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CONTENTS.

THROUGH the courtesy of the Director of the Mint we are enabled to give, from advance proofs, a full abstract of his report for the fiscal year ended June 30th, 1888. As usual this document contains a vast amount of valuable information from which we shall make liberal extracts when the full report is issued.

The production of the precious metals in the United States in the calendar year 1887 was, gold, fine ounces 1,596,375, coining value $33,000,000, as compared with 1,881,250 ounces, and $35,000,000 in 1886; silver, fine ounces 41,208,305, coining value $53,357,000, as compared with 39,445,812 ounces, and $51,000,000 in 1886. The production of gold therefore declined $2,000,000, and that of silver increased about an equal amount, or our rate of production of the precious metals was practically unchanged.

The gold production of the world has declined during the past four years, while that of silver has increased about $25,000,000, one of the apparent reasons why the relative value of silver should have declined as it has.

Taking the report of the Director of the Mint in connection with that of the Secretary of the Treasury, an extract from which is also printed on another page, they show that the amount of United States coined gold and silver is more than the country needs. The device of issuing paper certificates to get the coin nominally in circulation has, as the Secretary states, both advantages and serious disadvantages, and we fully indorse his views where he says that "further accumulations of the precious metals should be only in the form of bullion, which can be kept more safely and counted more easily than the coin." Moreover, this would greatly reduce the mint expenses. Then, if one well designed and properly equipped mint were established, we would be able to fill the demands of the government in an economical and creditable manner, which is absolutely impossible by means of the antiquated and costly appliances with which the Director of the Mint has now to make shift."

WE are indebted to the Local Committee of the Arkansas Society of Engineers, Architects and Surveyors for a copy of the programme of the second annual meeting of the society, held at Little Rock, November 22d. The papers presented at this meeting covered a wide range of subjects, without transcending the limits of appropriateness and timeliness, as the following list of titles will show: The Fort Smith Sewerage System Municipal Improvements in Little Rock; Water Works of Texarkana; Concrete in Construction; Water Works of Rogers, Ark.; Electric Lighting of Towns; Arkansas Timber; Proportionate Errors in Surveying; What is Generally Expected of a Surveyor; Descriptions in Deeds; Construction of Hydraulic Rams; and Highway Bridges. The programme comprises excellent maps of Little Rock and of the State of Arkansas, and is provided with an artistically designed and neatly "blue-printed" cover.

The *menu* of the annual dinner is entitled "Specifications of Banquet to be Eaten According to Contract," and is drawn in the form and printed in the style of those usually uninteresting, though important, documents. From the foundation "which shall consist of meats, laid as follows," and the "interstices to be well filled with," etc., etc., through the water-table, superstructure, ornamentation, inside finish, plastering and hardware ("of best selected mixed nuts") to the final "two flowing coats of French coffee," which the whole is to receive, the banquet is built up with conscientious solidity. We cannot, however, forbear to express our surprise and admiration, that our friends were able to contract for such a feast. The average Engineers of this part of the country would certainly have had to expand for it. The circumstance affords a striking proof of the capacity of Arkansas engineers, at least when properly supported by architects of similar build, and surveyors of equally comprehensive views!

DRAWING ELECTRO DEPOSITED COPPER WIRE RODS.

We drew attention in our issue of August 18th to the importance of the new Elmore process for making copper tubes, recently introduced in England, and from the tests then cited and fully reported by us, there remained no question of the superiority and economy of this process over welding or even cold drawing. Now we have to record the adaptation of this electro-depositing system of tube making to the manufacture of electrolytic wire rods.

It has heretofore been necessary to melt electrolytic copper before it could be drawn in wire, and this melting is always accompanied by a deterioration in the conductivity of the metal.

Mr. ELMORE has arranged machinery by which an electro-deposited copper tube is cut spirally into a square wire which is afterwards drawn to the required thickness. The length of these wires, of course, is regulated by the length, thickness, and diameter of the tube, but there appears to be no difficulty in obtaining them of sufficient length for all practical purposes. On another page we give the details of the results obtained from the new wire, and it appears to show as good results in the desired directions as were already found in making boiler tubes.

