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The meeting of the railroad presidents in this city early in the week has practically decided on the more concentrated management of the roads west of Chicago. In the association a four-fifth vote will control the remaining fifth. All transportation rates and the quota of tonnage to be allotted to each road are to be regulated by the board, and are taken altogether out of the hands of the railroad managers. Combinations of this kind have not in the past been permanently successful, but the condition of success is concentration of authority and responsibility. If one man or one committee is given absolute authority to make and enforce rates and quota, the vexed problem will be solved. The effect of the new departure will undoubtedly be beneficial on the values of railroad securities, and will make a still wider market for them abroad.

MINERAL RESOURCES OF THE UNITED STATES.

The value of the minerals produced in a single year in the United States amounts to about \$600,000,000, including such first products from the minerals as pig iron, copper, lead, zinc, etc. In other words, this great mineral industry is, next to agriculture, the most important industry in this country, and yet Congress, so lavish in its expenditures in other directions, does not appropriate anything for the collection annually of statistics concerning it. The Geological Survey of the United States has doled out an-

nually the pitiful sum of about \$8,000—scarcely more than a fair salary for one expert in this work—to collect the statistics of the mineral resources of the United States. Through the combined sentiments of patriotism and personal friendship, which are annually appealed to by the chief of this department of the Geological Survey, a certain number of gentlemen are induced each year to devote, gratuitously, much time and labor to the work of preparing the reports which are published annually in a valuable volume entitled "The Mineral Resources of the United States." It is not, of course, possible to greatly urge those who, at great personal inconvenience, do the work gratuitously, and in some cases actually paying out more in expenses than they receive. Consequently these statistics, whose value so greatly depends on the promptness with which they are published, do not appear for about a year after the period to which they relate.

The neglect of the government to provide at least \$50,000 a year for the collection of the mineral statistics of the country is simply disgraceful, and all the more so when we consider the vast sums squandered in paying pensions, which in innumerable cases are to wholly undeserving mercenaries, and on many other useless or mischievous expenditures.

The prompt publication of a full and careful report of the mineral statistics of the country greatly promotes the development of the mineral industry, and if this work were done annually it would greatly lessen the cost of collecting the census statistics every tenth year.

It is unworthy of a great government to ask private individuals to devote gratuitously their time and money to performing work which is of great national importance and for the proper performance of which the taxpayers already furnish an abundance of money.

THE MEXICAN AND UNITED STATES TARIFFS.

In our issue of December 6th we said erroneously that "Mexico has placed a prohibitory duty on cattle from this country, in answer to our duty," etc. Our attention has been called to this statement by His Excellency the Mexican Minister in Washington, and we take pleasure in making the necessary correction. The fact is that the Mexican government has acted in a much more liberal and enlightened spirit than our own Congress. The duties on a few articles compare as follows:

	Mexican duty.	"McKinley." U. S. duty.
Live sheep, per head.....	\$0.35	\$1.50
" lambs, ".....	0 05	1.50
" hogs, ".....	2.25	10.00
" neat cattle, per head.....	3.00	30.00
" mules, per head.....	2.00	
" horses, ".....	2.00	

Since the Mexican ponies are worth only about \$10 a piece the McKinley duty is about 300 per cent.

The Mexican minister makes the following pregnant remark: "The exclusion of our ores has, so far, been advantageous to us, because several reduction works are being built in Mexico for the treatment of the same, which used to be done in the United States when crude ores came in free of duty in the shape of raw material. Such ores as cannot be worked profitably in Mexico will be sent to Europe for treatment since the doors of the United States have been shut to us."

This in fact has been the effect of our insane McKinley protection. We are driving the smelting business out of the country and are building up rival industries in Mexico and elsewhere. And what have we gained? Our silver miners have to pay higher smelting charges. The price of lead has fluctuated wildly, disorganizing business, interfering with both consumption and production, and causing great injury to many industries, while conferring a doubtful benefit on a small number of rich mine owners. It is to be hoped that Congress will undo at an early date the mischief it did in this matter, and, that, heeding the voice of public opinion expressed in the last election, it will reduce or, better, abolish the duties on raw material before the rising flood of popular indignation at the extortions of excessive protection shall overflow all barriers and sweep away even necessary protection.

THE STATISTICAL NUMBER OF THE ENGINEERING AND MINING JOURNAL.

The ENGINEERING AND MINING JOURNAL will publish January 3d its usual valuable report on the mining industries of the country, with full statistics of the production of copper, lead, zinc, aluminum, and other metals during the current year, 1890, and with special reports of the stocks of the different metals on hand at the close of the present month. These statistics are compiled from direct returns courteously furnished us by all the producers throughout the country, and are therefore absolutely reliable, while the promptness with which they are furnished adds to their practical value.

The market prices throughout the year of all the metals and chief minerals, and a review of the condition of the markets, add greatly to the value of this statistical volume, for volume it may well be named, having the matter which would fill about 300 pages of an ordinary octavo book. Experience has shown that this issue of the ENGINEERING AND MINING

JOURNAL is preserved as a book of reference, on account of the valuable statistical information which it contains, and which cannot be obtained elsewhere. The demand for it continues throughout the year, and comes from every part of the globe. An extremely large edition has therefore to be published.

That issue offers a very exceptional opportunity for manufacturers and merchants to advertise their wares, and most of our regular advertisers take advantage of it to make more prominent their usual cards, while many others find this an excellent opportunity to test the value of the ENGINEERING AND MINING JOURNAL as an advertising medium, both for the home and the export trades. Those who do this, usually remain as regular advertisers, since they find in every case that "it pays to advertise in the ENGINEERING AND MINING JOURNAL." No extra charge is made for advertisements in that issue.

ECONOMICAL MINING AND MILLING.

The conditions under which mining and metallurgical operations are carried on in this country are so constantly changing and being ameliorated that it is never quite safe to say that because such and such an enterprise failed last year it must also fail this. The improvements and changed conditions referred to embrace every possible branch of the industries affected, such as means of communication and consequent cheapening of supplies, and first cost of plant; improvements in the plant itself both for mining and treatment of ores; methods of application of water power transmitted from a distance such as were not dreamed of a few years ago, and new discoveries in metallurgical chemistry, the whole constituting entirely new conditions to be taken into account by the engineer and mine owner.

Ores that even five years ago would not have been worth a second thought now form the basis of sound business enterprise, and all the sounder from the fact that the lowest grade ores exist in the largest quantities, and once a margin of profit is established in handling them, the business is usually divested of the ordinary risks accompanying mining and is more akin to manufacturing a product with an assured market and a certain profit, be it great or small.

In our issue of May 5th, 1888, we gave a detailed statement of the cost of mining and milling gold ore at the Spanish mine, Nevada County, Cal. These figures were so extraordinarily low that they attracted much attention at the time, and it was proved conclusively by Mr. Bradley, the superintendent, that under certain conditions a living profit could be made out of a gold ore containing no more than \$1 in value per ton. The actual average cost of working in this case was little over 57½ cents a ton, of which 23 cents represented cost of milling. It was thought at the time that the conditions were so favorable that these figures were quite exceptional, and almost impossible to beat; yet we learn from our special correspondent at Auburn, El Dorado County, Cal. (see ENGINEERING AND MINING JOURNAL, December 6th), that still more economical work than the record of the Spanish mine is being carried on by Mr. G. C. Pearson at the Dalmatia mine. The low grade and soft ore body, carrying, it is said, \$1.50 to \$2 in value of gold to the ton, is so large that it is quarried by contract at 7½ cents per ton, and we are assured by our correspondent that 42½ cents a ton is more than sufficient to meet cost of milling, management, and amortization of capital. That this may well be credited we have only to remember that at the Spanish mine the cost of milling including payment for water used was only 23 cents, while at the Dalmatia mine the water is the property of the company. Not the least interesting feature of this instance of modern practice is the fact that the power station is situated 1,200 feet below and two miles distant from the mill, the transmission taking place by means of electricity. It is also very satisfactory, though we confess entirely unexpected, to learn that this remarkably economical record is made by an English company.

THE FINANCIAL QUESTION IN CONGRESS.

The several propositions before Congress for the relief of the financial stringency now existing in the great money centers of the country seem to aim rather at increasing the currency than at restoring confidence.

As we clearly demonstrated in our last issue in quoting certain statistics collected by the Comptroller of the currency, only four or five per cent. of the business of the country is done with gold and silver or the representatives of gold and silver, and the 95 or 96 per cent. with checks, bills of exchange and other classes of securities, whose negotiability, and therefore value, depends largely upon public confidence. It is evidently not a deficient quantity of silver or gold that causes the trouble, but a deficiency in public confidence; hence, how has confidence been shaken? and how can it be restored? are the all-important questions.

As an illustration of how this lack of confidence manifests itself, we may instance two examples that occurred in a Wall street office within two weeks. In one, a wealthy, retired merchant casually made the remark: "My wife keeps a small account at one of the banks to check against,

but I have drawn my balances down low and have put the money in gold certificates in the safe deposit vault."

Another gentleman, who usually carries a pretty large balance, having purchased something calling for, let us say, \$1,000, consulted his pocket check-book and remarked: "Why, I actually have not enough in the bank;" and being told to leave it to some other time, he replied: "No, I will go out and get the money." He presently returned and paid the amount in gold certificates. In answer to the inquiry as to this, he said: "Oh, I keep my balance in the safe deposit vaults in gold, for there is no knowing what kind of money we will shortly have, or whether the banks will be able to pay their depositors promptly."

These examples that came under our personal observation show the effect of some of the crazy notions of finance that are now being agitated in Washington.

It is not necessary to refer to all the propositions that have been made. Of those which appear most likely to secure consideration, is the proposal that the government shall buy, in addition to the 4,500,000 ounces a month, the speculators' stock of silver now weighing on the market and estimated at 13,000,000 ounces.

We look upon this proposition as simply an outrageous job. Why should the government be called upon to help these speculators out of a bad investment. While they were buying this silver and prices were booming, it was all right; but when it was discovered, as the ENGINEERING AND MINING JOURNAL at that time maintained, that the amount of silver ready to be offered at any high price, far exceeded the estimates made by the advocates of the silver legislation, and prices declined, special legislation is asked for, and the government is requested to come to the relief of the speculators and advance the price. It has been openly charged that both congressmen and senators were or are interested in this silver speculation, and the alacrity with which the proposition to buy this silver has received the approval of the Finance Committee does not tend to refute this charge.

The present legislation is rapidly drifting this country on to the rocks of a silver standard, and this is certain to have as an effect the disappearance of our gold. As the gold coins in the United States amount to \$630,000,000, and gold bullion nearly \$66,000,000, the disappearance of the gold will be a very serious matter and will work an incalculable amount of mischief.

The proposition of Secretary WINDOM is substantially to buy the present bonded indebtedness of the United States at a fair price to be agreed upon between the holders and the Secretary, and pay for the same in 2 per cent. thirty year bonds to be issued at par, that is, its face value, and at the same time to place to the credit of the Treasurer of the United States an amount of new greenbacks equal to the face value of the 2 per cent. bonds out, and further, to make the 2 per cent. bond interchangeable with greenbacks at the will of the holder at their face value, interest to cease while the bonds are in the Treasury and to continue when they are out. The bonds would be used as the basis of the issue of the greenbacks as they are now for the national bank currency.

The plan would be not to allow the new bonds to be deposited by national banks for circulating notes, nor to be held as a portion of their lawful reserve, the idea being to keep them afloat so that they, when money panics arise, will find their way into the Treasury for greenbacks.

The merits claimed for the proposition are that it would save considerable interest, prevent the locking up of coin as a basis for the issue of notes, and preserve the features of the national bank currency; only the government issues the money instead of the national banks.

To this proposition there can be no objections such as hold against that of buying the speculators' stock of silver or against the free coinage scheme. It would simply exchange one kind of government certificates of indebtedness for another of a more convenient kind.

It is to be hoped that the Secretary of the Treasury will be authorized to exercise his discretion in exchanging gold bars for gold coin. This would be a wholly unobjectionable measure. On another page will be found the bill which has been approved by the Finance Committee of Congress.

BOOKS RECEIVED.

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

First Lessons in Metal Working. By Alfred G. Compton. Published by John Wiley & Sons, New York, 1890. Pages 170. Price, \$1.50. Illustrated.

Mitteilungen aus den Königlichen technischen Versuchsanstalten zu Berlin. Herausgegeben im Auftrage der Königlichen Aufsichts-Kommission. Achter Jahrgang, 1890. Fünftes Heft, Berlin. Verlag von Julius Springer, 1890.

The Mechanical World Pocket Diary and Year Book for 1891, containing also a useful collection of notes and formulae arranged for the use of engineers, draughtsmen, mechanics, manufacturers and others. Manchester: Emmott & Co., Mechanical World offices. London, 1891.

Valve Gears. By H. W. Spangler, P. A. Engineer, United States Navy. Published by John Wiley & Sons, New York, 1890. Pages, 175. Price, \$2.50. Illustrated.

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.

How Can the Smoke and Sulphur Gas Nuisance be Avoided?

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Do you know of any process for the destruction of the gases and smoke emerging from stacks, resulting from burning copper ore and evolving large quantities of sulphur and sulphurous gas?

This is written by request of committee of Butte Board of Trade. I hope some of your readers can suggest an efficient remedy.

HEBER ROBERTS, Health Officer, Butte.

BUTTE CITY, Mont., November 26th, 1890.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: The contract of the Tinto company is a pill both to acid makers and miners of pyrites in this country. I am very strongly inclined to free trade myself, but this kind of an illustration of it is pretty bad. It looks as if the McKinley bill was unfortunate in both its free list and duty list; for pyrites under 2% copper now comes in free. As a result Tinto has sold 250,000 tons according to your report. Tinto ore is first treated for sulphur, then for copper, and then sold to Carnegie and smelted in his blast furnaces. All other iron ore must pay 75 cents; all other copper ore must pay 1/2 cent per pound of copper. Tinto pays no copper and no iron duty; is that fair?

Furthermore, if it had not been for Tinto, acid must have risen; it was becoming plain that 66° acid was leaving no fair margin of profit at \$13 a net ton. It became necessary, therefore, to get sulphur cheaper. Brimstone is up out of sight, and miners of pyrites in this country could not go under present prices.

The result of this will be that acid will not rise, even if it does not fall, and acid works which have no copper works to sacrifice will have hard sledding.

BOSTON, December, 1890.

W. E.

Russell Lixivation vs. Amalgamation.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: "Muscular Amalgamator," in your issue of November 8th, 1890, makes some references to the Marsac and Ontario mills, which call for comment and explanation.

The Marsac mill treats the ore from the Daly mine. The Daly vein is the south fork of the west-rn extension of the Ontario vein. The character of the ore differs materially from that in the mother vein. While the Ontario milling ore shows considerable iron pyrites and runs from 2% to 6% in sulphur, the Daly milling ore has no pyrites and contains only from 0.15% to 0.40% of sulphur. The Ontario can select its ore (and mix it for good milling results) along 6,000 feet of the vein, while the Daly has only one-quarter of the ground. Still during the year 1888, when both mills were using the amalgamation process only, the average extraction in the Marsac mill was 90.7% at a cost of \$6.40 per ton, and the average extraction in the Ontario mill was 86.5% at a cost of \$9.80 per ton.

In the fall of 1888 the Daly Company erected a plant for leaching its ore by the Russell process. The capacity of the works proved insufficient to leach all the ore, so one-third of it had still to be treated in the pans by amalgamation. The pans were run with all the care possible, and every effort made to attain good results. The leaching was conducted with similar intentions, but the usual breakdowns, etc., incidental to starting up a new process were encountered. Still the final average results showed that the extraction in the leaching vats exceeded that in the amalgamating pans by four-tenths of 1%.

The Marsac mill using two processes during 1889, a person of ordinary comprehension ought to be able to see why the cost per ton for reduction would be increased. The increase in the quantity of wood consumed was due to its inferior quality.

The percentage extracted this year, when all the ore will be leached, will surely exceed that of last year. The cost per ton will be about the same, as the tons of ore worked will be much less owing to an increase in hardness in the ore from the lower levels.

For the last few months we have been saving from \$30 to \$40 per day in fuel by the use of the Taylor gas producer for firing our dryers and furnace. The ore is much better roasted by the gas than with wood. It is necessary to have a certain kind of coal for our best results. Were it not for the increased hardness of the ore and the trouble in getting the proper coal from the mines for our producer, much better results would have been attained this year.

During the latter part of August of this year, while getting good coal for the producer, a comparative run was made in the pan room. The extraction was 82.1% on 18 charges of 1.6 tons each. The corresponding extraction in the leaching vats on six charges of 65 tons each was 92.8%.

It is fair to assume that leaching as conducted at the Marsac mill has merits which will command recognition even from "Muscular Amalgamator."

Good results have been attained by amalgamation, and even better will yet be obtained by leaching.

W. A. WILSON,
Superintendent Marsac mill.

PARK CITY, Utah, December, 1890.

The Incubation of More Alaska Bubbles.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: It is a long time since I have written anything for the ENGINEERING AND MINING JOURNAL, and I only propose now to call your attention to an article in the Juneau *Free Press* in regard to the Nowell combination. This article is quite near the truth, although it might have been made much stronger. The Juneau papers are a little different from the ENGINEERING AND MINING JOURNAL. When their pay stops, they come out and speak the facts; when they are under pay they publish anything that the company paying them may desire. The Juneau *Mining Record* was against the Nowell company until July, when Mr. T. S. Nowell arrived here and fixed things with them, since which time the Nowell com-

pany has been a blooming success. The *Free Press* is now out with the Nowell company, and hence comes out with a few bare truths. It is generally believed that Mr. Nowell has a fine chance to make a big stock deal on his Basin Placer mine next season, but as to its ever paying any large returns, there is hardly any one in Alaska that expects it, but they will not say so, since it would be taking money out of their own pockets; for the Nowell company is and has been spending considerable money.

Out of the 100 acres owned by this company there are six or eight acres that will probably pay fairly, and it is Mr. Nowell's intention, as near as I can find out, to start work next summer on this rich ground, boom the stock and unload not only in the East but in the European market. It was his intention when he left here this summer to proceed to England some time this winter and perfect arrangements for his boom next summer. He has taken hold of five properties in Alaska already that were worthless, and has failed in his attempt to make a raise. He has at last succeeded in obtaining a property that has a little merit, and he is blowing it up into the millions, when in all probability a quarter of a million or possibly, to be very liberal, over half a million in gold lies buried in the gravel and among the rocks in one side of the Basin, and the plant and labor in saving this gold will leave a very small margin of profit. It is about equal to Dr. Flower's immense scheme in Colorado a few years ago, now called the Geyser Company, which the ENGINEERING AND MINING JOURNAL so justly denounced.

You have already shown up Mr. Nowell in the past, and you will do a further service to legitimate mining by informing the investing public as to the merits or demerits of his present scheme. His peculiar manner of operating leaves him less open to attack than many, as he has no stock on the market, and none for sale now. He has a few friends in the East who are backing him, and he will hold all the stock until the whole thing is ready and a first showing is made, and then Mr. T. S. Nowell can have his own bank account again, little caring who is the loser. You may know who these backers are better than I do, as they are prominent men, and I think they are blindly ignorant of the deal they will receive. The Governor Sawyer, of New Hampshire family and J. W. Clark, of the Tamarack & Osceola mines, are probably his heaviest backers. Among others to give stamina to the affair are John A. Brown, bank president of Providence, R. I.; Aaron Hobert, president Tremont National Bank of Boston; W. T. Colbron, of New York, and a few others. Mr. E. L. Amory, of Boston, and Mr. Thurber, of the Gorham Silver Plate Company, dropped him about two years ago.

The Juneau City *Mining Record* of October 23d contains the flowery report, and the Alaska *Free Press* of October 25th contains the digest of the report. It might be added that the few prospect shafts sunk in the Basin in 1881 prior to working the side hill claims, and before the Basin was covered with tailings, were sunk only 15 or 20 feet deep, and no pay dirt was found, and in most cases only a soft, muddy deposit was found. The mountain slopes which form the Basin only contain gold on the southern side, and it is not likely with gold only on one side of the Basin that the wash from all sides is going to yield gold after it gets down into the Basin, as Mr. Nowell and his engineer calculate. Any further information you may desire will be furnished to the best of my ability and a strict adherence to facts.

You recently copied from the *Free Press* items about two important mining sales here to Messrs. Koehler, Williams, Johnson, et al. These properties were purchased in the names of these gentlemen, but Mr. Bernhardt, of the "great" Bear Nest mine, is the actual purchaser in his endeavor to play even with the country. These two properties have some merit, but it remains for development to show whether he will come out even or not.

ALASKA, November, 1890.

Gold Chlorination—A Plea for the Plattner Process.

EDITOR ENGINEERING AND MINING JOURNAL:

SIR: Knowing full well that I am way behind the times in my chlorination works from the fact that I am still using the old Plattner process of ore vats, precipitation tanks and independent generator for the generating of chlorine gas, yet I am goaded on to say something in defence of our simple ways. That I may have standing before you as a metallurgist, allow me to make one statement of fact, which kindly print in large letters.

Of all the gold and silver that came in my works for the year from January 1st to December 31st, 1889, I shipped and sold to the mint and to Selley & Co., at San Francisco, 97% of the total amount as given by assay of the raw ores.

This fact will give me a hearing I think, and in addition to this, I treated by this old-fashioned process nearly 300 tons of tailings from the Central Mine, assaying \$4.50 a ton at a cost of \$1.40 per ton, including unloading from the cars on the railroad and dumping the tailings; the extraction in this case was practically equal to the assay value of the ore. It was a "ground hog" case. I had used up all my money and six thousand dollars more, to finish my works: no one would trust me for a pound of ore. These tailings were ten miles down the track and across the Sacramento River, 200 vertical feet below the level of the cable dump at the side track. I hauled them up a trail in single sleds carrying 200 pounds each. I had four mules and my wife's saddle horse. Two trips were a ton, 20 trips were a car. The railroad charged me \$10 a car to my works, and \$5 a car to the Central Mine for the tailings and the use of the cable. It is needless to say that the cars frequently carried more than ten tons. The material was worked very rapidly in 20 ton vats without roasting, and that gold gave me money to commence to pay my bills; on that a local reputation was built and the works have never lacked ore since.

Now, if after this bit of history in practical metallurgy your respect for the old Plattner process is not increased, I shall be obliged to consider that I am not in the procession. I tell you, Mr. Editor, I know what it is to have to work ores at a profit. If I did not get the profit, my hands went without pay and my stock without feed. Metallurgy, as I understand it, is the art of producing a metal at a profit; I have yet to see any material advance in the chemistry or the chemical appliances for the production of gold by chlorine over the old Plattner process. I expect to be metaphorically sat upon and entirely covered up by a very broad-pointed stub pen for this irreverent statement.

Permit an illustration: the Alaska Company when it commenced to treat

sulphurets very naturally desired to lead in improvements in its chlorination plant. The company first had reverberatory furnaces, then Bruckner cylinders were tried, and the last and final "improvement" was the introduction of an expensive plant of Spence furnaces. These according to Mr. Treadwell, for he told me so himself, gave 95% of the gold. Mr. Perkins came in and found out that it was 65% of the raw assay, 30% being volatilized. Mr. Treadwell only assayed his tailings, not having to pay 90% and 92% for his ore as I do. And now the fourth advancement comes in putting back the reverberatory furnace, and thereby being at the point of beginning.

In Central America, at the San Sebastian mine, I roasted and chloridized as high as five hundred tons a month of tailings (from wet crushing in Huntington mills) with reverberatory furnaces and tanks. This material was all handled, and all labor performed by natives, one-half of whom were Indians. The operations were all simple and adapted to their capacity.

We had to use 12 pounds of chlorine gas on every ton of ore we worked. I found my gas cost me 21 cents a pound by ordinary process, and it would have cost me over 50 cents a pound if I had used chloride of lime. I could not see the benefit of the barrel process in that case, although pressed to adopt it. Barrels were sent there afterwards, but it stands as cold history that my tanks did the only successful continuous work that has ever been done at that really valuable mine. The hunt for new processes took the place, in that company's hands, of the hunt for ore. Mine development was subordinated to indulgence in experiments on ore treatment, and with a vein 90 feet wide, from which thousands of tons of good ore have been extracted without gaining a depth of over 70 feet beneath the level of the patio, they are now without ore and without money, but still hunting for a new chlorine process that will handle their ores cheaply.

My labors and study have been directed not to finding a substitute for the chemical operations but to taking the three simple appliances, increase their capacity and durability and reducing the cost of treatment to a minimum on each class of ore. It is really surprising the number and the complexity of the operations that are sometimes required to be performed on a single vat of ore in a chlorination plant.

Where one has custom works, treats all classes of ores and pays smelters' prices for them, he must figure very closely to come out square. Take for example Idaho sulphurets from Grass Valley, Cal. I worked all they made for a year, bought and shipped the ore 200 miles to my works in the face of local competition, this being the first time it was ever done in California. These sulphurets contain lime and magnesia in abundance, manganese, zinc blende, galena and chalcophyrite, gold about 4 ounces, and silver 8 to 12 ounces to the ton.

I am obliged to work this stuff to a very close percentage to make it pay, as I have to pay freights, shipping, sacking and agents' fees. As to the metallurgy of the operations, the ore can not be roasted with salt, for if it is, the profit goes up the chimney, so you must roast at a black heat, discharge, allow to cool dead cold, wet down and screen rapidly, a little at a time, otherwise your pulp, being a natural cement, will solidify perfectly; after the sulphates have absorbed all their water of crystallization, taking about two days, you have again to screen it carefully. It is then filled into a vat and washed for 48 to 70 hours with cold water, then neutralize the carbonates and alkaline bases with sulphuric acid, this taking from 60 to 100 pounds of 66° acid to the ton. When you have acidified the pulp, add 20 pounds of acid to the ton and circulate for 24 hours to dissolve the copper oxide. Then wash for 48 hours with cold water, shovel out, partly dry the pulp, screen and tank it, put on the gas, and then when you have washed it, precipitated and got your clean, spongy gold in elegant condition, you feel paid for your trouble. The tailings, however, still assay four to six dollars in gold, and all the silver and "hypo" won't touch it, it having been roasted raw; and the acid does not dissolve the silver more than one ounce to the ton. Now this has to be treated as a distinct substance; 5% salt is added to the wet pulp and it is put through the furnace just as hot and as fast as we can "ram it through," then you get nearly all the balance. Gold here is united with the silver, and volatilization does not take place.

This is perhaps an extravagant type of an ore to illustrate what chlorination plants in California are sometimes required to handle, and there is no appliance more susceptible of a multiplicity of operations than a leaching vat, even if it is old fashioned. To me it is something like a knife and fork: hard to beat for the use intended. If you will allow me I will say a word about Mr. Godshall's able article on gold precipitation, and in defence of ferrous sulphate as a precipitate. I admit that it takes 48 hours for clear settling, and 60 hours is better. My test for clear settling is to tap the vat 2 inches above the bottom and draw a quart glass pitcher even full, filter through a 7-inch Munktell filter, the best and heaviest to be had; if the filter is only slightly darkened by this I consider it settled; the solution still holds gold, the amount depending on the amount of copper salts in the gold solution. However, this is all recovered in the copper vat, and my loss on this, which is 10%, is recovered when the cement copper is sold. Experiments on various ores showing amount going to the copper vat (the term copper water being used to designate the solution of copper chlorides and sulphates after precipitating the gold by ferrous sulphate), my actual per cent. of gold and silver recovered from copper vat for the year 1889 was 2.2%.

With Utah and California Consolidated (Walker Bros., Utah) sulphurets the copper water contained \$3.06 in gold and .06 cents in silver per ton of ore treated; with Texas and Georgia and Utah and California Consolidated sulphurets, mixed: copper water contained per ton of ore treated, \$2.22 gold and 22 cents silver.

In one case the vats stood seven days; the solution was filtered twice, and the 471 cubic feet of copper water gave \$14.62 in gold.

As an illustration of the solvent effects of metallic salts on gold, the first wash water before gassing contained seven cents in gold and five cents in silver.

As showing the extreme fineness in mechanical subdivision of the gold suspended in copper water, a tank of solution, after being precipitated by ferrous sulphate, was allowed to settle, and the copper water was first filtered through Swedish filter paper. The apparently clear solution was refiltered and left upon the filter 33 cents per ton. This second filtrate was then precipitated by sodium sulphide and yielded 53 cents per ton in gold and one-half cent per ton in silver. This last recovery was either

in true solution, or, if in suspension, was carried down by the mass of base sulphides.

In treating concentrates containing dolomets, the copper water contained in 471 cubic feet: gold, \$4.97, and silver, 10 cents; or 51 cents a ton.

A sample drawn two inches from bottom of tank of gold solution 12 hours after precipitation, shows by filtering 1½ milligrams of gold per quart of solution; after 36 hours .75 milligram per quart; after 64 hours practically none, though the copper water still carries gold.

Numberless experiments have been made showing presence of gold in copper water, even after a week's standing. After the copper in the copper water has been precipitated by metallic iron, tests showed the presence per cubic foot of solution 2.56 milligrams gold and 10.24 milligrams silver, or \$0.93 for the tank.

Mr. Godshall advises the use of ferrous sulphate as a test for the presence of gold after the copper sulphide filter, but the foregoing shows that appreciable amounts of gold remain undetected, either in suspension or solution in presence of ferrous sulphate. And no mention is made by Mr. Godshall whether the copper water in his arrangement still carries gold after passing the sulphide filter.

Mr. Godshall says it would not be possible to treat 50 tons a day and precipitate by ferrous sulphate on account of space required; 50 tons of plain gold ore or sulphurets with no silver, treated daily, would want just four vats (each vat containing 1,300 cubic feet) for leaching, and four precipitation vats containing 800 cubic feet each, if cold water was used, and three vats containing 600 cubic feet each, if warm water was used for leaching; so this is quite possible.

When there is a very large excess of chlorine in the solution I simply allow it to stand cold over night; this reduces amount of free gas, and then a comparatively small amount of ferrous sulphate does the work. It costs money to heat up 500 or 1,000 cubic feet of cold water, to drive off, and chlorine, and not only that, but this hot gold solution penetrates the pores of your precipitation vats and gets through any sort of a protecting coat you may devise. Should you resort to a lead-lined vat just when you drive out your free chlorine down goes the gold precipitated by the metallic lead. This objection may seem a weak one, but a bit of history may strengthen it.

A case occurred to my knowledge last year, the privilege of cleaning up an old chlorine plant being bought for \$20, the clean up being \$2,300. I always make it a practice to add on the start enough ferrous sulphate to precipitate the entire vat. It takes more but it saves absorption.

It is only when I work tailings producing three to four dollars a ton, in which case there is always a large excess of chlorine, that I try to save ferrous sulphate. So I simply ask Mr. Godshall what he is going to keep his hot gold chloride solution in while he waits to filter it. He would have paid money to heat his solution in order to lose money by vat absorption.

My experience has been that it is cheapest and best as a rule to precipitate with the ferrous sulphate, allow it to settle, and then draw it off into the copper vat. I think it might be a step in the right direction to pass it through the copper sulphate filter as it goes to the copper vat if you can obtain the grade in the mill. It would not pay to elevate it or pump it to do this.

Refining your precipitates would add to the cost and the trouble, and no living practical chlorination man could be induced to exchange his beautiful yellow bar, as clean and fine as a refiner can turn out, and which sells directly to the mint for almost its full value, and which every bank accepts on presentation, for a dirty mess of a copper sulphide precipitate, of whose value no one is certain, and on which the refiner charges you what he pleases. Even with lead sulphide, if you scorify down and then cupel, your losses are much larger than you are willing to believe until you examine your by-products and assay the sublimate which paints the inside of your flues.

CHARLES BUTTERS,
BUTTERS ORE MILLING WORKS, KENNEL, Cal., December, 1890.

GEMS AND PRECIOUS STONES.

