dec. 15.** (By telegram).—The opening quotations to-day were as follows: Best & Belcher, \$1.25; Bodie, 20c.; Belle Isle, 15c.; Coblar, 75c.; Consolidated California and Virginia, \$1.70; Eureka Consolidated, \$2; Gould & Curry, 65c.; Hale & Norcross, \$1.25; Mexican, \$1.30; Mono, 20c.; North Belle Isle, 5c.; Navajo, 15c.; Ophir, \$1.75; Savage, \$1.10; Sierra Nevada, \$1.40; Union Consolidate, \$1.25; Yellow Jacket, 60c.

**ASSESSMENTS.**

COMPANY.	No.	When levied.	D'nq't in office.	Day of sale.	Amt. per share.
Belle Isle, Nev.....	16	Nov. 5	Dec. 12	Jan. 4	.10
Carra, Cal.....			Nov 23	Dec. 28	1.00
California, Cal.....	76	Sept. 28	Dec. 20	Jan. 7	.01
Challenge, Nev.....	13	Nov. 16	Dec. 31	Jan. 25	.25
Commonwealth, Nev.....	10	Nov. 23	Dec. 28	Jan. 24	.10
Con. Imperial, Nev.	34	Nov. 22	Dec. 29	Jan. 19	.03
Con. New York, Nev.	9	Nov. 2	Dec. 5	Dec. 28	.10
Del Monte, Nev.....	3		Dec. 23	Jan. 24	.10
E. Best & Bel., Nev.	3		Dec. 24	Jan. 18	.20
Eclipse, S. Dak.....	7	Nov. 18	Jan. 3	Jan. 23	.001½
El Leopoldo, Mex.....	1	Nov. 11	Dec. 14	Jan. 2	.10
Evening Star, Nev.	7		Jan. 12	Jan. 31	.01
Exchequer, Nev.....	34	Oct. 28	Nov. 30	Dec. 20	.10
Gould & Curry, Nev.	70	Nov. 22	Dec. 28	Jan. 20	.25
Indian Creek, Cal.....	3	Nov. 4	Dec. 14	Jan. 6	.10
Louvre, Con.....	1		Dec. 14	Dec. 30	.05
Martin White, Nev.	28		Jan. 16	Feb. 20	.25
Navajo, Nev.....	23	Nov. 5	Dec. 9	Dec. 30	.10
North Gould & Curry, Nev.....	14	Nov. 21	Dec. 24	Jan. 16	.10
North Belle I., Nev.	21	Nov. 14	Dec. 20	Jan. 17	.01
Ocidental, Con., Nev.....	11	Oct. 25	Nov 30	Dec. 21	.25
Russell, Cal.....	8	Nov. 14	Dec. 19	Jan. 16	.01
Sierra Nevada, Nev.	103	Nov. 9	Dec. 14	Jan. 3	.25
Silver Lick, Con., Nev.....	23	Nov. 5	Dec. 9	Dec. 30	.10
South Eureka, Cal.	1	Nov. 2	Dec. 9	Dec. 31	.02
Therakoff, Cal.....	9	Oct. 11	Nov. 11	Dec. 20	.02
Trent, S. Dak.....	4	Oct. 29	Dec. 15	Jan. 5	.001
Yellow Jacket, Nev.	53		Jan. 6	Feb. 14	.30

**MEETINGS.**

Barker Mining and Milling Company, at the office of James J. Fleetford, No. 1117 Seventeenth street, Denver, Colo., January 14th, at 3 P. M.

Diamond B. Mining and Milling Company, at the office of the company, Mining Exchange Building, Denver, Colo., January 10th, at 3 P. M.

Gipsev Consolidated Mining Company, at the office of the company, No. 53 Broadway, New York City, December 19th at 2 P. M.

Potosi Consolidated Mining and Milling Company, at the office of Messrs. Ross & Dewese, No. 14 Union Block, Denver, Colo., December 31st, at 10 A. M.

**DIVIDENDS.**

Boston & Colorado Smelting Company, of Colorado, quarterly dividend of 2½ per cent., payable January 2d to stockholders of record December 19th.

Centennial Eureka Mining Company, dividend No. 24 of 50 cents per share, \$15,000, payable December 20th at the office of the company in Salt Lake City.

Colorado Central Mining Company, dividend No. 35 of five cents per share, \$13,750, payable January 10th, 1893, at the office of the Farmers' Loan and Trust Company, New York City. Transfer books close December 30th and reopen January 11th.

General Electric Company, dividend of 3¼% on the preferred stock, payable January 2d, at the office of the company, No. 44 Broad street, New York. Transfer books close December 17th, and reopen January 3d.

Homestake Mining Company, dividend No. 173 of ten cents per share, \$12,500, payable December 24th at the office of Messrs. Lounsbury & Co., Mills Building, No. 15 Broad street, New York. Transfer books close December 20th.

Minnesota Iron Company, dividend No. 10 of 1¼% per \$210,000, payable January 3d, 1893. Transfer books close December 19th and reopen January 4th.

Tennessee Coal and Iron Company, dividend of 4% on preferred stock, payable January 14th, at the Fourth National Bank, New York City. Transfer books close December 31st and reopen January 16th.

**METAL MARKET.**

NEW YORK, Friday Evening, Dec. 16, 1892.  
Prices of Silver per Ounce Troy.

Dec.	Sterling Exch. ge.	London Pence.	N. Y. Cente.	Value of sil. in \$.	Dec.	Sterling Exch. ge.	London Pence.	N. Y. Cente.	Value of sil. in \$.
10	4.87¾	38¾	83¼	.636	41	4.88	38¾	82¾	.638
12	4.88	38¾	83¼	.642	15	4.88	38¾	83	.640
13	4.88		83	.640	16	4.87¾	38¾	83¼	.642

Silver market has been unsettled and the tendency a declining one, until it became apparent that no radical changes, either in the coinage of silver by the India mints, or in the silver operations of our own Government, was likely to be brought about at present. Since then the market is steady with a moderate inquiry.

The United States Assay Office at New York reports the total receipts of silver for the week to be 136,000 ounces.

There were sold during the week ending December 15th 190,000 ounces in silver bullion certificates at from 83¼ to 83½ cents per fine ounce.

**Government Silver Purchase.**

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

Dec. 12, 447,000 ozs. at 83.7 to 83.8c.

Dec. 13, 320,000 ozs. at 83.45c.

Dec. 16, 277,000 ozs. at 83.5 to 83.74c.

**Gold and Silver Exports and Imports at New York for Week Ending December 10th, 1892, and for Years from January 1st, 1892, 1891.**

	Gold.		Silver.		Excess of Exports.
	Exports.	Imports.	Exports.	Imports.	
Week.....	\$227,350	\$150,917	\$1,008,612	\$32,157	\$1,152,888
1892.....	61,995,950	8,445,765	21,609,022	2,979,240	72,240,065
1891.....	75,940,386	30,143,700	19,375,086	2,592,403	62,779,369

During the week ending December 17th the exports and imports, so far as ascertained, have been as follows: Exports, gold, \$3,795,375; silver, \$319,350. Imports, gold, \$1,800; silver, \$1,179.

The unusually large exportation of gold during the present week has caused a flurry among bankers because present indications point to a still larger shipment during the following week. Of the gold shipped \$2,250,000, went to Bremen, presumably for Austria and \$1,000,000 to Paris, which it is supposed will eventually go likewise to Austria.

There is good authority for believing that the gold exported during the present week, and that about to be exported, must reach Austria before December 31st, in order to comply with the law putting that country on a gold basis.

From the Sub-Treasury it is learned that the coin now given out for export is quite light, although coming within the legal tolerance, and it is quite clear that a large amount of the gold shipped goes out in response to premiums paid on the other side and not for regular trade demand.

The one cheering feature of the market is the large exportation of American silver bullion, and this promises to continue.

**NOTES OF THE WEEK.**

The Solution of the Silver Problem presented by the editor of the ENGINEERING AND MINING JOURNAL continues to excite the attention of all careful students of the question. Many do not hesitate to say the plan is impracticable, but modify it by saying that the fault is not in the plan, but in the selfishness of nations.

President Palmer, of the Broadway National Bank, says of the plan, "it is impracticable, for it is impossible to get the nations of the earth to agree to it." He is much disappointed at the work of the Monetary Conference, and said; "The delegates will return with the silver of the world, and all our gold will leave us."

Our Washington correspondent writes us that Mr. Rothwell's ideas are receiving serious consideration at the capitol, and that they are said to be the soundest propositions yet announced. The need of some plan of this character is made apparent by the action or rather "confusion worse confounded" of Congress on the subject. We have already mentioned the bills introduced by Senator Hill, of New York, and Representative Williams, of Massachusetts. It is said that neither bill has a prospect of being passed unless coupled with the revival of the Bland Coinage Act, and a coinage of \$4,000,000 per month instead of \$2,000,000 as formerly. The Executive Committee of the American Bimetallic League met at Washington on December 14th inst., and the following resolutions were adopted:

*Resolved*, That the repeal of the act of July 14th, 1890 which authorizes the yearly purchase of 54,000,000 ounces of silver bullion and the issue of legal tender treasury notes thereon, without substituting other

legislation favoring free bimetallic coinage would leave our monetary system precisely as it was under the demoralizing act of 1873, and thus deprive bimetallicism of all the advantage it has gained in 20 years of earnest effort.

*Resolved*, That we are unequivocally opposed to any change in the existing law unless in furtherance of free coinage, and to this end we urge all friends of free bimetallic coinage to use every legitimate means in their power to prevent the repeal of the act of July 14th, 1890, unless free bimetallic coinage, or legislation more favorable thereto than the present law, be substituted at the same time and in the same act.

Senator Stuart, of Nevada, has introduced an amendment to the bill of Senator Hill, which provide that the following be inserted after Section 1:

SEC. 2. That the silver coins in the United States shall be composed of standard silver. That of the silver coins, the dollar shall be of the weight of 412½ grains, the half dollar of the weight of 206¼ grains, the quarter dollar of the weight of 103¼ grains, and the dime, or tenth part of a dollar, of the weight of 41¼ grains; and that dollars, half dollars, quarters and dimes be legal tender of payment according to their nominal value for any sums whatever.