ECUADOR.

We have read in some of our contemporaries, what we believe to be very erroneous and misleading statements with regard to the credit of this South American State, and concerning the propects of entering into satisfactory commercial relations with it, and the opening it affords for American enterprise in railroad building. Instead of the glowing picture of the paper referred to, we learn that President FLORES is much disappointed at the state of affairs in Ecuador, and so hopeless about mending them that he threatens to resign and quit the country. There is no question about the valuable resources of the country and its natural wealth if properly developed. Under equitable administration, its grow-

ing prosperity and increasing revenue are also indubitable, but the trouble is a want of honesty.

After long negotiation with its foreign creditors, who have not received a cent of interest for twenty years, though constantly promised the reduced rate of interest of 1 per cent, Congress has now adjourned till some date in 1890, until which time the nation must remain in a state of bankruptcy. This evident preference for dishonesty shows clearly that it is better for Americans to leave the country severely alone, especially as regards transactions with the government. In Europe, where they have had so long and painful an experience, the country is totally discredited as a field for capital and enterprise.

THE HYDRAULIC MINING DEBRIS QUESTION.

It is amusing to read the editorial comments in the California press upon this "burning question" in consequence of the action now being taken on the Biggs Bill, to which we referred in our issue of November 10th. Naturally enough those portions of the State which expect to be benefited by the revival of a great and profitable industry are well pleased at the reopening of an inquiry, which, it is presumed, will be intelligent and impartial, and the result of which, they hope, will be to reverse the hostile State legislation and revive hydraulic mining. The question has been carefully studied by some of our most able and experienced engineers, men who have devoted many years to considering the solution of the problem of preventing the damage to agricultural lands by the débris from the mines, and it is asserted that a practicable system has been devised, that the mischief was done long ago, and really before the agricultural lands had a value.

Now that the hydraulic mines are closed, the farmers find that not only the débris still comes down in the freshets, but there is no longer a market for their produce; they are, therefore, more liberally disposed towards the mines, and may be satisfied with less than they demanded a few years ago.

The San Francisco *Call* indulges in utter nonsense when speaking of the "hydraulic machinery reducing the gravel to impalpable powder" and when it asserts that hydraulic mining brings about "the destruction of vast tracts of timber land, and sweeps the soil from hundreds and possibly thousands of fertile valleys situated in the mountain regions." Undoubtedly the hydraulic mining has destroyed or injured some small areas of agricultural land, but on the other hand it has added infinitely more to the wealth of the country than the few acres it injured, and it is suspected that most of the outcry against it came from those who bought valleys at a very small price and with the object of having them destroyed and then claiming immense damages from the mines. It is to be hoped that the new commission will get at the "bottom facts" and will treat the great industry affected in a broad and liberal spirit.

STEEL AND ALUMINUM BRONZE HEAVY CAST GUNS.

The failure of the Hainsworth cast steel gun, recorded on another page, is very unfortunate, though not at all conclusive against the use of cast steel for heavy ordnance. The cause of the failure in this case is not yet known, but we have the utmost confidence that cast steel guns will be made that will prove stronger and far more uniform and reliable than the expensive and irrational "built-up" gun.

It may be as Mr. Hainsworth suggests, that the tempering of the gun may have been badly done or may have affected its strength, or it may be that some modification in the method of casting may be necessary. The old Rodman principle of making cast-iron guns is considered by such eminent authorities as Mr. William Metcalf to be the best for casting steel also, and perhaps the Gatling modification of the Rodman method, by which the gun, cast with a core, is cooled from the center while the outside is kept at a high temperature, may bring the success which we are confident will before long be demonstrated.

In a matter of such vast importance to the government it would be proper that a certain portion of the public money be appropriated to making a few experimental cast steel guns, and the further experience which Mr. Hainsworth has now acquired, added to his recognized great skill, would especially fit him to make the experiments at the public expense. Such experiments are too costly for private enterprise, and the Pittsburg Steel Casting Company has already expended a large sum in this first one.