The October number of *Literaturblatt zur Berg- und Huttenmännischen Zeitung* says:

This work, written by a man who is recognized as the foremost American expert, is unquestionably the most exhaustive treatise on the subject. In a manner equally satisfactory to the learned and interesting to the general reader, the author describes the qualities of gems and precious stones, their value and history, where they are found, and their bearing on mineralogy and archaeology. He dwells on special collections of note, owned by Americans. Moreover, an instructive chapter is appended concerning pearls and directions as to the polishing and other treatment of precious stones.

Prominent as the intrinsic attractions make this volume, it is simply a work of art in regard to typography and illustrations. A number of plates render the gems, in their colors and lustre, and with all their special peculiarities, with so much plasticity, so to speak, that the most casual glance at once recognizes and appreciates their natural beauty. A large number of original woodcuts serve to explain and elucidate the text. The work deserves in full measure to be known in Germany. It is published by the Scientific Publishing Company, of New York.

Making of Projectiles.—In a recent lecture before the Boston Society of Arts, Lieutenant W. M. Wood, U. S. N., described the method of manufacturing armor-piercing shells by electric welding. In the case of a 6-inch shell for a rifled gun, the complete projectile is made of three component parts, each of which is finished to size, save a little extra length to allow for welding. The base and head are forged in dies, while the central portion is simply a piece of drawn steel tubing. The three pieces are clamped into a special form of electric welding machine, and in less than a minute are joined together into one homogeneous whole. The process is completed by grinding off the burrs resulting from the welding and the projectile is then ready for hardening. One great advantage of the process is that a high carbon steel can be used for the point of the shell, while a mild steel is used for the body.

THE PROGRESS OF GERMAN PRACTICE IN THE METALLURGY OF IRON AND STEEL SINCE 1876. WITH SPECIAL REFERENCE TO THE BASIC PROCESS.

By Dr. Herman Wedding, Berlin, Germany.

[NOTE.—Dr. Wedding's highly interesting paper covers 60 printed pages of the Transactions of the American Institute of Mining Engineers, and contains in addition seven folding plates. In the following abstract we have condensed chiefly those portions which show a difference between the practice of Germany and that of the United States. In this connection we may state that a translation of Dr. Wedding's recent book on the basic Bessemer process has been issued by the Scientific Publishing Company, and can be obtained by those interested.—Ed. E. AND M. J.]

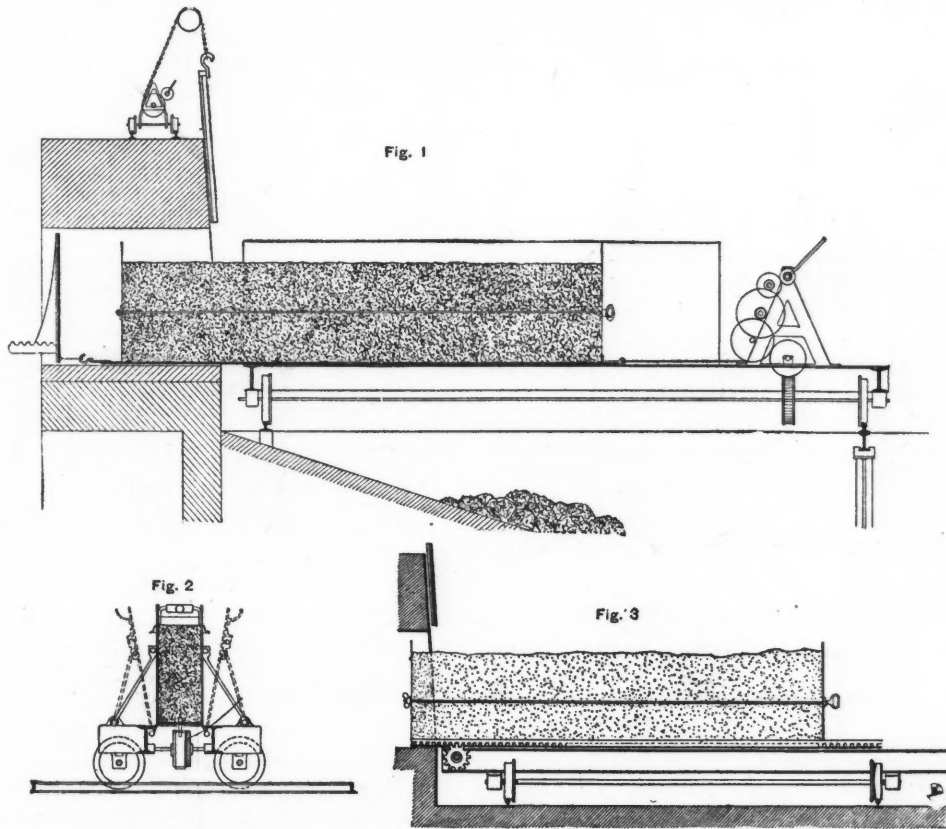
Ores and Fuels.—Like the United States and unlike England, France and Belgium, Germany is fortunate in possessing within its own borders the raw material for its iron industry. The importation of ores is more than offset by exports. We possess but few ores that are free from phosphorus, but we have an abundance of phosphoric ores suitable for the basic process. The proportion of the classes of ores is as follows: Ores suitable for Thomas pig, 64.6 per cent.; for forge and foundry irons, 22.2 per cent.; for acid Bessemer, 2.8 per cent., and manganiferous ores for white pig and spiegel, 10.4 per cent. As to fuel, we have an abundant supply, which will not be exhausted in many centuries. Only one basin, however, supplies a coke which is entirely satisfactory to the iron master. This difficulty has caused in Germany perhaps more than in

kilos being evaporated as against 8 to 8.5 kilos before the regenerators were used.

Liquid pig is sometimes carried a long way from the blast furnace to the Thomas apparatus, 1½ English miles at Hörde. The tapping of small casts at regular periods makes no trouble. The workmen tap from the furnace into the ladle (which usually stands on a scale) the exact quantity required. The tapping hole is kept during the cast as small as practicable, and it is stopped with a clay plug on the end of a long rod. Where a definite uniformity of operation in the blast furnace cannot be maintained the liquid iron from several furnaces is collected in a large reservoir or tank, holding at least 80 tons.

The increased production of slags rich in lime has led to a commercial application far more extensive than all others, namely, the manufacture of cement, the so-called *Schlackenpuzzolaniment*. The slag, granulated by running it into water, is ground with slacked lime, and yields a cement of strength sufficient for most purposes, and generally possessed also of hydraulic properties.

At Hörde each furnace produces in 24 hours from 100 to 130 metric tons of pig, using 85 to 90 per cent. of the weight of the product in coke. The object is to obtain a pig up to 3 per cent. of phosphorus, 2 of manganese, not over 0.15 of sulphur, and not over 0.5 of silicon. The high proportion of manganese is carried in the furnace charge partly to facilitate the furnace work, but chiefly to concentrate the sulphur. Experience has shown that 2 per cent. of manganese in the pig is generally an adequate proportion against an excess of sulphur.



QUAGLIO'S APPARATUS FOR CHARGING FINE, STAMPED COAL INTO COAL OVENS.

any other country, the careful testing of all means of improvement in order that the coke made from poor coal might be serviceable.

It has been found that there is a decided advantage in crushing the coal before coking, so that a more intimate contact of particles is secured. Resort has been had to the method of stamping the coal in a box and charging into the oven the whole of the thick slab thus produced. This procedure has given satisfaction at German works, and is now in extensive use. The apparatus is illustrated in Figs. 1, 2, 3 and 4, from the German patent of J. Quaglio, No. 36,097.

A whole series of useful by-products is obtained by condensation of the gases from coking; this system is now employed in ever increasing extent, particularly in upper Silesia.

Blast Furnace Practice.—The German blast furnaces work under the disadvantages of lean ores, the furnace charge sometimes falling below 30 per cent. of iron, and of considerable distances of transportation of ores or coke or both. The removal from the furnace walls of the weight of the tunnel head, bell, etc., is becoming more and more complete by means of hanging them from the top platform, which is carried by special supports, mostly of columns of iron pipe, as shown in Figs. 21 and 22.

At Friedenschütte, a simultaneous explosion of 22 boilers heated with blast furnace gas, took place, and this led to the adoption of the method of securing by regenerators in front of the gas jets the spontaneous and certain ignition of the gas current whenever after a brief intermission it may be again directed under the boilers. It was found that this method insured a marked increase of boiler capacity as at Hayingen, in fifteen boilers of 100 square meters heating surface, there was produced before they were fitted with regenerators, per square meter per hour, 16 kilos of steam, afterwards 2½ kilos. In Friedenschütte the gain is still greater, 14

The practice of mixing high sulphur Thomas pig with high manganese pig has been introduced. The manganese acts upon the sulphide of iron, forming sulphide of manganese, which separates in the slag. Two parts of pig containing 0.5 per cent. of sulphur and one part of manganiferous pig, containing only 0.02 per cent. of sulphur, produce a pig with only 0.1 per cent. of sulphur and still containing 1.5 per cent. of manganese.

Malleable Iron.—Puddling, notwithstanding the rapid introduction of the Thomas process, has not only held its own, but has been improved and extended. The following figures show the comparative progress of wrought iron and ingot iron:

	1886.	1887.	1888.	1889.
Wrought iron (Kilotons).....	1,416	1,625	1,547	1,655
Ingot iron	1,376	1,738	1,785	2,046

The reasons for this striking persistency in puddling lie partly in the obstinate prejudice of customers, but partly also in certain real advantages possessed by wrought iron, namely, its relatively greater ductility, the facility with which it may be welded, and the circumstance that under excessive strain it breaks gradually rather than suddenly. While the use of ingot iron for railways, buildings, bridges and boilers is constantly increasing, the small operator, blacksmith or machinist does not seem to be able as yet to get along without his wrought iron. Ingot iron, however, is already used for all varieties of merchant bar, which is furnished when desired in quality suitable for welding.

Improvements in puddling have not been in mechanical rabbling, nor in the use of the rotary puddler, but in the more complete utilization of fuel by means of gas-firing and double furnaces. Two furnaces deserve special mention in this connection, that of Springer, with fixed hearth and reversible flame, and that of Pietzka, with constant direction of flame and reversible hearths. The peculiarity of construction of the

*Abstract of a paper read at the International meeting in Pittsburg, Oct. 9, 1890.

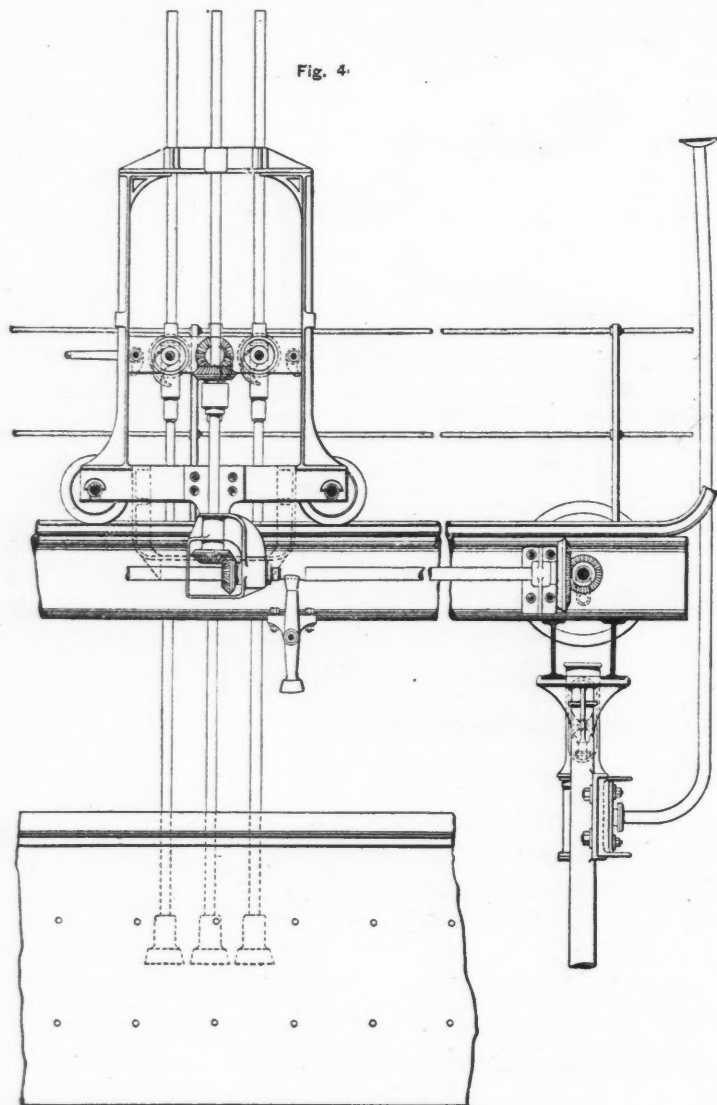
latter is that both hearths are carried on a hydraulic piston which stands underneath between them (Figs. 41, 42, 43 and 44).

The connections between the side-walls and the fixed fire-chamber or flue are made with inclined conical surfaces. The hydraulic piston lifts the hearths a little before turning them, and hence they turn freely and without friction until the reversed position has been reached, when they are lowered into place, and the connection is again complete.

A Pietzka furnace at Zawadsky, Upper Silesia, holding a charge of 500 kilos, produced, by direct firing, 6,280 kilos; by gas-firing, 6,674 kilos of muck-bar, as the average per shift—in single weeks, however, an average of 10,000 kilos of muck-bar, with a coal consumption per 100 of 66 kilos, with direct firing, and 42 kilos with gas firing. The escaping gases were here utilized further in the production of steam. The latter record is especially favorable, since, deducting the amount of coal practically burned for the steam power required in the operation of the furnaces, it shows only 28 to 29 kilos of coal used in puddling proper, while if all the

The original attempts of Thomas to make a basic lining from dolomite, with the addition of water glass, small amounts of clay and other siliceous substances, speedily came to an end, as did the numerous experiments of others who stood upon his shoulders, and who tried to substitute various materials, such as bauxite, for dolomite or magnesite, or to replace the binding material with something else, such as gypsum, starch, etc. All came back at last to the simple basic lining of burnt dolomite, mixed with anhydrous tar. The German converters, as a rule, are lined with this mixture by stamping, except at the throat, where bricks of it are used. All repairs of lining are likewise made with tar dolomite.

It has been found that the most suitable pig is one which contains 2, 2.5 and up to 3 per cent. of phosphorus. This has necessitated in Upper Silesia, for instance, where the ores carry too little phosphorus, the introduction of phosphorus into the blast furnace in the form of Thomas slag. In other places, as at Ilse, the phosphorites formerly separated from the ores are added, to bring up the percentage of phosphorus.



QUAGLIO'S TRAVELING STAMPER FOR FINE COAL.

PROGRESS OF GERMAN PRACTICE IN METALLURGY.

gas were used to heat the regenerators, this figure would be further reduced to 20 to 25 kilos.

Converter-Metal.—The production of ingot iron in the converter has experienced in Germany twice since 1876 a revolutionary change. In that year it was the admirable example of American works, far surpassing ours in their results, which led to a transformation of German establishments. It would be superfluous here to enumerate all the arrangements which we adopted from the United States: the continuous pre-melting in the cupola, the continuous operation of the converter, and, above all, the Holley movable converter-bottom may be mentioned as the three most important.

More important was the second transformation of practice, after the discovery by Thomas of the dephosphorizing process. The great importance to Germany of the basic process is indicated by the product, which between 1883, the first year of its complete success, and 1889 has increased more than fourfold, and now constitutes more than half the world's aggregate product of basic metal.

The quantity of blast used in the after-blow, *i. e.*, in dephosphorization, is universally regulated by engine measurement, *i. e.*, by revolutions. It is found that in the basic process the blast pressure which was usual in the acid process is too low, and that it is better at the outset to arrange the blowing engines for a pressure rising, if necessary, to 2½ or, still better, up to 45 pounds gauge-pressure.

The belly of the basic converter holds generally from 7 to 10 metric tons of pig.

The basic slag (except where it is required, as already described, as a phosphoric addition to the blast-furnace charge) is sold for agricultural use. The farmers demand more of it than can be produced, since it has been found, if only ground to sufficient fineness, to yield without chemical treatment an excellent fertilizer for all kinds of soil, though best adapted to sandy, siliceous and peaty soils.

Hörde.—Basic-converter practice at Hörde is carried on in the following manner: The pig metal, weighed off in 10-ton charges, is brought to the converter in a tipping ladle. Three

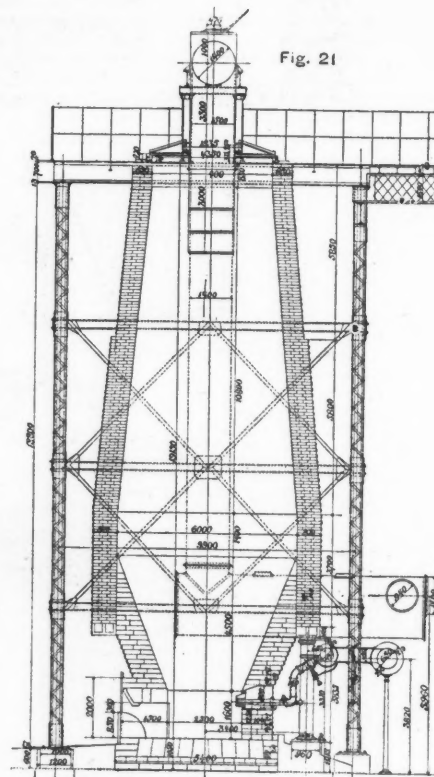
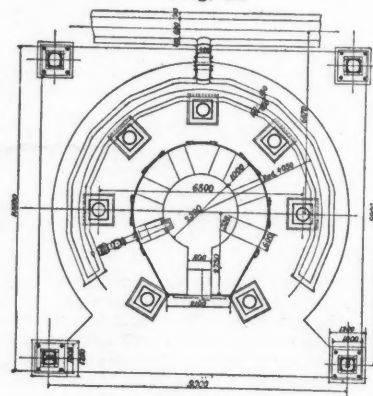
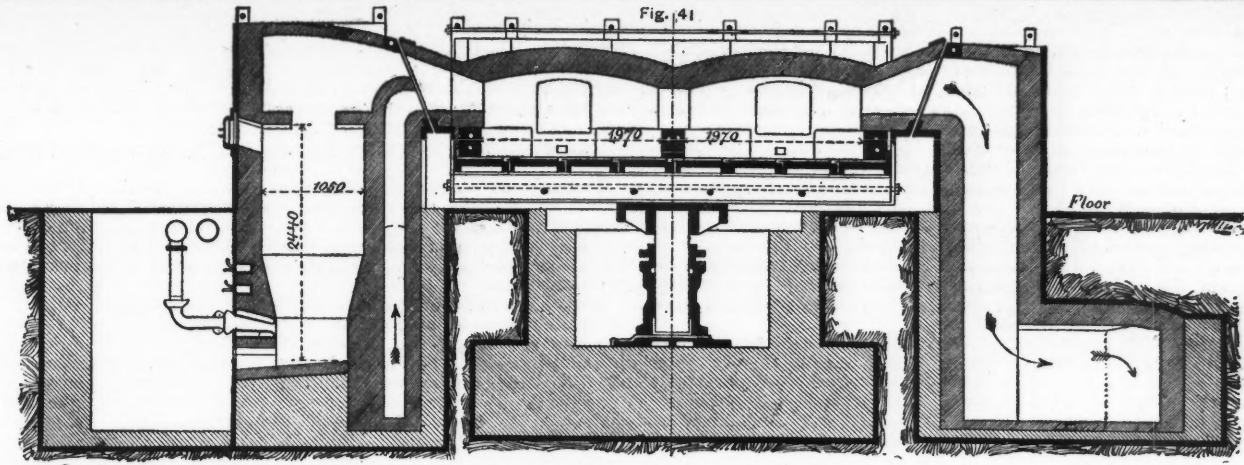


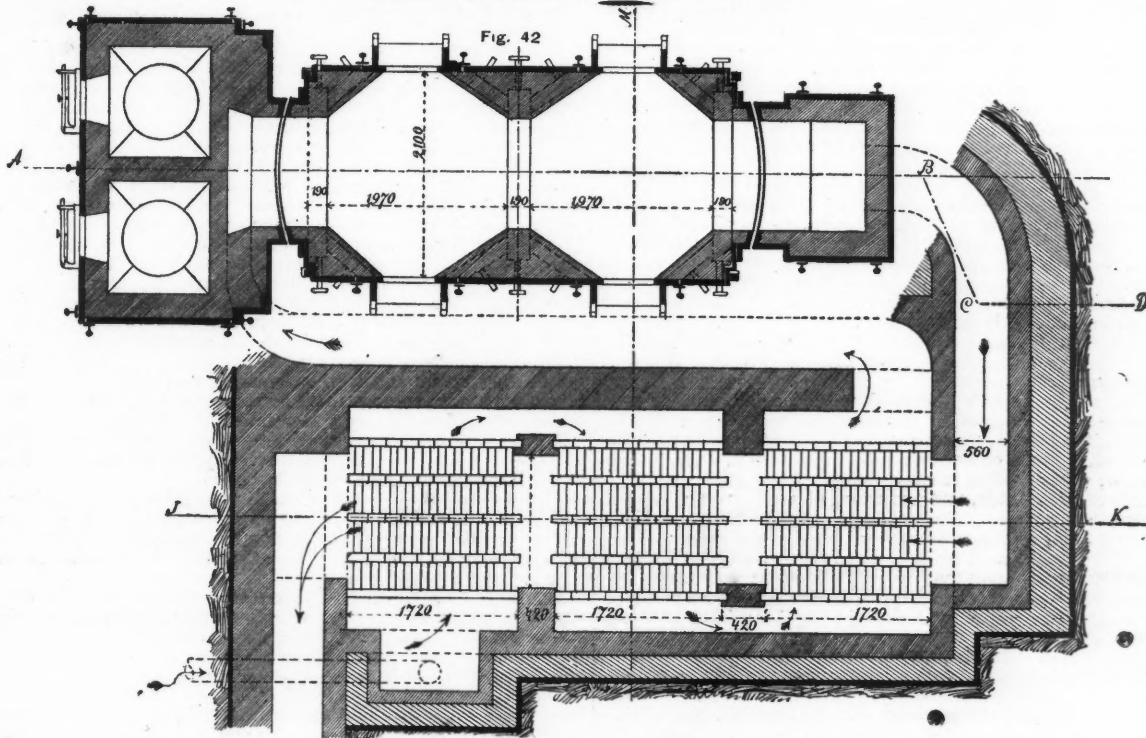
Fig. 22



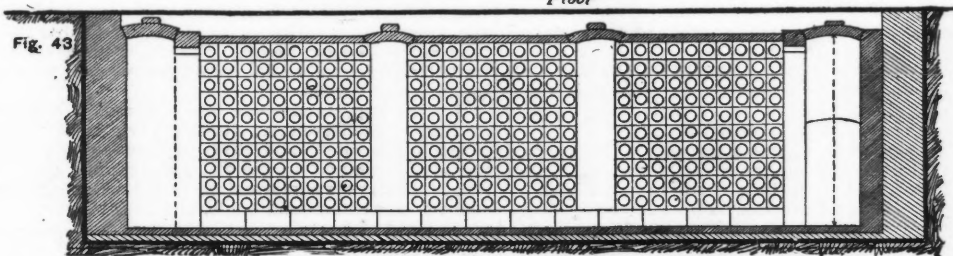
BLAST-FURNACE AT HÖRDE, WESTPHALIA.



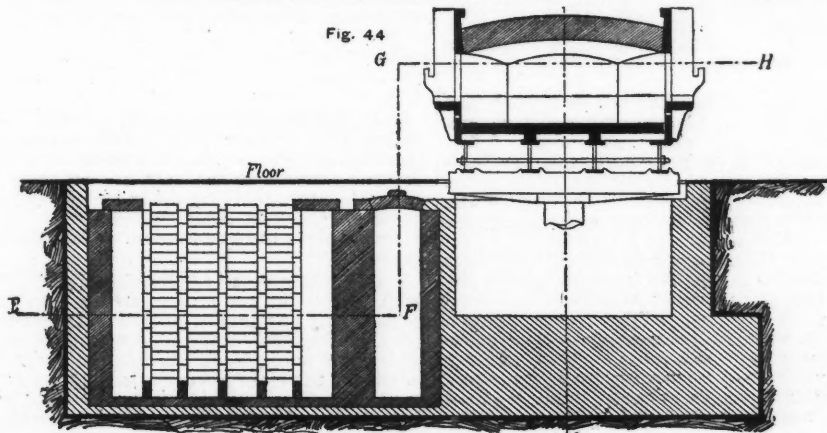
LONGITUDINAL SECTION ON A B C D, FIG. 42.



LONGITUDINAL SECTION ON E F G H, FIG. 44.



LONGITUDINAL SECTION ON J K, FIG. 42.



CROSS SECTION ON L M, FIG. 42.

PROGRESS OF GERMAN PRACTICE IN METALLURGY.—PIETZKA FURNACE.

converters are used in alternation. The lining consists of burnt dolomite brick for the throat, and rammed dolomite for the rest of the vessel. Formerly the whole vessel was walled up with burnt tar-dolomite brick; but the ramming of the sides has proved preferable. With a blast pressure of 30 pounds, the duration of a blow is nine minutes before decarbonization and five minutes after it.

The necessary lime addition amounts to 14 per cent. of the pig metal charged. At Hörde, two-thirds of it are introduced at the start; three minutes after dephosphorization has set in the metal bath contains only 0.3 per cent. of phosphorus, while the slag, which is quite fluid, runs as high as 20 to 30 per cent. phosphorus and carries but little iron. This slag is separately poured off by Scheibler's method, and the balance of the lime is then charged. The iron that is unavoidably oxidized in the elimination of the residual phosphorus is taken up by the new slag, which, therefore, becomes excellent material for the blast furnace, while the first slag is applied in agriculture.

At Phoenixhütte the liquid pig from the blast furnace is transformed into ingot iron in the converter, recarbonized and cast into ingots. These are annealed in Gjerns soaking-pits, then removed by an automatic lever and delivered to a train of live rollers, which carries them to the blooming mill, from which they pass to the bloom shears and to the rolls without having required, since the metal left the furnace, a single kilogram of coal to be used upon them.

Open-Hearth Metal.—The manufacture of ingot iron in the open-hearth furnace is generally conducted in Germany by the Martin process, according to which pig iron is decarbonized by malleable scrap—commonly the crop ends and rejections of the mill's own production. One or hammer scale is employed only in small measure, usually as auxiliary to complete the decarbonization. The regular pig-and-ore or Siemens process, if used at all, finds application only in isolated cases and to a very small extent. Equally limited in its introduction has been the practice of blowing air into the metal; the special, and, as it proved, perfectly practicable apparatus, which was used for some time in the Phoenix works at Ruhrort, has since been abandoned because economic advantages for it could not be demonstrated. The process is as frequently acid as basic; the latter method, however, is continually gaining ground, and it is especially interesting to observe that such works in particular as aim only at small output, or have but small quantities of scrap to work up, prefer the basic process. To such extent, indeed, is this true that even in ordinary machine shops and foundries 1.5 to 2 ton open hearths are found in successful operation.

At the present day all furnaces for acid as well as basic working are designed with a high roof—a silent recognition of Frederic Siemens' principle of free-flame development.

The hearth bottom is commonly prepared with tar-dolomite, though in recent practice calcined magnesite, dolomite or limestone, with milk of lime or of dolomite as binding material, has also been employed. Repairs are made with a paste of tar-dolomite. As a rule, both bridge walls are air cooled; water cooling is exceptional.

The roof is made of silica brick, and a mixture of chrome iron ore and tar generally serves to separate it from the basic hearth. Pure magnesite or a layer of rammed magnesia is used more or less for the same purpose.

Mannesmann Tube Rolling.—The invention of the brothers Mannesmann in the manufacture of pipes may be regarded as an important improvement. For pipes destined to meet the severe requirements of resistance to interior pressure it is indeed calculated to revolutionize previous practice.

CHEMICAL, MECHANICAL AND MICROSCOPIC INVESTIGATIONS OF IRON.

The progress of the metallurgy of iron in Germany has only been practicable with the help of science. Chemistry, physics and mechanics have furnished the foundations for its successive improvements. Sometimes new processes or devices have been directly deduced from the results of scientific inquiry; sometimes it has been the function of science to seek the principles underlying practical improvements, and thus to render their further development possible.

Immense numbers of tests and analyses are now made at our metallurgical works. To take an example: In the laboratory of the Rothe Erde works, near Aachen, there are made in a year, according to the statement of Kintzle, by two to three chemists and six to seven assistants, 26,500 chemical determinations and 62,000 bending and tensile tests; so that about 90 chemical determinations must be made daily.

The microscopy of iron is constantly widening its field. The method discovered by Sorby, nearly thirty years ago, namely the examination of carefully ground sections instead of the surfaces of fracture, has been increasingly employed. Samples of metal are ground upon metallic disks, carefully polished, cleaned and etched lightly with very dilute hydrochloric acid, in order to bring out the variations of texture which are always present, even in the finest crucible cast-steel, and which are made distinguishable by the varying depth to which they are attacked. The surface thus prepared is heated to 210 degrees C. (provided this will not, as in the case of hardened steel, affect its texture), and acquires thereby a variety of coloring which still further emphasizes the various elements in its composition.

The aid of photography has been invoked to make the results obtained by single observers the property of all. In photographing sections prepared as above described only ortho-chromatic plates can be used. A further difficulty, namely, that, in order to get a true photograph, the illumination of the section should be perpendicular to its surface, while at the same time the section must be placed perpendicular to the axis of the microscope through which it is photographed, has been overcome by the use of a parallel-plane glass plate, which serves also as mirror.

In conclusion, the outlook for our German iron and steel industry is neither all brightness nor all shadow. On the one hand, the patent law of 1877 and the tariff law of 1879 have greatly stimulated industrial activity and technical progress in this business, and the Thomas process, coming just at the right time, has made us independent of other countries for our raw material. On the other hand, the severity of military duty, both withdrawing and estranging from labor for three years every strong and healthy workman, and the compulsory contributions required by law from employers for the insurance (life and accident), medical care and pensioning of employes, constitute patriotic and philanthropic burdens, which we must needs feel in competition with other countries

not similarly handicapped. But the ironmasters of Germany make no complaint. On the contrary, spurred rather than daunted by difficulties, they mean, by increased vigilance, energy, economy, technical skill and continuous scientific researches, to maintain the honorable rank of the German empire among the iron and steel producing nations of the world.

THE DE WILDE AND REYCHLER PROCESS FOR MANUFACTURING CHLORINE.

Messrs. P. de Wilde and A. Reychler, both professors at the Brussels University, propose, according to *Revue Industrielle*, to which we are indebted for the following data, a process for the preparation of chlorine which appears to offer considerable advantages over the methods of Weldon, Deacon or Péchiney. Its main principle is the decomposition of hydrochloric acid.

Equal equivalents of hydrated sulphate of magnesium, $\text{So}_4\text{Mg} + 7\text{aq}$, hydrated chloride of magnesium, $\text{MgCl}_2 + 6\text{aq}$, and hydrated chloride of manganese, $\text{MnCl}_2 + 4\text{aq}$, are melted together, and the water of crystallization evaporated. This gives, besides disengaged hydrochloric acid, a precipitate that is gray-rosy, hard, brittle, very hygroscopic, and consists of a mixture of sulphate of magnesium, chloride of manganese and oxychloride of magnesium almost without a trace of water.

This mixture, when heated to dark red in contact with the air in a muffle, disengages at once hydrochloric acid and chlorine and leaves a precipitate that is black, porous, formed of anhydrous sulphate of magnesium and manganite of magnesium, for which precipitate the inventors use the formula $\text{Mg}_3\text{Mn}_3\text{O}_8$.