Sec. 3. That silver bullion brought to any mint of the United States for coinage shall be received and coined by the proper officers for the benefit of the depositor; provided, that it shall be lawful to refuse at the mint any deposit of less value than one hundred dollars and any bullion so base as to be unsuitable for the operation of the mint. And all silver bullion belonging to the United States shall be coined, but such coinage shall not delay the coinage of silver bullion for depositors.

Sec. 4. That the depositors of silver bullion at any mint of the United States for coinage shall receive therefor silver coin or treasury notes of the United States, to be issued by the secretary of the treasury in such form and of such denominations, not less than one dollar nor more than one thousand dollars, as he may prescribe. The treasury notes issued according to the provisions of this act shall be redeemable on demand at the Treasury of the United States or at the office of any Assistant Treasurer of the United States in either gold or silver coin, at the option of the United States; and such Treasury notes shall be a legal tender in payment of all debts, public and private.

The most far-reaching in its consequences, however, is the bill introduced by Representative Andrews, of Massachusetts. The banking sections of the bill provide that banks be allowed to increase their volume of circulating notes to the par value of the bonds deposited as security, that the minimum bond deposit be reduced to \$5,000 in case of banks whose capital exceeds \$50,000, and to \$1,000 where the capital is smaller, and that the duty of one-half of 1% each half year levied upon national bank circulation be repealed. The section relating to the silver law simply provides "that so much of Chapter 708 of the acts of the first session of the Fifty-first Congress, approved July 14th, 1890, as authorizes the purchase of silver bullion by the Secretary of the Treasury, and the issue of additional treasury notes therefor, is hereby repealed."

At the session of the International Monetary Conference in Brussels on Saturday, Dec. 10th, Henry W. Cannon, of the United States delegation, replying to M. Tirard, of France, said he was surprised at the attitude of the Latin Union delegates, as it was supposed in America that the States of the Latin Union, being the largest silver holders, would be very friendly to its use as money. But it appeared that they were not inclined to join America in an agreement for its extended use, while Great Britain, without an important quantity of silver, suggested its purchase for use as money. Despite this apparent paradoxical state of things the Americans still hoped that something would be accomplished. He denied that the United States was unduly influenced in its silver legislation by its silver product. He thought that the proposed annual purchase by Europe of 30,000,000 ounces of silver, provided it was in addition to the silver now naturally used, might be a bridge to join the money metals again. America, up to the present time had had no difficulty in maintaining a parity between gold and silver and intended to maintain it. If, however, silver was to be further dishonored and used the same as paper money, without regard to price, America would still be in an excellent position to profit by this state of affairs, as has been shown in the conference. Herr Hans I. Forsell, of the Sweden and Norway delegation, referring to Congressman McCreery's declared preference for a fixed ratio between gold and silver of 16 to 1, asked the Americans if they would agree to a ratio of 20 to 1, which would be a nearer approach to the present silver value. Senator Allison replied that 15½ to 1 was the most logical ratio.

At the meeting on the 12th inst. the special committee discussed at length the proposals of C. F. Tietzen, Danish delegate; M. Allard, Belgian delegate, and Sir William Houldsworth, English delegate. The majority of the committee objected to Sir William Houldsworth's proposals for a bimetallic union of the nations with these conditions. That their mints should receive silver bullion in not less quantity than a fixed minimum against receipts, noting quantity and value at price determined by international agreement, and that these receipts circulate as money and be redeemable at the bearer's demand. The objections to this plan were that it meant the creation of a new legal tender, based upon silver,

which the public would hasten to abandon if silver continued to fall, and would hasten to have redeemed with bullion if silver rose. M de Foville, the French delegate, moved an amendment to the plan to the effect that international legislation be made to facilitate the deposits of silver and the exchange of certificates, which would then be negotiable in the same manner as commercial warrants.

At the sitting on the 13th, Sir Guilford L. Molesworth, representing the Indian Government, protested against the obstructions offered by the British delegates at this and previous conferences. Sir C. Rivers Wilson, English delegate, replied to Sir Guilford Molesworth's attack upon the English representatives. The action of the delegation for Great Britain, he said, had been interpreted incorrectly. The object of his recent speech was to facilitate business, by enabling the conference to understand the position taken by the British Government. The English delegates had not come to discuss the general question of bimetallism, which did not serve the purpose for which the Conference was called. Senator Jones, whose connection with the Comstock mill ring is well known abroad and has discredited the American cause, made a long address on bimetallism, reviewing the history of the question at great length. His arguments being substantially those which he has made repeatedly in this country.

Mr. Jones did not finish his speech the first day and concluded it at the next sitting of the conference, on the 15th. He was followed by M. Allard, of the Belgian delegation, who spoke in support of his own plan, which proposes an international agreement for the purchase, under a common account, of stocks of silver, against which treasury notes shall be issued by the contracting states, none of which will be obliged to coin the silver thus purchased or to modify its existing currency legislation, the treasury notes to have international circulation. This is, as far as it goes, similar to the plan proposed by the ENGINEERING AND MINING JOURNAL, December 3d, but without some of its more important features.

Senor Oema, of the Spanish delegation, and M. Raffalovitch, of the Russian delegation, urged the American delegates not to press a vote on the main question at the present stage.

Senator Allison said that he and his colleagues did not ask for a vote on the main question. The proposals already presented were of such a character that they would, if adopted, impose a heavy burden upon America. The American delegates could not make concessions without compensating amendments. He believed that the truest ratio between gold and silver was 15½ to 1, and he wished to repeat that if there was any intention to resume the conference later, the United States would be willing to go as far as possible, with due regard to its just interests, to satisfy the expectations of Europe. He promised that the United States would accept any scheme that met with general approval. The committee appointed by the conference reported that

"Having regard for the fact that the Conference has not yet pronounced on the general question the committee do not feel justified in taking a vote upon the projects referred to them or in attempting to formulate a compromise between the varying monetary doctrines advanced."

The next and probably the last session for the present will be held on Tuesday. A proposal will then be made that the conference adjourn to June 6th, 1893, without dissolving.

The London Times of the 15th inst., referring to the International Monetary Conference, says: The American delegates must be held largely responsible for the ignominious failure of the Conference. America called the meeting as if prepared with a practical scheme, and then offered only vague platitudes. The exuberant rhetoric of Senator Jones would have been more to the purpose if the Americans themselves had not grown tired of protecting silver.

In the Reichstag on the 12th inst. Chancellor Caprivi said that the German delegates to the International Monetary Conference had been instructed not to give their assent to any proposal that restricted Germany's right to decide what should constitute her own currency. They had also been instructed to declare that Germany was content with her present system, and would not depart from it. The Chancellor said that Germany would continue to adhere to the gold standard.

Herr Buering, on behalf of the National Liberals; Herr Bebel, for the Socialists, and Herr Ballstrein, for the Centre, declared that their respective parties were in favor of a gold standard, while Dr. Frege remarked that the Conservatives would not make their vote on the Military bill dependent upon bimetallism.

M. Foville, a French delegate to the International Monetary Conference, has submitted a proposal to the Conference that warrants be issued against deposits of silver on the same system as that which prevails in Glasgow, Scotland, where warrants are issued on deposits of pig iron, the warrants not to have recognition as international currency, but simply to bear the statement that they are good for the weight of silver specified.

**Domestic and Foreign Coin.**  
The following are the latest market quotations for the leading foreign coins:

	Bid.	Asked.
Mexican dollars.....	\$ .65½	\$ .66¼
Peruvian soles and Chilean pesos.....	.60	.62
Victoria sovereigns.....	4.8c	4.90
Twenty francs.....	3.85	3.90
Twenty marks.....	4.74	4.78
Spanish 25 pesetas.....	4.78	4.81

The demand for all metals is rather quiet just now, as is usual at the approach of the holidays and stock taking time.

**Copper.**—Most of the Lake mining companies are reluctant to accept prices lower than those named by us last week, while at 12¼ the demand would probably be enlarged and a considerable movement effected, as most of the manufacturers seem not at all well stocked, while having considerable orders already on their books. Arizona copper is held at 10½c., with no business doing, as the price is too high to admit of exportation, and there is practically no demand for home consumption. Casting copper is quite steady at 11¼@11½. The foreign market has gradually eased off, and though the beginning of the week brought quotations of £47 10s. @ £47 12s. 6d. for spot, and £47 17s. 6d. @ £48 for three months G. M. B's., at the close the ruling figures are £46 15s. and £47 5s. respectively. The decline was due to realizations, but as the greater part of the stocks is concentrated in strong hands, an upward movement after the holidays would not be surprising. The statistics for the first half of the month show an increase of 500 tons. For refined and manufactured the quotations are as follows:

English Tough, £50 10s. @ £51; Best Selected, £51 @ £51 10s.; Strong Sheets, £59 @ £59 5s.; India Sheets, £54 @ £55; Yellow Metal, 5s. 18d.

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

To	Copper Lbs.		
To Hamburg	4 casks	5,000	\$672
S. S. Rhaitia	5 bars	842	f
S. S. " "	15 "	2,356	283
To Havre	Copper Lbs.		
S. S. La Bretagne	192 casks	230,214	30,133
" "	59 bar	10,888	"
" "	316 pigs	112,492	11,600
S. S. Gascogne	182 casks	227,500	27,900
" "	5 bars	869	104
To Haie	Copper Matte.		
S. S. La Borgoyne	214 bbls.—(In transit)		\$13,048
To Liverpool	Copper Lbs.		
S. S. Taurie	3.36 bags	414,681	\$19,000
" Britannic	3.120 "	367,150	16,000
" Wyoming	1.896 "	221,450	10,000
" Holland	2.660 "	228,720	11,436
" Aurania	1.575 "	172,180	8,540
" Kepler	4.550 "	441,045	20,000
To Liverpool	Copper Lbs.		
S. S. Wyoming	393 pigs	113,432	14,000

Tin opened at 19.95 for spot and December, but on Tuesday dropped thirty to thirty-five points, the cables from abroad showing a corresponding decline there, and continued to rule quite steady, closing to-day at 19.60 for spot and December; 19.70 for January; 19.80 for February and for later deliveries. The same doubtful feeling as to the permanency of any rise still exists, and this accounts for our market not having responded to the advance abroad, which we note below. In London the opening quotations were £93 2s. 6d. @ 5s. for spot and £92 15s. @ 17s. 6d. for futures; on Tuesday a drop of 15s. and £1 respectively was reported, and Wednesday brought another though not quite as extensive decline. Thursday morning the figures were fully £1 higher than those of the afternoon previous, which, in turn, were an improvement on those of the morning. The close is at £93 2s. 6d. and £91 17s. 6d. respectively for spot and three months, but the movement must be considered as more of a local character than anything else, and this is confirmed by the discount ruling for futures as compared with present deliveries.