It is understood that the Gatling Ordnance Company, who are the owners of Dr. Gatling's patents, are making, or intending to make by his system, two guns of, respectively, 10 and 12-inch calibre.

While we have undiminished confidence in the possibility of making strong steel cast guns, we still see so many advantages in the use of the aluminum alloys, which are being made so successfully by the Cowles Electric Smelting Company, that we believe experimental guns should be cast of this material, and tested at the public expense. There can be no question of its immense superiority over the brass or bronze still used successfully in field guns, and the possibility of making perfectly homogeneous castings of an alloy which equals high quality of cast stee in strength, and greatly exceeds it in elasticity, has been fully demonstrated. Cast guns are the heavy guns of the future as of the past, and the difficulties which have occasioned the present "set back" are, we feel assured, of an avoidable character, and will be overcome.

VICTORIA, AUSTRALIA.

In the annual report of Mr. C. W. Langtree, the Secretary for Mines of the Colony of Victoria, Australia, there is an earnest recommendation to the government "for the appointment of a commission of experts to visit Europe and America for the purpose of inquiring into the best means of saving the fine gold which, to the extent of many thousands of pounds in value, is annually lost to the colony," and the Secretary adds, "if the state spends willingly the large amount of £80,000 every year in assisting in the search for gold, surely the small sum of £3,000 spent in endeavoring to ascertain the best means of retaining the gold when found could not be considered wasted."

Without discussing, at this time, how far the general government can properly go in applying public funds to the encouragement of special industries, we may say that the practiceof sending expert commissions to foreign countries to study and report the progress made in any particular industry has proved a very beneficial investment for those who have done it.

Several foreign governments, as well as our own under the present administration, use their consular agents to gather information of this character. As consuls are rarely specialists, their reports are not often of great value, and no doubt the most efficient manner of gaining the information needed is either by experts employed in the country itself, which is probably the best way, or by sending experts to visit the foreign country and report on what they see, as is proposed in the Australian report referred to. The establishment of a National School of Mines is also recommended, and in this respect Victoria is behind her sister colony of New Zealand, where not only has such a school been established, but they have also the practical advantage of peripatetic schools in the various mining districts.

Another report from the same department relates to irrigation, to the importance of which our Australian cousins are becoming fully alive. This report deals with water from artesian and river sources, and details the large amount of work done in sinking artesian wells, building dams and storage reservoirs, and the formation of trusts under the irrigation act. The only national work of importance that has been undertaken is the building of one dam that will cost about $500,000.

The actual irrigable area of the trusts already constituted amounts to 704,688 acres, and the total amount of the loans to be advanced by the government for the execution of the works necessary is £586,367. In addition to these already formed there are nineteen applications under consideration, of which the irrigable area is estimated at 1,122,849 acres. Prizes are offered by the government for the best irrigated farm, and for best variety of irrigated crops.

THE CONSUMPTION OF WOODEN RAILROAD TIES AND THE USE OF STEEL TIES.

In our issue of October 27th we stated, on the authority of the *Moniteur Industriel*, that the six principal railroad companies of France consume 3,650,000 ties per annum. This may be correct, and ought to be so on such authority, but the subsequent estimate of our French contemporary as to the consumption of ties in this country we find to be much understated.

Assuming the entire railroad system of the United States to be 160,000 miles, as appears from Poor's Manual, with the addition of the lines in construction during the current year, and taking 2640 ties per mile of track, we have in use at least 422,400,000 wooden ties. This estimate, large though the total appears, is under the mark, as no railroad uses less than 2640 ties per mile, and many of the roads with heavy traffic have 2816 and in a few cases more.

The life of these ties varies according to their quality and the climatic conditions, but in the East, where only the best ties are employed, the average life is found to be about six years, while in the West, where a poorer quality of timber often has to be accepted, and where dry-rot and other disadvantages have to be contended with, the average life is from three to five years; so that even after allowing for a few exceptional cases in which ties may last ten years, the average life of ties all over the country cannot be counted as more than five years.