This mixture is introduced into a porcelain tube heated to about 425 degrees C and a current of hydrochloric acid gas is passed over it. Then a very regular disengagement of chlorine takes place mixed with steam, and, toward the end of the operation, with a gradually increasing proportion of non-utilized hydrochloric acid. The reaction can be expressed by a formula into which 3 equivalents of sulphate of magnesium, 1 equivalent of manganite of magnesium, as defined above, and 16 equivalents of hydrochloric acid must enter in order to produce 3 equivalents of chloride of magnesium, 3 equivalents of chloride of manganese, 8 equivalents of water and 4 equivalents of chlorine, the sulphate of magnesium remaining, such as it is, at the end of the operation, *i. e.*, one-quarter of the chlorine of the hydrochloric acid is disengaged while the three other quarters combine to magnesium and manganese. Those last chlorides, when heated in contact with the air, are decomposed when the temperature rises to a beginning red; they leave their chlorine and regenerate the manganite of magnesium.

Thus the chlorine is produced in two periods, one called that of chlorination, the second and more interesting that of oxidation. The presence of sulphate of magnesium in the mixture makes the mixture consistent, non-fusible and porous and only facilitates the reactions.

This process has not yet been tested on a sufficiently extensive scale to warrant a final opinion, but it seems probable that the following claims of the inventors are well founded:

The process, based on two successive reactions, each giving chlorine, is continuous, as in Deacon's. The employment of two decomposing furnaces, one for the period of chlorination, and the other for that of oxidation, would permit of double the production of chlorine from the same material and in equal time.

The range of temperature which this process permits of prevents an injurious excess of heat; the superintendence requires less rigidity; and specially skilled labor can be dispensed with. Moreover, the material of the furnace is less exposed to contamination than the Deacon material, and calls for but little and inexpensive repairs.

The gases are rich enough in chlorine to make chloride of lime of a high grade. The minimum percentage of decomposed hydrochloric acid is 70, and $\frac{1}{3}$ of the non-decomposed acid can be recovered and used over again.

The gas containing a small percentage of acid as furnished by the decomposition of chloride of magnesium may probably be utilized during the chlorination. The items of fuel and labor would be sensibly lower than in the Deacon process. The new process could advantageously be united with the industrial manufacture of oxygen, chlorate of potash and liquid hypochlorites.

If these expectations are realized, and the apparatus put up in the de Naeyer establishment already permits of the decomposition of 76% of the hydrochloric acid, then the prospects of the Leblanc soda process already threatened by the Salway ammonia process are poor indeed. A great industry's transformation would be the outcome of the established success, on a commercial scale, of this new process.

Twenty-four Hour Clock Dials.—The design which has been adopted as a standard for 24-hour clock dials to be used in the future on all Indian State railways is shown in a recent issue of *Ind an Engineering*. The periphery of the dial is divided into minute sections as in ordinary clocks and watches; the hour is indicated by a figure on a small conspicuous plate or disk above the center of the dial. This arrangement obviates the necessity of more than one hand.

Meldometer is the name given to a new and simple instrument for observing the behavior of bodies at high temperatures. It fits the stage of a microscope and consists of a platinum strip between two clamps. An electric current heats the strip, and material laid on it is soon heated up, the temperature being regulated by a carbon resistance controlled by the operator. Quartz is easily melted by this method, which also is said to be applicable to the examination of sublimates during and after their formation.

Precious Minerals in Colorado.—During the past few years crystals of beryl, bertrandite and phenacite have been found in abundance and associated with one another at Mount Antero and Mount White, one of its spurs, in Colorado. They are either implanted in granite or on crystals of the granitic minerals, quartz and feldspar. The number of specimens found, the beauty of the crystals and the interesting crystallization of the rare bertrandite and phenacite have caused a great deal of interest on the part of mineralogists to be taken in the occurrence of the minerals. Mr. S. L. Penfield gives some interesting information about these in an article in *The American Journal of Science*, December, 1890.

LEADING COAL MEN.

John Dean.

County Judge John Dean affords a conspicuous example of the advantageous effects of a legal training in commercial affairs. It is generally admitted in the Clearfield region of Pennsylvania that it is due more to his efforts than to any other cause that the mines in that district are now all being worked instead of being closed and nearly twenty thousand miners on strike.

John Dean was born on February 15th, 1835. His youth was closely devoted to study, in which he attained distinction. He afterwards entered a lawyers's office and was admitted to the bar on attaining his majority in 1856. His career as a lawyer was highly successful from the first, and the young advocate was entrusted with some of the most important litigation in the State of Pennsylvania. In this manner he was brought in contact with important coal interests, and was largely instrumental in organizing the Cresson and Clearfield Coal and Coke Company, being elected its first president, in June, 1877. In the development of the mines acquired by the company, as well as in the establishment of a very considerable lumber business, Judge Dean has shown great administrative ability.

To him belongs the credit of establishing the town of Frugality, named after one of the company's mines. Here dwell over 2,000 people under conditions for more favorable than those of the average miners in other regions. The cottages are all built on the most approved plans. Two fine churches for different religious denominations have been erected by the company. Among mining people for miles around the place has become known as "Judge Dean's model miners' village."

To his untiring energy and enterprise is due the construction of the

THE BAKER HYDRAULIC DREDGER.

The new hydraulic steam dredger invented by Captain Baker, for the rapid clearance of harbor bars, silt, consists of a flat-bottomed vessel 50 feet long by 14 feet beam, and having a draught of 22 inches, with full boiler. She is fitted with a pair of powerful steam pumps, which force a stream of water through a delivery tube, carried in swiveling bearings about four feet above the deck level and dipping down into the water through a well hole in the vessel. The tube is made in three 10-foot lengths, and is telescopic, so that it can be adjusted to suit the depth of water in which the dredger is working. At the outer end of the tube is fixed a branch pipe and nozzle of the type used in fire engines. When at work the tube has a swinging motion imparted to it by means of two hand wheels, one of which causes it to swing to and fro from one side of the dredger to the other, while the second wheel gives it a fore-and-aft motion. A large area of the river bed is thus acted on without any change in the position of the dredger, the area being only limited by the length to which the tube is extended. The water forced under a high pressure from the nozzle in a powerful downward jet, impinging upon the sand, silt or mud, at once disperses it, to be carried away by the tide or current to distances varying with the specific gravity of the material acted upon, and the velocity of the current. If a depth of 15 feet of material requires to be removed, it is stated that 18,500 cubic feet, or 500 tons, can be removed without the vessel being warped ahead, and that, with a three-knot current, half-an-hour's work is sufficient for the removal of this quantity. Operations are begun on the edge of deep water and on the ebb tide. In an experiment made early last month on the bar at Littlehampton, the matter removed was easily defined for one mile from the point of disturbance.

Several trials of the dredger were made in Littlehampton Harbor, each



COUNTY JUDGE JOHN DEAN.

Cresson & Clearfield Railroad, which has materially developed the territory along the 30 miles of its course. At the town of Dean, named after the Judge, the company has laid out a fine park and arbutus glen as a holiday resort for the miners and their families.

Mr. Dean was elected to the bench in the Twenty-fourth District of Pennsylvania in 1871. At the expiration of his first term he was again nominated, and this time by both parties, and was of course elected without opposition. His influence among the mining population is not due to his judicial position, but to the temperate methods he adopts in his business intercourse with them. Under his management there has been only one strike, and that lasted ten days.

It will be recollected, as stated in the ENGINEERING AND MINING JOURNAL at the time, that all the miners about the Cresson and Clearfield regions, to the number of nearly twenty thousand, were for several weeks last summer on the point of striking. Several mass meetings were held and the matter was finally to be decided at a convention of delegates at Altoona. Judge Dean was one of the delegates on the operators' side. To his masterly presentation of the facts of the case was due the averting of the impending troubles. Most of the delegates on both sides expressed their willingness to leave decision of the matter to the man who had evidenced so marked a desire to do justice to both sides.

Judge Dean is a man of very strong convictions and noteworthy characteristics, as may be judged from his portrait, which is published herewith. The judge on the bench is quite a distinct personage from the coal magnate among his men. His geniality attracts to him the affection of every person living within a wide radius of Frugality, where he is better known than probably any other man in a district of similar size. The popularity he enjoys is that of the beneficent patriarch. The inhabitants look up to him in all the affairs of life and leave to his judgment and decision whatever of difficulty and trouble assails them.

Although 55 years of age, Judge Dean is still in possession of the energy of a man of 35. He has before him many years of active judicial and business life in which to work out his plans for the further development of the Cresson and Clearfield coal, coke, lumber and building interests, and for the betterment of the workmen in the industries with which he is identified.

of five minutes' duration, and in the first the deposit on the bed of the harbor was cleared to a depth of 3 feet 6 inches. At another trial the soil was removed to a depth of 5 feet 4 inches in the five minutes' run, the clay bottom being acted upon. The jet directed on the muddy foreshore of the harbor did good work when playing at a low angle. This dredger, by submitting the tide for barging, effects evidently a great saving when the conditions are favorable for its use.

Armor-Piercing Projectiles.—Bids have been received by the Ordnance Bureau of the War Department at Washington for supplying armor-piercing projectiles for the new steel guns now being constructed for sea coast defense, as follows: Carpenter Steel Company, of Reading, Pa., 8-inch shot, \$150 each; 10-inch shot, \$285 each; Midvale Steel Company, of Pennsylvania, 8-inch, \$150; 10-inch, 287. Sterling Steel Company, of Pittsburg, 8-inch, \$300; 10-inch, \$575. Congress has appropriated \$100,000 for the purpose of deciding the question whether or not American steel makers can produce shot and shell equal to those made in Europe. It is the desire of the ordnance officers to stimulate steel makers to produce in this country projectiles second to none of foreign make. Two of the bids received are said to be reasonable in amount, the average price being about 50 cents a pound. How the projectiles are to be made is not specified in the bids. The Carpenter Steel Company is believed to have secured the right to make them under the Firmly secret process, used in England, but it refuses to permit the process of manufacture to be observed. The Midvale Company has been in correspondence with four leading firms of European shell makers, and is willing to permit the manufacture to be witnessed but only by an inspector. The Sterling Company has been working up its own process, and purposes to use the best crucible steel made from Danneborra iron. The requirements of the Ordnance Bureau, based upon European tests, are severe. The 10-inch shot, weighing 570 pounds, and fired at a velocity of 1,625 feet a second, must pierce a steel plate 11.2 inches thick, and emerge without crack or material deformity. The eight-inch shot, fired under the same conditions, must pierce a plate nine inches thick.

ON CERTAIN TERNARY ALLOYS.

The description of the investigation on this subject of Messrs. C. R. Alder-Wright and C. Thompson, as rendered in *Proc. Roy. Soc.* 45, 461 and 48, 25-45, the *Journal of the Society of Chemical Industry* has condensed in the following way:

The authors having had occasion to examine technically various mixtures of lead, zinc and tin, noticed that while in certain cases these three metals could be fused together and intermixed so as to form a homogeneous alloy exhibiting no alteration on standing molten for some hours, this was by no means universally the case, especially with mixtures where the proportion of tin was materially below some 38% of the total mass; in such cases the fused mass separated into two dissimilar alloys, the heavier one mainly consisting of lead with some tin and zinc, and the lighter one chiefly containing zinc with some tin and lead. On preparing several series of mixtures where the proportion of tin gradually increased from 0 upwards, it was found that a variation of temperature of from below 600° C. to about 700° produced but little effect on the way in which a given mass divided itself into two alloys; but that at higher temperatures approximating to 800°, a measurable difference was discernible. On plotting curves with the percentages of tin in the heavier alloys as abscissæ and those of zinc as ordinates, it was found that the solubility of zinc in lead-tin increased regularly as the proportion of tin present increased, the solubility curve at 800° distinctly overlying that at 650°. Similarly the solubility curves of lead in zinc-tin obtained in the same way with the lighter alloys exhibited analogous characters, the amount of lead dissolved by zinc increasing regularly as the quantity of tin present increased, and the solubility being uniformly greater at 800° than at 650°. A curious behavior was noticed as regards the way in which the tin distributed itself between the two alloys; with small proportions of tin the lighter alloy contained most, the difference rising to a maximum when the entire mass contained 14% to 16% of tin; after which the difference diminished again until the entire mass contained 25% to 28%, when both alloys contained the same percentage of tin. With still greater proportions the lighter alloy contained less tin than the heavier one; so that on plotting curves with the tin percentages in one alloy as abscissæ and the differences (+ or -) as ordinates, the curves rose from the origin to a maximum elevation, then fell again, and finally crossed the base line and sank below it. It was found that the values of the ordinates were slightly variable with the composition of the total mass employed, although in all cases the character of the curve was the same; when the ratio of lead to zinc in the entire mass was 2:1, the curve underlay that obtained with mixtures where the ratio was 1:1; which again underlay that obtained with mixtures where the ratio was 1:2. On the other hand, whatever the ratio between lead and zinc might be, in every case the two alloys found corresponded with two points (*conjugate points*) lying respectively on the solubility curves of lead in zinc-tin, and of zinc in lead-tin, pertaining to the particular temperature employed.

Results in some respects similar, in others quite different, were obtained with other ternary alloys, the examination of some of which is still in progress. When lead and zinc are fused along with silver, or with cadmium, or with antimony, the masses separate into two different alloys when the three metals used are outside of certain limiting ratios with respect to one another; and the same remark applies to mixtures of bismuth and zinc, of lead and aluminum, and of bismuth and aluminum, with either tin or silver as third metal; but with some of these mixtures the solubility curves differ considerably from those observed with lead, zinc and tin. Thus, in presence of tin, a given quantity of lead will take up considerably more zinc than it will if an equal weight of silver be substituted for the tin; and, similarly, a given weight of zinc will dissolve more lead in presence of a certain quantity of tin than it will if an equal amount of silver be substituted for the tin. Again, according to experiments still in progress, the way in which the tin divides itself between the heavier and the lighter alloys, is quite different with mixtures of bismuth, zinc, and tin from that above described with mixtures of lead, zinc and tin; instead of the curve representing the results rising above the base line to a maximum and then descending again, it regularly sinks away from the base line; i. e., the heavier alloy always contains the most tin, the more so the greater the amount of tin in the total mass.

With mixtures of lead, zinc, and silver some remarkable numerical results were obtained, leading to the conclusion that two definite compounds, Ag_2Zn_3 and Ag_4Zn_5 , exist, the formation of which modifies the character of the solubility curves deduced. The first of these dissolves lead, and is itself dissolved by lead, to a greater extent than either pure zinc or the alloy Ag_2Zn_3 ; so that when the lighter alloy formed contains silver and zinc in just the right proportions to form Ag_2Zn_3 , more lead is dissolved therein than is the case with alloys either richer or poorer in silver. Moreover, this alloy is of an unstable character, so that if a saturated solution of lead therein be kept molten for a long time under favorable conditions, the mixture (at first perfectly homogeneous) gradually divides itself into two alloys, owing apparently to the breaking up of Ag_2Zn_3 into free zinc and Ag_4Zn_5 , the result of which is that more or less lead is thrown out of solution, sinking to the bottom and carrying with it a little zinc and silver. In the same way lead containing Ag_2Zn_3 in solution, when kept molten for a long time, becomes changed; the solution, at first homogeneous, by and by forms two different alloys, because the breaking up of Ag_2Zn_3 into free zinc and Ag_4Zn_5 causes the former to be more or less thrown out of solution, so that it floats up, carrying with it some silver and lead.

The other alloy, Ag_4Zn_5 , is characterized by being even less soluble in lead than pure zinc (relatively to the zinc present); so that when lead is saturated with silver and as much zinc as will form Ag_4Zn_5 , there is less zinc present than the lead could take up were the silver absent. Moreover, the solubility of lead in Ag_4Zn_5 is less than in mixtures of this alloy with either Ag_2Zn_3 or free silver. Further, the alloy Ag_4Zn_5 , when exposed to the air for a short time after freshly scraping or filing, assumes a peculiar coppery hue; the presence of small quantities of lead or bismuth does not prevent this action taking place, nor does the tint become much modified if a little surplus zinc or silver be present, although larger proportions greatly reduce the shade.

Identically the same conclusions as to the existence of the two compounds Ag_2Zn_3 and Ag_4Zn_5 , also appear to result from the examination of the alloys formed on intermixing bismuth, zinc and silver, in some respects in an even more marked way.

In the case of alloys of lead, zinc and silver, the curve representing the distribution of the silver between the heavier and lighter alloys formed resembles in general character that similarly obtained in the case of lead, zinc and tin; at first, with small proportions of silver, the lighter alloy contains by far the larger quantity of silver—so much so, indeed, that only inconsiderable amounts are retained by the lead, practically the whole floating up with the zinc, whence, obviously, the utility of the zinc process for desilvering argentiferous lead. But with mixtures richer in silver this behavior is less marked; as the silver in the total mass increases, the difference between the silver percentage in the two alloys increases less and less rapidly, until finally a point is reached when the difference attains a maximum, after which the silver in the heavier alloy increases more rapidly than that in the lighter alloy, causing the difference to diminish again. In other words, the curve first rises from the origin extremely steeply, then at a less rapid rate, until a turning point is arrived at, after which the curve descends again toward the base line. With tin as the third metal the curve finally descends below the base line; but with silver the descent is not carried so far as this.

Precisely analogous results appear to be obtained with mixtures of bismuth, tin and silver.

GRAPHICAL RECORD OF EFFICIENCY OF A STEAM PLANT.

An interesting paper on "A Graphical Method of Showing the Relative Efficiency of a Steam Plant," by H. F. J. Porter, M. E., is printed in the *School of Mines Quarterly* for November. It gives the result of daily records of the steam plant of Columbia College for the past five years. During the summer of 1884 and the following winter the steam piping of the boiler house was rearranged on a manifold system, so that the boilers could be used independently or together by any desired combination on any or all of the buildings, and the steam piping of the buildings was arranged so that the whole plant would work as a unit, and not as a collection of units as before. The exhaust steam from all the engines, pumps, etc., was turned into the heating mains, and, after performing its work of heating, all the steam was returned in the condition of condensed water to the boilers. The result of the rearrangement of the plant was the reduction in the coal bill of over 50 per cent.

In the year from November, 1884, to October, 1885, inclusive, 1,563 tons of Lehigh lump coal was used, costing \$4.60 per ton, or a total of \$7,192. In the following year, after making the alterations, only 1,093 tons was used, nearly all being Lackawanna pea coal, the average cost per ton being \$2.84 and the total cost \$3,104. The principal use of the steam was for heating purposes, only a small amount being required for power. An hourly record of the temperature of the outside atmosphere was kept in the boiler house, and a daily record of the quantity of coal used. By plotting these records on a diagram the relation of coal consumption to temperature could be clearly seen, and by a comparison of these diagrams the relative efficiency of the operation of the steam plant at different times was determined. The following table gives the monthly totals of the year 1885-1886:

Months.	Mean temperature	Gross tons of coal used.	Rate per day.	Total cost \$
November	44° 33'	108.57	\$11.60	\$347.56
December	35° 70'	185.70	16.77	519.99
January	26° 79'	235.71	21.28	659.90
February	27° 45'	198.57	19.85	556.00
March	37° 60'	155.00	14.00	434.00
April	52° 37'	80.00	7.46	224.00
May	60° 18'	38.57	3.48	108.00
June	68° 05'	9.28	.86	25.98
July	74.83°	8.57	.77	24.00
August	70° 19'	8.57	.77	23.99
September	65° 25'	10.00	.93	28.00
October	54° 90'	54.29	4.90	152.01
Year	51° 56'	1,092.83	8.50	\$3,103.38

The following is a recapitulation for the series of years during which the records were kept:

Years.	Mean temperature, not including June, July, Aug. and Sept.	Coal, gross tons per year.	Cost per ton.	Rate per day.	Cost per year.	Relative efficiency obtained from the diagrams.
1884-5	39° 39'	1,563.54	\$4.60	\$19.70	\$7,192.41	1'1056
1885-6	42° 55'	1,092.83	2.84	8.50	3,103.88	1'2250
1886-7	41° 42'	1,132.13	3.76	11.86	4,255.96	1'3500
1887-8	38° 77'	1,264.05	4.13	11.30	5,226.05	1'2370
1888-9	43° 49'	1,065.55	3.88	11.35	4,140.77	1'1840
1889-90	44° 96'	1,123.35	3.11	9.71	3,491.39	1'2000

The figures for efficiency are obtained from the ratio between the areas circumscribed by the curves representing coal and temperature. The coal curve when indicating the greatest efficiency should be parallel with the temperature curve, and as far below it as possible. In the year 1889-90 buckwheat coal was used instead of pea, which accounts for the reduction in cost.

At a recent lecture in Sheffield, Prof. W. Ripper ascribed justly to the use of steam the immense increase in the world's material prosperity, directly as well as by stimulating the inventive powers of man. At the present time 400,000,000 tons of coal, it is estimated, are consumed annually, at least one-half of which is used for generating steam. Even a small percentage of saving makes a considerable difference in the annual expenditure of coal. A great deal of ingenuity has been enlisted to reduce the consumption of coal per horse power. Thus while in 1830 the expenditure of coal with the best types of engine of that time was about nine pounds per horse power per hour, to-day engines are running with an average expenditure of a little under 1.5 pounds. The consumption cannot be expected to go much below one pound per horse power per hour. The best boilers account for from 75 to 80% of the heat of the fuel, the rest goes up the chimney. Economy has increased as steam pressures increase, and pressures of 150 to 180 pounds on the square inch are now used with perfect safety.

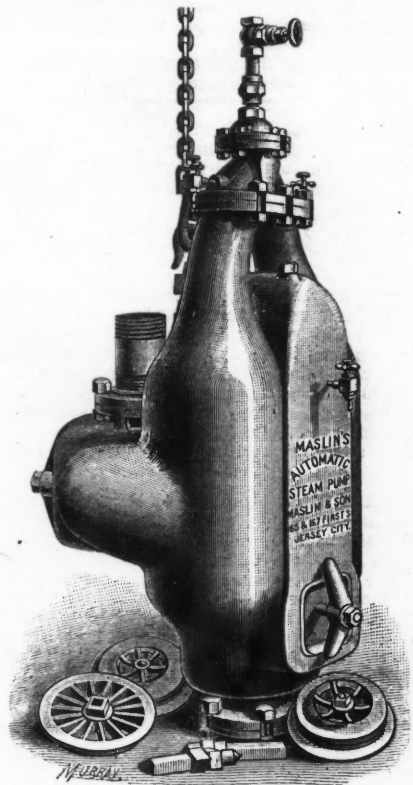
MASLIN'S AUTOMATIC STEAM VACUUM PUMP.

Under the title of an "automatic steam vacuum pump," Messrs. John Maslin & Son have recently commenced to manufacture what is in effect an improved pulsometer pump. Mr. Maslin, Sr., is a machinist and inventor of large experience, who has some seventy or so patents to his credit. He was one of the sewing machine pioneers, and was closely identified with the Singer machine when it was first manufactured. Many years ago he was associated with Mr. Charles H. Hall, the inventor of the pulsometer pump, and since then he has devoted much of his time to the production of that machine.

Within a few months Mr. Maslin has made and patented such improvements in the pulsometer as to turn it virtually into a new pump.

A glance at the regulation pulsometer pump will show that each valve has an outside cover, secured by six bolts, and the valves are secured in place by bolts running from the outside through the casing to the inside, and requiring packing. In the new pump there is a single opening or door as seen in the accompanying engraving. It is especially claimed for the Maslin pump that it is self-contained, requiring no bolting on of extra foot valves, stuffing boxes or other accessories, being constructed from the operator's as well as the mechanic's standpoint. A partial removal of two bolts makes every valve readily accessible for cleaning or examination.

This door seats on the inside, and is secured like the cover of a manhole



AUTOMATIC STEAM VACUUM PUMP.

in a boiler, and is so placed that when opened all the three valves can be easily reached, and can be removed in a few seconds and replaced in a few minutes. The crowfoot is slotted at the side, so that it can be removed without taking the nut wholly off, which facilitates taking the pump apart. The foot valve and the two reduction valves are both in the same box inside the pump. A heavy hook is provided, from which to suspend the pump when that is necessary in shaft sinking or similar work, and neither the valves nor neck mechanism are obstructed.

In the sectional view it will be seen that the pump consists essentially of two cast iron chambers, designated *CC*, which are alternately filled with water, which is forced out by the direct pressure of steam, which enters at the top through a steam pipe. The valve *A* swings from side to side and alternately opens and closes the chambers to the passage of the steam. Air is admitted by the automatic action of a small air valve above the water in the cylinder. By this air it is claimed the steam is prevented from coming into direct contact with the water and condensation is avoided. The pressure thus put upon the surface of the water forces it through the discharge valve *I* (shown in dotted lines) to the delivery. As soon as the water falls in the chamber to the valve the steam will suddenly condense by passing under it, and a more or less complete vacuum will be formed which will cause the valve *A* to swing over, shut off the steam and transmit the pressure to the opposite cylinder. When the pressure in the delivery pipe closes the valve *I*, the valve *F* opens and the chamber again fills with water, drawn through the suction pipe *D*; while this chamber is filling the other one is being emptied, and thus a practically continuous stream is delivered. There are no moving parts which are subject to much wear or require lubrication.

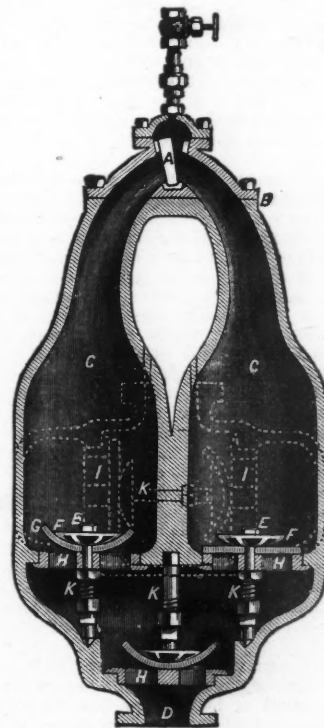
The vacuum chamber is cast between the necks of chambers *CC*, and connects only with the foot valve chamber below the valves *FF*. The air valves are screwed one into each of the chambers *C*, and one into the vacuum chamber *J*, their stems hanging downward. *K* are brass bolts, having double square-headed brass nuts attached, and are used to hold

the induction foot valve and discharge valve seats, with valves and guards attached, in their places. The plug in the top of the vacuum chamber is used for charging pump when necessary; the small brass plugs inserted in handhole plates are used for draining the pump in cold weather to prevent freezing. The valves are of a peculiar shape, more flexible at the center, to admit of full opening at each pulsation. The induction and foot valve seats are placed horizontal. The air valve used on this pump is also a new invention. It prevents the escape of steam, as it rests on shoulders, and can only be moved upward by the pressure of air caused by the vacuum.

The rubber valve, which has hitherto been entirely flat, Mr. Maslin makes with an annular concavity, which permits freer action and reduces the probability of splits at the orifice.

Mr. Hochstetter has, according to *l'Industrie Moderne*, made a series of experiments in order to find an explanation of the fact that he had observed variations in the resistance of lead to concentrated acids. The plates of lead which the acids did not act upon he found to be impure. The alloy that proved to possess the greatest resistance to acids was one of 98% of lead and 2% of copper.

Self-Lighting Crustaceans.—The naturalist on an Indian Marine Survey steamer is reported to have made the discovery that some deep sea crustaceans are highly luminous, thus furnishing presumably the first



SECTIONAL VIEW.

positive proof that the source of light in the depths of the ocean is the self-luminosity of the animal inhabitants. A large prawn lying in a bucket of sea water on deck was observed to be shining brightly, and being seized, it emitted copious clouds of phosphorescence from the orifices of the genital glands. By the light of this luminous secretion it was possible, in otherwise perfect darkness, to see the details of the interior of the bucket, as well as the position and shape of the animals in the bucket. After the removal of the animal the water remained luminous for some time.

Deepening the Hudson River Channel.—A board of army officers is to convene at Albany on January 6th pursuant to an act of Congress "to thoroughly examine obstructions to navigation in the Hudson River between New York City and the State dam at Troy, and to report a project and estimate the cost of widening and deepening the channel of said river between New York City and Albany for the navigation of sea-going vessels drawing 20 feet of water, and also to report an estimate of the expenses of improving the river between New Baltimore and the State dam to such an extent as to secure a navigable channel 12 feet deep at mean low water."

The inquiry will in part be directed to ascertaining the value of the proposed improvement to commerce, especially in view of the commercial advantages to accrue to the great lakes and to the Erie, Oswego and Champlain canals as well as to the river itself. In this view of possible benefits Mayor Manning, of Albany, has asked the co-operation of the New York officials in laying before the board the necessity and benefits of government control of such improvements. He states that the traffic of the Hudson is three times as great as that of the Mississippi, and that Congress is awakening to the importance of appropriations by the government for this purpose. The State has heretofore appropriated sums varying from \$20,000 to \$50,000 per year for improving the navigation of the Hudson, but these sums were inadequate for any general or sufficient scheme of improvement such as is now designed under government control.

THE PROPOSED SILVER BILL.

A bill to provide against the contraction of the currency and for other purposes.

Be it enacted, etc., that the Secretary of the Treasury is hereby directed to purchase from time to time during the calendar year 1891 silver bullion to the aggregate of 12,000,000 ounces at the market price thereof, not exceeding \$1 for 371.25 grains of pure silver, in addition to the amount required to be purchased by the act approved July 14, 1890, entitled "An act directing the purchase of silver bullion and the issue of Treasury notes thereon, and for other purposes," of which sum of 12,000,000 ounces there shall be purchased, at the discretion of the Secretary of the Treasury, not exceeding 3,000,000 ounces in any one month, and the Secretary of the Treasury shall issue in payment for such purchases of silver bullion Treasury notes of the United States of the same form and description and having the same legal qualities as the notes provided for by the said act. And such Treasury notes shall be a legal tender and be received, redeemed, and reissued in the same manner and to the same extent as other Treasury notes.

SEC. 2. That the compulsory requirement of deposits of United States bonds with the Treasurer of the United States by national banks having a capital of not more than \$50,000 is hereby limited in amount to \$1,000 of bonds for each and every national bank; provided that the voluntary withdrawal of bonds for the retirement of such national bank notes shall not exceed the sum of \$3,000,000 in any one month; and provided, further, that this act shall not apply to the deposits of bonds which may be required by the Secretary of the Treasury to secure deposits of public moneys in the national banks.

SEC. 3. That upon any deposits already or hereafter made of any United States bonds bearing interest, in the manner required by law, any national banking association making the same shall be entitled to receive from the Controller of the Currency circulating notes of different denominations, in blank, registered and countersigned as required by law, not exceeding in the whole amount the par value of the bonds deposited; provided that at no time shall the total amount of such notes issued to any association exceed the amount at such time actually paid in of its capital stock.

SEC. 4. That whenever the circulating notes of national banks, including such notes in circulation represented by lawful money deposited by the banks in the Treasury for the redemption of such notes, shall be less than \$180,000,000, the Secretary of the Treasury is authorized and directed to purchase from time to time, as such circulating notes are retired and canceled, silver bullion as may be offered at the market price thereof, not exceeding \$1 for 371.25 grains of pure silver, but such purchases shall not exceed in the aggregate at any time an amount of such national bank notes retired and canceled below the said sum of \$180,000,000, and the Secretary of the Treasury shall issue in payment for such purchases of silver bullion Treasury notes of the United States of the same form and description, and having the same legal qualities as the notes provided for by the same act, and such notes shall be a legal tender and be received, redeemed and reissued in the same manner and to the same extent as other Treasury notes issued under the act aforesaid, approved July 14, 1890, and if the Secretary of the Treasury shall be unable to purchase silver bullion to the amount required on the terms herein provided for, he is authorized and directed, to make good the deficiency, to issue United States notes similar in terms and description to the United States notes now outstanding to an amount equal to the amount of such national bank notes retired and canceled below the said sum of \$180,000,000. And such notes shall have the same qualities and be a legal tender, and be received, redeemed and reissued in the same manner and to the same extent as other United States notes.

SEC. 5. Whenever the market price of silver bullion shall have been continuously for a period of one year \$1 or more for 371.25 grains of pure silver, all purchasing of silver bullion by the Secretary and Treasurer shall cease, and thereupon and thereafter any owner of silver bullion not too base for the operations of the Mint may deposit the same in amounts of the value of not less than \$100 at any mint of the United States to be formed into standard dollars or bars for his benefit and without charge, and at the said owner's option he may receive instead the equivalent thereof in the Treasury notes of the said act approved July 14, 1890.