Lead is unchanged, and therefore our last report holds good.

In London the price is a little lower, being £9 16s. 3d. @ £17 6s. for Spanish and 2s. 6d. more for English lead.

**Chicago Lead Market.**—The Post-Boynton-Strong Company telegraph us as follows: "Market fairly steady but demand light. Sales during the week at 3.55c. At the close 3.57½c. is asked."

**St. Louis Lead Market.**—The John Wahl Commission Company telegraph us as follows: "Lead quiet at 3.50c. Demand light and consumers continue to buy from hand to mouth only. Spelter steady at 4.10c."

**Platinum.**—Since November 1st this metal has greatly increased in value, its price at that date being from \$6 to \$7 per Troy ounce for sheet and wire, and at present from \$10.50 to \$11. It is said by some that the increase is without warrant, being due solely to the refusal of the Russian miners to make contracts for future delivery; by others it is claimed that the advance is a permanent one due to legitimate use.

Spelter is very flat, reports from the West advising that the production is still on the increase, causing smelters to accept lower prices, as the demand has lessened. Business is reported at 4¼c. New York, with prices in St. Louis at 4.05 @ 10.

In London good ordinaries are quoted at £18 2s. 6d. and specials at £18 5s.

**Antimony** is perhaps a trifle weaker, Cookson's at 11½, L. X. at 11 and Hillel's at 10½.

Nickel has still to be quoted at 52½ @ 55c.

The receipts of quicksilver, at San Francisco, for November and for the first eleven months of the year were as follows:

	For Nov.	Jan. 1 to Nov. 30.
1890, flasks.....	1,254	11,740
1891.....	1,401	13,763
1892.....	1,856	18,004

The only shipments by sea from that port last month were 300 flasks to Mexico and 10 flasks to

New Zealand. The movement by sea for the first eleven months of the year has been as follows:

	Flasks.	Value.
New York.....	3,300	\$110,800
Australia.....	762	31,047
New Zealand.....	160	6,542
Central America.....	42	1,669
Mexico.....	2,579	103,882
British Columbia.....	215	8,435
Total.....	7,058	\$292,490
In 1891.....	3,908	163,483

A large quantity has also been sent overland since January 1st. The shipments overland in October were 1,244 flasks. The report for November on that route has not been made public.

**IRON MARKET REVIEW.**

NEW YORK, Friday Evening, Dec. 16th, 1892.

**Pig Iron Production.**—The following table gives the number of furnaces in blast and the estimated production of pig iron in the United States during the week ending Saturday, December 10th, 1892, and for the corresponding week ending Saturday, December 12th, 1891. Also the total estimated production from January 1st of each year to these dates. This table has been corrected by the official returns of the American Iron and Steel Association for the first six months of this year. The figures are in gross tons:

**Pig Iron Production During Weeks Ending December 12th, 1891, and December 10th, 1892, and During Both Years to These Dates.**

Fuel used.	Week ending				From Jan., '91.	From Jan., '92.
	Dec. 12, '91.		Dec. 10, '92.			
	F'cs.	Tons.	F'cs.	Tons.	Tons.	Tons.
Anthracite.....	86	35,250	69	33,500	1,758,199	1,633,068
Coke.....	162	143,710	135	133,000	5,444,565	6,471,330
Charcoal.....	56	11,890	42	9,700	544,848	562,888
Total.....	304	190,850	246	176,200	7,745,612	8,677,246

As compared with the corresponding period of last year, the pig iron production shows an increase of 861,634 tons. With this increase coming upon the lowest prices ever ruling in this country we enter upon another period of restricted profits. We are making too much iron to hope for a rapid recovery to normal conditions. There are fewer furnaces in blast by 58, than at this time last year. Last year 306 furnaces in blast were making 190,190 tons per week, an average of 621 tons per furnace per week. This year 246 furnaces are making 176,200 tons per week, an average of 716 tons per furnace per week. There has been therefore an increase of 95 tons per furnace per week during a year which will probably be known in history as the bedrock year.

The capacity of the furnaces blown out or banked has been more than counterbalanced by the output of the furnaces that are running. When one considers further that a furnace is but seldom driven to its full capacity he is forced to the conclusion that the end of low prices is not yet in sight. That there will be a reaction is apparent to any one who takes the trouble to look into the depressions and reactions that are part of our metallurgical history. But the reaction will be gradual, just as the depression was gradual, and no one can say when it will begin.

It is an ill wind that blows no one good, and the present blast has shown capacities of economy that our best furnace men could not foresee. The situation is full of meaning to him who regards it as an object lesson in management.

Prices here are as last week. Southern, ex-steamer, No. 1 F., \$15.25; No. 2 F., \$14.25; No. 3 F., \$13.75; Gray Forge, \$13.01; Northern, tide-water, No. 1X, \$15; No. 2X, \$14; No. 2 plain, \$13.50; Gray Forge, \$13. Southern irons are quoted, nominally, 25c. higher than Northern.

**Spiegeleisen and Ferromanganese.**—Ferro is dull at \$60. Spiegel, \$26.50 with no special movement.

**Steel Rails.**—The market is dull at \$30.

**Rail Fastenings.**—Prices rule as follows: Fish and angle plates, 1.55 @ 1.65c. at mill; spikes, 1.90 @ 2c.; bolts and square nuts, 2.40 @ 2.70c.; hexagonal nuts, 2.70 @ 2.80c., delivered.

**Merchant Iron and Steel.**—Prices stand: Mushet's special, 48c.; English tool steel, 15c. net; American tool steel, 6¼ @ 7¼c.; special grades, 13 @ 18c.; crucible machinery steel, 4.75c.; crucible spring, 3.75c.; open hearth machinery, 2.25c.; open hearth spring, 2.30c.; tire steel, 2.25c.; toe calks, 2.25 @ 2.50c.; first quality sheet, 10c.; second quality sheet, 8c.

**Structural Iron and Steel.**—We quote: Beams, 2.3 @ 2.55c., except for 20-in. beams which are 2.75c.; angles, 1.95 @ 2.15c.; sheared plates, 1.90 @ 2.10c.; tees, 2.30 @ 2.60c.; channels, 2.35 @ 2.50c.; universal plates, 2 @ 2.10c.; bridge plates, 2 @ 2.10c.; steel hoops, 1.90 @ 8c. All on dock.

**Buffalo,** Dec. 15.

(Special Report by Rogers, Brown & Co.)

The recent activity in buying has given place to the customary December quietness, so that very little new business is being booked. The consumption of iron is going on at a heavy rate, and the activity of foundries at this usually dull season is one of those healthy indications which promises well for the future. We quote on the cash basis f. o. b. cars Buffalo, No. 1 X Foundry Strong Coke Iron Lake Superior ore, \$15.25; No. 2 X Foundry Strong

Coke Iron Lake Superior ore, \$14.25; Ohio strong softener No. 1, \$15.25; Ohio strong softener No. 2, \$14.25; Jackson County silvery No. 1, \$17.30; Jackson County silvery No. 2, \$16.80; Lake Superior charcoal, \$17; Tennessee charcoal, \$18; Southern soft No. 1, \$14.40; Alabama car wheel, \$19; hanging rock charcoal, \$20.50.

**Chicago.** Dec. 15.

(From Our Special Correspondent.)

In a general way, the season considered, there is a fair amount of business doing, and in crude iron rather more activity has prevailed than during the previous week. So that while there is not a particle of anxiety to discount the future, there is a manifest desire to cover all existing contracts at the lowest figures now obtainable. Hence several good-sized orders which had been pending for pig metal have been closed. The weakness noted in Southern iron is largely confined to the smaller furnaces, although rumor has it that shading has been done by some of the leading Southern companies indicating that the market is a little "top heavy." This is attributed to a prolonged absence of large orders, or rather the non-placing of same, as there were a number of good inquiries, which have been withdrawn. It will be seen from the foregoing that Southern producers are not quite as well fixed as their confederates in the north. With few exceptions finished iron and steel is quietly inactive.

**Pig Iron.**—Local coke foundry iron was in better demand last week and several good sized contracts ranging from 500 to 1,500 tons were closed up, covering deliveries for several months in the new year. Concessions were asked for in each case, but promptly refused as producers see nothing in the situation to warrant them being made. There is a fair amount of inquiry, though most of it will probably go over until after the holidays. Car lot orders are frequent showing that stocks in most foundry yards are light. Lake Superior charcoal iron is in light demand in quantities of 100 to 150 tons, and manufacturers generally are in a position to command our full quotations of \$16.50@17, and for the high chilling numbers \$17.25@17.50. Southern soft iron is in moderate demand and quick delivery orders bring better prices than those for shipment in February and March. Small orders prevail and there is just now no large business in sight. There is at present nothing in the situation to cause any disquietude.

Quotations per gross ton f. o. b. Chicago, are: Lake Superior charcoal, \$16.07@17.25. Lake Superior coke, No. 1, \$14.25@14.75; No. 2, \$13.75@14; No. 3, \$13.25@13.75; Lake Superior Bessemer, \$15.50; Lake Superior Scotch, \$15@15.50; American Scotch, \$16.50@17; Southern coke, foundry No. 1, \$14.50; No. 2, \$13.10; No. 3, \$12.85; Southern coke soft, No. 1, \$13.85; No. 2, \$13.10; Ohio silveries, No. 1, \$17; No. 2, \$16.50; Ohio strong softeners, No. 1, \$17; No. 2, \$16.50; Tennessee charcoal, No. 1, \$17; No. 2, \$16.50; Southern standard car wheel, \$20@21.

**Steel Billets and Rods.**—Both of these specialties are in better supply on account of the failure of a large consumer near here. Demand is light and quotations lower at \$24.50 on billets and \$33 on rods.

**Structural Iron and Steel.**—Some important contracts were closed for elevated railway construction work, and more will follow shortly. Architectural shapes are in moderate demand from stock. Quotations, car lots, f. o. b. Chicago, are as follows: Angles, \$2@2.20; tees, \$2.35@2.45; universal plates, \$1.95@2; sheared plates, \$1.95@2; beams and channels, \$2.35@2.50.