It follows, therefore, that the annual consumption must be about 84,500,000, which, with the steady increase of railroad building, must soon exceed 100,000,000, a gigantic demand to be satisfied from our forests each year, when we consider the many other calls upon them, and the fact that at present virtually nothing is being done by the government or the people to replenish our source of supply.

The certain rise in the price of wooden ties, when these facts come to

be fully appreciated by the lumber men who control so large a part of the available timber area, will force the railroads to seek the best solution of the question in the adoption of a metal tie. This, indeed, is the only thing that can save our forests and render possible and effective the endeavors of the Forestry Division.

The prime questions with railroad managers are economy and safety. It has now been amply demonstrated in Europe that a properly constructed steel tie is both safer and more economical than a wooden one, and indeed wooden ties will soon be looked upon as almost as much behind the age as are wooden bridges and iron rails. One of our contemporaries devoted to railroad interests takes exception to metal ties as wanting in the necessary elasticity, and asserts that there is in practice no efficient substitute for wood.

This, however, is not borne out by the experience of those who have used them, and the growing favor with which they are received. It is certain that greater firmness and solidity will be attained by their adoption, with sufficient elasticity, if a suitable form be used. Mr. WOOD, President of the Cleveland Institute of Civil Engineers in England, in a recent address pointed out the growing importance of this branch of industry to that famous steel-making center, and stated that the North-eastern Railway had tried such ties in 1879; when taken up 3,000,000 tons of traffic had passed over them, and that if they had been made of steel in place of iron they would still be in use. The amount manufactured there in the last five years was 525,000 tons, a convincing proof of their growing popularity, in spite of admitted defects, as is also the tender for 30,000 tons now called for by one of the Indian railways, which has had them in use for many years. The Mexican (Vera Cruz) line found, after the recent torrential storms that greatly damaged their road, that the portions laid with steel sleepers suffered much less than the rest, so much so that we are informed they have decided on pushing the replacement of all their wooden ties with steel ones, a step they had already determined to adopt.

THE ELMORE ELECTRO-DEPOSITED COPPER FOR WIRE BARS.

The advantage to be derived by obtaining the most conductive copper was perceived in the early days of submarine cable enterprise, and over twenty years ago Dr. Matthiessen carried out a series of careful and valuable experiments in order to fix a standard to which the various samples of commercial copper could be referred. By using elaborate precautions he obtained the purest copper that was then practicable, and determined that a pure hard-drawn copper wire, 1 meter in length and 1 gramme in weight, should have a resistance of ·1469 ohm at the temperature of 0 deg. Cent. This standard has been in use up to the present and has been believed for many years to be the extreme limit of conducting power for copper. But, owing to the great care that has since been bestowed by copper manufacturers, this standard has occasionally been surpassed, and by the introduction of the improved method now under consideration, has been rendered obsolete, and the Electrical Standards Committee of the British Association have now under their consideration the desirability and the necessity of fixing a new standard.

In order to obtain the best quality of copper for cable and other electrical purposes, the practice of late years has been to get electro-deposited copper in the usual manner, and then to exercise the greatest possible care in melting it for casting into "wire bars," which are then drawn into wire. A very small amount of an impurity such as arsenic, antimony, sulphur, phosphorus, etc., gaining access to the metal, at once greatly reduces the conductivity.

The new method has the important advantage that impurities have no opportunity of gaining access to the metal. By the nature of the process it is necessarily and unavoidably pure. Special machinery has been arranged so that an electro-burnished tube of any desired length, diameter and thickness can be cut spirally into a square wire which can then be drawn down in the usual manner to any required diameter.

The wire being drawn directly from the electro-burnished tube obviates entirely the necessity for melting, and thus constitutes altogether a new departure in the manufacture of pure copper wire. Some of the tests to which it has been subjected are very interesting. Two large coils of the new wire were taken, the wire of the first having a diameter of 0·113 inch (about 12 B. W. G.), and the second a diameter of 0·05 inch (about 18 B. W. G.), both being extremely hard-drawn. In order, however, to be perfectly satisfied that the practical limit of hardness had been reached, the larger wire was drawn through 13 holes in a drawplate (the last hole being of agate), without annealing, until the diameter of the wire was reduced to ·057 inch. Its hardness may be judged of by the fact that the breaking strain was 29 tons per square inch, with an elongation of only ¼ per cent. The No. 18 B. W. G. wire had a breaking strain of nearly 29 tons per square inch with an elongation of only ¼ per cent. When these wires were annealed they showed an elongation of 25 to 33 per cent before breaking.