SEC. 6. That the Secretary of the Treasury be, and he is hereby, authorized to cause the subsidiary silver coins of the United States now in, or which may hereafter be received into the Treasury or Sub-Treasuries of the United States, which are abraded, worn, mutilated, defaced or otherwise unfit for circulation, or are of denominations for which there is no current demand, to be recoined at the mints of the United States into such denominations of silver coins now authorized by law as may be required to meet the demand therefor. That the loss incident to the recoinage of such uncurrent silver coins into new coins shall be paid from the gain arising from the coinage of silver bullion into coin of a nominal value exceeding the cost thereof, denominated "the silver profit fund."

SEC. 7. The Secretary of the Treasury is hereby authorized and directed to issue Treasury notes of the act approved July 14, 1890, to an amount equal to market value of the bullion made from the trade dollars now in the Treasury, and of the bullion to be formed from other trade dollars, and also upon the bullion value of \$10,000,000 of the abraded and otherwise uncurrent subsidiary silver coin now in the Treasury.

SEC. 8. That Paragraph 8 of Chapter 327 of the supplement of the Revised Statutes of the United States, which requires that refining and parting of bullion shall be carried on at the Mints of the United States and at the Assay Office at New York, be amended by inserting, after the word "law," in the fourth line, the following words: "and from the proceeds of the sale of by-products resulting from the operations of the refinery," so that the paragraph shall read:

"And it shall be lawful to apply the moneys arising from charges collected from depositors for these operations pursuant to law, and from the proceeds of the sale of by-products resulting from the operations of the refinery, so far as may be necessary, to the defraying in full of the expenses thereof, including labor, materials, and wastage."

SEC. 9. That an act to authorize the receipt of United States gold coin in exchange for gold bars, approved May 26th, 1882, be amended to read as follows.

"That the superintendents of the coinage Mints and of the United States Assay Office at New York may, with the approval of the Director of the Mint, but not otherwise, receive United States gold coin from any holder thereof, in sums of not less than \$5,000 and pay and deliver in exchange therefor gold bars in value equaling such coin so received; provided that the Director of the Mint, with the approval of the Secretary of the Treasury, may impose for such exchange a charge which in his judgment shall equal the cost of manufacturing the bars."

SEC. 10. That it is the continued policy of the United States Government to use both gold and silver as full legal tender money under the ratio now existing in the United States, or that may be hereafter established by the United States, acting in accord with other nations; and the United States is willing to join with other commercial nations in a conference to adopt a common ratio between gold and silver with a view of establishing, internationally, the use of both metals as full legal tender money, and securing fixity of relative value between them. And when, in the judgment of the President, a sufficient number of such nations shall have entered into such international arrangement he may declare the ratio so fixed to be the existing ratio in the United States, and all coinage thereafter shall be at such ratio until changed by law. The President shall, by and with the advice and consent of the Senate, appoint commissioners, not exceeding three, who shall attend any such conference on behalf of the United States, and they shall report their doings to the President, who shall transmit the same to Congress. Said commissioners shall receive the sum of \$5,000 and their reasonable expenses, to be approved by the Secretary of State, and the amount necessary to pay such compensation and expenses is hereby appropriated out of any money in the Treasury not otherwise appropriated.

SEC. 11. That all acts and parts of acts inconsistent with the provisions of this act be and the same are hereby repealed.

Compensation of Civil Engineer Employed by Municipal Corporations.—The fact that a civil engineer has been employed by a city for several years at a stipulated price for common surveying does not establish an implied contract for compensation at the same rate for drawings and specifications for work requiring a higher degree of care and skill than the work formerly performed by him.

Brauns v. City of Green Bay, Supreme Court of Wisconsin, 46 N. W. Rep. 889.

Legal Charges for Assaying in the State of Washington.—Charges for assaying are fixed by law in the State of Washington as follows: For determining gold and silver, \$2; lead, \$1.50; copper, \$1.50; iron, \$3.50; silica, 12.50; alumina, \$2; lime, \$3.50; magnesia, \$4.50; phosphorus, \$5; sulphur, \$3.50; manganese, \$5; zinc, \$5; nickel and cobalt, each \$10; chromium, \$5.00; tin, \$5; cinnabar, \$5; borium, \$5; bismuth, \$5; antimony, \$5; arsenic, \$5; platinum, \$5; uranium, \$10; vanadium, \$10; molybdenum, \$10; tellurium, \$10; potash and soda, \$5; coal, \$6. The charges for analyzing or assaying anything not enumerated are fixed by the Mining Bureau.

The Corrosion of Steel and Iron by Salt Water.—Mr. David Phillips stated, in a recent address before the British Institute of Marine Engineers, that he had experimented from 1881 to 1888 with two plates of Bessemer boiler steel, two of Yorkshire and two of B. B. Staffordshire boiler iron. The plates were as nearly as possible 6 x 6 x 1/8 inches, and were kept immersed in salt water. The results show a great difference between the behavior of steel and iron. The steels lost 120% more than the irons the first three years when the plates were in contact; 124% more the second three years, when they were insulated, and 126% more for the whole period of seven years.

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 16th, 1890.

- 442,600. Apparatus for Utilizing Waste Gaseous Products. Emil Biedermann and Ernest W. Harvey, Westminster, England, Assignors to Frederiek Siemens and Alexander Siemens, same place.
- 442,606. Rolls for Rolling Skelps for making Pipe Couplings. Thomas J. Bray, Warren, Ohio, Assignor of one-half to the Paige Tube Company, same place.
- 442,608. Steam Boiler. Theodore E. Button, Waterford, N. Y.
- 442,634. Rotary Engine. August Meyer, Baltimore, Md., Assignor of one-half to Decatur H. Miller, Jr., same place.
- 442,661. Process of Desilverizing Lead by Electrolysis. Turner D. Bottome, Hoosiek, N. Y., Assignor to John B. Tibbits, same place.
- 442,692. Machine for Making Rock Drill Bits. Samuel C. Lewis, San Francisco, Cal.
- 442,694. Water Wheel. Thomas A. McDonald, Durham, Canada, Assignor to the Leslie Brothers Manufacturing Company, Paterson, N. J.
- 442,708. High Speed Engine. John F. Sleat, Newington, England.
- 442,731. Rock Drill. Carl Franke, Eisleben, Prussia, Germany.
- 442,764. Crushing Rolls. Daniel Brennan, Jr., Bayonne, N. J.
- 442,765. Apparatus for Reducing Ores. Daniel Brennan, Jr., Bayonne, N. J.
- 442,766. Feed Regulator for Roller Mills. Daniel Brennan, Jr., Bayonne, N. J.
- 442,782. Tool for Dressing Emery Wheels. Anson A. Reed, Worcester, Mass.
- 442,802. Process of Refining Hydrocarbon Oils. John Gardner and James F. Harris, Toledo, O.
- 442,815. Machine for Reducing Bituminous Rock. William Meakin, San Francisco, Cal.
- 442,874. Draw Bridge. Gustavus A. Wiedennayer, Oceanic, N. J., and Sigmund Bergmann, New York, N. Y.
- 442,877. Crane. Samuel Forter, Pittsburg, and Julian Kennedy, Latrobe, Pa.
- 442,896. Oil Filter or Separator. James Johnson, Meenah, Wis., Assignor of one-half to Sidney Smith, Cambridge, Mass.
- 442,905. Steam Engine. Foster M. Metcalf, Battle Creek, Mich., Assignor to the Battle Creek Machinery Company, same place.
- 442,914. Machine for Removing Fins from Metal Beams. Alfred Povall and Frank P. Howe, Danville, Pa.
- 442,943. Manufacture of White Lead. Gustav Bischof, London, England.
- 442,947. Pipe Coupling. William Bowers, New York, N. Y., Assignor to Sarah E. Bowers, same place.
- 442,954. Method of Welding Metals Electrically. Charles L. Coffin, Detroit, Mich.
- 442,956. Shut-Off Device for Engines. Thomas Conroy and Lewis P. Fuhrman, Kansas City, Mo., Assignors of one-third to Albert W. Dold, same place.
- 442,974. Ore Pulverizer. Arthur Hendey, Denver, Colo.
- 443,029, 443,030. Pneumatic Tool. Wm. M. Wood, Washington, D. C., Assignor to the Thomson Electric Welding Company, of Maine.
- 443,042, 443,043, 443,044. Magnetic Ore Separator. George S. Finney, Chicago, Ill., Assignor to the Rotary Magnetic Ore Separator Company, same place.
- 443,067. Steam Generator. Arthur Cameron and Henry H. Schumaker, Chicago, Ill., Assignors to Frederiek C. Austin, same place.

PERSONALS.

Mr. S. Humphries, of this city, is at El Paso, Tex., inspecting mining interests.

Auditor Fagg, of the Calumet & Hecla Mining Company, is visiting that company's mine in Houghton County, Mich.

Mr. D. Bowman, purchasing agent for the Picher Lead and Zinc Works, of Joplin, Mo., is making a trip through New Mexico and Texas.

Mr. Chas. E. Phelps, of this city, who is connected with the Santa Juliana mine, Jesus Maria, Mexico, is on his way to that property.

Messrs. George L. English & Co., mineralogists, propose to transfer their Philadelphia stock to 739 and 741 Broadway, New York, on January 1st, 1891.

Mr. Chas. M. Rolker, Mining Engineer, of New York, is at present at the Victoria copper mine, Lake Superior, Mich., examining it in the interest of parties who are negotiating for its purchase. ■

Mr. Stuart W. Cramer, mining engineer, of Charlotte, N. C., the Southern representative of the ENGINEERING AND MINING JOURNAL, has started on an extensive trip through the Southern States in the interests of the JOURNAL.

We are glad to learn that Mr. A. W. Walburn, of Fort Scott, Kan., has now completely recovered from his long and serious illness, and is able to attend to the business of the Fort Scott Foundry and Machine Works Company, of which he is president.

Gen. John B. Newton, whose acceptance of the office of Consulting Engineer of the Chicago Sanitary District was noted in the ENGINEERING AND MINING JOURNAL, December 13th, is now in Chicago. Mr. W. B. Worthen, of this city, President of the Society of Civil Engineers, has been chosen as Chief Engineer, to succeed L. E. Cooley. He is a warm personal and business friend of General Newton.

President Harrison on the 17th inst. transmitted to the Senate a letter from the Secretary of the Navy, accompanied by a letter from the secretary of the American Society of Mechanical Engineers, who transmits a memorial addressed to the United States Government, in relation to the late John Ericsson. The Secretary, in his letter, says that the Navy Department is in full accord, in sentiment and in purpose, with the American Society of Mechanical Engineers, and trusts that it may be the pleasure of Congress to make some suitable recognition by this nation of the services of the inventor.

OBITUARY.

Colonel Charles Fuller died in Appleton, Wis., on the 16th inst., aged 76. For fifteen years he has been in charge as engineer of the United States Government improvement of the Upper and Lower Fox. It is said he was the oldest living graduate of West Point.

Richard Gatewood, Naval Constructor, U. S. N., recently died at Bloomingdale Asylum, New York. He was appointed Cadet Engineer from Virginia in 1875, Assistant Naval Constructor in 1881, and Naval Constructor in 1888. He was considered one of the most efficient members of his corps.

The death is announced at Nora, Sweden, at the age of 75, of Ludvig Rinman, director of the metallurgical office of the Jernkontor or Swedish Iron Board, which post he has held since 1856. In 1837 he was one of the commissioners at the Paris exhibition. The deceased was the author of a handbook on furnace practice, and, in conjunction with B. Fernqvist, of "Researches on the Chemical Composition, Pressure, and Temperature of Blast-furnaces," besides many papers in *Jernkontors Annaler*.

Mr. Thomas J. Whitman, of St. Louis, Ill., died suddenly, last week. Mr. Whitman was born in Brooklyn, N. Y., in 1833. He was a half-brother of Walt Whitman the poet. He was appointed chief engineer of the water-works of St. Louis in 1867. In 1877 he was chosen Water Commissioner. This position he held until 1887, since which time he has been in business as a consulting engineer. He was known in connection with the Milwaukee drainage system, and his last work was upon the Memphis water-works. He held the office of Vice-President of the Society of Mechanical Engineers at the time of his death, and was Vice-President of the American Society of Civil Engineers in 1885.

INDUSTRIAL NOTES.

On the 15th inst. the coining mill of the Ohio Powder Company blew up at Youngstown, O. Two employes were killed.

A powder explosion at the Aetna Powder Company's works, Millers, Ind., wrecked the wash-house. Several employes were killed or injured.

The council of the city of Duluth has authorized Mr. Sooy Smith to prepare plans for a tunnel under the ship canal which separates Minnesota point from the city.

The Carlisle Car Manufacturing Company's

works, at Carlisle, Pa., were burned on the 13th inst. Loss, \$10,000. Origin, incendiary. The plant will be rebuilt at once.

The Pottstown Iron Company, it is said, has posted notices of a reduction of 25 cents per ton in the wages of puddlers, and a proportionate reduction in the wages of all employes in its plate and puddle department. The new rate goes into effect Monday, December 29th.

A cable despatch dated Paris, December 18th, says: The Court of Appeals has confirmed the judgment of the Tribunal of Commerce annulling the contracts between the Société des Métaux and the mining companies. The guarantee of the Comptoir d'Escompte is also declared null.

The Deflector Safety Lamp and Miners' Appliance Company, Limited, has been incorporated at London, Eng., with a capital of £20,000 in £5 shares. The object is to acquire letters patent on several improvements in miners' safety lamps, invented by Mr. Andrew Howat.

The Tasker Tube and Steel Company has been organized for the purpose of manufacturing seamless steel tubes under the Tasker process. The officers are: Wm. F. Bartlett, president; Henry B. Anderson, treasurer, and Henry S. Iselin, secretary. The main office has been established at 22 William street, New York City.

The Morris Canal and Banking Company, on the 16th inst., placed on record in Belvidere, N. J., a mortgage of \$500,000 to the Provident Life and Trust Company, of Philadelphia, dated September 15th, 1890. The old mortgage for \$1,000,000 was cancelled. This shows a payment of \$500,000 on the principal.

The Taylor gas producer, of Philadelphia, Pa. (see advertising columns) is effecting notable economies. The superintendent of the Marsac mill, Utah, says in a letter on another page, "For the last few months we have been saving \$30 to \$40 a day in fuel by the use of the Taylor gas producer for firing our dryers and furnace."

The boiler house of the Illinois Steel Company, at Chicago, Ill., was destroyed by fire on the 13th inst. The fire was caused by the explosion of accumulated gases in the feeder pipe. The explosion set fire to the big tank, holding a hundred barrels of crude petroleum. The loss will reach \$30,000. It is said that the works will be closed pending the erection of a new plant.

The St. Louis water power on the St. Louis River above Duluth, Minn., was recently transferred to a syndicate of Duluth, Eastern and English capitalists for \$1,000,000. It is said another million is to be expended on dams, etc. The useful fall is 300 feet and the minimum flow is 1,200 cubic feet per second. The new company expects to erect vast mills and to transmit power to other points by electricity.

A meeting of blast furnace, coke and railroad men was held in Pittsburgh, Pa., on the 16th inst. The furnace men demanded lower rates from the railroads and lower prices for coke. This, it is said, was refused by both, and the furnace men of the Mahoning and Shenango Valleys threatened to suspend. The H. C. Frick Coke Company, on behalf of the coke men, asked that definite action be postponed for two weeks, which was agreed to.

We have received from Messrs. E. W. Bliss & Co., of Brooklyn, N. Y., their latest catalogue of the machinery and mechanical adjuncts manufactured by them. It is a formidable book of nearly 270 pages, containing hundreds of illustrations of the firm's specialties for the manufacture of tin and sheet iron ware in all varieties, pressed, stamped or pieced. The book, besides containing particulars of all the latest inventions and contrivances in this industry, is full of useful information to all concerned in the manufacture of tin and sheet iron.

During the season there were 600 boats run by the Delaware & Hudson Canal Company for the transportation of coal between here and Honesdale, Pa. In 1889 there were 7,473 cargoes, averaging about 135 tons each, cleared from Honesdale, and in 1890, 6,783, showing a decrease of 690 cargoes for this year. The boatmen averaged eleven trips during the past season from Honesdale to Rondout. The coal shipped from Honesdale by canal in 1889 amounted to 1,007,652 tons. In 1890 the total was 919,003 tons, showing a difference of 88,646 tons in favor of 1889.

The great steel bridge across the Columbia River at Vancouver, British Columbia, will be 6,000 feet from the Washington to the Oregon shore, and double tracked, with a roadway on top for teams. The whole structure is to be of steel, built 10 feet above the high water of 1876 and 40 feet above low water. It rests 80 feet below low water on a foundation of coarse gravel similar to that upon which the bridges across the Missouri River are built. This gigantic structure is to cost over \$1,000,000, and is expected to be completed early in 1892.

It is alleged that the temporary suspension of the Henderson Steel Works was caused by the embarrassment of the Bessemer rolling mill. The product from the former was handled by the lat-

ter, and naturally the removal of their consumer could not fail to cause trouble to the steel works. The court has granted the company the right to go ahead with the proposed improvements lately arranged for by the new organization. The capacity of the plant will be doubled, and the amount of the product correspondingly increased. It is believed that better prices can now be had for the output than was paid by the rolling mill.

A serious attempt is being made by E. & O. W. Norton, of Chicago, to manufacture tin plate in competition with the tin-plate makers of Wales. They have only a small plant, but they have already turned out some tin plate. They claim that one great obstacle to the profitable pursuit of the tin-plate industry of Wales is that nearly all the work is done by hand. Much of this labor can be accomplished by machinery, and thus lessen the cost of production to a wonderful extent. It is claimed by the firm that it has one machine for cleaning plates which saves the work of 50 women.

The Steel Patents Company, owner of the patents formerly controlled by the Bessemer Association, including the Thomas Gilchrist, Snelus patents have decided that a royalty of \$1 per ton shall be paid by outsiders for the use of the basic patents. Our plate mills and wire works have become familiar with the excellent qualities of basic, Bessemer and Open Hearth stock through importations from abroad. It is not quite clear, however, whether those who have an interest in the patents are to pay the open rate of license, but outsiders in the north do not seem very eager to acquire rights while in the south the attitude of those who have given the process any attention is hostile to the Steel Patents Company.

The permission granted by the Board of Aldermen at last week's meeting to the New York & Long Island Railroad Company to build a tunnel under Forty-second street (see ENGINEERING AND MINING JOURNAL December 13th) has turned out to be ineffectual, owing to a flaw in the resolution that was discovered by Mayor Grant. The section of the resolution providing for recompense to the city for the franchise read that the company must pay to the city three per cent. of its gross receipts, "inclusive of all taxes and assessments." It should have read "exclusive." The mistake is said to be a clerical error. By common consent it was withdrawn, and will be corrected and submitted at the next meeting of the board.

Messrs. Wm. Simons & Company, Renfrew, England, successfully launched from their works recently, a Steam Hopper Dredger constructed to the order of the Alcoy & Gandia Railway & Harbor Company. The machinery has all been completed in the vessel previous to launching, and is similar to that recently supplied to the Nicaragua Canal. The hopper has a capacity to contain 400 tons of dredgings and the buckets have a lifting capacity equal to filling this in one hour in ordinary material. The bucket ladder dredges to a depth of 35 feet under water. Triple expansion engines are fitted for driving the propelling and dredging machinery. The builders' patent raised bow and fore-castle is provided for the additional strengthening of the vessel at bow and also to enable the buckets to dredge in advance and cut their own flotation and to work close to the foot of quay walls. The dredger has been built under the direction of Sir James Brunlees' Sons & McKerrow, and is expected to leave in a few days for its destination.

THE WHEEL TRUST.—The carriage manufacturers of St. Louis have suddenly awakened to a knowledge of the fact that they are completely at the mercy of the Wheel Trust. Something less than a year ago the National Wheel Company was formed, with a capital of \$3,000,000, the chief promoter being N. G. Olds, of Fort Wayne, Ind. The declared object was to cheapen the cost of wheels by certain improved business methods.

It has taken very nearly up to this time to perfect the combination, and it is now said to include the Woodburn Sarver Wheel Company, of Indianapolis; Sandusky Wheel Company, Sandusky, Ohio; Keys Manufacturing Company, Terre Haute; Hoopes Brothers & Darlington, of West Chester, Pa.; Wapakoneta Wheel Company, of Wapakoneta, Ohio; N. G. Olds & Co., Fort Wayne, Ind.; Carthage Wheel Company, Carthage, Ohio; Jackson Wheel Company, Jackson, Mich.; Standard Wheel Company and Munson Wheel Company, of Cincinnati, and ten other concerns. The trust is now firmly established, and, through an agent who recently visited the city, it succeeded in getting all contracts abrogated.

About 60 days ago notice was received of an advance in prices of about 10%, and this has been followed by another notice of a general advance of 80%. Carriage men are simply speechless in their indignation, and are planning to fight the trust.

[This is an example of the pernicious "Trust" method in business. Of course this outrageous extortion will raise up an opposition that will secure laws against all combinations, and the reaction will go beyond what is fair and just. The McKinley protective policy, whether or not it has enabled this particular trust to advance prices so greatly, will be held responsible for it, as it undoubtedly is for many other trusts, and will be further executed by the voters who are asked to pay a heavy

unnecessary tax to the government on many foreign articles of necessary consumption in order that home manufacturers may be able to swindle the public through combinations and trusts.

Is it any wonder that the people is becoming disgusted with a policy that produces such results?—EDITOR ENGINEERING AND MINING JOURNAL.

MACHINERY AND SUPPLIES WANTED AT HOME AND ABROAD.

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

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

No charge will be made for these services.

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

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

GOODS WANTED AT HOME.

- 1,180. Crusher and other machinery for a gold quartz mill. North Carolina.
- 1,181. A second-hand Blake stone crusher, 15 x 9. Pennsylvania.
- 1,182. Prices on sinking artesian wells. Georgia.
- 1,183. Planing mill outfit. Georgia.
- 1,184. Brick machines. Georgia.
- 1,185. Saw mill outfit. Georgia.
- 1,186. Machinery for cutting lime barrel staves from pine wood. Virginia.
- 1,187. Mica of a fine transparent quality. Pennsylvania.
- 1,188. Complete roller flour mill. Kentucky.
- 1,197. A 20 horse power engine, a 40 horse power boiler, machinery and tools for a canning factory. Texas.
- 1,198. All kinds of tanning tools. Texas.
- 1,199. Drum washer with screens, combined to wash 250 to 300 tons of phosphate rock a day. Florida.
- 2,000. Galvanized gutters for a semi-circular building. New Jersey.

AMERICAN GOODS WANTED ABROAD.

- 1,179. Prices and catalogues of hydraulic and other machinery for working diamondiferous alluvial gravels. Vaal River, South Africa.
- 1,189. Catalogues from the leading manufacturers of wire tramways. Mexico.
- 1,190. Price lists and catalogues of improved clay working and brick making machines. Mexico.
- 1,191. Catalogues from the leading manufacturers of rock drills. Mexico.
- 1,192. Catalogues and price lists of machinery for working the jute plant, *i. e.* Hennequen o pita, which grows in considerable quantities in Argentine Republic.
- 1,193. Brushes. Argentine Republic.
- 1,194. Spades. Argentine Republic.
- 1,195. Forks. Argentine Republic.
- 1,196. Ice machinery. Argentine Republic.
- 2,001. Estimates on a small canning outfit. Canada.

GENERAL MINING NEWS.

The doors of the Spokane National Bank, Spokane Falls, Wash., one of the largest institutions in the city, were closed on the 17th inst. The difficulty has precipitated the failure of three branches in the Coeur d'Alene mining district, Idaho, namely, Bank of Wallace, Bank of Wardner and the Bank of Murray.

The Illinois Central and the Louisville, New Albany and Chicago railroads propose to enter the Indiana coal fields, heretofore served exclusively by the Chicago & Eastern Illinois Railroad. The former, through the Chicago, Paxton & Cayuga Railroad, from Paxton, Ill., to Brazil via Cayuga, a distance of 120 miles, taps the field direct. The right of way has been purchased. The second named road has 200 men at work constructing a road bed between Bridgeton and Carbon. The ultimate design is to reach Evansville via French Lick. It is said that the Indiana Midland Railroad proposes an extension to Brazil.

Concerning the scheme to construct a World's Fair mine at Chicago (see ENGINEERING AND MINING JOURNAL, December 13th), Colonel Browne, of Denver, Colo., one of the promoters of the enterprise, is reported to have expressed himself as follows: "There has been a great deal of talk about the difficulties of sinking a mine in Chicago on account of water. Lying but a short distance from the surface at Chicago is a heavy layer of impervious blue clay, from 40 to 60 feet thick. There is no

surface water below this layer, and there is no great flow of artesian water until the depth of from 1,000 to 2,300 feet is reached. Eighty-seven feet under the surface at Lake Front Park, where the mine is to be located, lie solid layers of Niagara limestone, which is not a rock through which many water courses run, as the numerous wells in the immediate vicinity fully prove. When it is considered that ten shafts have been sunk in the rock in that immediate vicinity, four of them out in the lake, and that at the present time there are one and three-quarters miles of tunnel completed on the new water works in addition to a mile or two of tunnel in conjunction with the old works, it can readily be seen that trouble resulting from water will be small.

ALABAMA.

COAL.

The miners' strike in Jefferson county threatens to close every industry in this district. The members of the Amalgamated Association of Iron and Steel Workers held a meeting on the 17th inst., and passed resolutions of sympathy, pledging support to the strikers. They agreed, it is said, to refuse to work with coal mined by convict or scab miners if the strikers ask them to do so. Patrick McBride, of the Executive Board of United Mine Workers of America, who arrived from Detroit Wednesday night to look into this strike says if he cannot settle it he will call out all the iron and steel workers. This means the closing of all the rolling mills, foundries and machine shops. The strike has already seriously injured business, and there seems no prospect of a settlement.

(From our Special Correspondent.)

WHITING-REYNOLD.—This iron mine has been purchased by Mr. McKay, of Rhode Island. It is stated that a new mining plant will be erected very soon at a cost of \$30,000.

CALIFORNIA.

AMADOR COUNTY.

AMADOR GOLD MINE, LIMITED.—Suit was begun in the United States Circuit Court in San Francisco on the 13th inst. by Charles W. Trotter and William E. Trotter, of New York, to annul a conveyance to the Amador Gold Mine, Limited, an English corporation, of the property of the Amador Gold Mine. The bill of complaint alleges that Charles Edward Harrison and A. Basil Cochrane, of London, have obtained possession of this property, and through the representations of agents sent to London, the treasurer of the company was induced to deliver a deed to the property, which has been placed in escrow by the California company without the payment of \$200,000 in cash and one-fourth of the stock in the English company, which was the consideration agreed upon for the transfer of the property. Eastern capitalists are largely interested, ex-Senator Wallace, of Pennsylvania, owning one-third and the plaintiffs one-fifth interest.

(From our Special Correspondent.)

SAN FRANCISCO, Dec. 10.

KENNEDY MINING COMPANY.—This is the only property listed in the San Francisco Stock Board since the reduction in the charges, and it is a puzzle to the street to understand why such action was taken. The company pays dividends with average regularity, the last one of five cents per share having been declared yesterday, but since the mine was listed about six months ago not 100 shares have changed hands in the Board, the offerings having been absolutely nil.

TEIVAKOFF MINING COMPANY.—An assessment of 1c. per share, delinquent January 8th, was levied on Monday by this company.

FRESNO COUNTY.

BUCHANAN COPPER MINE.—The London and San Francisco Bank, an English corporation, acquired title to this property by the foreclosure of a mortgage and worked it for several years at a profit. Upon M. S. Latham, the manager of the bank, applying for a patent, its issuance was contested by B. Hook and D. McIntyre, who had relocated the mine, on the ground that the entry made by Latham was for the benefit of an alien corporation which, not being able to acquire government land directly, sought, it is alleged, to circumvent the law by carrying on proceedings in its manager's name. The Department of the Interior has, on appeal, just confirmed the decision rendered in favor of the contestants by the Stockton Land Office, and the mineral entry of M. S. Latham has been cancelled.

SAN JOAQUIN COUNTY.

A large flow of gas was struck at Stockton, December 4, in a well being bored by the county to furnish fuel for heating and lighting the new Court-house. Several gas flows have been struck in the well, but the largest was reached at a depth of 1,900 feet. It is estimated that the new flow will measure 30,000 feet every twenty-four hours, which, with the other veins tapped, will make a daily flow of more than 60,000 feet. The Supervisors are greatly pleased, and will continue boring, as it has been ascertained that the gas veins are found fifty feet apart. More than enough gas has been struck to supply the Court-house, but the Supervisors now propose to pipe the gas to the County Almshouse, a mile distant. Petroleum comes up in the water flowing out of the well.

COLORADO.

(Special Report for the ENGINEERING AND MINING JOURNAL.)

Mineral surveys approved by the United States Surveyor General of Colorado during the week ending December 13th, 1890:

Survey No. 6,537, land district Montrose, name of claim, Clara Bell, Mikado, Victor and Sarah Bernhardt; 6,701, Garfield, Prince Alice and Prince Alice No. 2; 6,761, Central City, Burlington; 6,572, Gunnison, Mountaineer, Yellow Diamond, Little Hattie, Gold Cross, Gold Eagle, Wahl, Park View, Red Cloud, Gold Coin, Gold Cleft, Cross Mountain No. 1, Cross Mountain No. 2 and Cross Mountain No. 3; 6,717, Central City, Wilhelmine; 6,689, Durango, Wilson; 6,539, Gunnison, Hidden Treasure; 6,493, Pueblo, Contact; 6,606, Del Norte, Parole and Parole No. 2; 6,642, Garfield, Alpine and Bushwhacker; 6,525, Durango, Silver King; 6,746, Central City, Independence; 6,676, Garfield, Silver Nugget.

Amended survey: Survey No. 3,903, land district, Garfield, name of claim Way Up Lode.

State Inspector Hutchinson's report, the first authorized by a State law, is now in print. It covers a period from July 1st, 1889, to September 30th, 1890. The following figures are taken from the advance sheets:

First District—Number of miners employed in mines visited, 4,181; number of mines visited, 324; number of fatal accidents, 5; number of non-fatal accidents, 15. Number of miners in this district are credited to the following counties: Cedar Creek, 1,872, Gilpin, 1,543; Boulder, 657; Larimer, 95; El Paso, 5; Grand, 9.

Second District—Number of mines visited, 302; number of miners employed, 5,925; number of fatal accidents, 37; number of non-fatal accidents, 42.

The miners employed in this district are distributed as follows: Lake County, 2,412; Pitkin County, 1,793; Gunnison County, 450; Eagle County, 308; Summit County, 297; Chaffee County, 218; Park County, 117; Saguache County, 134; Huerfano County, 21; Custer County, 175.

From 1880 to January, 1890, Leadville has produced \$147,834,180.03 in real value, distributed as follows: Gold, 228,091 ounces; silver, 86,230,111 ounces; lead, 442,726 tons.

Third District—Number of miners employed, 3,676; number of fatal accidents, 11; number of non-fatal accidents, 28.

Number of miners in this district are credited to the following counties: Ouray, 1,392; San Juan, 720; San Miguel, 650; Dolores, 516; Hinsdale, 162; Conejos, 114; Rio Grande, 39; La Plata, 83.

BOULDER COUNTY.

CHATHAM MINING COMPANY.—This company, according to the St. Louis *Republic*, has about perfected its organization and will shortly issue stock to subscribers. The mines at present are being worked under the management of E. Wallace as trustee for the subscribers to the stock. Since the 27th ult. a 10-stamp mill has been treating the ore. On the 4th of December another mill of 20 stamps was rented and is now running night and day on Chatham ore. On the 5th a carload of smelting ore was shipped to Denver, which is said to have sampled \$82.10 per ton. The claims owned by this company are located in the Ward district and are near neighbors to the Ni Wat and Utica mines.

FREMONT COUNTY.