**Plates.**—While mill business is still quiet, that from warehouse is fairly active and the outlook promises well for its continuance. Steel sheets, 10 to 14, \$2.30@2.40; iron sheets, 10 to 14, \$2.20@2.30; tank iron or steel, \$2.05@2.15; shell iron or steel, \$2.50@2.75; firebox steel, \$4.25@5.50; flange steel, \$2.75@3.00; hoiler rivets, \$4.00@4.15; boiler tubes, all sizes 65% and firm.

**Merchant Steel.**—New business at this time of the year is ordinarily quiet, but several agents report occasional orders for car lots and some inquiry for early delivery next year. Tool steel moves slowly. We quote: Tool steel, \$6.50@6.75 and upward; tire steel, \$2.00@2.10; toe calk, \$2.30@2.40; Bessemer machinery, \$2.10@2.20; Bessemer bars, \$1.70@1.75; open hearth machinery, \$2.30@2.40; open hearth carriage spring, \$2.10@2.20; crucible spring, \$3.75@4.1.

**Galvanized Sheet Iron.**—Considering the season there is a fair amount of trade from warehouse, but mill orders are light. Discounts remain unchanged at 70% and 10% off on Juniata and 70@15% and off on charcoal, and jobbing quantities at 70@5% off on the former and 70% and 10% off on the latter.

**Black Sheet Iron.**—Carload orders of well assorted sizes for quick shipment are a feature just now. We continue to quote iron sheets at 2.85c. for No. 27, common; steel sheets are 3c. Jobbers quote 3@3.10c. for iron and 3.10@3.15c. for steel, same gauge.

**Bar Iron.**—The grouping together of so many iron and steel interests in the Mahoning Valley by consolidation will effect a considerable saving, and should enable those mills to compete on more even terms for Western business. Bar iron is in very fair demand, and several contracts have been placed during the week at 1.65c. flat. Regular quotations are 1.62½c.@1.65c. half extras Chicago, Jobbing quotations are 1.75@1.85c., and 1.95c. for steel bars,

**Nails.**—Some demand is noted for wire nails for delivery in January and February in lots of 2,000 to 5,000 kegs at \$1.55 Chicago. Jobbers quote \$1.70 from stock. Steel cut are quiet at \$1.60@1.62½, 30c. average and \$1.65 from jobbers.

**Steel Rails.**—There is no change in the situation, demand is light with no inquiry for the future. The mills here will shut down for repairs at end of year. Mill quotations remains steady at \$31@32. Some good sized orders are in the market for splice bars. Prices are steady at 1.70c. for iron or steel splice bars; spikes, \$2.05@2.15 for 100 lbs.; track bolts, hexagonal nuts, \$2.65; square, \$2.55.

**Scrap.**—Demand shows no improvement and dealers look for none until January. Prices are nominal only. No. 1 railroad, \$15.50; No. 1 forge, \$15.00; No. 1 mill, \$9.50; fish plates, \$16.50; axles, \$19; horseshoes, \$16; pipes and flues, \$7; cast borings, \$6; wrought turnings, \$8; axle turnings, \$9.50; machinery castings, \$10; stove plates, \$6.50; mixed steel, \$10.50; coil steel \$15; leaf steel, \$15.50; tires, \$14.50.

**Old Material.**—Railroads are offering iron rails more freely which apparently are going direct to consumers at about \$18.50. Steel rails are dull at \$12.50@14.50, and car wheels stagnant at \$14.50 nominally.

**Louisville.** Dec. 10.

(Special Report by Hall Bros. & Co.)

The market is featureless. Prolonged absence of placing orders is affecting values, and rumors are afloat of shaded prices being accepted by some of the leading Southern companies, indicating that the market is a little "top heavy." There is no doubt but it will require a continued heavy buying movement to keep values up to the recent advance, and the probabilities of this have been somewhat discouraged by the experience of the past few weeks. Prices remain substantially the same.

**Hot Blast Foundry Irons.**—Southern coke No. 1, \$13.50@13.75; Southern coke No. 2, \$12.50@12.75; Southern coke No. 3, \$12@12.25; Southern charcoal No. 1, \$16@17; Southern charcoal No. 2, \$15.50@16.

**Forge Irons.**—Neutral coke, \$11.50@12.00; mot tled, \$11@11.25.

**Car Wheel and Malleable Irons.**—Southern (standard brands), \$20@21; Southern (other brands), \$18.50@19.50; Lake Superior, \$19.50@20.50.

**Philadelphia.** Dec. 15.

(From our Special Correspondent.)

**Pig Iron.**—The increased output in anthracite pig iron has been followed by an apparent drop of 25c. per ton in prices. Makers do not look for cheaper ore or coal, and, as margins are already down to the danger line, there is nothing to do but make iron for which an assured market can be had at fixed prices. Standard Pennsylvania No. 1 is selling at \$15@15.50; the very best No. 2 is had at \$14.50. Shaded quotations amounting to \$1 per ton are made on poorer qualities of No. 2. Southern No. 2 is offered at \$13.75; forge, \$13@13.50. Standard Bessemer is offered in large lots this week at \$16 at furnace.

**Muck Bars.**—Mill owners are anxious to secure business for January delivery at \$24.50, but no orders have been heard of.

**Steel Billets.**—Business in Western markets is unsettling values here. Makers are anxious to sell at \$25 and under. There is nothing whatever to be said on steel billets at present, as both makers and buyers are out of the market.

**Merchant Iron.**—The retail demand is good, but the heavy buyers are not about. Prices run from 1.60 to 1.75. There will be but little business until after New Year's.

**Nails.**—Nails are in abundant supply at factories and warehouses. The market is not in a satisfactory condition. Stocks, however, will be for the present kept at the maximum limit.

**Skelp.**—The business for the week in skelp has been better than was expected. Price 1.60.

**Sheet Iron.**—Card rates are paid for prompt deliveries of small lots; but large buyers for late delivery have had inducements extended to them within a few days, showing that mill owners are more anxious for midwinter business than they have been for some months.

**Wrought Iron Pipe.**—Quite a run of small orders during the past few days has restored confidence, in a measure, in wrought iron pipe, and agents say that a good deal of business is in sight for the winter.

**Plate and Tank.**—The plate mills are now assured of plenty of business for the winter; but manufacturers are not confident enough of more business to say that prices will improve. Large orders have been placed for water pipes—aggregating some six or seven thousand tons, according to one estimate. Small orders are also quite abundant. Tank plate, 1.80.

**Structural Material.**—Quotations are 2 to 2.10 for beams, tees and channels; angles, 1.85. The market has not gained any strength, although a good deal of business is coming in.

**Steel Rails.**—Rails are quoted at \$30. The market is quiet.

**Old Rails.**—Old iron rails are offered at \$18; steel at \$15.

**Scrap.**—No. 1 scrap is offered at \$16; machinery \$11. There is very little business.

**Pittsburg.** Dec. 15.

(From our Special Correspondent.)

**Raw Iron and Steel.**—There is certainly an easier tone in the iron market, but only such as frequently develops at this season of the year. It is the more pronounced because of the large increase in capacity, both in pig iron as well as finished material. A great many concerns will close down during the holidays; at the same time the first of the year is drawing near, when the annual inventories are taken, and certain buyers are, therefore, not desirous of laying in large stocks on this account. For these reasons the pig iron trade has remained less active than for some time past. The volume of sales did not reach the expectations of some parties. Taken as a whole, we see no particular reason for complaint, taking all things into consideration. The truth is, there is a want of confidence among both consumers as well as producers. Until there is more confidence among the parties noted, business will necessarily be restricted. The situation is not by any means discouraging. There is certainly a large amount of business looming up; and although competition will keep prices down to an extremely low point, it is certainly satisfactory to know that the business will be forthcoming in the near future. Hence, while the prices of iron and steel are abnormally low, there is no reason to suppose that it indicates general depression, but the reverse. Buying cannot be postponed indefinitely, however; and as deliveries are being taken quite freely, there is at least a fair chance that when the demand does set in it will be vigorous enough to enable holders to maintain prices, if not advance them. The next 30 days will probably give the market a thorough test, and, while everyone must recognize the enormous amount of iron that has to be taken care of, consumers realize that there is probably not much to be gained by waiting. Still, this appears to be the policy at present, and it will require some effort to bring buyers to realize the fact that while they are waiting the market may get away from them. In this respect the situation is altogether different from what it was in former years. A slight movement towards higher figures a few years ago would start a general demand from all sources, which in itself was sufficient to carry prices upward, but in these days it is not the buyer that is afraid of being left—it is the "other fellow." A few days of good buying would soon inspire confidence and stiffen prices, while indiscreet offers to sell might have precisely the opposite effect. The natural conditions, so far as they now appear, are for a brief period of dullness, and after that a steady market at about the present range of prices; beyond that everything depends upon what may turn up between this and the end of December.

The following sales show how the market prices range:

Coke Smelted Lake and Native Ore.	
4,000 Tons Bessemer, December, January	\$13.75 cash.
4,000 Tons Bessemer, January, February	13.85 cash.
2,500 Tons Bessemer, 1st 3 months 1893	13.90 cash.
2,000 Tons Grey Forge, Jan., Feb., March	12.50 cash.
2,000 Tons Bessemer, prompt	14.00 cash.
1,000 Tons Grey Forge, January, February	12.50 cash.
1,000 Tons Bessemer, December, January	13.75 cash.
1,000 Tons Bessemer, Jan., Feb., March	13.85 cash.
1,000 Tons Grey Forge, December, January	12.50 cash.
600 Tons No. 2 Foundry	14.00 cash.
500 Tons Bessemer	14.00 cash.
500 Tons Grey Forge	12.50 cash.
500 Tons No. 2 Foundry	13.50 cash.
500 Tons Grey Forge, December	12.50 cash.
200 Tons No. 1 Foundry	14.50 cash.
200 Tons No. 1 Silvery	16.25 cash.
100 Tons No. 2 Silvery	15.25 cash.
100 Tons No. 2 Foundry	13.00 cash.
Charcoal.	
200 Tons Cold Blast	26.00 cash.
100 Tons Cold Blast	26.50 cash.
50 Tons No. 2 Foundry	19.00 cash.
50 Tons Warm Blast	18.00 cash.
50 Tons Cold Blast	24.00 cash.
Steel Blooms, Billets and Slabs.	
5,000 Tons Billets, Jan., Feb., March at Mill	22.00 cash.
3,000 Tons Billets, and Slabs, Jan., Feb.	23.00 cash.
2,000 Tons Billets, Jan., Feb.	23.00 cash.
2,000 Tons Billets, Jan., Feb., March at Mill	22.00 cash.
2,000 Tons Billets and Slabs, Jan., Feb., Delivered	23.50 cash.
500 Tons Billets, Jan.	23.00 cash.
Muck Bar.	
700 Tons Neutral, Dec.	24.75 cash.
500 Tons Neutral, Prompt	24.65 cash.
450 Tons Neutral	24.75 cash.
Skelp Iron.	
1,000 Tons Sheared Iron	1.80 4 m.
8 0 Tons Narrow Grooved	1.60 4 m.
750 Tons Wide Grooved	1.57½ 4 m.
Skelp Steel.	
700 Tons Wide Grooved	1.47½ 4 m.
Ferro-Manganese.	
100 Tons 80 per cent. delivered at Mill	62.00 cash.
Blooms, Beams, Rails and C. Ends.	
1,200 Tons Bloom and Rail Ends	16.50 cash.
600 Tons Billet Ends	18.00 cash.
500 Tons Bloom Ends	16.00 cash.
Sheet Bars.	
500 Tons Sheet Bars, at mill	28.75 cash.
Steel Wire Rods.	
800 Tons Five-Gauge American, at mill	31.00 cash.
Spelter.	
200 Tons Spelter, January, February	4.30 cash.
Old Iron and Steel Rails.	
600 Tons American T's	20.50 cash.
500 Tons American T's, Youngstown	20.50 cash.
500 Tons Old Steel Rails	15.25 cash.
Scrap Material.	
400 Tons No. 1 R. W. Scrap, net	16.25 cash.
200 Tons Cast Scrap, gross	12.00 cash.
200 Tons Cast Borings, gross	8.00 cash.
200 Tons Cast Scraps, gross	12.00 cash.
150 Tons Wrought Turnings, net	11.00 cash.
100 Tons Hammered Iron Axles, net	25.00 cash.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Dec. 16.  
PRODUCTION OF BITUMINOUS COAL for week ending  
December 10th, and year from January 1st.

	1892.		1891.
	Week.	Year.	
Phila. & Erie R. R.	2,473	93,753	151,400
Cumberland, Md.	80,671	3,623,238	3,941,379
Barclay, Pa.	1,027	64,150	187,593
Broad Top, Pa.	17,841	698,615	491,129
Clearfield, Pa.	90,510	3,783,104	3,506,941
Allegheny, Pa.	28,623	1,212,463	1,169,520
Beach Creek, Pa.	37,325	2,121,128	2,265,631
Pocahontas Flat Top	63,496	2,507,803	2,178,028
Kanawha, W. Va.	768,753	2,544,797	2,296,120
Total	891,019	16,556,071	16,487,951

\*Week ending November 30th.

	1892.		1891.
	Week.	Year.	
Pittsburg, Pa.	29,321	1,200,585	1,197,796
Westmoreland, Pa.	46,085	1,681,384	1,847,926
Monongahela, Pa.	14,043	629,459	575,435
Total	89,449	3,511,428	3,621,157

Grand total..... 480,468 20,067,499 20,109,108

PRODUCTION OF COKE on line of Pennsylvania R.R. for the week ending December 10th, 1892, and year from January 1st, in tons of 2,000 lbs.: Week, 121,354 tons; year 5,106,704 tons; to corresponding date in 1891, 4,199,870 tons.

Anthracite.

There are no new developments of importance concerning the combine, if we may except some rumors of dissatisfaction on the part of a few bankers. Just what has given rise to the rumors, or whether they have any real foundation, is not known. The present combine, although it is, perhaps, stronger than any of its predecessors, still shows signs of weakness. It can control prices now, and, perhaps, for some time to come. This is evident, but it may fall to pieces from internal decay. The financial support that was needed to inaugurate the movement had to be obtained from a source outside of the combine itself. This money has been needed just as much to sustain prices as to advance them originally, and it is from this direction that the first signs of approaching dissolution are to be expected, viz., from the side of external assistance.

It cannot be denied that the temptation to engage in "a dead sure thing," with profits practically assured, must have been very great, and the hope of ultimate reward has kept the friends of the combine harmonious. But can this condition of affairs last? Does the combine at present give evidence of such strength as will enable it to withstand popular sentiment and the investigations of the legal authorities? Waiving, as we have heretofore done, all considerations of the legal status of the agreement, and looking at the matter from the standpoint of practical efficiency, our long experience leads us to expect it to follow the path of nearly all other attempts to corner or control a great industry.

Its end may not be hastened by the report of the Congressional Committee, even should this be of the most adverse character, for the hidden causes of disintegration are much beyond range of the governmental stethoscope. Commercial forces brought it into existence and commercial forces will no doubt destroy it sooner or later. In the long run people get tired of paying for things that have an uncertain future. It may be exciting, but it is not sound policy.

Bituminous.

There has been some welcome relief in the car famine, though it may be only temporary even small favors are thankfully received.

Some extensive operators are fearing the future more than they rejoice over the present. They do not know what a day may bring forth, but they are strongly of the opinion that it will not be more cars. The complainants as to car service are not confined to any one company or to any one district, but no one seems to have an adequate explanation of the trouble. The railroad companies seem to be doing all they can to provide transportation and claim that they can do no better. One large coal company reports that with a production considerably less than last year they still cannot secure sufficient transportation.

Some recent introductions of George's Creek coal for heating houses, in place of anthracite, have been quite satisfactory. There seems to be little reason why a first rate quality of bituminous coal should not be used for this purpose. An immense quantity of coal is consumed in the various forms of house furnaces, and up to this time by far the greater proportion is anthracite. The difference in cost is approximately \$2.50 per ton, putting the soft coal at \$4.00, and the other at \$6.50.

If there were to arise a healthy demand for bituminous coal to be used in such furnaces it would mean a large increase of trade in this article.

There is no change in cheaper rates except from Baltimore to Boston, Salem and Portsmouth, to which ports 95c. is the ruling figure. Vessels are scarce and skippers independent.

Boston.

This has been a very dull week in the anthracite coal market. The retail dealers are doing so little that they really find no necessity for buying hard coal. We hear of no concessions being made in prices. Quoted prices are f. o. b. net New York: Stove, \$4.75; Egg, \$4.40; Free broken, \$4.00; Chestnut, \$4.65; Lykens Valley (at Philadelphia), Broken, \$4.85; Egg, \$5.45; Stove, \$6.00; Chestnut, \$5.00.

There is not much doing in bituminous coal, that is the volume of business is not heavy. Deliveries have been improved this week over last. Prices are very steady. George's Creek coal on cars here is worth from \$3.60 to \$3.65 per ton; Clearfield, \$3.25.

It is now getting later in the year and rates are naturally strengthening although not sufficient from the parts to cause an advance in prices. Baltimore rates are reported a little higher in some cases. We quote: From New York to Boston, 50c.; from Philadelphia, 80c@85c.; to Bath 90c@11; to Providence, 70c.; from Baltimore, 90c@95c.; Newport News to Boston, 80c.; Sound Points, 70c@75c.

In a retail way there is very little doing at the yards. The weather here has been very mild during the past week, which of course has been the cause of a dull business. There is some talk in the trade of the retailers putting up prices next month. It is claimed they could not replace their coal at the prices they are selling at present. Figures would seem to bear out these facts. The retail price of stove coal is \$6.25 per ton. To compare the cost let us take the wholesale price first which is \$4.75 per ton. Add to this 50 cents for freight rates, 25 cents for unloading and 5 cents for insurance.

The total of this will be \$5.55 per ton. Now it is estimated that the largest and best equipped dealers in this city cannot handle coal less than \$1 per ton, which makes the total cost \$6.55, or 30c. more than the present price. There is another incentive for advancing prices and that is the advancing freight rates.

Retail prices in this market are: Stove, \$6.25; nut, \$6.25; egg, \$6; furnace, \$5.75; Franklin, \$7.50; Lehigh egg, \$6.25; Lehigh furnace, \$6.25. Wharf prices are 50c. less than the foregoing.

The receipts of coal at the port of Boston for the week ending December 10th were: 49,486 tons of anthracite and 38,896 tons of bituminous, against 44,949 tons of anthracite and 10,229 tons of bituminous for the corresponding week last year. The total receipts thus far this year have been 1,962,369 tons of anthracite and 825,189 tons of bituminous against 1,970,302 tons of anthracite and 945,550 tons of bituminous for the same time last year.

Buffalo.

(From our Special Correspondent.)  
The anthracite coal market quiet and prices unchanged. The trade is without incidents, therefore this memorandum will be brief.

Bituminous coal in good demand from manufacturers. Supply also good and no trouble experienced in obtaining cars for transportation. Prices steady. Coke steady and volume consumed large. The propellers Pillsbury and Washburn left Buffalo for West Superior on Friday, December 9th, coal laden. The last boats of the season of 1892.

It is reported that the coal on the Northwestern Fuel Company's docks at West Superior has been burning for several days and that at least 150,000 tons are in danger. The coal belongs to private owners.

Two new fuel gas wells have been struck in Canada, "twenty miles away" from Buffalo; one flows 10,000,000 and the other 2,000,000 ft. per day. The product will be piped to Buffalo by the Erie County Natural Gas Fuel Company who are the owners of the wells. One of the Toronto newspapers this morning directs the attention of the Dominion Government to the export of natural gas to the United States at Buffalo from the gas fields of Port Colborne and vicinity, and says "hundreds of thousands of dollars of value is being taken out of Canada and not one dollar of it is coming back, beyond a small consideration paid for the land and the cost of boring the wells."