Dr. Matthiessen found that the purer the metal was obtained, the greater was the variation of its electrical resistance with corresponding variations of temperature, and gave the general law as $Rt = R_0 (1 + at \pm b\,t^2)$ where R_0 is the resistance of the metal or alloy at the temperature of 0 deg. Cent., and Rt the resistance of any temperature t deg. Cent. above 0 deg. He found that for most pure metals the value of a was ·003824t, and b ·00000126t^2, with the + sign between them. The experiments carried out on the new wire are confirmatory of its great purity, as these coefficients are found to be distinctly higher, the expression for it being $R^t = R_0 (1 + ·0041158t + ·000003077t^2)$.

The results of the conductivity tests are given in the first table in the next column. The conducting power of the hardest wire is so high that, with a breaking strain of 29 tons per square inch, it has a conductivity about 2½ per cent higher than that of soft annealed wire of the best quality hitherto obtained commercially (say 98 per cent). When the new wire is annealed it has a conducting power 4½ per cent above that of best commercial copper.

Diameter.	Gauge (approximate) B. W. G.	Conductivity of annealed wire in terms of standard for annealed copper.	Conductivity of annealed wire in terms of standard for hard copper.
in.			
0·113	12	102·38	104·39
0·057	17	102·35	104·41
0·049	18	102·45	104·51
Mean.....	.....	102·38	104·44

The following mechanical tests have been made on the wire, each result being the mean of three experiments:

Diameter. In.	Weight per statute mile. Lb.	Breaking strain. Observed. Lb.	Breaking strain. Per sq. in. Tons.	Elongation. Per cent.	Number of twists in 3 inches.
0·113	205·0	612	27·4	2	31
0·082	110·0	375	31·2	1⅝	42
0·057	52·8	166	28·7	¾	not taken
0·05	40·8	127	28·4	⅝	47

The wire was also tested as follows: It was wrapped six times around its own circumference, as in making a "bell-hanger's joint." It was then unwrapped, wrapped again, and so on until the wire broke. The results were:

Diameter. In.	Specimen. No.	Wrapping and Unwrapping. on	off	on	off	on	off	on	off
0·113	1	6	6	6	6	6	6	..	..
	2	6	6	6	6	6	6	6	..
	3	6	6	6	6	6	6	6	..
0·05	1	6	6	6	6	6	3	..	..
	2	6	6	6	6	6	6	6	4
	3	6	6	6	6	6	6	6	6

It will thus be seen that the hard wire is admirably adapted for over head telegraph wires possessing the two requisites of great strength and high conductivity. The efficiency of dynamo machines and electrical instruments can be increased because a greater number of "ampère-turns" can be got within a given space. The copper tape or riband used so extensively for lightning conductors can be cut direct from the tube of any length and sectional area by the special machinery before mentioned. It would take up too much of our space to dilate upon the enormous demand for pure copper that must arise due to the development of the industrial applications of electricity. Mr. W. H. Preece, in his recent address to the Mechanical Section of the British Association meeting at Bath, said that already there were 110,000 miles of submarine cables at work, and over £40,000,000 of British capital had been expended in laying and working them. It requires a fleet of thirty-seven ships, maintained in various oceans, to lay new cables and to repair breaks and faults as they occur. It has recently been computed that in a comparatively short time London will require 150,000 tons of copper for electric lighting purposes, and a like amount will be wanted for Paris. But enough has been said to show that the new process commends itself as much to the consideration of the electrical engineer as it does to his brother in the mechanical profession.

We condense the foregoing from *Engineering*.

NEW PUBLICATIONS.