The oil fields of this county are enjoying an era of prosperity. The start was made in April by the Rocky Mountain Oil Company, capitalized at \$1,000,000. Up to date it has five producing wells and one dry hole in its 11,000 acres of land. The Colorado Coal and Iron Company started operations in September. It now has two wells. The company is now putting up a large refining plant.

The Florence Oil and Refining Company is at present engaged upon the construction of a 90-foot tank, with a capacity of 35,000 barrels. Following this one will be a 98-foot tank, with a capacity of 40,000 barrels.

It is currently reported that a syndicate is figuring upon a tract of 3,000 acres south of this point

GILPIN COUNTY.

RUNNING LODGE MINING AND MILLING COMPANY.—This company reports November operations to have been as follows: Between the second and third levels an exploration drift was driven 23 feet, exposing a pocket of smelting ore. Work has been continued upon the North crevice in third level. The vein is larger, the "pay streak" is four inches wide. Considerable difficulty has been experienced with a flow of gas from the crevice, and a line of ventilating pipes has been put in to give the men sufficient air to continue the work. The fourth level has been extended 26 feet, making a total length for this drift of 723 feet. During the month 14 cars of ore have been shipped to the smelter. The scarcity of cars the first half of the month prevented larger shipments. December 1st there were at the smelter eight cars of ore unsettled for, and on hand about 12 car loads ready to ship. From 20 to 25 tons of concentrating ore is being treated at the Humphrey Mill.

LAKE COUNTY.

DUNKIN MINING COMPANY.—This company's balance sheet December 10th is as follows: Dividend account, \$180,000; disbursements since October 1st, 1883, for salaries, etc., \$20,235.04; cash on

hand, \$30,558.57. Credits—Dunkin Mining Company, \$27,040.62; dividend account outstanding, 1883, \$35.53; interest on Eastern deposits, \$3,688.31; balance, \$230,794.51; cash on hand in the West, \$5,080.59, makes total cash, \$35,639.16. From October 17, 1889, to October 17, 1890, receipts were \$74,956.38; expenses and payments to lessees, \$53,811.69; profit, \$21,144.69, expenses in the East not included.

REED & NATIONAL MINING COMPANY.—This company makes the following report of operations for the month of November: An upraise from the hanging wall drift has been carried 120 feet. It shows for the entire distance from 3 to 4 feet of mill ore. The stopes aggregate 2,000 yards and the number of tons of rock hoisted 505. Owing to the scarcity of cars there is now on hand 90 tons of concentrates and 18 tons of high grade ore.

OURAY COUNTY.

AMERICAN BELL MINES, LIMITED.—The prospectus of this company has been issued by the London incorporators. From the statement we take the following: Directors, Frederick Powell Chowther, Thos. Phillipotts, Thos. J. Bewick, George Crawford. Capital stock £400,000 in 400,000 shares. Of this number 133,000 have been accepted by the vendor in part payment of the purchase money, and 202,000 or more have been applied for. The vendor is Mr. George Crawford. The price, in addition to the 133,000 fully paid shares, was £217,000 in cash. For further improving the working facilities, systematic prospecting, and working of the various claims, a working capital of £50,000 has been provided.

This company is formed to acquire, as a going concern, the American Belle Mines, comprising the National Belle, the Silver Bell and Hudson mines, together with all plant, materials, tools, appurtenances, stores, etc., belonging thereto, as on November 30th last. These mines are situated in Red Mountain district, and are in near proximity to the Guston and Yankee Girl mines, owned by the New Guston Company, limited, and Yankee Girl silver mines, limited, of London.

The claims, comprising three distinct mining properties, are as follows: American Bell group, National Belle, Auxiliary, Silver Wave, Silver Cord; Silver Bell group, Silver Bell, Gertie H., Rayen; Hudson mine, Hudson. Five of the above claims are held under United States patents, and all the necessary requirements for perfecting the titles to the other three having been complied with, United States patents will be issued in due course.

The main shaft on the Silver Bell mine is about 650 feet deep, from which eight levels have been driven, the two lowest being about 100 feet apart. In these two levels large bodies of ore are developed and regular shipments are being made therefrom. During the month of November a considerable quantity of ore was shipped and the contents of many of the cars contained from 150 to 250 ounces of silver per ton.

On the National Belle Mine there is a shaft 235 feet deep. At the lowest level ore has been partially developed for a width of 69 feet and a length of 75 feet. Trial shipments of several hundred tons recently made from this ore body yielded, according to the smelters' returns: Copper 8% to 12%, silver 10 to 15 ounces, and gold from \$2 to \$4 per ton. There is also a large ore body to the south of the shaft, at the lowest level, in which 38 feet have already been driven in solid ore. Further, a network of ore shoots appear to exist in the south end of the claim from the surface downwards. Some of these ore shoots have been partially developed by means of underground works and a shallow day level. Eight hundred and eight tons obtained from these shoots near the surface realized \$40,547, or an average of \$50.18 a ton after payment of railroad freight and smelting charges.

The Hudson shaft has been sunk to a depth of about 100 feet. In connection with this shaft there is an ore body partially developed for a depth of 100 feet, the width of which cannot be accurately stated, but it appears to be a large and valuable one. About 350 feet south of the Main shaft ore has been discovered which has assayed several hundred dollars per ton.

PITKIN COUNTY.

The accused in the Aspen case of alleged ore stealing (see ENGINEERING AND MINING JOURNAL, Dec. 13th), were released from jail the night of their arrest, each furnishing bail of \$500. The case came up before Judge Wiley on the 13th inst. New developments seem to indicate that the amount of ore alleged to have been stolen is much larger than at first supposed. It is estimated by some that 1,000 tons were carried off, having a value of from \$25,000 to \$30,000. The defense is that the ground from which the ore was taken is claimed by the Longfellow. This claim laps on the Monarch and only has one and one-half acres of land clear. The Monarch is an old location, and its title has been practically undisputed.

COWENHOVEN MINING, TRANSPORTATION AND DRAINAGE TUNNEL COMPANY.—The tunnel which this company is driving through Smuggler Mountain, recently encountered a bed of quicksand at a point 2,800 feet from its mouth. The sand threatened to fill up the openings. A bulkhead was built, and the work proceeded. A second break filled from 20 to 30 feet of the tunnel. Work was stopped, and the face tightly bulkheaded. A lateral has been started into the foot wall for the

purpose of tapping the crevice, and relieving the pressure.

EDISON No. 2.—This mine recently commenced shipping; a test is being made on a 25 ton lot of ore. A heavy hoisting plant has been put in at the 400-foot shaft. An incline has been run from the bottom of the shaft, a distance of 30 feet. As this incline increases in length, levels will be started therefrom, and the mine systematically developed.

GOOD THUNDER.—The ore recently opened in the Good Thunder is said to be the richest yet found in the Tourtelotte Park. A large amount is being shipped from the north lease. The ore is all of good grade and is shipped without sorting. The last two lots settled returned 55 and 49½ ounces per ton. The ore in the south end is much richer. The last lot settled for from that place went 103 ounces. The grade has since been improving, and bucket samples of the first-class ore have been running up to 150 ounces. The pay streak in the south end is from three to seven feet thick.

LITTLE RULE MINING COMPANY.—This company's report for November shows that the main south drift has been extended 47 feet and cross-cut from south drift to hanging wall, 21 feet. The north drift extended 30 feet showing a body of low grade ore; this drift has improved both in quality and quantity of ore. The drift from bottom of winze No. 2 has been extended 40 feet. The upraise drift has been extended 60 feet, showing three feet of ore, which will be good stoping ground when connected with south upraise No. 2. Drift from upraise No. 2 extended 20 feet south, showing a small but well defined body of ore. All of said drifts had to be heavily timbered on account of water courses. The development work from outcrop near blacksmith shop, continues to show well.

PARK CONSOLIDATED MINING COMPANY.—This company's report of operations for November states that the drift from the tunnel on the Buckhorn has been extended south 35 feet, and a chamber six feet wide and 12 feet long has been excavated along the west side of the drift. A winze sunk in the chamber encountered the vein about 15 feet below the level of the drift and follows it on its dip to the west. The vein continues strong and shows considerable good ore. About 65 feet of work has been done in these workings during the month. The level from Castle No. 2 shaft has been extended southeast on the vein about 25 feet and shows a streak of good ore for the last 10 feet. The level is being pushed as rapidly as possible, and a drift is being run to the northeast on the ore, which shows well in that direction. The work in Castle No. 2 is being done under a lease to Howe & Tourtelotte, and about 50 feet of work has been done by them during the month.

RED JACKET MINING COMPANY.—This company is working the Wilton Belle mine on a lease. The property lies west of Old Castle City, and was worked at one time by Mr. John C. Yeller. Recent developments, it is said, show a rich streak 3 inches wide assaying from 211 to 5,024 ounces of silver and 14% of copper to the ton. The vein is four feet wide.

PUEBLO COUNTY.

PUEBLO SMELTING AND REFINING COMPANY.—According to the Boston News Bureau this company is readjusting its debt of \$150,000 so as to bear a lower rate of interest. The holders of the 10% notes are very generally taking the 7% bonds in payment of their debt, as the company is now in a much better financial state.

SAN JUAN COUNTY.

AMERICAN-NETTIE MINING COMPANY.—Concerning this company's property, Superintendent Bunce writes: That the drift in No. 3 level, Dunhum winze, is still following the quartz vein to the northwest, but without much success, though a pocket of ore was run into that produced 16 sacks. It looks well and seems to continue ahead. Nettie No. 2 is in very hard ground. A crosscut has been started to the dyke from this tunnel at a point 100 feet beyond Y, this being the place so much copper stained. The place in No. 2 beyond Y is still producing, and the last assay was 7.3 gold and 127 silver. The X upper line is also producing a small quantity of good ore. About 55 feet remains to be worked before winze No. 2 is reached. Nettie No. 3 from winze No. 11 is very open ground.

SAN MIGUEL COUNTY.

GOLD KING MINING COMPANY.—This company will hold a meeting early in January. The St. Louis Republic states that it is contemplated to reorganize on a basis of \$3,000,000 capital, shares of a par value of \$10. Just what it will cost the stockholders to come into this new company is not definitely known, but it is said that it would not be less than 50c. a share and probably more. During the construction of the electric plant and tramways the mine has been again leased, the lessees retaining 75% of the output and the balance going to the company, which is using it on its big plant.

(From our Special Correspondent.)

TELLURIDE, Dec. 11.

The completion of the Rio Grande Southern Railway to this point has greatly stimulated mining as well as other branches of industry. In the spring the road will be built through to Rico, a distance of about 25 miles. During next season it will be com-

pleted to Durango, a distance of nearly 200 miles from its initial, Ridgeway, on the Montrose & Ouray branch of the Denver & Rio Grande. It opens up one of the richest mining belts in the San Juan and paves the way for development. Already capitalists are taking hold with great confidence, and ore mines that have lain idle for years are being worked.

BELMONT.—This mine, in Marshall Basin, is showing a body of ore, running high in gold. It is a property that has undergone quite an amount of development, but, owing to its remoteness and the high rates of freight, it has not been a great or profitable producer. About 1,000 feet of development work has been done and an immense body of ore has been disclosed, some of which will warrant shipment to the smelter. The great mass, however, to be profitably handled must undergo concentration. A mill for that purpose is now under consideration. The property is owned by Judge Geo. P. Costigan and others of Telluride.

SHERIDAN MINING COMPANY.—The Union Mine in Marshall Basin is reported to have been sold to Eastern capitalists for \$400,000. It is one of the great Sheridan group. The Sheridan, Mendota, Smuggler and Union constitute a group which if not owned by this company will at least be controlled by it and worked under its management. The Sheridan is one of the great mother veins of this country, and has yielded \$3,000,000 in the last seven or eight years. Ground is now opened and facilities are established whereby its capacity will be largely increased. A tunnel has been run a distance of 3,500 feet, cutting the vein at a depth of 960 feet, disclosing a large body of silver bearing ore, much of which is of high grade. It is said there is ore enough in sight to give employment to 1,000 miners a lifetime. The dimensions of the tunnel are 7x8 feet. The rock encountered was of the hardest and most tenacious kind of conglomerate. Seventeen diamond drills are now boring into the trachyte above and below, to make the connection between main shaft and tunnel. Less than 130 feet intervenes. By January 1st it is expected that this connection will be made. Mining will then be resumed on all four of the properties. Openings on the four claims now amount to about 23,000 linear feet.

From the mouth of the tunnel to the company's mill, the Pandora, at the foot of the mountain, a double track tramway, 7,000 feet in length, is just receiving its finishing touches. It is the endless cable system, and dumps the ore on the upper terrace of the mill. The mill now contains 40 stamps and 23 Frue vanners. It is stated that the capacity will be doubled in the near future. Only the low grade ore is milled, as the high grades are shipped direct to the smelters. The four properties, together with their improvements and all appurtenances, have cost approximately \$2,000,000.

Almost the entire length of the San Miguel River placer claims have been staked, and with the advantages of the railroad it is expected that extensive mining operations will soon be carried on in that field. Placer gold has been found from the source of the San Miguel to its junction with the Dolores, a distance of about 100 miles, and in a primitive way placer mining has been carried on below Telluride for the past fifteen years. The principal properties are now in the possession of heavy companies.

SAN BERNARDO.—This is a group of four or five claims lying near Trout Lake. It was sold last winter to an English syndicate by Mr. J. W. Mason, the present manager. Mr. Mason is now making extensive improvements, building concentration works and putting the mine in shape for heavy production. The vein shows a large body of silver-bearing ore, much of it low grade and adapted to concentration. The railroad will run near it and with the completion of the mill profitable results are anticipated.

GEORGIA.

LUMPKIN COUNTY.

(From our Special Correspondent.)

BONY TANK MINING COMPANY.—This company has purchased the Briar Patch property, near Auranla.

FINDLEY.—A gold saving machine, claiming to be an improvement on the old method, has been placed at this mine for a practical test.

IDAHO.

SHOSHONE COUNTY.

HELENA AND FRISCO MINING COMPANY.—This company operates the Badger mine, located at Gem. It is developed by two tunnels, aggregating 2,178 feet, and its daily output of crude ore is 150 tons. The amount of ore in sight is estimated to be large. From the mine to the mill, the ore is conducted by a gravity tramway 600 feet long. Among the recent improvements in the company's concentrator is its increased capacity of from seven to 20 gigs. The daily output of concentrates exceeds 30 tons, and the daily net profit of the mine and mill is said to be \$1,000. The motive power of the mill is furnished by a Pelton water wheel under a 290 foot head. A. M. Esler, of Helena, is the superintendent.

SIERRA MINING AND MILLING COMPANY.—Articles of incorporation have been filed for the

the Sierra Mining and Milling Company, with John Hanley as President of the company; Andrew Kavanaugh, Vice President; H. S. Harris, Secretary; Wm. Daxon, Treasurer, and A. M. Strode, General Manager. The capital stock is six hundred thousand shares, at a par value of \$1 per share. The Sierra mine is situated south and adjoining the famous Gold Hunter mine, now supplying a concentrator with one hundred tons of rich ore daily. The ledge of the Sierra is on the same mineral belt or zone as the Morning, Evening, and the great mines of Canyon Creek and Nine Mile. The ore is of the same character as that of the Gold Hunter and Morning mines.

A good wagon road runs over the ground to the Northern and Union Pacific railways, less than half a mile distant. Mr. Hanley is a mining man of large experience, and has for the past two years been superintendent of the Gold Hunter mine. The headquarters of the company will be at Mullan, Idaho, and the business of the company will be transacted there. It will be but a short time until the Sierra will be one of the great mines of the Cœur d'Alenes.

TIGER.—This mine at Burk, it is said, has been closed on account of a strike by the union miners, who demand the discharge of all non-union men.

KANSAS.

CHEROKEE COUNTY.

A special report shows that during the week ending December 13th, the output of ore from the mining districts of Galena and Empire City was: Rough ore, pounds milled, 1,921,450; zinc ore, pounds sold, 585,000; lead ore, pounds sold, 100,000. Sales aggregated a total value of \$9,327.50.

MICHIGAN.

IRON—MARQUETTE RANGE.

LAKE ANGELINE.—The Ishpeming Iron Ore of December 13th states that a party of miners, while engaging in driving a drift to the north from the 33-foot level of this mine, west end, cut a vein of water which drove them out and filled a drift and shaft with 52,500 cubic feet of water in six hours, with the pumps working to their fullest capacity. The water is thought to be from the same source as struck in Section 16 mine of the Lake Superior Iron Company some years ago, and which showed a pressure of 120 pounds to the square inch. There is evidently a large body of water to the north of the ore that is finding its way through the banded ledge to the mine, and it evidently lies well above the point at which the drift cut it. The point at which it was cut is about 500 feet to the west of the lake.

IRON—GOGEBIC RANGE.

(From our Special Correspondent.)

HURLEY, Wis., Dec. 15.

ASHLAND IRON MINING COMPANY.—The reported finding of ore under the main dike in this company's mine, while true, does not have any great significance or importance, as the ore is very limited in extent, both in width and depth. The shaft, after passing through the main dike, was sunk through rock and mixed ore for nearly one hundred feet. Then a small lens of ore, resting on a small dike, was encountered, and since passing this small dike the shaft has been in Jasper.

ANVIL MINING COMPANY.—At the annual meeting of the Anvil Mining Company the old officers were re-elected as follows: C. E. Tarbell, president; R. L. Dingwall, secretary, Rudolph Nunnemacher, treasurer. During the year the company shipped about 45,000 tons of ore, and the season has been fairly profitable.

EAST DANGLER MINING COMPANY.—At a meeting of the directors of this company, operating at Ramsay, held at Ironwood recently W. L. Tourangeau was elected vice-president in place of Andy Byrnes, resigned, and T. E. Mays as treasurer, to fill vacancy caused by resignation of John Mullen.

METROPOLITAN IRON AND LAND COMPANY.—This company's work with the diamond drill on the town site of Ironwood has been delayed by the loosening of the sand pipe and consequent leakage of surface sand, etc. This drill hole is expected to strike the ore formation at a vertical depth of 1,200 feet.

The Norrie stock piles are already assuming large dimensions, although the force of men employed has been greatly reduced since the close of navigation.

COPPER.

The following table shows the outputs of the 12 copper producing mines of the Lake Superior district:

	November		11 months	
	1890.	1889.	1890.	1889.
	Tons.	Tons.	Tons.	Tons.
Calumet & Hecla.....	3,634	3,527	28,502	32,915
Quincy.....	550	611	4,604	3,575
Franklin.....	633	464	2,969	2,407
Osceola.....	305	253	2,649	2,373
Atlantic.....	243	207	2,238	2,338
Huron.....	85	110	1,009	1,259
Alouez.....	120	82	842	1,145
Kearsarge.....	80	92	818	943
Peninsula.....	61	...	612	...
Tamarack.....	742	590	6,153	6,563
Central, estimated.....	65	83	775	731
Copper Falls, estimated.....	50	...	150	409
Twelve months.....	6,538	5,917	61,362	54,638

From this it will be seen that the increase for the eleven months amounts to 6,704 tons of mineral.

ALLOUEZ MINING COMPANY.—The Calumet conglomerate has been struck on this property. At the place cut it is said to be two feet thick and rather lean. It is said to be the intention of the company to drift on the lode.

CALUMET & HECLA MINING COMPANY.—The reason given, unofficially, for the delay in declaring a dividend at the December meeting of this company's directors is that the company had \$750,000 due on its sales of copper, but did not press the payment on account of stringency in the money market, but, it is said, a dividend may be declared in January.

CENTENNIAL MINING COMPANY.—Everything is in readiness at this company's mine for the putting in of the new Ball head of stamps, which will be done immediately. The No. 4 shaft is down to the tenth level and looks good. The shoots of copper in No. 6 shaft dip to the north.

NATIONAL MINING COMPANY.—The operation of sinking No. 2 shaft of this company's property was begun on the 11th inst. Blasts under the eleventh level have exposed a large mass of copper.

PEWABIC MINING COMPANY.—The sale of this company's property by auction has been postponed a second time. It was to have taken place to-day, and is now announced for the 20th prox. It is said that the reason assigned is the monetary stringency and depreciated values of mining properties. It is said that while the delay strengthens the position of the mining companies interested it is detrimental to the interests of the small stockholders.

TAMARACK MINING COMPANY.—This company's mine produced 742 tons of mineral in November, against 720 tons in October, 704 tons for September, 700 tons for August and 590½ tons for November, 1889. The second shaft is adding to the output. A dividend of \$4 per share, or a total of \$200,000, has been declared, payable January 20th, to stockholders of record December 24th. The transfer books will be closed from December 26th to January 2d, both inclusive.

TAMARACK, JR., MINING COMPANY.—This company has cut the Calumet conglomerate in its No. 1 shaft. The following telegram from Superintendent John Daniell is self-explanatory:

HOUGHTON, Mich., Dec. 17, 1890.

Cut into conglomerate in shaft 1, Tamarack, Jr., Mining Company. Drill hole shows probably eight feet thick. Carries copper. I think prospect quite favorable, but do not find it rich throughout. Prefer to say middling from present limited opportunity to judge. Miners require two days to uncover hanging wall.

JOHN DANIELL.
The successful completion of this shaft has a second time proved the correctness of the theories of the Tamarack people. The whole Tamarack enterprise has brought about a revolution in Lake Superior copper mining methods, the stock of this company has never been listed on an exchange for dealings, although now it is thought that it will be. There has been quite a number of private dealings in it, however, at prices ranging from \$37 to \$50. The capital stock is 50,000 shares, par \$25, of which 10,000 shares are treasury stock. An assessment of \$10 per share has been levied, of which \$8 has been paid, and \$2 is due in May, or it may be prepaid without interest and certificates obtained. Some subscribers have paid in full and taken out certificates. The expenditures upon the property to date amount to about \$320,000, and the remaining \$80,000 (\$2 per share on 40,000 shares) will have been expended by the time the final installment is paid. The Tamarack (Sr.) No. 1 shaft and surface works cost about \$200,000. The two Tamarack, Jr., shafts will cost fully \$400,000. They are permanently timbered.

TECUMSEH MINING COMPANY.—Supt. Vivian is reported as having stated that the shaft on the Kearsarge conglomerate in the Tecumseh mine has cut the vein, and that the outlook is promising.

MISSOURI.

MACON COUNTY.

KANSAS AND TEXAS COAL COMPANY.—This company for a consideration of \$100,000 in cash and \$400,000 in 5% bonds has purchased the S. C. Wardell coal mines and lands in this county. The tract aggregates 11,100 acres. The company now owns 25,000 acres of coal lands in Macon County.

(From our Special Correspondent.)

JASPER COUNTY.

JOPLIN, Dec. 15.

Saturday evening closed rather a dull week in the mines of this district owing to the heavy snow storm the early part of the week, also a decline in the price of zinc ore, the average price only being about \$26.50 per ton. Lead is on the decline, the market closing at \$23.75 per 1,000. Following are the sales from the different camps as far as reported: Joplin mines, 904,610 pounds zinc ore and 125,280 lead; value \$15,221.

Webb City mines, 753,000 pounds zinc ore, and 55,930 lead; value, \$11,230.
Carterville mines, 1,030,106 pounds zinc ore and 58,930 lead; value, \$15,035.
Zincite mines, 203,400 pounds zinc ore, and 540 lead; value, \$2,770.
Oronogo mines, 43,000 pounds zinc ore; value, \$580.
Lehigh mines, 16,100 pounds zinc ore; value, \$224.

Galena, Kan., mines, 585,000 pounds zinc ore and 100,000 lead; value, \$9,337.50.

All districts, total value, \$54,436.50.
The total sales for the week from the Aurora, Mo., mines amounted to 100,000 pounds of lead, 86,000 pounds of zinc blende and 460,000 pounds of silicate that came to \$6,775.

MONTANA.

BEAVER HEAD COUNTY.

NEW DEPARTURE.—Mr. Lawrence A. Brown, according to the Denver *Republican*, has decided to ship ore from this mine to Denver for treatment. It will aggregate \$200,000 a year in value.

LONE PINE.—The 10-stamp mill belonging to this mine, which was shut down a short time ago pending negotiations with an English syndicate, has started up, and treats twenty-eight tons of ore daily, which, it is said, returns fifty ounces of silver per ton. Work is being pushed in the mine. The English syndicate's option expires on the first of the year. The property is appraised on a basis of \$525,000.

CASCADE COUNTY.

THE FLORENCE MINE.—This mine in the Neihart district is said to be looking finely. Ore is being raised whole, and its bins are filled with first-class. Several hundred tons of second grade have accumulated on the dump. The lower tunnel is in 385 feet. From the lower tunnel an upraise through ore all the way reaches the upper tunnel. Nothing is being shipped at present from this district, as the mine owners expect confidently the coming of a railroad, and hope thus for cheaper transportation and great saving in handling.

DEER LODGE COUNTY.

The Montana Union Railroad has filed a complaint in the District Court at Deer Lodge against the Anaconda Company. It is said that the railroad built all its side tracks, switches and spurs necessary to supply the Anaconda smelter and works at Anaconda on land virtually owned by the defendants, with the understanding that the same should be transferred to the former. It seems the mining company shows no inclination to come up to its part of the agreement, and the plaintiff now begs the court to enjoin such conveyance, or give a judgment of \$500,000 as compensation for the improvements.

EAST GRANITE MINING COMPANY.—The New Departure, Boston Montreal, Welch and Black Rock area group of claims in close proximity to the works of the Granite Mountain Company. It is alleged that a company styled as above is being formed to operate these claims. The names of Messrs. J. K. Pardee and Allan McDonnell are prominently mentioned in this connection.

BUTTE AND BOSTON MINING COMPANY.—The suit between this company as plaintiff, and John Sloan et al., locators of the Brown Girl quartz claim, was called for trial in the district court on the 10th inst. The question involved is the right of a discoverer to locate a quartz claim within the limits of a patented placer claim, the existence of a lode not being known to the discoverer of the placer claim at the time of location.

LION MINING COMPANY.—The car load of ore from this company's mine, which was tested at the Helena Sampling Works, did not meet the expectations of those interested in the result. The test, it is said, gave a return of 50 ounces per ton, when 75, or even more was expected. The recent strike in the mine's 300 south [see ENGINEERING AND MINING JOURNAL December 6th] is proving better than anticipated. At last account they were in 47 feet on the vein, which showed an average of over three feet of ore. The ore is said to be continuous and is growing stronger as drifting goes ahead.

RED LION MINING COMPANY.—It is stated on good authority that this company, operating in Georgetown district, is soon to be reorganized on an assessable basis. The ten-stamp mill at present on the ground is said to save on an average \$7.90 per ton, fully \$2 escaping in the tailings. With the proper machinery it is believed that 90% of the assay value of the ore can be saved. The last mill run covered seventeen days, and resulted in a clean-up of \$1,582—about \$93 per day. The mill has been shut down for the winter when a small force of men will be kept steadily at work in the mine.

JEFFERSON COUNTY.

CATARACT MINING COMPANY.—It is alleged that this company intends, in the coming spring, to put up a mill of sufficient capacity to reduce its own output. Report has it that during the summer a seven-foot vein was opened up which averaged 14% lead and 16 ounces silver per ton.

LEWIS AND CLARKE COUNTY.

MONTANA COMPANY, LIMITED.—Following is given a statement of this company's operations for November:

50-stamp mill, tons crushed, 3,801.....	\$47,000
10-stamp mill, tons crushed, 513.....	14,000
60 stamp mill, tons crushed, 2,800.....	25,300
Total.....	\$87,300
Working expenses.....	58,200
Balance.....	\$29,100
Estimated number of ounces contained in re-	

turns by assaying: Gold, 3,081 ounces; silver, 18,290 ounces.

PARK COUNTY.

Contiguous to Emigrant Gulch, in Park County, is a rich section of mineral country included in the recent secession from the Crow Indian reservation. The Minneapolis Mining and Smelting Company had even gone so far as to partially build a smelter when last year's resurvey established the fact that the district was within the reservation lines. This action of the government commission is expected to add materially to the resources of the State, as many valuable discoveries of gold, silver and lead have already been made there.

SILVER BOW COUNTY.

It is said that a syndicate of Butte mining men, is now being formed to purchase and develop a group of mines north of the city. The None Such, Excelsior, Amy and Silversmith, Goldsmith and Argonaut are expected to be included in the contemplated purchase.

ANACONDA COMPANY.—After a ten days' suspension of operations the Chambers Syndicate mines of Butte resumed work last week. No explanation has been made as to the cause of the shut down. The same force, nearly 800 men, have taken their old places.

LEXINGTON MINING COMPANY.—The report that the recent strike on the 1,500 foot level north vein was very low grade gains in weight from the fact that half the stamps of the Lexington mill have been hung up. The mill is at present running on ore from the upper workings of the Lexington and Allie Brown, and as these are not sufficient to keep it running continuously the company must depend to a considerable extent on custom ore.

MAJOR BUDD GOLD AND SILVER MINING COMPANY.—Recently 20,075 shares of the stock of this company were sold on the St. Louis Exchange to Mr. J. J. Mullally for 2½ cents a share. The 6-cent assessment levied will soon be due. It is said that indications now point to its payment on the 406,000 shares issued. Such action on the part of the stockholders will furnish means to pay off the company's indebtedness, and leave a sufficient fund to operate the mine for several months.

PARROT SILVER AND COPPER COMPANY.—This company was recently listed on the Boston Stock Exchange. The following sworn statement of the company's affairs is made by its officers: Incorporated under the laws of the Territory of Montana, for mining and smelting ores. Capital \$1,800,000; par value, \$10, non-assessable. About \$600,000 paid out in dividends up to date. No bonded indebtedness. Financial statement June 1, 1890: resources: permanent investment, \$750,000; mine, \$750,000; cash, copper and silver on hand, \$1,168,518.70; total, \$2,568,518.70. Liabilities: capital stock, \$1,800,000; bills and accounts payable, \$425,804.97; profit and loss, \$342,713.73; total, \$2,568,518.70. Directors: Franklin Farrel, president; S. F. Hauser, A. F. Migeau, J. E. Gaylord, secretary; A. M. Holter, George B. Turrell. Principal office, Butte, Montana; place of registration, Seventh National Bank, New York.

NEVADA.

(From our Special Correspondent.)
ELKO COUNTY.

SAN FRANCISCO, Dec. 10.

CONSOLIDATED CALIFORNIA & VIRGINIA MINING COMPANY.—The disagreement that has existed between the various companies and the Comstock Tunnel Company, which resulted in back royalties being withheld, has, after prolonged negotiation, been amicably settled. The terms of the agreement are that the Comstock Tunnel Company shall reduce its rates of royalty to 4% upon the net bullion products of the mines, and on this basis the contracts will be signed this month. Over \$200,000 is due the Tunnel Company, the larger proportion by the Consolidated California & Virginia, which has recently paid \$100,000 of its indebtedness.

COMMONWEALTH MINING COMPANY.—Bullion shipments on joint account of this mine and North Commonwealth are being made regularly, but owing to the unfortunate mode of rendering accounts in vogue at the Union Mill at Tuscarora, it is not possible to get exact particulars regarding the standing of the several bullion producers of the group. The Mill Company was organized but a short time ago, the principals being also the controllers of the principal mines in that district. It would seem right and proper that all accounts should be made by the Mill Company, so that a true showing might be made by the companies on the first of each month, as required by law, but this is just what is not done. The Mill Company renders accounts on the 15th of the month, or two weeks after the mining companies are required to have their financial statements on file.

FOUND TREASURE MINING COMPANY.—A special meeting will be held on the 29th inst. for the purpose of taking measures to dispose of stock now in the company's treasury. This property has been rather unfortunate, but as the Tuscarora group of mines is beginning to figure on the dividend paying list, efforts are being made to bring this one into line.

STOREY COUNTY—COMSTOCK LODGE.