The Custom House report of the shipments of coal from Buffalo by lake during 1892 is published as follows:

To:	1892.	1891.	1890.	1889.
Chicago.....	1,179,635	957,504	938,730	1,004,089
Milwaukee.....	715,974	608,139	415,945	450,055
Duluth.....	318,580	257,625	171,675	159,905
Superior.....	206,680	163,077	172,670	121,321
Toledo.....	102,525	69,619	86,945	57,845
Detroit.....	22,500	24,560	32,500	.....
Racine.....	34,020	30,510	32,800	.....
Gladstone.....	57,500	35,170	29,610	.....
Green Bay.....	35,300	29,015	1,890	.....
Sheboygan.....	7,800	17,175	2,890	.....
Marquette.....	21,180	20,934	16,300	.....
Bay City.....	15,205	13,337	6,610	.....
Saginaw.....	25,110	23,461	11,830	.....
Ashland.....	20,200	12,075	12,250	.....
Washburn.....	8,900	8,090	8,500	.....
Kenosha.....	7,435	7,862	5,730	.....
Menominee.....	6,320	7,775	600	.....
Escanaba.....	2,665	4,630	3,060	.....
Alpena.....	650	1,030	900	.....
Manitowoc.....	8,690	3,850	5,790	.....
Sault Ste. Marie.....	.....	4,075	7,120	.....
Canadian possessions.....	32,565	32,575	.....	.....
Other ports.....	32,885	33,567	.....	.....

Chicago.

(From our Special Correspondent.)  
The advance in freight rates two months ago, necessitating a corresponding advance in the price of anthracite coal, has not and is not being maintained. All-rail coal has been and is now still selling at \$6.10 on track, the same price as for coal loaded from dock. The continued mild weather and the reported downpour of rain all through the country, making the roads almost impassable, has rendered the trade very dull. As we have said before, we see no prospect for an improvement until colder weather arrives. With the increased demand for crushed coke for domestic use and soft coal for some purposes, it would appear the height of folly, with

the big stocks on hand at present, and the numerous vessels yet unloaded in dock and harbor, to advance coal now. The fact is prices are too high at present to be maintained and a further advance simply means an additional margin for certain dealers to cut upon and still be below the prices fixed by the "combine." It would seem that in this market certainly they would decidedly get the worst of the deal and he made the "catspaw" for their competitors to draw the chestnuts from the range. Chestnut coal is reported scarce by most of the shippers and the only size not coming forward freely. Shippers look for no change from the present dull and sluggish market until after the holidays or pending a radical change in the weather conditions.

Bituminous coal is in excellent demand in the West and Northwest, and on some grades the supply is very uncertain, more particularly Indiana block. While there is a fair supply at Chicago and Milwaukee, at points outside of the limit reached by them there is little block coal to be had and odd cars bring high prices. The cheaper grades of Illinois lump are active at very fair prices. Demand for Hocking has fallen off considerably and unless colder weather supervenes there will be an over supply in this market, though at this writing there is little, if any, surplus on track. Chicago operators in Ohio coals have not as yet cut down their mine orders. Railroads operating in Iowa are absorbing most of the output of coal mined in that state, and there is little available for outside consumption. Steam sizes there are selling at from 25 to 50% higher than is usual at this season of the year. This is taken as an indication that the consumers of steam coal are appreciating the value of small sizes in preference to lump coal. Circular prices are well maintained, but a continuance of the present mild weather will soon unsettle them.

Coke is in fair demand only, as the usual easing up is noticed toward the end of the year, when foundries and other consumers of standard grades do not care to stock up immediately preceding invoicing of material on hand. Some of the cheaper grades of West Virginia cokes are in moderate demand for other purposes than foundry use. Connellsville crushed domestic is improving in demand as a substitute for anthracite and prospects are very promising for a good tonnage being placed next season.

Quotations are: \$4.65 furnace; \$5.05 foundry, crushed, \$5.40 Connellsville; West Virginia, \$3.90 furnace, \$4.10 foundry; New River foundry, \$4.75; Walston, \$4.65 furnace, \$5 foundry.

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

Prices of bituminous per ton of 2,000 lbs., f. o. b. Chicago, are: Pittsburg, \$3.40; Hocking Valley, \$3.20; Youghiogheny, \$3.25; Illinois block, \$1.90@2; Brazil block, \$2.60@2.75.

Pittsburg.

(From our Special Correspondent.)  
Coal.—There was a slight rise in the Ohio River since the date of our last report, enabling those who had light barges to send out a small shipment, reaching 3,000,000 bushels, most of the coal loaded being in boats. The water was not sufficient at this writing. The Monongahela is rising at headwaters. The prospect for water is favorable unless checked by cold weather. The latest reports from the river mines is that the diggers are gradually returning to work. W. H. Brown Sons have about 160 men at work. J. D. O'Neil, of Elizabethtown, who operates several large coal mines said that 150 men, his old hands, have resumed work at 3c. It is now over twelve weeks since the strike was inaugurated; to all intents and purposes the miners strike may be set down as a thing of the past. This week's shipments is the first since July. The year's shipments to date fall below last year over 26,000,000 bushels. On the railroads in the vicinity of Pittsburg a moderate amount of business is being done. We still hear the old familiar cry of car shortage.

Connellsville Coke.—This week's shipments show a material increase compared with the preceding one; only two weeks in the year can show a larger one. The improved car supply enabled the operators to cover the shortage; in doing so they ran the shipments up to the high figures quoted. The actual demand for the two weeks under consideration would be the average of their output about 6,895 cars. The operations and output for the week shows 13,292 ovens in blast and 3,964 idle, with a total production of 120,640 tons. Compared with the previous week this is an increase of 2,427 tons. The active plants of the region made a better average the past week, the averages of the whole region being 5.09 days as against 5.03 days the preceding week. The Pittsburg shipments increased 250 cars; Western 455 cars; Eastern shipments 340 cars; week's shipments to Pittsburg, 2,050; East of Pittsburg, 1,440; points west of Pittsburg, 3,637 cars; total, 7,127 cars. The shipments show a tonnage over production, which is accounted for from the fact that a large amount of stock coke is being shipped. Prices are unchanged.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, Dec. 16, 1892.  
Heavy Chemicals.—The heavy chemical market during the past week has been very quiet. Sales were light, as is usual at this time of the year, and

there are features of interest to report. Carbonated soda ash and caustic soda are very quiet. Alkali has been in some request and for delivery over 1893 is still low priced, quotations being 1.30@1.35c. Sal soda continues dull. Bleaching powder is quiet.

Our quotations to-day are as follows: Caustic soda 60%, 3.17 1/2 @ 3.27 1/2 c; 70%, 2.95 @ 3.12 1/2 c; 74%, 2.97 1/2 @ 3.15 c; 76%, 3.12 1/2 @ 3.25 c; 77%, 3.12 1/2 @ 3.25 c. Carbonated soda ash, 48%, 1.57 1/2 @ 1.60 c; 58%, 1.47 1/2 @ 1.52 1/2 c. Alkali, 48%, 1.50 @ 1.55 c; 58%, 1.37 1/2 @ 1.42 1/2 c. Sal soda, English, on the spot, .37 1/2 @ 1 c; American, .40 @ .95 c; bleaching powder, 2.30 @ 2.50 c.

Acids.—The trade in acids continues good. Business both for immediate delivery as well as for delivery over 1893 has been brisk, and manufacturers report a steady demand from consumers. There is no change to report in prices, which continue as follows: Acid, per 100 lbs. in New York and vicinity, in lots of 50 carboys or more: Acetic, \$1.60 @ \$2, according to quality; muriatic, 18", 90c @ \$1.10; 20", \$1 @ \$1.25; 22", \$1.25 @ \$1.50; nitric, 40", \$4; 42", \$4.50 @ \$4.75; sulphuric, 90c @ \$1.10; mixed acids, according to mixture; oxalic, \$6.50 @ \$7.25. Blue vitriol is quoted all the way from \$3.25 @ \$3.75; glycerine for nitro-glycerine, 1 1/4 @ 1 1/2 c., according to quality and quantity.

Brimstone.—The brimstone market has weakened somewhat since our last report. Our quotations are as follows: On the spot, best unmixed seconds, \$24; thirds, \$23. January February shipments, \$20.75 for best unmixed seconds and \$19.75 for best unmixed thirds. In Sicily "nearby" sulphur is being freely offered, but for later shipments the market is very firm and higher than consumers like.

Fertilizing Chemicals.—The fertilizer market has undergone no change since our last report. The demand from the South continues as good as was expected, and a fair amount of business has been done. The ammoniates are scarce and in some instances show an advance. Our quotations this week are as follows: Sulphate of ammonia, \$2.90 @ \$2.95 for bone goods and \$2.95 @ \$3 for fish liquor. Dried blood, \$2.37 1/2 @ \$2.50 per unit for high grade and \$2.35 for low grade; acidulated fish scrap, no stocks on hand; dried scrap, \$26.50; Azotine, \$2.37 1/2 @ \$2.45. Tankage, high grade, \$24.50 @ \$25; low grade, \$20 @ \$22, according to grade. Bone tankage, \$22.50 @ \$23.50; bone meal, \$23.50 @ \$25.50.

Double manure salts are unchanged. The price has been fixed by the syndicate's agents, and has not changed during the year. Quotations are as follows: \$1.13 1/2 cwt., basis 48 @ 50%, in 50 ton lots,

on foreign weights and analysis. High grade sulphate, \$2.13 cwt. basis 90%, foreign weights and basis.

Phosphates.—Phosphate rock, Florida, 60 @ 70%, is quoted from Punta Gorda at \$4.50 per ton of 2,240 lbs. Charleston rock is quoted at \$4.50 @ \$5 f. o. b., Charleston.

Kamit.—There has been some inquiry from the South, and several sales are reported. Prices continue as follows: \$8.75 for invoice weight and \$9 for actual weight, New York and Philadelphia; Southern ports \$1 higher.

Muriate of Potash.—There is no change in the position of this salt. Arrivals during the past week aggregated 650 tons. New sales were 50 tons for future shipments. Prices are: For 50 tons or over, New York or Boston, \$1.81 1/2; Philadelphia or Baltimore, \$1.84; Southern ports, \$1.86 1/2.

Nitrate of Soda.—There has been a good demand for nitrate during the past week and the market has ruled strong. We quote: \$2.17 1/2 @ \$2.20 for spot, and \$2.15 @ \$2.17 1/2 for "nearby". Messrs. Mortimer & Wisner the well-known nitrate brokers send us the following interesting statistics:

Table with 3 columns: 1892, 1891, 1890. Rows include: Imported into Atlantic ports from West Coast S. A. from Jan. 1, 1892, to date; Imported into Atlantic ports from Europe; Stock in store and afloat Dec. 1, 1892, in New York, Philadelphia, Baltimore; To arrive, actually sailed; Visible supply to March 1, 1893; Additional charters; Total supply, when shipped; Stock on hand, Jan. 1, 1892; Deliveries past month; Deliveries since Jan. 1 to date; Total yearly deliveries; Prices current Dec. 1, 1892.