THE STEAM BOILER CATECHISM forms one of the well-known series by Mr. Robert Grimshaw, and published by the Practical Publishing Company of this city, and is perhaps the best of the series. It seems to us to be what it professes, viz., complete, practical and easy for any one who *should* be put in charge of boilers, to understand. We do not know that we fully appreciate this fashion of instruction by catechism, and on some people it has an irritating effect; but any objection that may be raised on this score is amply met by the copious index, so that a boiler user who is impatient can obtain the information sought for without submitting himself to questions on other points. One feature which should prove of use is the insertion of the examination questions of the Canadian, New York, and Philadelphia licensing boards.

HAMPE'S METHOD OF DETERMINING Cu_2O IN METALLIC COPPER.

We regret that in the article last week by Professor F. P. DEWEY, on Hampe's Method of Determining Cu_2O in Metallic Copper, two misprints occurred, changing nitrite into nitrate, first on the thirty-eighth line from the top of page 460, and second, the first time the word occurs in the twenty-first line from the bottom of same page.

Quick Foundry Work.—The Chattanooga *Tradesman* gives the following account of quick work done for the United States Rolling Stock Company, of Anniston, Ala.: The bell at Woodstock Furnace No. 2 having fallen in, another had to be made. At 2 o'clock P.M. the metal was still in the shape of pig-iron, and the large casting was made, taken to the machine shop and turned, and then drilled and delivered to the Woodstock Company at their furnaces before 4 o'clock A.M. Considering the size and shape of the casting and the difficulty of handling and fastening it to the lathe, much credit is due for the exceedingly short time required to do the work.

The Coal-Fields of Colorado.—The geological survey brings forcibly before us the resources of this State in the matter of coal. Within sixty miles of Pueblo, there are now being worked 1,000,000 acres that have veins of from six to nine feet in thickness. The output of the State for 1887 was 1,791,735 tons, of which nearly two thirds came from the coal-field referred to. The amount of coal in the Cañon district is placed at 150,000,000 tons, and is a first-class bituminous coal. Retail price in Pueblo, $3.50 to $5 per ton, according to quality and season, and $1 to $1.50 for small coal for factory purposes. The average value of coal on cars at the pits is about $2.25 a ton; therefore the total of the output in 1887 was $3,941,817. The number of persons employed in the industry was about 5000, and the average cost of placing coal on cars, including royalty, is $1.73 per ton.

REPORT OF THE SECRETARY OF THE TREASURY.

The principal features of Mr. Fairchild's report are the following:

BOND PURCHASES.

Upon the subject of bond purchases, after stating that they have amounted to $46,577,165.88 during the fiscal year, the secretary says:

I am confident that the delay in the purchase of bonds, while waiting for Congress to act, resulted in no substantial pecuniary loss to the Government. The purchase was resumed under a circular of April 17, 1888, and since that time nearly all the bonds which have been offered for sale to the Government have been bought by it, as will appear from an inspection of the bond purchase book. Of course many offerings of bonds have been declined because the price was thought to be too high, but finally almost all of the offered bonds were bought at some price. An example will show this more clearly. Certain bonds of a par value of only $326,000 were offered so often that the offerings aggregated more than $19,700,000, but they were at last secured by the department. Ninety-four millions of dollars of bonds have been secured under this circular, and a premium paid for the privilege of buying them of about $18,000,000; the net rate of interest realized from this investment is only about 2 per cent. and the saving in the total amount of interest which would have been paid had the bonds been allowed to run to maturity, is about $27,000,000. Had taxation been reduced so as to leave this money with the people, and if it is worth in their business 6 per cent per annum, the total value of the money to them during the term which these bonds had to run would be about $83,000,000; thus, there is a resulting loss to the people of $56,000,000 upon this transaction alone. If this over-taxation is not stopped, and if the government is forced to continue to be a purchaser of its own bonds at the holder's prices, the loss to the people, as could be shown by a like calculation, must be hundreds of millions of dollars.

SILVER COINAGE.