CROWN POINT MINING COMPANY.—It is believed that below the 1,700 level the incline is in

good condition and that sinking work will be carried on more quickly than heretofore. A stationary Dow hoisting pump, to be worked by steam, is to be placed in position on the 1,700 level, which will take the water from the sinking pumps and send it to the Suro Tunnel level. Another Dow pump will be placed on the 2,000 level to do like service. The Dow contract is only to drain down to this latter level. It is known that on the 1,700, 1,900, 2,100, 2,300 and 2,700 levels of the Belcher and Crown Point good ore exists, the largest and most important body being, however, on the 2,700 level, which cannot possibly be reached for a very considerable time. Meantime, when work commences on the 1,700 level it is expected that Belcher, Crown Point and Yellow Jacket stock will climb up from the low figures now ruling.

EXCHEQUER MINING COMPANY.—An assessment of 25 cents per share was levied by this company to-day.

UTAH CONSOLIDATED MINING COMPANY.—An assessment of 25 cents per share was levied by this company yesterday, falling delinquent on January 9th.

NEW MEXICO.

GRANT COUNTY.

KEY MINING COMPANY.—Five more stamps are being added to the Key mill and will soon be dropping on ore. The main workings of the Key have now reached a depth of 600 feet, and the mine is in better shape to produce heavily than ever before.

NEBRASKA MINING AND SMELTING COMPANY.—This company has been organized with the following board of directors: Delinzo A. Walden, Henry A. LaSelle, Edgar C. Salishury and Augustine W. Bradt, of Beatrice, Neb., and Benjamin W. Davis and Idus L. Fielder, of Silver City. The stock is unassessable, and the indebtedness of the company cannot at any time exceed \$15,000.

NORTH CAROLINA.

(From our Special Correspondent.)

CABARRAS COUNTY.

MONTGOMERY.—Col. I. M. Taylor is investigating this gold property with a view toward purchasing.

DAVIDSON COUNTY.

PITTSBURG AND NORTH CAROLINA MANUFACTURING AND LUMBER COMPANY.—This company has been incorporated by S. H. Tatten, Alvert Reiser, John Kaiser and others for the purpose of mining gold, silver, coal, etc. The capital stock is \$50,000.

MOORE COUNTY.

KENDALE GOLD MINING COMPANY.—Capt. Wm. Jenkins of this company reports that the ore body in this company's mine is 20 feet thick, and assays a little over \$2 per ton. An improved style of amalgator is to be tried in the company's mill.

PENNSYLVANIA.

COAL.

At the examination of mine bosses held in Greensburg recently seven applicants out of 15 passed. In the Uniontown district, of the 19 only three had made the grade of 75% necessary in order to secure certificates.

The report of Mr. Josiah T. Evans, inspector of mines for the Sixth Bituminous District, has been issued. The district is composed of all the mines lying along and adjacent to the main line of the Pennsylvania Railroad between Beatty Station west, and Tyrone east, of Johnstown, and all the mines on the Northwestern Pennsylvania Railroad (formerly Bell's Gap Railroad), and all those mines lying along and adjacent to the Cresson & Coalport Railroad. The total production of coal for 1889 was 4,205,029 tons, an increase over last year's production of 930,433, as the district then stood, and an increase in the production of coke of 233,249 tons. The number of persons employed, 7,891; of this number 6,265 were underground and 1,626 surface workmen. The total production of coal was 3,205,629 tons; total production of coke, 907,000 tons. The number of men employed per fatal accident was 986; number per non-fatal accident, 607. Number of tons mined per fatal accident, 525,626; number per non-fatal accident, 323,463. Five of the fatal accidents were caused by fall of coal, and one by fall of rock. Seven of the non-fatal accidents were caused by fall of coal, two by fall of rock, and four by mine wagons.

The past week has been noted for the numerous miners' conferences which have taken place. On Monday, the 15th inst., those of the Houtzdale checkweighmen fund met in semi-annual convention to consider the advisability of insisting on an advance in mining rates; on the 16th the organized miners of the Philipsburg, Beech Creek and Osceola fields (District A., U. M. W. of A.) met in annual convention to consider the scale question; on the 17th the organized miners of District Q., U. M. W. of A., met in semi-annual convention at Altoona to talk over the question of an advance and other important matters. These districts take in all the coal territory in Clearfield, Center, Cambria, Jefferson and Indiana counties, from which coal is sent East. On the 18th inst., at Altoona, a conference was held between representative miners from the two districts named, attended by national officers Rea and Watchorn, and this conference (probably) decides on the scale to be taken on the 1st of January. While wel-

posted miners are of the opinion that a general advance in price all along the line will not be made.

CLEARFIELD CREEK COAL COMPANY.—Mr. Porter B. Zentmyer, of Clearfield County, was recently appointed receiver of this company.

DELAWARE AND HUDSON COAL COMPANY.—This company's mine, the Laurel Run, located near Wilkesbarre, caved in on the 17th inst. The cave-in covers many acres and wrecked many houses located thereon.

LEHIGH VALLEY COAL COMPANY.—All the collieries in the vicinity of Wilkesbarre, Pa., operated by this company, that have been idle for some time past resumed operations on the 16th inst. This gives employment to several thousand men and boys.

OIL.

Exports of refined, crude, and naphtha from the following ports, from January 1st to December 13th, were as follows:

	1890. Gals.	1889. Gals.
From Boston.....	2,468,866	4,378,913
Philadelphia.....	160,065,905	155,362,636
Baltimore.....	12,812,461	3,335,244
Perth Amboy.....	14,758,807	15,775,196
New York.....	440,206,797	422,492,730
Total.....	630,252,736	606,344,719

The production of the Willard oil field is about 11,500 barrels. There are 120 producing wells divided as follows among various lease holders: Ralshouse, 25; Ralshouse, 3; Kress, 2; Zingenheim, 5; Willison, 3; Moon, 4; Whitesell, 2; Whitesell, 2; Gibson, 2; Hunter, 1; Guyton, 2; Gibson, 1; Guyton, 1; Ringeisen, 1; Glum, 1; Hancock, 1; Gibson, 2; Anderson, 1; McCaslin, 1; Murray, 1; Harbush, 9; Whitesell, 7; Smith, 9; Young, 4; Ice Pond lot, 3; Biddikeeper, 2; Simpson, 4; McCaw, 1; Menke, 2; Bryant lot, 1; Whitney, 1; McClay, 1; McCaslin, 1; Bryant, 1; Scott, 1; Kietzer, 5; Fogle, 1; Price, 1; Wallan heirs, 1; Herr, 2; Anderson, 1; total, 120. Those which are drilling or have rigs up are located as follows: Whitesell, 2; Smith, 2; Young, 1; Simpson, 1; McClay, 1; Bryant, 1; Herr, 2; Ralshouse, 2; Kress, 8; Runge, 4; Ringeisen, 6; Kolhar, 1; Kietzer, 1; Marks, 1; Peebles, 1; Alston, 1; Kyle, 1; Jones, 1; S. Semple, 1; J. Semple, 1; Murray, 1; Horbush, 2. W. E. Griffith and the Forest Oil Company's Whitesell No. 2, which has produced altogether nearly 200,000 barrels of oil, and which has gotten down to 200 barrels a day, was agitated on the 15th inst., and it is reported responded by starting off at the rate of 100 barrels an hour.

The ENGINEERING AND MINING JOURNAL, in its issue of December 13th, noted the fact that a meeting of independent oil producers had been held in Pittsburg on the 10th inst. Later advices concerning this conference state that none of the parties interested will admit that any definite action was taken. However, it is acknowledged that a second meeting will be held in Pittsburg in the near future, at which an organization of independent producers will be perfected.

SOUTH DAKOTA.

LAWRENCE COUNTY.

The capacity of the chlorination works at Deadwood, it is said, is soon to be enlarged by the increase of a 20-ton per day plant, thus making a total of 60 tons. The machinery has all been contracted for, and is to be delivered within the next 40 days. Report has it that the result of a 10 days' run was a \$5,000 gold brick, and the success of the chlorination process is thus assured. These works have been under the management of Mr. John E. Rothwell, to whom the credit for this success is due.

It is stated that the 100 coke ovens commenced at New Castle some time ago will all be completed inside of two weeks. Each has a capacity of six tons, and thus the needs of the plants and reduction works now in existence will be well attended to. Messrs. Kilpatrick Bros. & Collins, owners of the mines, state that they are now shipping 70 carloads of coal every day. With the progressing work at the mines the outlook continues bright.

BIG MISSOURI MINING COMPANY.—With reference to this company it is alleged that they have purchased the Uncle Sam mill, situated at Perry, on the Black Hills & Fort Pierre Railroad, and will in future ship their ore over the above road to the mill for reduction. A skip is being built, and Superintendent Delano expects to hoist from the open cut on an inclined track, and they will shortly commence loading cars for shipment to the mill.

CALEDONIA MINING COMPANY.—Superintendent Skinner, of this company, in view of the fact that the vertical working shaft as at present located is inconveniently situated with regard to the ore body, being 2,000 feet distant from the stopes on the 500-foot level, recommends that a new shaft be sunk. He reports that a new level, 150 feet lower than the 500-foot or lowest level, will have to be opened before ore in sufficient quantities, or high enough grade to mill profitably, can be mined. He estimates that 300 feet of drifts will have to be driven from the proposed new shaft to strike the ore. He suggests that the mill be started up to run on custom work.

(From our Special Correspondent.)

DEADWOOD, Dec. 11, 1890.

The Fremont, Elkhorn & Missouri Valley, the Deadwood Central, and the Black Hills & Fort Pierre railroads are busily engaged in grading narrow gauge beds not only in all the principal gulches, but across and around the mountains, so as to strike close to the dumps of all the most desirable properties in the dry ore belt. The track of the Fremont, Elkhorn & Missouri Valley railroad will be laid to Deadwood by Thursday, the 18th inst., and the Burlington & Missouri River railroad should be in here from the southwest by January 1st, the track being now within 34 miles of the town, and only one fill in that distance awaiting completion. The branches and spurs, with the exception of that into the Carbonate camp, are being built as rapidly as possible.

PHANTOM FRACTION.—This property was located by McClintock, Maloney and Primrose several hundred feet to the southeast of the Richmond mine at Galena. A shaft four feet by eight feet inside the timbers is being sunk, with the hope of striking the Richmond contact of galena ore at a distance of about 150 feet. At the date of writing 125 feet of this distance had been traversed. The first 100 feet was through limestone, the next 15 feet marble. At this latter point, 115 feet, the porphyry, of the same character which overlies most of the ore in this district, was encountered.

PIEDMONT.—This group, situated at the head of main Bear Butte Creek, near Galena, and owned by H. C. Smith, Thomas Bentley, J. A. Harding and C. H. Jewett, all Deadwood business men, consists of three claims. The ore is dry, assaying from \$16 to \$20 a ton. By amalgamation process in a test run from \$7 to \$8 a ton has been saved. The foundation has the appearance of being vertical. In a shaft 120 feet deep ore was exposed 30 feet from the surface and continued in the shaft to its bottom. A tunnel 175 feet long has been run, and for about 100 feet ore is exposed on the walls and roof. The character of this ore is unlike any we have seen elsewhere in the Hills. It shows volcanic action more clearly. Running through it are narrow seams of white barren quartz, as well as seams of talc. It is very much more decomposed than the dry ore usually found in the Hills.

PIERCE.—This mine, which lies on the south of the Homestake property, has been transferred to Thomas Bell, vice-president of the Caledonia Mining Company and one of the directors of the Homestake Mining Company. Whether this mine, which has lain idle for some months, will now be operated could not be ascertained by the writer. One time the general rumor gained ground that the Miller Syndicate, in which the Swift Brothers, of New York, are largely interested, had bonded the property and would purchase it. But these negotiations, if such were ever carried on, came to naught.

RICHMOND AND GENERAL MERRITT COMPANIES.—These companies are at present under the superintendence of G. L. Havens and are being worked with a system heretofore unknown, which has given most encouraging results. The present workings are a main tunnel 1,400 feet in length, with side tunnels of 750 feet west of the main shaft and 309 feet south of it. The shipments during the last eleven months up to December (1st) have been as follows: Richmond, 325 tons first class, worth 97 ounces silver and \$6.50 in gold per ton. Richmond, 600 tons second class, worth 23 ounces silver and \$3 in gold per ton. Merritt, 450 tons first class, worth 48 ounces silver and 60% lead. Merritt, 60 tons second class, worth 22 ounces silver and 30% lead, and \$3 in gold per ton. The cost of shipment to, and reduction at, Omaha has been \$15 per ton. With the completion of the branch of the B. H. & Ft. P. R. R. to Galena, it is believed ores averaging \$12 can be shipped and treated.

SOUTH CAROLINA.

(From our Special Correspondent.)

LANCASTER COUNTY.

HAILE GOLD MINING COMPANY.—Mining is now being carried on at the Bequillin shaft of this gold mine. It is 180 feet deep, with three levels at 60, 120, and 180 feet respectively. Large bodies of ore are being stoped out between the 60 and 180 feet levels. The body ranges from 40 to 60 feet thick, and carries from 6% to 10% of sulphurets. It assays about \$4.50 per ton, of which value about 70% is in the sulphurets. In mining all the ore gravitates through chutes to the 180-foot level, where it is hoisted to the surface and dumped immediately into the crushers, going thence into the bin. Two air drills are used in driving the headings, while both single and double hand drills are used in stoping. All work is executed automatically and economically. Forty stamps are now crushing ore. The pulp after passing over plates is concentrated on 16 Embrey concentrators. This plant will be added to by the starting up on February 1st of the 20 stamps recently erected by the Mecklenburg Iron Company, of Charlotte, N. C., and four more Embrey concentrators. The concentrates are treated by the Thies chlorination process with admirable results (see ENGINEERING AND MINING JOURNAL of June 14th). The capacity of the present mill is 2,000 tons of ore per month. It will be increased

to 3,000 upon the starting of the new stamps. The chlorination plant has a capacity for treating the concentrates resulting from 60 stamps. The mine has been producing at the rate of \$100,000 per year. On the whole, the mine and mill are excellently equipped and economically conducted by Manager Thies.

The Bumala shaft is being cleaned out with a view to investigation as to the practicability of opening up work in it.

TEXAS.

BURNETT COUNTY.

(From an Occasional Correspondent.)

The Capitol Granite Quarries are situated about 1½ miles from Marble Falls on one side of a granite mountain covering about 84 acres and rising some hundred feet above the surrounding country. One of the peculiarities of this formation is that it appears to be distinctly stratified, the layers varying in thickness from 10 inches to as many feet. The lines of stratification follow the general outline of the mountain. Until recently these quarries have not been worked to any extent, although the company owning them was organized two years ago. During the last two months steam drills and polishing machinery have been brought to the ground, and the granite, broken by means of plugs and feathers, slides down the hill, where it is then handled by derricks.

UTAH.

SUMMIT COUNTY.

ALLIANCE MINING COMPANY.—The news reaches us that this company has struck the vein in its great tunnel. Starting about a mile up Empire canyon the tunnel has been driven a distance of 4,817 feet; a cross-cut was then run for 555 feet in a southerly direction, when the vein was cut. The total distance driven from the mouth of the tunnel to the intersection of vein is 5,372 feet. The strike of the vein is south 62° west, being only 12° different from the course, while the dip is about the same as in the upper workings. *The Park Record* says: Where cut the vein is comparatively barren, though it carries much good ores in bunches and is all highly mineralized. The walls are perfect and of the same formation as above. Drifting has commenced in both directions along the vein and a large chimney of ore may be encountered any day.

UTAH COUNTY.

Mr. Joseph A. Harris, et al., are interested in an anthracite coal deposit located in Slate cañon near Probo. It is said that the bed has been followed into the mountain 60 feet, increasing in thickness from five to eighteen feet in that distance. An assay shows its composition to be as follows: Volatile matter 20%, fixed carbon 70%, ash 10%, no water, and a trace of sulphur.

VIRGINIA.

(From our Special Correspondent.)

VIRGINIA-FLORIDA PHOSPHATE COMPANY.—This Company has been incorporated with a capital stock of \$120,000, with the privilege of increasing it to \$600,000. Mr. Paschal Davis is the President.

CRAIG COUNTY.

MANGANESE COAL AND IRON COMPANY.—This company, it is reported, will develop 20,000 acres of mineral land in this county.

ROCK BRIDGE COUNTY.

Moses Joy of Boston, Mass. will organize a stock company for the purpose of erecting works at the tin mines recently leased by him.

WEST VIRGINIA.

The troubles at the Monogalia mines at Fairmount have been settled and the men have returned to work.

WISCONSIN.

(From our Special Correspondent.)

GOGBEC RANGE.

DELLA MINING COMPANY.—This company's property lies on the Gogebic Syndicate lands west of Upson, Wis., and was explored four years ago by the Margaret Iron Mining Company. The shaft has been sunk 140 feet vertically, the last 20 feet being in clean ore, and the calculations, made from the exploring work, indicate that the foot wall will be reached at about 175 feet. When the ore was first encountered, a cross-cut south was put in for 15 feet, but was abandoned on account of the volume of water obtained. One hundred feet south of this shaft an old shaft was sunk 90 feet, and a cross-cut run north for 60 feet, the first 40 feet being mixed ore, and the last 20 feet clean ore. At a greater depth it is expected that the whole vein will "clean up," and prove to be merchantable ore. This property is one of the most promising developments of the past year.

The development of the Della will add new zeal to all the options on the west end of this range, and will assist the other properties in locating the vein on their own lands.

WYOMING.

ALBANY COUNTY.

(From our Special Correspondent.)

There are strong indications of an oil or gas strike in this valley. A well which is being bored for water is throwing up a saturated solution of salt water and gas. A second well is now in a lead-colored talc that exhales a strong petroleum odor.

FOREIGN MINING NEWS.

BELGIUM.

A cablegram announces that a cage operated in the Escuffiaul colliery at Hornu, Province of Hainaut, dropped from the mouth to the bottom of the shaft, carrying eighteen miners with it. All were killed.

CANADA.

PROVINCE OF NOVA SCOTIA.

(From our Special Correspondent.)

COAL.

Full returns of the season's coal trade are not yet to hand. So far the Gulf shipments from Cape Breton mines show an increase of 108,388 tons, from Pictou County an increase of 13,408 tons. The sales to Quebec, etc., by rail from Cumberland County, are not known, but will also show an increase. Shipments to other points also show increases, and the shipments to the United States, owing to the cargoes of gas coals recently forwarded, will be slightly in excess of last year. In Cape Breton County it is expected that the pits will be put in order for a large output next season, and that a larger amount of coal will be banked out than has been customary during recent previous winters.

In Cumberland County all the mines continue working full time, and anticipate a busy season. At the Joggins an important discovery of an overlying seam is reported.

ARCADIA COAL COMPANY.—This company, operating in Pictou County, is adding twenty-five more coke ovens to its plant.

GOLD.

The Killag mine is reported sold for \$50,000 to American capitalists, who have commenced work. The Caledonia Gold Company's mill at Malaga is reported to have been destroyed by fire. The loss is estimated at \$15,000. Fresh discoveries of auriferous conglomerate are reported from Colchester County, and preparations are being made for a large mill at Burnside. Elsewhere in the province there is little new to report about gold mining.

PROVINCE OF QUEBEC.

(From an Occasional Correspondent.)

BLACK LAKE, Dec. 13.

The following table gives the amount of asbestos shipped over the Quebec Central railroad from June 30th, 1881 to June 30th, 1890:

Year.	Tons.	Cwts.	Lbs.	Year.	Tons.	Cwts.	Lbs.
1882	410	5	35	1888	3,344	6	70
1883	724	2	20	1889	4,822	19	65
1884	1,104	4	5	1890	6,584	8	30
1885	1,327	3	20				
1886	1,882	8	45	Totals	22,725	9	30
1887	2,535	11	40				

This practically is the output of the Black Lake and Thelford districts during the years designated. In 1888 No. 1 asbestos sold at from \$70 to \$80 per ton; No. 2 from \$50 to \$60; No. 3 from \$25 to \$35. The current price ranges as follows: No. 1, from \$200 to \$225; No. 2, about \$100; No. 3, \$40 to \$65.

AMERICAN ASBESTOS COMPANY.—The mine owned by this company was purchased by Mr. E. Wartham, of Germany, who turned it over to the company afterwards formed. It is located on a hill, and is consequently provided with plenty of dumping ground. It has been equipped with an excellent plant of machinery, and has been well opened up by tunnels, levels, etc. The output since last January has been 1,200 tons. About 150 men are employed.

CUBA.

In our issue of September 6th we announced that Capt. W. E. Dickinson had resigned the superintendency of the Colby mine, Gogebic Iron Range, Michigan, in order to take charge of extensive iron mines in Cuba. From a private letter from Captain Dickinson, who is now in Cuba, we take the following: "The product of about 50 mines is shipped from the docks at Santiago. The mining work so far is but prospective, and nothing is known as to the extent of deposits. Seven miles of opening were found at the Bethlehem Iron Company's mines, and the development far exceeded expectations in extent and probable permanency of ore bodies. The company is shipping from 30,000 to 40,000 tons per month. The Spanish-American Company is building four and one-half miles of railroad to reach its mine, the Signa company eight miles. The Beracco company is just starting up. These mines cover an extent of about 20 miles of country. The iron range is pronounced very extensive and but little developed."

FRANCE.

The antimony mines of Montignat, in the Department of Allier, which had been abandoned since the beginning of the century, are now again being worked successfully. The present exploiters are Messrs. Lassalle and Brulot, of Montluçon, and about 400 tons of the antimonial ore were extracted during the last 12 months. The Montignat ore was famous in the beginning of this century for its high quality. It is said to be free from arsenic and to contain only traces of iron.

GERMANY.

At a meeting of miners' delegates recently held at Saarbrücken, Herr Freund, a mining councillor, promised, in the name of the German Government, that all reasonable demands should be considered.

MEETINGS.

Peer Mining Company, at No. 309 Montgomery street, San Francisco, Cal., December 26th at 1 P. M.
Peerless Mining Company, at No. 309 Montgomery street, San Francisco, Cal., December 26th at 1 P. M.
Weldon Mining Company, at No. 309 Montgomery street, San Francisco, Cal., December 26th, at 1 P. M.

DIVIDENDS.

Cœur D'Alene Silver Lead Mining Company, dividend No. 11, of (5) five cents per share, \$25,000, payable December 23d at the office of Hoge, Brownlee & Co., Butte, Mont. Transfer books close December 20th, and reopens December 24th.
Minnesota Iron Company, dividend of (1½) one and one-half per cent., payable January 2d, 1891, at the office of the company, Mills Building, New York. Transfer books close December 20th and reopen January 3d.

ASSESSMENTS.

COMPANY.	No.	When levied.	D't'nt' in office.	Day of Sale.	Am't per share.
Atlantic Con., Nev.	17	Nov. 11	Dec. 29	Jan. 19	.25
Confidence, Nev.	17	Nov. 17	Dec. 22	Jan. 12	.75
Con. New York, Nev.	4	Nov. 12	Dec. 17	Jan. 6	.15
Crown Point, Nev.	53	Dec. 3	Jan. 7	Jan. 28	.50
Exchequer, Nev.	30	Dec. 11	Jan. 15	Feb. 5	.25
Live Oak D., Cal.	12	Sept. 3	Dec. 10	Jan. 5	.05
Morzan, Cal.	14	Oct. 30	Dec. 6	Dec. 29	.10
Union Utah	1	Dec. 6	Jan. 10	Jan. 28	.01
Utah Con., Nev.	11	Dec. 9	Jan. 19	Feb. 9	.25
Wasboe, Nev.	1	Oct. 28	Nov. 23	Dec. 27	.05

MINING STOCKS.

For complete quotations of shares listed in New York, Boston, San Francisco, Baltimore, Denver, Kansas City, Minneapolis, St. Louis, Pittsburg, Birmingham, Ala.: London and Paris, see pages 733 and 734.

NEW YORK, Friday Evening, Dec. 19.
The tone of the market under review during the past week has been anything but healthy. It is the same old story, "in sympathy with the stringency in the money market," "the unsettled silver market," "the endeavors on the part of hard pressed holders to realize," etc., etc. The brokers all wear the same triple expansion smile which has buoyed them up during the past few months. They tell you "things will not always be thus"; the great majority are looking for better days.

A panicky feeling seems to prevail in the market. So little faith is manifest that an operation involving a thousand shares of some particular stock has a decided tendency to force it out of sight or consign it to temporary oblivion. This feeling however is not true of a few of those stocks which have been quite extensively traded in through the present semi-demoralized market.

This general condition of affairs has had a tendency to keep the speculative public out of the market, and in consequence sales have been limited. The buying this week has been executed largely by those long-headed individuals who, knowing that there is money in good stocks, are willing to wait a reasonable time for a realization. The total number of sales was 53,820 shares, against 73,785 shares for the preceding week.

Transactions in "coppers" were light. A tone firmer than that of last week seemed to prevail. Sales rose to meet the slight advance of Boston quotations. The news that the Calumet conglomerate had been struck in the Tamarack, Jr., Mining Company's No. 1 shaft did not bring out any Centennial or Kearsarge stock, as was the case on the Boston board. There was an inquiry for Tamarack on Tuesday and an offer several points above the then prevailing Boston quotations was made without bringing out a share.

Of the sales we note: Atlantic, 150 shares at \$16.33 to \$15.38; Quincy, 10 at \$85.75; Osceola, 20 at \$34.87; Kearsarge, 50 at \$12.25; Franklin, 20 at \$15.25.

From this it will be seen that the heavier shares were comparatively neglected.

The Comstocks were ruled by San Francisco quotations.

As will be seen by a reference to another column, the San Francisco market is anything but a healthy one. Certain local brokers are very bitter in their denunciation of the mill ring which is in control on the coast. One man says, "They are in control of three-quarters of the stock, and are looking for the last quarter;" another, "The ring is in control, and propose to run affairs to suit until the 'silver issue' is settled." This class of stocks were depressed through the week up to this forenoon, when upon the arrival of the San Francisco quotations there seemed to be a slight general rise. Of the stocks we quote: Alta, 700 shares at 75; Best and Belcher, 200 at 2.05 to 2.15, closing at the latter figure. Chollar sold 600 shares, closing at \$2.20, a drop of 20c. (during the week; Crown Point, 400 shares at \$1.50 and \$1.40; Comstock, stock, scrip and bonds were inactive. Ophir lost 45 cents during the week on sales of 400 shares, closing at \$2.85. Occidental experienced a single sale of 300 shares on Saturday at 30c. Potosi lost 30c. during the week on sales of 300 shares, closing

at \$4.20; Savage on sales of 200 shares dropped 90c., closing at \$1.75. Sutro Tunnel, Sierra Nevada and Union Consolidated were uncalled for. Utah was moderately active, declining \$1.50 during the week, and closing at 50c. on sales of 950 shares.

Of the Tuscarora stocks, Commonwealth has passed its dividend. No reason is assigned. A solitary sale of 100 shares at \$1 is to be recorded. The balance of these stocks were inactive.

Brunswick was one of the active stocks of the week. It opened at 11c., one cent lower than the closing of the previous week, at which price it closed on sales of 5,200 shares. Those interested in this property continue to speak encouragingly of the prospects. The stock quotations, however, do not show public confidence in these reports.

Middle Bar has been the active stock of the week. Sales of 14,300 shares at prices ranging from .05 to .06c. are to be recorded. It closed at 6c.

Horn Silver developed quite strong to-day on sales of 625 shares, the first in several weeks, closing at \$3. Of the stocks which are comparative strangers on the board, Fr. de Smet sold 100 shares at 23c. and Amador 200 at \$1.50. No particular significance is placed on either of these sales.

The Emmett Mining and Milling Company, of Grass Valley, Cal., which was listed a short time ago, has not yet been called. The capital stock is \$200,000, in as many shares.

Of the remaining free selling stocks 3,900 shares of Freeland was bought out at prices ranging from 32 to 25c., closing at the latter figure. Astoria closed at 4c. on sales of 5,200 shares, and Pecenix, of Arizona, 4,300 shares. It opened at 70c. and closed at 55c.

Boston. Dec. 18.

(From our Special Correspondent.)
There has been a better feeling pervading the market for copper stocks the past week with some advance in prices, notably the high-priced stocks, which were unduly depressed in consequence of tight money and forced liquidation. The reports received yesterday from the Tamarack, Jr., were of such an encouraging nature that quite a little boom was started in Centennial and Kearsarge, both of which mines, from their location, are likely to be benefited by any success attending that mine.

While we do not look for any material advance in coppers generally until the price of ingot copper has been definitely settled for the coming year. We do believe that it is time to buy stocks which have a good outlook and are selling much below their prospective value. Calumet and Hecla advanced from \$240 to \$257, with reaction to \$252, a net gain of \$12 over last week.

Tamarack, which sold last week at \$123, advanced on the announcement of a \$4 per share dividend to \$145.

Allouez has been very weak with considerable pressure to sell it, the price receding to \$3. There is a rumor that another assessment is talked of, but we cannot trace it to any reliable source. We think it a purchase at present price for a good profit in the near future.

Atlantic sold up to \$16½, but settled back again to \$15.

Boston & Montana advanced to \$43½ early in the week, but has been quite heavy the past two days, settling down to \$40 without reaction.

Butte & Boston fairly strong at \$13½@14. The new 400-ton concentrator has started up on a regular run.

Franklin sold at \$17, but lost the advance and declined to \$15½@16.

The sale of the Pewahic property has been again postponed to January 24th, 1891 (see mining news column).

Centennial, as before stated, had quite an incipient boom yesterday on the news and good buying orders, carrying the price up on purchase of about 4,000 shares from 14½@21. This was little too much to hold and to-day prices receded to \$18 with later sales at \$17½. The stock seems cheap at these prices compared with sales last May.

The advance in Centennial started buying of Kearsarge which is expected to share in the good fortune of the Tamarack and Centennial, advancing the price from \$11½@14½ with reaction to-day to \$11.

Osceola advanced during the week to \$36, but steadily declined subsequently to \$33, closing price to-day.

Quincy sold at \$90, but fell off to \$85 again same last week.

Favorable reports were received from the National this week, which advanced price of the stock to \$3½, with reaction to \$2½.

Santa Fe steady at 40@45c. Pewahic sold at \$10 for fifty shares; Tecumseh at \$2, and Bonanza at 50c.

Silver stock, a little more active, with sales of Breece at 40c; Catalpa at 25c; Dunkin at 65c., and Crescent at 14c.

By Telegraph.—Calumet & Hecla, \$251; Tamarack, \$137; Tamarack, Jr., \$41 to \$43; Boston & Montana, \$40½; Osceola, \$33; Butte & Boston, \$13½; Centennial, \$16½; Allouez, \$3, Kearsarge, 11½.

San Francisco. Dec. 10.

(From our Special Correspondent.)

The mining share market continues in a weak and demoralized condition. No improvement can be expected while the financial situation in the

East is so strained, and meantime the market will remain, for the most part, in the hands of the shippers. More than one local representative of New York brokers has been instructed to transmit no more orders for stocks unless accompanied by the full amount of purchase. The shorts took advantage of the situation during the latter part of last and the early part of this week, but got badly squeezed on Wednesday when Potosi, the leading favorite, sharply advanced from \$385 to \$650. An improvement in the mine was the excuse for this raid on the bearish element. The tendency to-day on the part of Potosi, and the two most sympathetic neighbors, Bullion and Chollar, is to decline, the first being quoted at \$460 and the last two \$165 and \$250 respectively.

Denver. Dec. 8.

Prices and sales for the week ending Dec. 13th.