Liverpool. Dec. 7. (Special Correspondence of Joseph P. Brunner & Co.)

The bulk of the inquiries for heavy chemicals are for 1893 contracts, buyers being pretty well booked up for their requirements for the balance of this month.

Soda ash is in small compass for prompt delivery and quotations are nominally as follows: Caustic ash, 48% £5 6s. 3d. per ton and upwards 57-58% £6 7s. 6d. per ton and upward; Carb ash 48% £5 7s. 6d. per ton and upward, 58% £6 10s. per ton and upward; Ammonia ash, 58% £6 7s. 6d. per ton and upward, all net cash. For 1893 delivery a fair amount of business is reported but all on private terms, and particulars are not allowed to transpire. For 1893 business, however, values may be stated to be about 15s. per ton under the nominal spot quotations. Soda crystals are receiving little attention, £3 3s. 9d. to £3 5s. 2d. per ton, less 5%, are nominal values. Caustic soda is neglected, prices are very varied, depending entirely upon the market. The nominal spot quotations are as follows: 60%, £9 2s. 6d. per ton; 70%, £10 5s. per ton; 74%, £11 8s. per ton; 76%, £12 2s. 6d. per ton, and upward, all net cash. For certain quarters however, a concession of from 10% to 20% per ton is offered, according to market. For contracts over 1893 quotations vary from 10% to 20% per ton under spot values, according to destination. Bleaching powder is scarce and steady at £7 15s. to £8 per ton, net cash, for hardwood casks.

Chlorate of potash has improved, there being a fair number of orders in the market lately from the East. On this account and owing to scarcity, holders are demanding an advance, and now quote 8 1/2 d. per pound for prompt delivery, while 8d. is asked for January; for January-March 7 1/2 d. to 7 3/4 d. is asked; and for April-December, 7d. per pound is nearest quotation. Bicarb. soda remains steady at \$6 15s. per ton, less 2 1/2% for one cwt. kegs, with usual allowance for larger packages. Sulphate of ammonia is in fair demand and values keep steady at £10 9s. 6d. to £10 8s. 9d. per ton for good grey 24%, and £10 10s. to £10 11s. 3d. for 25% both in double bags, less 2 1/2% f. o. b. here.

Nitrate of soda is quiet at £9 5s. to £9 7s. 6d. per ton, less 2 1/2% for double bags, f. o. b. here

Carb. ammonia, 3d. per pound for lump, and 3 1/2 d. per pound powdered.

CURRENT PRICES.

These quotations are for wholesale lots in New York unless otherwise specified. Acid—Acetic, chem. pure, 16 @ .17 Commercial, in bbls. and chys., .015 @ .017 Carbonic, liquefied, 18 @ .25 Chromic, chem. pure, 1 @ 1.00 for batteries, .40 Hydrobromic, dilute, U. S. P., .25 Hydrocyanic, U. S. P., .45 Hydrofluoric, 20 @ .20 Alcohol—95%, 50 gall., \$2.30 @ \$2.40 Absolute, .32 Ammoniated, 50 cwt., \$1.75 @ \$1.80 Alum—Lump, 50 cwt., \$1.85 @ \$1.90 Powdered, 50 cwt., .04 1/2 @ .06 Lump, 50 ton, Liverpool, .45 Aluminum Chloride—Pure, 10 lb., \$1.25 Amalgamating solution, .60 Sulphate, 50 cwt., \$1.90 @ \$2.50 Ammonia—Sul., in bbl. lots, 10 lb., .02 1/2 @ .03 Carbonate, 50 lb., English and German, .07 1/2 @ .07 3/4 Muriate, white, in bbls., 50 lb., .08 1/2 @ .09 Aqua Ammonia—(in cubs) 18 @ .04 @ .05 27 @ .04 @ .05 36 @ .05 @ .05 Antimony—Oxymur., 10 lb., .04 @ .05 Regulus, 50 lb., .10 @ .11 Argols—Red, powdered, 10 lb., .15 Arsenic—White, powdered, 10 lb., .03 @ .03 1/2 Red, 10 lb., .065 @ .07 Yellow, .08 @ .09 White at Plymouth, 50 lb., \$12.2 @ \$13.0 Asbestos—Canadian, 50 lb., \$5.0 @ \$6.0 Italian, 50 lb., \$18 @ \$20 Ashes—Pot, 1st sorts, 10 lb., \$4.75 @ \$5 Pearl, .06 @ .06 1/4 Asphaltum—Prime Cuban, 50 lb., \$28.00 @ \$30.00 Trinidad, refined, 50 lb., \$30.00 @ \$35.00 Egyptian and Syrian, 50 lb., .05 @ .07 1/4 Californian, at mine, 50 lb., \$12.00 @ \$29.00 at San Francisco, 50 lb., \$15.00 @ \$29.00 Barium—Carbonate, pure, 50 lb., .45 Carbonate, commercial, 50 lb., .06 @ .10 Chlorate, crystal, 50 lb., .75 Chloride, commercial, 50 lb., .06 @ .10 pure, 50 lb., .18 Iodine, 50 oz., .40 Nitrate, 50 lb., .09 1/2 @ .07 1/2 Sulph., Am. prime white, 50 lb., \$1.75 @ \$1.90 Sulph., foreign, floated, 50 lb., \$1.50 @ \$1.9 Sulph., off color, 50 lb., \$1.50 @ \$14.00 Carb., lump, f. o. b. L'pool, 50 lb., \$4.10 @ \$4.15 No. 1, Casks, Runcorn, " " \$3.15 @ \$3.15 No. 2, bags, Runcorn, " " \$3.10 @ \$3.10 Bauxite—50 lb., \$11 @ \$12 American, 50 lb., \$11 @ \$12 Bichromate of Soda—50 lb., \$9 1/4 @ \$10 Borax—Refined, 50 lb., in car lots, \$8 @ \$9 San Francisco, .08 @ .08 1/2 Concentrated, in car lots, .07 1/2 @ .08 Refined, Liverpool 50 lb., \$29

Bromine—50 lb., \$15 @ \$13 Cadmium Nitron—50 lb., \$2.00 Cadmium Iodide—50 lb., \$5.50 Chalk—50 lb., \$1.40 @ \$1.75 Precipitated, 50 lb., .05 @ .06 China Clay—English, 50 lb., \$1.3 @ \$1.80 Domestic, 50 lb., .29 @ \$1.11 Chlorine Water—50 lb., .10 @ .15 Chrome Yellow—50 lb., \$10 @ \$25 Chrome Iron Ore—50 lb., San Francisco, \$10.00 Chromalum—Pure, 50 lb., .40 Commercial, 50 lb., .12 Cobalt—Oxide, 50 lb., \$1.90 @ \$2.00 Copper—Sulph. English Wk. ton \$20 @ \$21 Vitriol (blue), ordinary, 50 lb., \$3 1/2 @ \$3 3/4 extra, .04 1/2 Nitrate, 50 lb., .04 Copra—Comm. n., 100 lbs., 90 @ \$1.00 Best, 100 lbs., \$1.35 @ \$1.50 Liverpool, 50 lb., in casks, \$2 @ \$2.10 Corundum—Powdered, 50 lb., .04 1/2 @ .09 Cryolite—Powdered, 50 lb., bbl. lots, .07 Emery—Grain, 50 lb., .04 1/2 @ .05 Flour, 50 lb., .02 1/2 @ .05 Epsom Salt—50 lb., .01 @ .01 1/4 Feldspar—Ground, 50 lb., \$6.00 @ \$10.00 Crude, \$2.00 @ \$3.00 Fluorspar—Powdered, No. 1, 50 lb., \$20 @ \$30 Lump, at mine, \$8 @ \$3 French Chalk—Fuller's Earth—Lump, 50 lb., \$16 @ \$20 Glauber's Salt—in bbls., 50 lb., .01 @ .01 1/4 Glass—Ground, 50 lb., .10 Gold—Chloride, pure, crystals, 50 oz., \$12.00 pure, 15 gr., c. v., 50 doz., \$5.40 liquid, 15 gr., g. s. v., 50 doz., \$5.50 Chloride and sodium, 50 oz., \$6.00 15 gr., c. v., 50 doz., \$2.88 Oxide, 50 oz., \$7.25 Gypsum—Calcined, 50 lb., \$1.25 @ \$1.50 Land Plaster, .02 @ .03 Iodine—Resublimed, \$3.30 @ \$3.35 Iron—Nitrate, 40°, 50 lb., .01 @ .01 1/4 47°, 50 lb., .02 @ .02 1/4 Kaolin—See China Clay. Lead—Red, American, 50 lb., .06 1/2 @ .07 1/4 White, American, in oil, 50 lb., .06 1/2 @ .07 1/4 White, English, 50 lb., in oil, .06 1/2 @ .06 3/4 Acetate, or sugar of, white, .06 @ .06 1/4 Granulated, .09 @ .10 Nitrate, .09 @ .10 Lime Acetate—Am. Brown, 50 lb., \$1.75 @ \$1.87 English flake, 50 lb., .06 1/2 @ .06 3/4 Magnesite—Crude, 50 lb., \$1.05 kilos, \$14.75 Calcined, 50 lb., \$2.20 @ \$2.20 Brick, 50 lb., \$47.50 Manganese—Ore, per unit, .23 @ .28 Oxide, ground, 50 lb., .02 1/2 @ .06 1/2 Mercuric Chloride—(Corrosive sublimate) 50 lb., \$2 @ \$4 Powdered, 50 lb., \$50