The ownership of silver by the Government again was largely decreased, in spite of the increase of the total stock of silver dollars in the country, by the coinage of 16 months. During the past few years the decrease of circulation caused by the cancellation of national bank notes, and by the deposit of money with the Treasurer by the banks to redeem their notes when presented for that purpose, has been but little exceeded by the increased circulation of silver certificates and of standard silver dollars; thus silver seems to have filled the vacuum caused by the retirement of national bank circulation. The circulating medium in small denominations has been largely converted into silver certificates. And finally business has largely increased in the South and in portions of the country where there are few banking facilities. All of these causes have co-operated to postpone any evil effects which might arise from a continued and excessive coinage of the silver dollar; but the danger still exists and should be guarded against. This can be done by the adoption of the recommendation of my last report, viz., by fixing the maximum of silver which shall belong to the Government and by providing that when it was exceeded by $5,000,000 the purchase of silver bullion should cease until the amount owned by the Government should be again reduced to such maximum, or by cancelling United States notes to the amount of the excess over the maximum, provided the Government held the notes; if not, then by ceasing the purchase of bullion. Such plan, if adopted, would provide a safety valve which would be self-operative and would assure the country against any possible danger from silver, for as soon as it exceeded the amount which could be absorbed in the business of the country it would begin to flow into the treasury in payment of taxes, and would be there held until business called for it, and when the government's ownership fell below the maximum the purchase of the bullion would again begin.

Thus the country's business demand would regulate the country's silver circulation, and there would be little danger of depreciation in the value of the silver dollar as compared with the gold dollar. I venture to predict that if some such safeguard is not adopted and if thereby the silver dollar is suffered at some time to lose a part of its purchasing power, that the people will demand the absolute stoppage of the silver bullion purchase, and furthermore, the use by the Government of the whole or a portion of the silver coinage profits for the redemption of the silver dollars which are held by them. It is to be hoped that before such crisis is reached that the nations of the world will have agreed upon some standard of bimetallism which will forever maintain a fixed ratio between gold and silver, but in the meantime there is no occasion to burden ourselves with a stock of silver which may be troublesome.

COIN CERTIFICATES.

The system of coin circulation by means of certificates has certain conveniences and advantages, but it is a costly form of money; last year the cost of the $105,000,000 silver certificates issued was about $421,000, and as more and more of these certificates are converted into smaller denominations this cost is likely to increase. There are also certain dangers connected with it—for example, in time of war, the possession by the Government of such vast stores of the precious metals might prove embarrassing, and at a time when the Government was in financial need the temptation to spend the coin held against outstanding certificates might prove too strong. The loss by the abrasion of the coin, if it was in circulation, would not equal the cost of the certificates; on the whole, I think it may be said that the currency of the country would be more safe and more economical if the coin were in actual circulation instead of being held by the Government on pledge against outstanding certificates, as is now the case. But whatever may be thought about the wisdom of the certificate system there can be no doubt that with it the further coinage of gold and silver, except subsidiary coin, is not necessary or wise. Far more gold and silver coins are now in the possession of the Government than probably ever will be needed for the redemption of certificates. Future accumulation of the precious metals should be only in the form of bullion, which can be kept more safely and counted more easily than the coin. If this suggestion was adopted all but one of our mints might be closed and large useless expense be saved annually. I earnestly call the attention of the Congress to this subject.

THE DRAINAGE OF THE VALLEY OF MEXICO.

Written for the Engineering and Mining Journal by Richard E. Chism, M.E.

The valley of Mexico is comprehended between 19 and 20 degrees north latitude, and between longitudes 98 degrees 41 minutes 45 seconds, and 99 degrees 9 minutes 45 seconds west from Greenwich. The City of Mexico, in the center of the valley, is in latitude 19 degrees 26 minutes 5 seconds north, and longitude 99 degrees 6 minutes 45 seconds west of Greenwich.

The valley is bounded on the north by the mountain chain of Pachuca and the smaller ranges that converge upon the sierra of Tezontlalpan, from which point they pass on to the westward to form the mountain chains on the western side of the valley. To the southward the cordilleras of Ajusco, and to the eastward the great Sierra Nevada complete the enclosure, which has no natural outlet.