Company.	Open- ing.	H.	L.	Clos- ing.	S.
Alleghany, Colo.	13b	*14b	13b	*14	23,900
Amity, Colo.	04½b	04¾	02	02¾	4,400
Banckok, C. B., Colo.	06¾	06¾	0¾	05¾	12,200
Bates-Hunter, Colo.	46b	*54	46	51	7,200
Brownlow, Colo.	05b	05¼	04½	04	1,900
Calliope, Colo.	18b	*20	18	19	3,500
Cash, Colo.	10b	10b	10b	10	600
Clay County, Colo.	94b	*98	80	83	1,300
Hard Money, Colo.	02b	02¼	02¼	02	9,700
Leavenworth.	70b	*73	70	70	3,400
Little Rule, Colo.	92b	93	93	93	50
Matchless, Colo.	200b	250b	200b	250	2,900
May-Mazzeppa, Colo.	114b	116	114	116	50
Mollie Gibson, Colo.	51b	104b	50b	50	28,700
Oro, Colo.	01½b	01½	03	03	600
Pay Rock, Colo.	08¾b	06¾	06	05¼	1,200
Puzzler, Colo.	07b	*73	70	70	5,000
Reed-National, Colo.	208½b	*21½	20	20	1,000
Running Lode.	25b	30	30	30	500
Silver Cord, Colo.	13b	13	12¾	12¾	209,200
Whale, Colo.	15b	20	19	18	5,100
Argonaut, Colo.	05¼b	05¼	03½	03½	1,400
Aspen United, Colo.	10b	10b	10b	10	25
Big Indian, Colo.	06¼	06¼	06	05½	2,300
Big Six, Colo.	35a	31b	25b	25	10,900
Century, Colo.	06b	*72	05	05½	11,100
Claudia J., Colo.	20b	*27	19	18½	10,800
Nat. G. & Oil Co.	02½	02½	02	02	8,700
Diamond B., Colo.	35b	40	36	36½	6,700
Emmons, Colo.	20b	*24	18½	15	1,500
Golden Treasure, Colo.	04b	04½	03¾	03¾	2,300
Ironclad, Colo.	12a	04	02½	02¾	2,700
John Jay, Colo.	143½b	116	14½	14	2,300
Justice.	04b	04	03	03	2,700
Legal Tender, Colo.	48b	50	48	50	2,100
Morning Glim, Colo.	30¼b	30¼b	25	20	1,400
Park Consolidated.	05¼b	05¼	04¾	04¾	2,000
Potosi, Colo.	39¾b	*65	52	52	21,600
Rialto, Colo.					

Total for the week..... 209,200

*Buyer 30 days. †Buyer 60 days. ‡Seller 60 days. Seller 30 days a Asked. b Bid.

Lake Superior Iron and Gold Stocks.

IRON MINING STOCKS.

Name of company.	Par value.	Bid.	Asked.
Ashland Iron Co.	\$25.00	\$60.00	\$65.00
Aurora Iron Co.	25.00	8.50	102.00
Champion Iron Co.	25.00	100.00	102.00
Chandler Iron Co.	25.00	40.00	42.00
Chicago & Minn. Ore Co.	100.00	145.00	148.00
Cleveland Iron Co.	25.00	17.00	18.00
Germania.	25.00	11.50	12.00
Jackson Iron Co.	25.00	110.00	125.00
Lake Superior Iron Co.	25.00	70.00	75.00
Milwaukee Iron Co.	25.00	5.50	6.50
Minnesota Iron Co.	100.00	83.00	87.50
Montreal Iron Co.	25.00	9.50	10.00
Norrie (Metropolitan)	25.00	75.00	78.00
Odanah Iron Co.	25.00	17.00	18.00
Pittsburg Lake Anzeline Co.	25.00	175.00	200.00
Republic Iron Co.	25.00	39.50	41.00

GOLD MINING STOCKS.

Name of Company.	Par value.	Lowest.	Highest.
Gold Lake M. Co.	\$25.00*
Grayling Gold & Silver Co.	25.00*
Michigan Gold Co.	25.00*
Peninsula Gold & Silver Co.	25.00*
Ropes Gold & Silver Co.	25.00	\$2.00	\$2.25

Quotations nominal.

PIPE LINE CERTIFICATES.

(Specially reported by Messrs. WATSON & GIBSON.)

Nothing has been doing in the oil market, though in the early part of the week a spurt occurred in quotations, but no spurt in actual business. The market was bid up to about 70 cents, but transactions were very few, and no public interest is manifested in the speculation. The Standard Oil Company undoubtedly controls the entire product in both Ohio and Pennsylvania, and individual speculators feel that they are entirely incompetent to cope with so great a financial power.

NEW YORK STOCK EXCHANGE.

Opening.	Highest.	Lowest.	Closing.	Sales.	
Dec. 13.....	64½	64½	64	64½	28,000
15.....	64½	64½	64½	64½	10,000
16.....	64	64	64	64	8,000
17.....	64½	64½	64½	64½	7,000
18.....	63¾	63¾	63¾	63¾	3,000
19.....	64½	71½	64½	71½	119,000

Total sales in barrels..... 175,000

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.

Opening.	Highest.	Lowest.	Closing.	Sales.	
Dec. 13.....	64½	65	64½	65	5,000
15.....	65	65	64½	65	54,000
16.....	65	65	63¾	63¾	34,000
17.....	63¾	35	63¾	64½	21,000
18.....	65	65½	64½	64½	57,000
19.....	65¼	72	65¼	71¾	116,000

Total sales in barrels..... 287,000

COAL TRADE REVIEW.

NEW YORK, Friday Evening, December 19.

Statistics.
STATEMENT of shipments of anthracite coal (approximated) for the week ending December 13th, 1890, compared with same period last year:

Regions.	Dec. 13, 1890.	Dec. 13, 1889.	Difference.
Wyoming Region. Tons	370,220	349,181	Inc. 21,039
Lehigh Region ..	127,895	81,612	Inc. 46,283
Schuykill Region ..	206,079	289,052	Dec. 82,973
Total..... Tons	704,194	719,845	Dec. 15,651
Total for year to date			
Tons.....	34,201,617	34,058,497	Inc. 143,120

STATEMENT of anthracite coal shipments for month of November, 1890, compared with the same period last year. Compiled from the returns furnished by the mine operators:

Regions.	November, 1890.	November, 1889.	Difference.
Wyoming Region.	1,819,280.00	1,803,649.14	Inc. 15,630.86
Lehigh Region ..	557,572.02	569,488.12	Dec. 11,916.10
Schuykill Region ..	1,124,634.19	999,675.16	Inc. 124,959.03
Total.....	3,501,487.01	3,372,812.02	Inc. 128,674.99

Regions.	For year, 1890.	For Year 1889.	Difference.
Wyoming Region	16,984,946.02	17,255,895.11	Dec. 270,949.09
Lehigh Region ..	5,842,448.12	5,802,756.16	Inc. 39,691.96
Schuykill Region	9,962,571.19	9,613,323.05	Inc. 349,248.14
Total.....	32,789,965.33	32,671,974.32	Inc. 117,991.01

The stock of coal on hand at tide-water shipping points, November 30th, 1890, was 608,479 tons; on October 31st, 1890, 632,498 tons. Decrease, 24,019 tons.

PRODUCTION OF BITUMINOUS COAL for week ending December 15th and year from January 1st:

Regions.	1890.		1889.
	Week.	Year.	
Phila. & Erie R.R.....	1,878	127,396	83,698
Cumberland, Md.....	486,375	3,638,603	2,953,686
Barclay, Pa.....	2,762	146,481	121,892
Broad Top, Pa.....	12,671	492,606	350,563
Clearfield, Pa.....	73,063	3,552,225	763,620
Allegheny, Pa.....	21,138	1,194,716	887,134
Beach Creek, Pa.....	47,241	1,773,421	1,476,930
Pocahontas Flat Top.....	30,530	1,785,490	1,647,383
Kanawha, W. Va.....	254,678	1,977,040	1,751,528
Total.....	330,366	14,687,978	10,025,934

* Estimated
† Week ending Dec. 10th.
‡ Week ending Nov. 30th.

WESTERN SHIPMENTS.			
Pittsburg, Pa.....	17,762	799,348	652,187
Westmoreland, Pa.....	27,977	1,116,590	1,488,386
Monongahela, Pa.....	10,923	522,352	358,244
Total.....	56,662	2,438,290	3,498,817
Grand Total.....	387,028	17,116,268	13,524,751

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending December 13th, and year from January 1st, in tons of 2,000 lbs.: Week, 112,387 tons; year, 5,101,364 tons; to corresponding date in 1889, 4,327,088.

Anthracite.
With the thermometer falling the hopes of coal men are rising. But the celerity of the former movement is not quite equalled by that of the latter. The fleeting vision of winter weather has become such an accustomed spectacle that the consumer doesn't scare off to the coal yards with that haste which might be expected of him, and which the retail coal dealer considers he has a constitutional right to expect in the third week in December. From frequent disappointment in expectations the coal dealer has arrived at that stage when he is brimful of thanks for the smallest favors. In November a brief cold snap gave rise to ejaculations of gratefulness, assuming that the domestic buyers must flock to the retailer and deplete his stock in the yard. A month later and the tune is changed. Now the coal dealer is thankful that a cold snap will tend to make the consumer scrape up and consume the siftings and leavings in his cellar preparatory to ordering in more coal. That is, of course, if we have any winter.

If present atmospheric and financial conditions should continue into the new year, it is probable that the rumor we reported two weeks since that some were advocating a return to the old method of disposing of their coal by auction, will approach nearer to verification. The sales agents generally report considerable difficulty in collecting accounts, and a consequent shortness of money. Large retail buyers, as well as not a few jobbers, who buy coal in quantities, generally pay for the same by notes. As the notes are now maturing, a large proportion of them are renewed, to run from 30 to 90 days more after a part of the old note has been paid. To make matters worse, these unpaid accounts have the effect of keeping the makers, no matter how "good" they may be, out of the market, and that in part accounts for the small volume of current business.

One healthy sign during the past week has been that retailers and large consumers have been making inquiries. That precedes buying, and the sales agents, as before remarked, are now disposed to appreciate very small favors. Whatever actual business is being done is at the September rates.

The outlook for next year, which is a very general subject of discussion, is no better and no worse than it was a month ago. The goose bone theorist promises intense cold until April. So does the corn-husk prophet. But the migrating wild-bird and others of this school of weather wise seers are equally confident that daisies will bloom in March, and that the business in heavy ulsters will fall to pieces.

Although the shipments for the week are 15,651 tons less than the corresponding week of last year, the total for the year to date, is this year 143,120 tons more than that of last year, while the month of November this year exceeds the same month last year by 128,672. This is not a particularly good showing considering that this has been a poor coal-taking year. The large stocks on hand, must necessarily keep the prices where they are, even in the face of a good winter, unless it should be unusually severe and protracted.

December prices are: Stove, \$4.40; egg, \$4.10; broken, \$3.75; chestnut, \$3.95. Buckwheat and pea are rather weak, as follows: Buckwheat, Lehigh, \$1.60; free-burning, \$1.60@1.75 on board; pea, \$2.25; free-burning, \$2.40@2.50. Pea and buckwheat are in good demand because scarce. The market could take a large tonnage at above rates, as inquiries and offers are plentiful. But until more of the larger sizes are moved there can be no relief in this respect. Reading has shut down one-third of its collieries and is running the rest on short time. For fiscal year ending November 30th Reading production was 500,000 tons ahead of 1889.

Bituminous.

Things are getting from bad to worse in the soft coal trade. Just when the demand is strongest the supply almost stops. It has been difficult for some months to secure adequate transportation facilities. The recent storms have practically stopped the carriage of bituminous coal for the time being and buyers and sellers in this market are in an awkward plight. Nothing short of the most fanciful price will secure soft coal for early delivery and some of the companies are short on their contract supplies.

The Cumberland region is blocked up with heavy snow drifts, and several mines in other localities have stopped working for the same cause. Coal-carrying on the Pennsylvania Railroad and the Baltimore & Ohio has almost stopped for the nonce, and the main line companies inform their customers that the outlook for an improvement in the early future is not encouraging. There is a talk, too, of raising the freight tariff on soft coal, which will necessarily find its echo in the rates charged to consumers. The recent gales at most shipping ports stopped the working on coal vessels, so that scarcely any relief is to be expected in that direction for some time. On Wednesday the gale here wrecked the coal barge "Agnes K." in the North River, which resulted in the loss of a great part of 500 tons of soft coal.

There is another rumbling of labor trouble in the Clearfield region this week. It has been understood by the miners, though not agreed to by some of the operators, that the new scale was to go into effect about January 1st. Yesterday forty delegates, representing 16,000 miners, met in Altoona for the purpose of formulating a new scale. They represented Center, Blair, Cambria, Somerset, Bedford, Huntingdon and Jefferson counties. Nothing definite has, so far as heard, been done beyond the appointment of committees. But there is an unmistakable feeling of uneasiness all round, and a lively anxiety to know whether the operators will join in convention, or what steps they will take. So far as could be learned in this city the operators seem to be firmly and unitedly decided against conceding anything until March, and even not then unless the decision is made binding by delegates from both sides in another convention.

At the prices we quote coal can be bought for spring and summer, but not for early delivery: At Baltimore, \$2.60 f. o. b.; at Philadelphia, \$2.65; at New York, \$3.25; alongside, \$3.45.

Boston. Dec. 18.

(From our Special Correspondent.)

Agents here do not appear dissatisfied with the condition of the anthracite market, but, on the contrary, report it to be as good as might be expected under the circumstances. The demand no doubt is small, and buyers do not find much trouble in getting coal at a price considerably below circular rates. Individual operators and commission agents are to blame for this. The passing business is small, however, and dealers say that it would not pay them to neglect their contracts for this trifle. Domestic sizes are in rather short supply, egg in particular being scarce. Coal is not coming forward very fast, but still the supply is ample for all present needs. F.o.b. New York stove is held by agents at \$4.40; chestnut, \$3.95; broken, \$4, and egg, \$4.25.

The demand for bituminous coal continues to be large. Offerings are small, and old customers are given the preference of this. Shipments are not coming forward as fast as might be expected, considering that the mines are again operating. The spot supply is very small and is cherished dearly by dealers. The price on cars is firm at \$3.75. The gas coal scare has subsided, and most of the gas companies are in possession of fair supplies.

Freights are ruling steady. There is a fine sup-

ply of vessels offering. The recent high winds are expected to have some effect on rates. From New York \$5@90c. is quoted, from Philadelphia, \$1.10 @ \$1.15, and from Baltimore, \$1.15.

The demand at retail is very good. One large retailer states that so far in the present month his sales have been about 100 tons more a week than they were at this time last year. All attempts to advance prices have failed and dealers are content with the prospect of a continuance of the present good trade.

The receipts of coal at the port of Boston for the week ending December 12th were 31,662 tons of anthracite and 29,693 tons of bituminous, against 35,260 tons of anthracite and 14,101 tons of bituminous for the corresponding week last year. The total receipts thus far this year have been 1,671,110 tons of anthracite and 926,790 tons of bituminous against 1,674,330 tons of anthracite and 941,055 tons of bituminous for the same time last year.

Dealers are having great difficulty in getting coal into the interior. The railroads are not able to handle the business.

Buffalo. Dec. 18.

(From our Special Correspondent.)

Seasonable weather has prevailed for several days, and a fair family consumptive demand for anthracite resulted. Dealers and others at nearby points sent in orders as well. Prices unchanged; supply fully adequate for all requirements at the leading trestles in our city. Money still very stringent. Bituminous coal in good request at nominally unchanged prices. There is apparently no difficulty in filling orders, as transportation facilities are better. The assortment of qualities and from special localities is all that dealers require.

There are rumors afloat here that the Rome, Watertown & Ogdensburg Railroad has fallen into the hands of the New York Central Railroad Company. If true, how will it affect the coal trade?

Trouble is brewing again among the coke makers and the consumers. Overproduction and firm prices, with limited demand from iron men, is the reported cause.

The Lehigh Coal and Iron Company has 70 coke ovens in operation at Superior, Wis., a recent increase of 20.

The quantity of coal received at Milwaukee this season just closed was 901,444 net tons, namely: 568,116 tons of anthracite and 333,328 tons of bituminous; last year, 608,269 and 288,179 tons respectively. Several vessels have not been able to unload their cargoes yet in consequence of lack of facilities.

Toledo received during the navigation season of 1890 by lake 133,813 net tons of anthracite coal and shipped 940,000 net tons of bituminous coal, which was 295,000 tons in excess of 1889.

The Canadian Pacific Railway consumes over 5,000 tons of coal per month.

Anthracite coal sells at \$9.25 per ton, delivered at Winnipeg.

The coal tonnage passing through the Sault Ste. Marie Canal during the season of 1890 was 2,176,585 tons, as compared with 1,629,197 tons in 1889; 2,096,358 tons in 1888, and 1,352,987 tons in 1888.

Chicago. Dec. 17.

(From our Special Correspondent.)

The anthracite coal trade in Chicago cannot be said to be in a satisfactory condition. As reported by the ENGINEERING AND MINING JOURNAL at the beginning of the season, when the local press predicted ten dollar coal, the foundations for the advanced prices made at that time were none too solid. A trade cannot now be looked for further than in meeting the demand for immediate requirements. Still, the local consumption is ample to create a large and profitable business for the trade. Prices remain firm and unchanged.

Wholesale prices are f. o. b. Chicago: Large egg, \$5.50; small egg, range and chestnut, \$5.75; Lehigh lump, \$7.

The retail prices fixed by the Chicago Coal Exchange are: Large egg, \$6.75; small egg, range and chestnut, \$7.

Business in bituminous coal continues active. A larger tonnage is being moved, and prices are well sustained.

Quotations per ton of 2,000 pounds are: Erie, \$4.25; Pittsburg, \$3.40; Indiana block, \$2.50; Blossburg, \$3.90; Greene and Sullivan county (Ind.), shaft, \$2.25@2.40; Jackson Hill, \$3.45; Jackson shaft, \$3.45; Hocking Valley, \$3.30; Youghiogheny, \$3.

The demand for coke is all that could be desired. The only drawback seems to be the demand, as yet unfulfilled, for additional transportation facilities.

Quotations are: Connellsville, 72 hours, \$5.20; domestic, crushed, \$4.10@4.25; Elk Lick, 72 hour, \$4.25@4.50 per ton of 2,000 pounds f.o.b. Chicago.

Pittsburg. Dec. 18.

(From our Special Correspondent.)

Coal.—Market firm, local demand active, with a slight increase in prices. Most of the mines in the pools are in full operation. There have been no shipments by the Ohio River on account of insufficient water. When the rise does come there will be a large shipment, as there is much coal loaded. Prices at the mines are as follows:

Per 100 bushels.		Per 100 bushels.	
1st pool	\$4.75@4.80	3d pool.....	\$4.00
2d pool.....	4.50@4.55	4th pool.....	3.50
Railroad coal,	\$5.00@5.50.		

Connellsville Coke.—It's the same old story. The car famine continues. Prices are still maintained; furnacemen are still demanding lower rates of transportation and lower priced coke. They contend that the low price of pig iron will not admit of paying present prices. A number of ovens have shut down owing to the want of cars. The number of idle ovens reach 3,250 and is on the increase. Active ovens reach 12,350. Small operators work five days, large ones generally six. Shipments west of Pittsburg, 3,475; east of Pittsburg, 850; Pittsburg and river points, 900; total, 5,225. Tonnage shipments aggregate 99,450. Pittsburg shipments fell over 400 cars.

The rates were for 2,000 pounds f. o. b. cars at ovens: Blast furnace coke, \$2.15; foundry coke, \$2.45; crushed coke, \$2.65.

Freights to Pittsburg, 70c. per ton; Maboning and Shenango Valleys, \$1.35; St. Louis, \$3.35; Cleveland, \$1.70; Chicago, \$2.75.

The United States Iron and Tin Plate Company of Demmer station, after testing the Archer fuel gas process for six weeks, have ordered a second plant. The Pittsburg Tube Works decided yesterday to put in three of the Archer plants; the Duquesne Tube Works is putting in one, and Smith Bros. are putting in one plant at the La Belle Steel Works.

METAL MARKET.

NEW YORK, Friday Evening, Dec. 19.
Prices of silver per ounce troy.

Dec.	Sterling Exch'ge.	London Pence.	N. Y. Cts.	Dec.	Sterling Exch'ge.	London Pence.	N. Y. Cts.
13	4.84	48½	1.04	17	4.84	49½	1.07
15	4.84	49	1.08	18	4.84	49½	1.07½
16	4.84	49½	1.08	19	4.84	49½	1.06

Silver took a sudden bound on Monday of 4 to 5 points on speculation purchases—parties anticipating additional and favorable legislation in the Senate during current year—but as progress in this direction has been slow, silver has reacted. The prevailing impression, however, is that the government will be authorized to increase its purchases, and silver will rule higher.

The United States Assay Office at New York reports total receipts of silver during the week to be 145,000 ounces.

The following dispatch has been sent out from Denver by the Associated Press: "David H. Moffat, ex-Senator Tabor and other millionaire mining men have decided upon a bold step to test the question of free coinage of silver under the present law. Arrangements have been made for an agent of Senator Tabor to have ready a bar of silver containing 1,000 ounces, accompanied by a certificate of its fineness from the mint. This will be presented to the Treasury Department at Washington, and a demand made that it be exchanged for coin. The demand will, of course, be refused, when a writ of mandamus will be obtained from the United States Court, and the matter will become the ground for a legal battle. The theory of this action is that the law and its interpretation are unconstitutional, and that the government has no right to refuse coin for bullion."

Silver Bullion Certificates.

NEW YORK STOCK EXCHANGE.

Date	Price.		Sales.
	H.	L.	
Dec. 13	105	104	160,000
Dec. 15	110	106	543,000
Dec. 16	109	107½	316,000
Dec. 17	108½	107½	266,000
Dec. 18	109	107½	211,000
Dec. 19	107½	106	387,000

Total sales 1,883,000

Domestic and Foreign Coin

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

	Bid.	Asked
Trade dollars	\$.80	\$.83
Mexican dollars	.82	.83½
Peruvian soles and Chilean pesos	.74	.76
English silver	4.80	4.84
Five francs	.94	.95
Victoria sovereigns	4.83	4.87
Twenty francs	3.83	3.88
Twenty marks	4.74	4.78
Spanish doubloons	15.55	15.70
Spanish 25 pesetas	4.80	4.85
Mexican doubloons	15.55	15.70
Mexican 20 pesos	19.50	19.60
Ten guilders	3.96	4.00
Bar silver	1.06	1.07

Foreign Bank Statement.

The governors of the Bank of England at their weekly meeting on Thursday made no change in its rate for discount and it remains at 5%. During the week the bank lost \$454,000 bullion, and the proportion of its reserve to its liabilities was lowered from 46.20% to 44.44% against an advance from 39.18% to 37.90% in the same week last year, when its rate for discount was 5%. The weekly statement of the Bank of France shows a gain of 3,550,000 francs gold and 2,075,000 francs silver, against, for the same week of last year, a

gain of 1,875,000 francs gold and 1,070,000 francs silver.

Copper.—The Lake companies have not yet officially declared their new price, and in the meantime the market is in a state of suspense. Supplies are not lacking however. On the contrary plenty of Lake copper is being offered in small and large quantities at 15½@15½ cts. and even somewhat less. But for export much lower prices have been accepted, and it said that some 400 to 500 tons have been sold, which will be shipped within the next four or six weeks. This is about all the business we have to report for this week, as the small sales made were entirely of retail character. Arizona copper can be bought at 13½ c., and casting brands at 13@13½ c., and it is quite evident that there is a considerable surplus of copper hanging over the market, which it will not be easy to dispose of unless larger sales for export can be made.

The foreign market is also in a very unsettled condition. G. M. Bs. opened on Monday at again lower prices, and business took place at £52 10s. @ 52 12s. 6d. for spot. Later on a firmer tendency prevailed and prices advanced to £54 5s for spot but the next day declined to £53 15s. @ 53 17s. 6d. spot, and £54 7s. 6d. @ 54 10s. three months. Refined and manufactured sorts have been very dull and we have to quote English tough at £56 @ 56 10s. best selected, £58 10s. @ 59; strong sheets, £65 @ 65 10s.; India sheets, £60 @ 60 10s. and yellow metal sheets, 6d. @ 6½ d.

The prices for brass and copper tubes have been reduced one half cent per pound, and solid drawn condenser tubes are now quoted at 9½ d. The reports received lately have not been at all cheering, and it is said that the brass trade is very dull in England as well as on the continent. The cable statistics again show a decrease for the first half of the month of about 1,600 tons.

The exports of copper during the past week were as follows:

To	Copper matte.	Pounds.
To Liverpool:		
S. S. Arizona	6,293 bags	689,264
To Havre:		
S. S. La Gascogne	2,302 bags	216,470
	Copper	20,000
S. S. La Gascogne	351 bars	101,021
		12,628

Tin.—The market has been dragging in spite of the good position of this metal. Shipments from the East have been exceedingly light, and amount in all for England and this country for the first half of this month to only 500 tons. There is no pressure anywhere to sell. Some arrivals have taken place lately, and the premium which was prevailing for spot has now to a large extent disappeared. The transactions have been of no importance, and we quote spot at \$20.80, December at \$20.60, January at \$20.50, February at \$20.50, and March at \$20.50.

The London market opened lower at £90 5s to £90 10s for spot, afterwards advanced to £92 15s but reacted again, closing to-day at £91 10s., £91 12s. 6d. Spot and £92 to £92 2s. 6d. three months prompt. The business reported from London has also been of little importance.

Lead continues difficult of sale and the market shows no improvement as yet. Some sales have been reported at 4'05 but the bulk of business was done at 4'10 to 15 cts. There is little disposition on the part of either buyers or sellers to come to business, and a good deal of spot lead has accumulated in this city, which, until consumers buy more freely, will stand in the way of any material improvement.

The London market is firmer, and has advanced for Spanish Lead to £12 17s. 6d. and for English to £3 12s. 6d.

St. Louis Lead Market.—Messrs. John Wahl & Co. telegraph us as follows: "The market is no better. Spot lead is difficult to place, and as low as 3'7½ has been accepted by sellers. Futures are obtainable at better prices, but none are bought."

Chicago Lead Market.—Messrs. Everett & Post telegraph us as follows: "The lead market is dull, and there is nothing doing. Prices are nominally four cents."

Spelter continues exceedingly scarce, and hardly anything can be obtained in this city. Prompt shipment from the West is obtainable at 5'95 @ 6 cts., and January shipment perhaps a trifle less. We understand that some orders have been in the market for delivery over the next three or six months, but could not be executed as manufacturers refuse to sell for such late deliveries. London is ruling steady at £24 for ordinaries and £24 5s. for specials.

Antimony is quiet, with very little business doing. We quote Cookson's at 19 cts., LX. at 17½ cts., and Hallett's at 16½ cts.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Dec. 19.

The iron market has not recovered one inch of the lost ground during the week. At the same time it has not retrograded. This because nothing has been done to give retrogression a chance. The trade is simply existing in a comatose condition, the small breaths of business keeping up the merest semblance of life until the electrical stir of a healthy revival shall animate it. It is stated that the improvement—which is a problematical quantity—in the financial situation has not yet

affected the iron trade. There is little reason why it should.

No one wants to use banking conveniences just now. Banking accommodations were a great boon when people were climbing over each other to get at iron. Then 10% for accommodation was a fleabite. Money was turned over almost daily and three or four dollars a ton was a common profit. Who cared whether he paid 10 or 15% for money then? The interest was not a measurable offset to the profit when iron was booming upward. But now, when 75 cents a ton profit on a fair order would be a fine stroke of business for the seller, 5% interest assumes the proportions of a considerable factor. Hence, scarcely any one wants to borrow except the weak producers.

A significant indication of the true condition of this market is that the Birmingham strike has not caused a ripple. And the news this morning, that the strike is expected to spread and cause the closing up of yet other concerns, has not had the least perceptible effect.

American Pig Iron.—While the market cannot be said to have weakened to any appreciable extent during the week, it is undeniable that buyers are not eager to meet sellers who are prepared to sacrifice a margin to enable them to unload. Holders generally want money, and would make small concessions to get it. But the probable uncertainty of the next few weeks does not encourage buyers. The only business being done is of the hand-to-mouth character. The report in the market that several lots of Northern iron are being pressed for sale gives consumers reason to believe that a week or two will see a slight fall in prices if money remains tight. We notice that the stock in the yard of the American Pig Iron Storage Warrant Company is steadily increasing, despite the moderate views of holders. The stock in the yard on December 2d, was 64,500 tons, and on December 16th, 64,900 tons. For the fourteen days ending December 16th, 600 tons was put in and only 200 tons taken out. The figures we quote are those of last week, but there is no doubt that a fair order would be filled at a shading of 25 to 50 cents a ton: Northern iron, No. 1 X, \$17.50 @ \$18; No. 2 X, \$16.50 @ \$17. Southern, No. 1 X, \$16.50 @ \$17.50, and No. 2 X, \$15.50 @ \$16.50.

Scotch Pig Iron.—The only transaction of the week was the arrival, and sale to arrive, of 100 tons of Eglinton pig at \$20.50, the price we quoted last week. It is noteworthy that several manufacturers of small hardware, such as locks, etc., have been in the market for small lots of the best American pig iron. They formerly used Scotch pig almost exclusively. Summerville at \$24.25, the price asked for small and moderate lots, finds no buyers. In Dalmellington 50 cents to 75 cents divides seller and buyer at \$22.50.

Spiegeleisen and Ferro-manganese.—A small sale of spiegeleisen is reported at \$29.50, which is half a dollar less than we quoted last week. Present stocks of ferro-manganese seem to hold out, as no transactions are claimed to have been made by holders, who ask \$65 @ \$67 for 80% metal.

Steel Rails.—The Eastern and Western mills are still working to perfect their organization, and a consummation is expected within a week. No current business has affected the price, which may be quoted as \$29. It is said that some small sales have been made at \$28.50 and less, but they are insignificant. Some of the mills are working on orders for spring delivery at \$28.50 @ \$29. Buyers can get all the steel rails they want for early delivery at these figures for cash or guaranteed equivalent.

Rail Fastenings.—The dealers are unanimous in reporting an entire cessation of business. Asked prices are: Spikes, 2'15c.; angle plates, 1'80 @ 1'90c.; bolts and square nuts, 2'75c.; hexagonal nuts, 2'95 @ 3c.; complete joint; iron and steel according to weight.

Tubes and Pipes.—The demand continues fair, with a slight seasonable falling off. The association has not yet decided upon the expected increase in their tariff, but the trade expects it as soon as business revives. The only work being done now is on contracts. We quote the following discounts on car lots: 47½% on butt, black; 40 on galvanized; 60 on lap, black, and 47½% on lap, galvanized; boiler tubes, 45 on 1½ inch and smaller; 50 for 2 inches and larger. Casing, all sizes, 50%.

Structural Iron and Steel.—The two concerns we reported last week as in this market with considerable offers of business went disappointed away. Manufacturers are not looking for any new business, as their works continue at full pressure. Many large buildings will be begun in the spring, and specifications are already in the hands of the draughtsmen. A large order for iron telegraph and electric light poles is about to be placed, and another is in preparation for Brooklyn. We quote: Universal plates, \$2.30; bridge plates, \$2.40; angles, \$2.20 @ \$2.30; tees, \$2.65; beams, \$3.10.

Merchant Steel.—Business is anything but active, but the falling off has not weakened prices. Prices are: Best English tool, 15c. net; American tool steel, 7½ @ 10c.; special grades, 13 @ 20c.; crucible machinery steel, 5c.; crucible spring, 3½ c.; open-hearth machinery, 2'60c.; open-hearth spring, 2'60c.; tire steel, 2'60c.; toe calks, 2'60c.; flat file, 4½ c.; mill file, 5½ c.; taper file, 7½ c.; first quality sheet, 10c.; second quality sheet, 8c.

Old Rails.—There is no inquiry for old rails at quoted prices, \$24 for tees and \$25 for doubles. It is asserted that offers at \$22 have been made, but no holder could be found who would meet sellers on that basis. Not a single transaction worth recording is reported for the week. There is little demand and the supply is very small.

Chicago. Dec. 18.

(From our Special Correspondent.)

The general business demoralization consequent upon the stress in financial circles has not remained entirely without its influence upon this market. While there is little actual depression the tone is not as confident as could be wished.

Contracts to run during the coming year are being placed slowly; the general disposition among buyers is to wait for further developments. At the same time producers and manufacturers are not pressing their products upon the market, thus indicating a confidence in the future.

Pig Iron.—Heavy consumption continues, although buying in all lines is light at present. Conservatism seems to be the general feeling. This policy will govern the trade for the near future, or until the financial situation resolves itself into a more satisfactory condition.