Marble Dust—50 lb., \$1.25 Metallic Paint—Brown, 50 lb., \$20 @ \$25 Red, 50 lb., \$20 @ \$25 Mineral Wool—Ordinary slag, .01 1/2 Ordinary rock, .02 1/2 Ground, 50 lb., .02 1/2 Mica—in sheets according to size. 1st quality, 50 lb., .25 @ \$6.00 Naphtha—Black, .02 Nitre Cake—50 lb., \$10.00 Ochre—Rochelle, 50 lb., \$1.10 @ \$1.50 Washed Nat Ox'rd, Lump, 50 lb., \$6 @ \$6 1/2 Washed Nat Ox'rd, Powder, 50 lb., \$7 @ \$7 1/2 Golden, 50 lb., .05 @ .06 Domestic, 50 lb., \$12 @ \$20 Oils, Mineral—Cylinder, light filtered, 50 gal., \$14 @ \$16 Dark filtered, 50 gal., \$10 @ \$13 Extra cold test, 50 gal., \$2 @ \$2.24 Dark steam refined, 50 gal., \$9 @ \$9 Phosphorus—50 lb., \$5 @ \$5.50 Precip., red, 50 lb., \$2 @ \$2.50 white, 50 lb., \$5 @ \$5.50 Plumbago—Ceylon, 50 lb., \$4 @ \$6 American, 50 lb., \$5 @ \$7 Potassium—Cyanide, 50 lb., C. P., .70 fused, .45 Bromide, domestic, 50 lb., \$5 @ \$6 Chlorate, English, 50 lb., \$14 @ \$15 Chlorate, powdered, English, 50 lb., \$14 @ \$15 Carbonate, 50 lb., by casks, \$25 @ \$40 Caustic, 50 lb., pure slick, .06 @ .06 1/2 Iodide, 50 lb., \$2.58 @ \$2.80 Nitrate, refined, 50 lb., .06 @ .06 Bichromate, 50 lb., \$10 @ \$11 1/2 Yellow Prussiate, 50 lb., \$22 @ \$23 Red Prussiate, 50 lb., \$40 @ \$45 Pumice Stone—Select lumps, 50 lb., \$15 Original cks., 50 lb., .01 1/2 @ .02 Powdered, pure, 50 lb., \$1 @ \$1.24 Pyrites—Non-cuprous, p. units, \$12 @ \$14 Quartz—Ground, 50 lb., \$6.00 @ \$10.00 Rotten Stone, Powdered, 50 lb., \$3 1/4 @ \$3 1/2 Lump, 50 lb., .06 @ .07 Original cks., 50 lb., \$4 1/2 @ \$5 1/2 Rubbing stone, 50 lb., \$3 1/4 @ \$4 Sal Ammoniac—Lump, in bbls., 50 lb., \$30 1/2 Salt—Liverpool, ground, 50 sack, .70 Domestic, fine, 50 ton, \$7 @ \$7.50 Common, fine, 50 ton, \$4.50 @ \$5 Turk's Island, 50 bush, \$2 @ \$2 Salt Cake—50 lb., \$10.00 @ \$15.00 Salt Peter—Crude, 50 lb., .05 @ .04 Soapstone—Ground, 50 lb., \$5 @ \$5 Sodium—Fusate, 50 lb., \$22 @ \$24 Phosphate, 50 lb., \$4 @ \$5 Stannate, 50 lb., \$6 @ \$12 Tungstate, 50 lb., \$6 @ \$12 Hyposulphite, 50 lb., in casks, \$23 @ \$24 Strontium—Nitrate, 50 lb., \$8 1/4 @ \$9 Sulphur—Roll, 50 lb., \$2 1/2 Flour, 50 lb., \$2 1/2 Sylvinit, 27 @ 35, S. O. P., per unit, \$40 Talc—Ground French, 50 lb., \$1 1/4 @ \$1 1/4 American No. 1, 50 lb., \$1 1/4 @ \$1 1/4 American No. 2, 50 lb., \$1 @ \$1

Terra Alba—French, 50 lb., \$65 @ \$80 English, 50 lb., \$65 @ \$80 American, No. 1, 50 lb., \$65 @ \$70 American, No. 2, 50 lb., \$45 @ \$60 Tin—Crystals, in kegs or bbls., \$14 @ \$10 feathered or flossed, .20 Muriate, single, 50 lb., \$7 @ \$8 Double or strong, 54° B., \$10 @ \$15 Oxymur. or nitro, .19 Vermilion—Imp. English, 50 lb., \$85 @ \$90 Am. quicksilver, bulk, \$57 @ \$62 Am. quicksilver, bags, \$58 @ \$63 Chinese, \$85 @ \$100 Trieste, \$90 @ \$95 American, \$114 @ \$113 Zinc—White—Am., Dry, 50 lb., \$4 @ \$5 Antwerp, Red Seal, 50 lb., \$67 @ \$70 Paris, Red Seal, 50 lb., \$75 @ \$80 Muriate solution, .06 Sulphate crystals, in bbls., 50 lb., \$8 1/2

THE RARE METALS.

Aluminum—50 lb., \$50 @ \$85 Arsenic—(Metallic), per lb., \$40 Barium—(Metallic), per gram, \$4.00 Bismuth—(Metallic), per lb., \$2.25 Cadmium—(Metallic), per lb., \$1.00 Calcium—(Metallic), per gram, \$10.00 Cerium—(Metallic), per gram, \$7.50 Chromium—(Metallic), per gram, \$1.00 Cobalt—(Metallic), per lb., \$6.00 Didymium—(Metallic), per gram, \$9.00 Erbium—(Metallic), per gram, \$7.50 Gallium—(Metallic), per gram, \$140.00 Glucinum—(Metallic), per gram, \$12.00 Indium—(Metallic), per gram, \$9.00 Iridium—(Metallic), per oz., \$7.00 Lanthanum—(Metallic), per gram, \$10.00 Lithium—(Metallic), per gram, \$10.00 Magnesium—(Powdered), per lb., \$4.00 Manganese—(Metallic), per lb., \$11.00 Chem. pure, per oz., \$10.00 Molybdenum—(Metallic), per gm., \$50 Niobium—(Metallic), per gram, \$5.00 Osmium—(Metallic), per oz., \$65.00 Palladium—(Metallic), per oz., \$35.00 Platinum—(Metallic), per oz., \$7 @ \$8 Potassium—(Metallic), per lb., \$25.00 Rhodium—(Metallic), per gram, \$5.00 Ruthenium—(Metallic), per gm., \$5.50 Rutherfordium—(Metallic), per gram, \$2.00 Selenium—(Metallic), per oz., \$1.50 Sodium—(Metallic), per lb., \$6 @ \$7.50 Strontium—(Metallic), per gm., \$60 Tantalum—(Metallic), per gram, \$9.00 Tellurium—(Metallic), per lb., \$5.00 Thallium—(Metallic), per gram, \$30 Titanium—(Metallic), per gram, \$32.00 Thorium—(Metallic), per gram, \$17.00 Tungsten—(Metallic), per lb., \$8.00 Uranium—(Oxide), per lb., \$6.00 Metallic, per gm., \$30 Vanadium—(Metallic), per gm., \$32.00 Yttrium—(Metallic), per gram, \$2.00 Zirconium—(Metallic), per oz., \$35.00

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

Table with columns: NAME AND LOCATION OF COMPANY, Dec. 10, Dec. 12, Dec. 13, Dec. 14, Dec. 15, Dec. 16, SALES. Lists various mining companies and their stock prices.

Table with columns: NAME AND LOCATION OF COMPANY, Dec. 10, Dec. 12, Dec. 13, Dec. 14, Dec. 15, Dec. 16, SALES. Lists various mining companies and their stock prices.

\*Ex-dividend. \*Dealt in New York Stock Ex. Unlisted securities. †Assessment paid. ‡Assessment unpaid. Dividend shares sold, 11,667. Non-dividend shares sold, 11,853. Total shares sold, 23,520.

BOSTON MINING STOCK QUOTATIONS.

Table with columns: NAME OF COMPANY, Dec. 9, Dec. 10, Dec. 12, Dec. 13, Dec. 14, Dec. 15, SALES. Lists various mining companies and their stock prices.

Table with columns: NAME OF COMPANY, Dec. 9, Dec. 10, Dec. 12, Dec. 13, Dec. 14, Dec. 15, SALES. Lists various mining companies and their stock prices.

Dividend shares sold, 4,200. Non-dividend shares sold, 1,402. Total shares sold, 5,602.

DIVIDEND-PAYING MINES

NON-DIVIDEND PAYING MINES

Table with columns: Name and Location of Company, Capital Stock, Shares, Dividends, Assessments. Lists mining companies with financial details.

Table with columns: Name and Location of Company, Capital Stock, Shares, Dividends, Assessments. Lists mining companies with financial details.

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 various mining companies and their financial details.

G., Gold. S., Silver. L., Lead. C., Copper. B., Borax. \* Non-assessable. † This company, as the Western, up to December 10th, 1881, paid \$1,400,000. ‡ Non-assessable for three years. § The Deadwood previously paid \$275,000 in eleven dividends and the Terra \$75,000. ¶ Previous to the consolidation in August, 1884, the California had paid \$31,320,000 in dividends, and the Cons. Virginia \$42,90,000. \*\* Previous to the consolidation of the Copper Queen with the Atlanta, August, 1885, the Copper Queen had paid \$1,350,000 in dividends. †† This company paid \$190,000 before the reorganization in 1880. ††† This company acquired the property of the Raymond & Ely Company which had paid \$3,075,000 in dividends. †††† Previous to this company's acquiring Northern Bell, that mine declared \$2,400,000 in dividends against \$425,000 in assessments.

COAL, RAILWAY AND OTHER STOCKS.

Table with columns for Stock Name, Dec. 10, Dec. 12, Dec. 13, Dec. 14, Dec. 15, Dec. 16, and Sales. Lists various stocks like Adams Express, Am. Express, etc.

COAL, RAILWAY AND OTHER STOCKS.

Table with columns for Stock Name, Dec. 10, Dec. 12, Dec. 13, Dec. 14, Dec. 15, Dec. 16, and Sales. Lists various stocks like Oregon Imp., Ore. R. & N., etc.

Total shares sold, 1,842,441.

San Francisco, Cal.

Table with columns for Stock Name, Dec. 9, Dec. 10, Dec. 12, Dec. 13, Dec. 14, Dec. 15. Lists stocks like Alpha, Alta, Belcher, etc.

Colorado Springs, Colo. Dec. 10.

Table with columns for Stock Name, Bid, Asked. Lists stocks like Anaconda Gold, Argentum Junata, etc.

Foreign Quotations.

Table with columns for Location (London, Paris), Stock Name, Highest, Lowest. Lists stocks like Alaska Treadwell, Amador, etc.

STOCK MARKET QUOTATIONS

Table with columns for Company, Bid, Asked. Lists stocks like Atlantic Coal, Baltimore, etc.

Pittsburg, Pa.

Table with columns for Company, H, L. Lists stocks like Bridgewater Gas Co., etc.

St. Louis.

Table with columns for Stock Name, Bid, Asked. Lists stocks like Adams, American & Nettie, etc.