We quote to-day for cash per ton of 2,240 pounds, f. o. b. Chicago, for Nos. 1 and 2, Lake Superior charcoal No. 3, for car wheels, Nos. 4 and 5 for malleable, \$19@19.50; Lake Superior coke, Bessemer, \$18.50; Lake Superior coke, Bay View No. 1, \$16.50; No. 2, \$16; No. 3, \$15.50; Southern coke, No. 1, \$16@17; No. 2, \$15.50@16; No. 3, \$15@15.50; Southern charcoal, \$19@19.50; standard Southern car wheel, \$22@24.50; Ohio softeners, Hanging Rock, \$18@18.50; Jackson County, \$18.25@18.75; Hanging Rock, cold blast, \$26@28; warm blast, \$23@25; No. 1 Scotch, according to brands, \$26@27; American Scotch, \$19@20; Bay View Scotch No. 1, \$17; No. 2, \$16; Chicago Scotch, No. 1, \$17; No. 2, \$16; Emma Scotch, \$19@19.50; black band, Hubbard Scotch, \$18.75; Hazelton, \$18.75; soft silvery, \$17; Wellston, No. 1, \$18.75; No. 2, \$18.25; Hamilton, No. 1, \$19.25@19.75; Norton, No. 1, \$17.50@18; Zanesville, No. 1, \$18.75@19.25.

Structural Iron.—Orders from the country are slow. The phenomenal pleasant weather has so facilitated building industries that there seems to be no cessation in Chicago's consumption. Prices are firm. For car lots, f. o. b. Chicago, iron and steel angles, \$2.35@2.40; Universal plates, \$2.55; sheared plates, \$2.50; tees, \$2.85@3; beams and channels, \$3.20. Store prices are: Angles, \$2.50@2.60; tees, \$3@3.10, and beams and channels, \$3.50@3.70.

Bar Iron.—New business is quiet, and no change is looked for at present. Mills are holding at a rate price of \$1.07½, the card extras f. o. b. works. Local mills quote \$1.85@1.90 for bar half extras. Store trade is fair at \$2.10@3.20, according to quality and quantity.

Black Sheet Iron.—A limited demand is reported, particularly for special sizes: prices are \$2.90@2.95 for No. 27 at mill. Stores quote \$3.20 for No. 34; \$3.30 for Nos. 25 and 26, and \$3.35 for No. 27.

Galvanized Sheet Iron.—A little more inquiry is noted, and business continues fair. The discount on both cheap and standard brands is 60% on Juniata, and 60 and 5% on charcoal from store. Jobbing lots are quoted according to the quantities ordered.

Merchant Steel.—Business is fair, without any change in the heretofore favorable condition of this market as reported. We quote as follows: Tool steel, \$7.75@8; specials, \$12@25; open-hearth machinery, \$3, Bessemer machinery, \$2.50@2.70; open-hearth spring steel, \$2.75@2.80; tire, \$2.50@2.60; toe calk, \$2.70@2.80; sleigh shoe, \$2.40@2.50; cutter shoe (T. & B.), \$2.65@2.70; crucible sheet steel, \$7@10; crucible spring, \$3.75.

Plates, Tubes, etc.—Business is quiet with unchanged quotations. Tank iron, \$2.70; tank steel, \$2.90; heavy sheets from 10 to 14, \$2.90@3; steel sheets 10 to 14, \$3.25@3.50; shell iron, \$3@3.25; flange iron, \$4@4.25; flange steel, \$3.50; sbell steel, \$3.25; boiler rivets, \$4@4.25; fire box iron and steel, \$4.75@5.50; boiler tubes, 4¼ inches and larger, 52½%; 2 to 4 inches, 50%, and 1¾ inches and smaller, 45%.

Nails.—Some mills refuse to meet the low prices quoted for round lots of steel cut from factory. Jobbers quote \$1.85 for car lots and \$1.90 from stock. Wire nails are selling at \$2.40 in small lots. Mill lots are sold only for immediate shipment.

Steel Rails.—The recent changes in railroad managements do not point to any extended work in the way of railroad construction or tracklaying. A cessation of railroad construction cannot now, as it would have done a dozen years or so ago, influence to any great extent the iron and steel market of to-day. As viewed from this center, small sales are reported, and all have a hopeful feeling for next year. The market is firm at \$30@31.50, f. o. b. Chicago.

Railway Track Supplies.—The market is at a standstill. Very little business is being done in this direction. Prices are: Iron fish plates, \$2.05@2.10; steel fish plates, \$2.25@2.30; bolts, square nuts, \$3@3.05; hexagon nuts, \$3.10@3.15; spikes, \$2.20@2.25.

Scrap Iron.—The market is unchanged, with a continued depression; values are nominal only. We quote as follows: country mixed scrap, \$15.50@16.50, according to condition; No. 1 mill, \$14@14.50; light wrought, \$9@9.50; borseshoes, \$19@19.50; axles, \$26; cast machinery, \$12; stove plates, \$9.50@10; borings, \$8@8.50; wrought turnings, \$13.50; No. 1 railroad shop or forge, \$21.50; track scrap, \$19.

Old Wheels and Rails.—Business is unchanged; small sales and a gloomy outlook is reported. Old iron rails are held at \$25@25.50 f. o. b. Chicago; steel rails are steady at \$18, according to condition; guards and frogs, \$15.50; old car wheels remain quiet at \$17@17.50.

Cleveland. Dec. 18.

(From our Special Correspondent.)

The ore market remains much in the same condition that it has for several weeks past *i. e.* in a state of inactivity. It is not possible that a week passes that there are not some sales of iron ore, but if there have been sales the past week the quantity sold has been small and for immediate delivery. The furnace men have practically covered their want up to the opening navigation, 1891, and but very little ore will be purchased for use this winter.

The proposed shut-down of the blast furnaces in the Mahoning and Shenango Valleys on January 1st, as mentioned in my letter of last week, is almost a forgone conclusion. Committees from the two valleys held conferences at Pittsburg, Tuesday, with the representatives of the railroads tapping the coke regions, and with the coke producers, urging a lower price for coke and lower freight rates. Nothing was accomplished at these conferences, and it is feared that no concessions will be made, either by the coke makers or by the railroad companies, in which case some thirty stacks in these two valleys will probably go out of blast on January 1st.

Prices remain nominally the same, and last week's quotations may be repeated:

Specular and Magnetic Ores.

Bessemer, 66@69 per cent	\$6.00
Non " 60@64 "	5.00@5.50
" " 66@69 "	5.00@5.50
" " 62@65 "	4.50@5.00
" " 57@60 "	3.75@4.25

Soft Hematites Dried at 212°.

Bessemer, 62@65 per cent	\$4.75@5.25
Non " 58@61 "	4.25@4.75
" " 55@63 "	3.50@4.25

Above prices are for deliveries on docks at Lake Erie ports.

Louisville. Dec. 16.

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

The pig iron market continues to rule quiet, with scattered sales in small amounts. In view of the stringency of monetary affairs, buyers continue conservative and purchase sparingly. If large orders were offered concessions would doubtless be made. Shipments on old business continue large and railroads are taxed to their capacity to furnish a sufficient supply of cars.

Hot Blast Foundry Irons.—Southern coke, No. 1, \$15@15.25; No. 2, \$14.25@14.50; No. 3, \$14@14.25. Mahoning Valley, lake ore mixture, \$17.75@18.75; Southern charcoal, No. 1, \$17@17.50; No. 2, \$16.50@17. Missouri charcoal, No. 1, \$18@18.50; No. 2, \$17@17.50.

Forge Irons.—Neutral coke, \$13.75@14; cold short, \$13.75@14; mottled, \$12.75@13.25.

Car Wheel and Malleable Irons.—Southern standard brands, \$22@23; other brands, \$18@19. Lake Superior, \$22.50@23.

Philadelphia. Dec. 19.

(From our Special Correspondent.)

Pig Iron.—There is no new feature with reference to this market worth referring to. Business is restricted to small lots of first-class forge, and foundry at about \$18 for No. 1, though somewhat lower grades are \$17. No. 2 is held at \$17, poorer quality having sold down to \$16. Good forge iron could be ordered at \$15, and cinder at \$14. The consumption continues heavy and buyers are buying as little as possible. Bessemer is offered a little under \$18.

Steel Billets.—Sharp competition for large lots has depressed prices to \$23.50@29. Small lots are quoted at \$29@29.50.

Muck Bars.—Very little business will be done until January. Sales have been made at \$29. Buyers offer \$28.50.

Merchant Iron.—A few manufacturers want immediate business, and have offered to furnish iron in 100-ton lots at 1.70, though most small lots are selling at 1.80@1.85.

Nails.—There is very little movement in nails. Present prices are \$1.75@1.85.

Skelp Iron.—An offer of 1.80 for grooved was accepted. Sheared is quoted at 2.10. There is, however, not much business to report for this week.

Sheet Iron.—Card rates and discounts are unchanged. Business is very slack.

Wrought Iron Pipe.—The report that concessions have been made on small lots is generally denied by manufacturers.

Plate and Tank.—Large buyers refuse to place

orders at the shaded quotations of the past two weeks, believing better prices will be named after January 1st, while mill men assert that there will most likely be an improvement in prices.

Structural Material.—The fact that but little new business is being done is no reason in the opinion of brokers and mill men why lower prices should be offered. Former quotations remain unchanged.

Steel Rails.—The local demand has been insignificant. Quotations, \$28@29. Lower prices, it is asserted, have been accepted by an interior mill. To-day's meeting may enable the makers to baronize on several points. A good deal of business is expected.

Old Rails.—Quotations are given to day on a basis of \$24.50 at tide-water.

Scrap.—Remains the same as quoted last week. No. 1 railroad at \$22.50.

Pittsburg. Dec. 18.

(From our Special Correspondent.)

Raw Iron and Steel.—Business during the week has been exceedingly dull, sales being the smallest recorded for a long time. We have seldom noticed less inclination to operate; even brokers who sell on commission show little anxiety to transact business. Under these circumstances the volume of business must necessarily be light. Prices of raw iron are extremely low compared with former years. For example, Bessemer pig, with sales at \$16.50@16.75, against \$24 for the same time last year. Furnace men contend that prices must advance or transportation on coke and iron be reduced. In the absence of one of these conditions, they will be compelled to close down until prices reach a reasonable figure.

Furnace owners from the Shenango and Mahoning Valleys held a meeting at the Monongahela House and demanded a reduction in freights and coke; how this matter will terminate will be learned later. Several parties spoken to are of the opinion that no reduction will be made. The coke men realize that they have a good thing.

Steel Billets.—The sales of some large blocks have been made to Eastern parties who have evidently made up their minds that prices have about touched bottom; the deliveries were for the next four months.

The fuel question is causing considerable anxiety among manufacturers generally. With the exception of ten, all the mills in Allegheny County have changed from gas to coal; only four of the ten have a full supply. Three beats instead of five is the usual thing. A large number of puddling furnaces have been changed back to coal; others will follow. The city is fast assuming her old position as the "Smoky City." The coal wagon can now be seen in all streets and at all times. On Saturday a big gas well was struck in the first ward, Pittsburg, on the Exposition Grounds, on the bank of the Allegheny River. It is being thoroughly tested, and may result in something very important.

A substitute for coal is now what is wanted; many experiments are being worked up. The Linden Steel Company is making a test of the Archer fuel gas process that is so far very gratifying. The machine for generating the fuel is inclosed by a structure 7 feet square. As yet no definite idea of success or failure can be given; the managers are hopeful and satisfied. Manager Hurrell says it is probable all the furnaces at the works would be modified to admit the use of Archer fuel, and that natural gas would be ostracised. To use Archer gas it is necessary only to change the flues in a chamber of a furnace. Mr. Hurrell is sanguine the experiment will be a success.

For the present there is no disposition to do business, and parties generally are availing themselves of the opportunity to take stock, make repairs, etc., with the expectation of resuming active operations as soon after New Year's as circumstances will permit. The following sales will describe the situation:

Coke Smelted Lake and Native Ores.

2,000 Tons Bessemer, at City Furnace	\$16.75 cash.
1,000 Tons Bessemer	16.75 cash.
1,000 Tons Bessemer	16.50 cash.
1,000 Tons Bessemer	16.30 cash.
800 Tons Grey Forge	14.50 cash.
500 Tons Grey Forge	14.75 cash.
200 Tons Grey Forge	14.75 cash.
100 Tons Grey Forge	15.00 cash.
100 Tons No. 3 Foundry	15.25 cash.
100 Tons No. 1, Silvery	16.50 cash.
75 Tons White Iron	14.50 cash.
100 Tons No. 1 Foundry	17.25 cash.

Charcoal.

100 Tons No. 2 Foundry	22.50 cash.
100 Tons No. 1 Foundry	23.50 cash.
75 Tons Cold Blast	28.00 cash.

Muck Bar.

1,000 Tons Neutral, December, January and February	30.00 cash.
750 Tons Neutral, February	29.50 cash.
1,000 Tons Neutral, January	30.00 cash.
500 Tons Neutral	30.00 cash.
2.0 Tons Neutral	30.00 cash.

Steel Slabs and Billets.

15,000 Tons Red Billets, to go East, taken from the works, next four months	25.00@26.25 cash.
1,200 Tons Billets, January, February	25.25 cash.
1,000 Tons Nail slabs	25.00 cash.

Crucible Steel.

1,000 Tons Crucible Steel, net	25.50 cash.
350 Tons Narrow Grooved	1.97½ 4 m.
250 Tons Wide Grooved	2.02½ 4 m.
200 Tons Sheared Iron	2.30 4 m.

Steel Wire Rods.	
250 Tons American Flves, January	38.00 cash.
150 Tons American Flves, December	37.50 cash.
Old Iron Rails.	
500 Tons American T's	26.50 cash.
250 Tons American T's	26.25 cash.
200 Tons American T's	25.75 cash.
Scrap Material.	
300 Tons Old Car Wheels, Gross	18.00 cash.
200 Tons No. 1 Wrought Scrap, Net	21.50 cash.
300 Tons No. 2 Wrought Scrap, Net	19.50 cash.
100 Tons Cast Borings, Gross	11.50 cash.
100 Tons Wrought Iron Turnings, Net	14.50 cash.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, Dec. 19.

Heavy Chemicals.—The prevailing tone of the market for heavy chemicals continues pretty much as reported last week. Arrivals have been fairly large, but everything is rather quiet, although there are no accumulations of any article. Quotations show little change and are as follows:

Caustic soda, 60%, 3'30c. @ 3'35c.; 70 to 74%, 3'10c. @ 3'12½c.; 77%, 3'07½c. @ 3'10c.

Carbonated soda ash, 48%, 1'55 @ 1'60c.; 58%, 1'57½ @ 1'60c.

Caustic soda ash, 1'57½ @ 1'60c., according to brand.

Sal soda, to arrive, 1.10 @ 1'12½c.

Bleaching powder, 1'75 @ 1'80c.

Acids.—The trade in acids is, as is usual at this time of the year, very quiet. No further news from the remnants of the Knickerbocker Chemical Company "combine" has been received. In reply to numerous inquiries from readers of this paper, we would say that in our annual review of the acid market, which will be published in our statistical number, on January 3d, 1891, will be found a succinct but complete history of the acid combination known to fame as the Knickerbocker Chemical Company.

In regard to the scheme for bettering the trade which is said to be hatching, nobody seems to know anything about it. As a matter of fact, an important official of the "combination" intimated recently that the said scheme existed only in the brains of the representatives of the trade papers. Nevertheless it is certain that some plan was under consideration.

We quote this week acid per hundred pounds in New York and vicinity: Acetic, \$1.72½ @ \$2.20; muriatic, 18°, 90c. @ \$1.20; muriatic, 20°, 95c. @ \$1.50; muriatic, 22°, \$1 @ \$1.75; nitric, 36°, \$3 @ \$3.25; nitric, 40°, \$3.50 @ \$4.50; nitric, 42°, \$4 @ \$4.75; sulphuric, 60°, 70 @ 80c., and sulphuric, 66°, 80 @ \$1.

Fertilizing Chemicals.—Everything is quiet in this market. Occasional sales occur at the prices below quoted, but no transactions of any magnitude are reported. Our quotations this week are:

Acid phosphate, 80c. per unit for available phosphoric acid. Charleston rock, undried, \$7 @ \$7.50 per ton; kiln dried, \$7 per ton; f. c. b. vessels and cars, \$7.25 @ \$7.75, according to time of delivery. Freight by rail from Charleston to New York, \$2.75 @ \$3 per ton. Charleston rock, ground, \$11.75 @ \$12.25, ex-vessel at New York.

Muriate of Potash.—Arrivals of muriate this week aggregate some 1,000 tons, all of which were sold and have gone into consumption. Our quotations are as follows: \$1.77½ for New York; \$1.80 for Philadelphia; \$1.82½ for Southern ports, and \$1.85 for Gulf ports.

Nitrate of Soda.—It is reported that owing to recent arrivals nitrate has been offered at \$1.70 @ \$1.75, ex-vessel, but dealers profess that quotations are \$1.80 ex-store, and sales at this price are reported. The market on the whole has been quiet.

Brimstone.—Quotations are very much lower, prices for December-January and January-February shipments being \$25.50 for the best unmixed seconds and \$25 for the best unmixed thirds. The market is easier, but is still very quiet, since buyers are prudently waiting for a still further decline before they give large orders.

NOTES OF THE WEEK.

The dissolution of the old chemical firm of French, Richards & Co., of Philadelphia, at the first of the year is announced. Clayton French, who died last July, failed to provide for the continuance of the business. An offer from Harry B. French to purchase the business from the other partners, Samuel H. French, Jr., and C. Stanley French, was declined, and the business is now being liquidated by C. Stanley French. The firm was started in 1844 by Clayton French, who was then but twenty years of age, and W. H. Richards. Fire twice destroyed their establishment, but by pluck and energy the business was continued.

Liverpool.

Dec. 10.

(Special Correspondence by J. P. BRUNNER & Co.)

Since our last report there is very little change in the position of heavy chemicals, the demand still being light, although a fair number of inquiries for forward delivery.

The Alkali Company has made no change in quotations, either for prompt or future delivery. Soda Ash, owing to extreme scarcity, continues in a strong position at 1½d. to 1¾d. per degree per hundredweight for December. For first six months of 1891, 1½d. paid for 58° carb. ash.

Soda Crystals less active, but nothing to be had at under £3 10s. per ton for any position.

Caustic Soda is meeting with very little attention from buyers, but as there are no secondhand parcels offering at present the union prices have

to be paid for anything required. Quotations remain unchanged, the following being minimum prices for December or January-March, 1891, viz: 80%, £10; 70%, £11 5s.; 74%, £12 5s.; 76%, £13 and up. For January-June, July-December, or all 1891 delivery, minimum quotations are 5s. per ton under above figures.

Bleaching Powder.—There are very few orders on the market, but manufacturers are independent, being cleared out for this month, and £7 remains "Union" minimum quotation for any delivery, although possibly an odd lot might be picked up from second hands at a shade less money.

Chlorate of Potash is in fair request at 5½d. per pound for any delivery, and higher figures talked of.

Bicarb Soda is less active, and price is reduced. Makers now ask £7 per ton and upward for one hundredweight kegs, according to brand and quantity, with the usual allowances for larger packages.

Sulphate of Ammonia is firmer owing to Short's covering, and £11 to £11 2s. 6d. per ton are about the nearest spot values for good grey 24% in double bags f. o. b. Liverpool.

BUILDING MATERIAL MARKET.

NEW YORK, Friday Evening, Dec. 19.

Brick.—The supply of brick at the present moment is very great, and the demand is very small, the consequence of this state of affairs being a very quiet market. Quotations for Haverstraws, \$5.50 @ \$6 per thousand, with some "extras" at \$6.25. Uprivers are not coming forward just now; we quote them, nominally, at \$5.25 @ \$5.50. The same statement applies to Jersey brick, at \$4.50 @ \$5.25. Pale is quoted at \$2.50 @ \$3 per M.

Lime.—This market is very quiet. There is very little lime here and very little on the way. The kilns in the Rockport, Rockland and Thomaston (Maine) lime district are all out. There is some lime there, but manufacturers have decided not to ship it to this market till there is a good demand for it. Our quotations this week are: Rockland lime, common, 90c., and finishing, \$1.10; St. John, common and finishing, 85 @ 90c.; Glen Falls, common and finishing, 90c. @ \$1.10.

Cement.—The cement season is at an end. The year 1890 has been about the same, in general features, as 1889. Quotations are altogether nominal. We give: Rosendale, \$1 @ \$1.10; Portland, American, \$2.25 @ \$2.50; foreign, \$2.35 @ \$2.75; special brands, \$2.60 @ \$2.85; Roman, \$2.80 @ \$3; Keene's coarse, \$4.50 @ \$5.50; Keene's fine, \$7.25 @ \$8.50 per barrel.

IMPORTS AND EXPORTS OF METALS AT NEW YORK FROM DECEMBER 6 TO DECEMBER 13 AND FROM JANUARY 1.

IMPORTS.			Steel Blooms, Billets, and Slabs. Tons.			Steel and Iron Rods. Tons.			Dana & Co. Tons.		
Week.	Year.		Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Spelter.			Warren, J. M.	5,771	Abbot & Co.	1,219	Abbott & Co.	10,650	Dana & Co.	15,97	
Amer. Metal Co.	422		Wheeler & Co.	1,663	Baldwin Bros. & Co.	2	American S. Co.	865	Foley, F.	50	
Hendricks Bros.	50		Whittemore & Co.	555	Dana & Co.	1,670	Bacon & Co.	551	Geisenheimer & Co.	35	
La Marche's Sons, H.	175		Wolf & Reising.	2,077	Dolge & Co., A.	1	Henderson Bros. & Co.	50	Henderson Bros. & Co.	14	
Lewisohn Bros.	175		Wright, Peter & Co.	227	Downing, R. F. & Co.	109	Bunnell & Co., J. H.	50	Hertsheim, L.	300	
Meyer, G. A. & E.	79		Total	42,267	Henderson Bros.	1	Carey & Moen Co.	603	Holt, H. N.	200	
Milne & Co.	123		Corres. date, 1889.	69,095	Holt & Co., H. N.	4	Cooper, Hewitt & Co.	371	Irvin & Co., R. L.	50	
Muller, Schall & Co.	883		Jan.	2,188,137	Martin & Co.	80	Dana & Co.	1,553	Naylor & Co.	13,158	
Total	1,290		Feb.	2,225	Milne, A., & Co.	275	Dodge & Co., A.	135	Perkins, C. L.	1,452	
Corres. date, 1889.	10		Mar.	2,928	Naylor & Co.	3,444	Downing & Co.	135	Sachs & Richmond.	2	
Pig Lead.	Lbs.		Apr.	1,480	Richards & Co., C. B.	61	Galpin, S. A.	1,241	Whittemore, H. & Co.	95	
Amer. Metal Co.	98		May.	115	Roehling's Sons, J. A.	2,074	Greely & Co., E. S.	33	Total	717	
Atlantic W. Lead Co.	100		June.	80	Ward & Co., J. C.	198	Hastings, W. & S.	4	Corres. date, 1889.	72,258	
Bruce & Cook.	125		July.	20	Wolf & Co., R. H.	60	Hazard Mfg. Co.	21			
Caswell, E. A.	747		Aug.	175	Total	9,199	Holt & Co., H. N.	3	Iron Ore.	Tons.	
Hendricks Bros.	50		Sept.	6	Corres. date, 1889.	130	Jacobus, E. Y.	8	Bal, Jacob.	67	
Hooper, B. F.	250		Oct.	85	Bar Iron.	Tons.	Lee, J. & Co.	1,832	Bergen Point Chem-		
Leroy Shot & L. Co.	95		Nov.	51	Abbot & Co., Jere.	1,026	Lillienberg, N.	300	ical Co.	4,950	
Naylor & Co.	10		Dec.	85	Bacon & Co.	1,319	Lundberg, G.	50	Bowring & Archibald.	5,292	
Paulsen, Wm.	1,000		Jan.	55	Crocker Bros.	77	Lundell, C. G.	207	Earnshaw, A.	4,677	
Schultz & Co., A.	290		Feb.	75	Dickerson, Van	6	Milne & Co.	135	Ennis, Andrew	438	
Sheldon, G. W.	149		Mar.	115	Dusen & Co.	6	Muller, Schall & Co.	102	Johnson & Co., R. de	15,276	
Thatham Bros.	395		Apr.	1,000	E. J. Jacobus	335	Naylor & Co.	7,933	Hill, Frank	700	
Total	1,290		May.	1,568	Fuller, Dana & Fitz.	11	Page, Newell & Co.	1,303	Johnson & Co., L.	5,030	
Corres. date, 1889.	10		June.	10	Holt, H. N.	123	Roehling's Sons, J. A.	2,937	Total	1,133	
Tin Plates.	Boxes.		July.	4,421	Lillienberg, N.	566	Sanderson & Son.	1	Corres. date, 1889.	36,430	
Adams & Westlake Co.	70		Aug.	20	Lundberg, G.	3,174	Schulze & R.	251		12,001	
Bruce & Cook.	1,491		Sept.	75	Milne & Co.	2,076	Taylor, N. L.	16	EXPORTS.		
Byrne & Son.	1,000		Oct.	20	Muller, Schall & Co.	606	Temple & Lockwd.	6	From Jan. 1 to Nov. 1, 1890.		
Central Stamp Co.	61,354		Nov.	124	Naylor & Co.	1,213	Wallace, W.	5	Copper.	Pounds.	
Coddington & Co.	5,332		Dec.	134	Page, Newell & Co.	1,855	Wessel & Co.	21	Abbott & Co., Jere.	3,061,058	
Cohn & Co.	849		Jan.	50	Plenty, J.	23	Wiehusch & Ho.	4	Amer. Met. Co., L.	940,385	
Con. Fruit Jar Co.	120		Feb.	75	Wilson, J. G.	3	Wood & Niebuhr.	25	Barber & Co.	13,750	
Corbierre F. & Co.	195		Mar.	13,224	Total	133	Wolf & Co., R. H.	3,569	Belmont, Aug. & Co.	1,125,901	
Cort & Co.	5,905		Apr.	11,996	Corres. date, 1889.	697	Total	320	Boker, C. F.	212,501	
Crooks & Co.	1,009		May.	250	Old Rails.	Tons.	Corres. date, 1889.	2,073	Burgess & Co.	454,353	
De Mill & Co., H. R.	381		June.	807	Bowring & Archibald.	340	Dana & Co.	10,609	Funch, Edye & Co.	135,374	
Hickson, V. D. & Co.	4,365		July.	250	Dana & Co.	1,219	Hendelbach, Ichel-		helter & Co.	672,608	
Fenton, D. E.	4,491		Aug.	100	Frankfort, M.	10,412	Lewisohn Bros.			251,478	
Haberman, F.	170		Sept.	170	Henderson Bros.	300	Muller, Schall & Co.			33,750	
Herring, Chas. E.	1,000		Oct.	100	Henderson Bros.	300	Paulsen, Wm.			50,000	
Iron Clad Mfg. Co.	597		Nov.	1,515	Hertsheim, L.	650	Sawyer, W. T. & Co.			22,796	
Lalance & G. M. Co.	9,118		Dec.	5	Mosle Bros.	123	Seaman, S. H.			66,950	
Lazard Bros.	1,048		Jan.	150	Naylor & Co.	3,099	Ward, J. E. & Co.			100,000	
Lehmaier, Schw'z & Co.	200		Feb.	600	West, H.	398	Wiechers, J. F.			41,507	
Merchant & Co.	204		Mar.	76	Wiechers, J. F.	600	Wilms & Thune.			112,004	
Mersick & Co.	3,443		Apr.	30	Total	17,451	Total			7,274,914	
Morewood & Co.	42,062		May.	400	Corres. date, 1889.	10,609	Corres. date, 1889.			2,088,338	
Newell Bros.	416		June.	2,409	Copper Matte.					14,773,304	
Payne, S. H. & Co.	394		July.	92	American Metal Co.	3,072,073					
Pratt Mfg. Co.	95,271		Aug.	101	Lewisohn Bros.	6,333,600					
Phelps, Dodge & Co.	15,295		Sept.	186	Nichols, Geo. H.	2,637,202					
Schneider & Co., J.	3,365		Oct.	101	Paulsen, Wm.	1,149,592					
Shepard & Co.	315		Nov.	186	Wilms & Thune.	2,848,706					
Shepherd & Co., W.	500		Dec.	80	Total	13,671,170					
Standard Oil Co.	51,828		Jan.	394	Corres. date, 1889.	2,924,369					
Taylor, N. & G.	1,429		Feb.	106		34,901,130					
Thomson & Co., A. A.	1,295		Mar.	106							

DIVIDEND-PAYING MINES.

NON-DIVIDEND PAYING MINES.

Main table with columns: NAME AND LOCATION OF COMPANY, CAPITAL STOCK, SHARES (No., Par), ASSESSMENTS (Total levied, Date and Amount of last), DIVIDENDS (Total paid, Date & amount of last), and NAME AND LOCATION OF COMPANY, CAPITAL STOCK, SHARES (No., Par), ASSESSMENTS (Total levied, Date and am't of last).

G., Gold. S., Silver. L., Lead. C., Copper. *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 Con. Virginia 240,000,000. ** Previous to the consolidation of the Copper Queen with the Atlanta, August, 1885, the Copper Queen had paid \$1,350,000 in dividends.

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

Main table of New York Mining Stocks Quotations, divided into Dividend-paying and Non-dividend-paying mines. Columns include Name and Location of Company, dates from Dec. 13 to Dec. 19, and Sales figures.

Ex. dividend. † Dealt in at the New York Stock Ex. Unlisted securities. ‡ Assessment paid. § Assessment unpaid. Dividend shares sold, 15,770. Non-dividend shares sold 38,150. Total New York, 53,920. † Omitted on the 12th inst.

BOSTON MINING STOCK QUOTATIONS.

Table of Boston Mining Stock Quotations, listing company names, dates from Dec. 12 to Dec. 18, and sales figures.

Boston: Dividend shares sold, 14,187. Non-dividend shares sold, 16,152. Total Boston, 30,339.

COAL STOCKS.

Table of Coal Stocks, listing company names, par value of shares, and prices for dates from Dec. 13 to Dec. 19.

San Francisco Mining Stock Quotations.

Table of San Francisco Mining Stock Quotations, listing company names and closing quotations for dates from Dec. 12 to Dec. 18.

**Sales in New York, 36,290; in Philadelphia, 35,580. Total sales, 199,374.

STOCK MARKET QUOTATIONS.

Baltimore, Md.

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

Birmingham, Ala. Dec. 17.

Table with columns: COMPANY, Bid, Asked. Lists companies like Ala. Coal & I. Co., Ala. Conn. C. & C. Co., etc.

Pittsburg, Pa. Dec. 18.

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

St. Louis. Dec. 17.

CLOSING PRICES.

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

Table listing various stocks and commodities like Major Budd, Mexican Imp, Mickey Breen, etc.

Trust Stocks. Dec. 19.

The following closing quotations are reported to-day by C. I. Hudson & Co., members of New York Stock Exchange: CERTIFICATES. Am. Cotton Oil. Tr. Repts. \$154@161

Foreign Quotations.

Table with columns: COMPANY, Highest, Lowest. Lists foreign companies like Almada, Mex., Amador, Cal., etc.

Paris. Dec. 4.

Table with columns: Belmez, Spain, Callao, Venez., etc. Lists Paris market prices.

CURRENT PRICES.

Those quotations are for wholesale lots in New York.

Table with columns: Acid, Muriatic, Nitric, etc. Lists current prices for various chemicals.

Large table listing various minerals and chemicals like Ammoniates, Blood, Bones, Bone black, Kieserite, Fish guano, etc.

Table listing various salts and minerals like Salt Cake, Saltpeter, Silica, Soda, Caustic ash, etc.

THE RARER METALS.

Table listing prices for rarer metals like Aluminum, Arsenic, Barium, Bismuth, Cadmium, Calcium, etc.

BUILDING MATERIAL.

Table listing prices for building materials like Bricks, Jerseys, Up Rivers, Haverstraw, etc.