The highest points of the mountain chain are the volcanoes of Popocatepetl and Ixtaccihuatl on the eastern side of the valley. The first is 5400 meters (17,820 feet), and the second 4786 meters (15,789 feet) above the sea level. The southern mountain chain culminates in the peak of Ajusco, which is 3945 meters (13,018 feet) above the sea.

The lowest point of the inclosure is directly north of the city of Mexico. At this point the hills are only about 100 meters (328 feet) higher than the lowest level of the valley, and it is here that the drainage tunnel is to be pierced.

The bottom of the valley is a nearly level plain of an oval shape, with its longest diameter 47⅞ miles from north to south, and its shortest, from east to west, 32¼ miles. The plain is interrupted by a few eminences, the most notable of which is the Guadalupe range of hills, which stretches out into the center of the valley from its western side.

The average altitude of the bottom of the valley is about 2260 meters (7412 feet) above the sea, and its total area is 4293 square kilometers (1657·3 square miles). The total area of the hydrographic surface of the valley, which includes the bottom of the valley and the mountain sides that drain toward the interior, is about 7024·4 square kilometers (2711·25 square miles).

Upon the bosom of the valley rest six lakes of considerable size, forming a crescent around the City of Mexico. Lakes Chalco and Xochimilco are to the southeast of the city, Lake Texcoco to the eastward, San Cristobal and Xaltocan to the northeast and Lake Zumpango to the north. The relative situation of these lakes will be more clearly seen by reference to the map which accompanies this paper, and their respective dimensions, contents and other particulars will be seen by the following table:

Lakes.	Average appro. length.		Average appro. breadth.		Average depth.	
	Kiloms.	Miles.	Kiloms.	Miles.	Meters.	Feet.
Chalco	14·500	9·00	14·500	9·00	1·5	4·25
Xochimilco	10·500	6·52	5·750	3·77	1·5	4·25
Texcoco	22·000	13·66	12·000	7·44	0·91	3·00
Xaltocan	12·000	7·44	6·000	3·72	0·71	2·34
San Cristobal	7·000	4·35	2·000	1·24	0·71	2·34
Zumpango	5·800	3·60	3·500	2·17	1·27	4·19

Lakes.	Altitude with respect to the Mexico City bench marks. Pavement of plaza.		Areas.		Contents in cubic meters.
	Meters.	Feet.	Sq. kiloms.	Sq. miles.	
Chalco	1·61	5·31	157·0000	60·60	235,500,000
Xochimilco	1·51	5·00			
Texcoco	1·25	4·10	241·4400	93·20	219,710,400
Xaltocan	2·17	7·16	76·4000	29·50	54,244,000
San Cristobal	2·17	7·16			
Zumpango	6·12	20·20	22·1263	8·54	28,100,401
Totals			496·9663	191·84	537,554,801

NOTE. Lake Zumpango has the general form of a triangle, altitude about 7 kilometers and base 5·8 kilometers.

Upon comparing the altitudes of the several lakes it will be noticed that there are four drainage planes in the valley. The highest plane is that of Lake Zumpango, the next is that of the lakes Xaltocan and San Cristobal, which are practically one. The third plane is that of Lakes Chalco and Xochimilco, also practically one lake, and the last and lowest is that of Lake Texcoco, upon whose banks is situated the City of Mexico. It is at once evident that the latter lake would naturally receive the waters of all the rest were it not for the restraints, partly natural and partly artificial, which prevent this and the consequent destruction of the city from coming to pass.

Each of the lakes receives several feeders, which are of small size or even dry in the dry season of the year, but which have considerable volume during the rainy season, causing the lakes to rise and overflow if the rains are heavy and of long continuance.

In bygone times Lake Zumpango was the point where the danger of overflow was greatest, as it then received the waters of the River Cuautitlan, which drains a large extent of country, probably one fourth of the entire extent of the valley, and rises very rapidly after a heavy rain at its head waters. That river is now led away through the Vertideros canal into the Tajo or cut of Nochistongo, so that this source of peril is eliminated.

The waters of lakes Zumpango, Chalco and Xochimilco are derived from springs and clear brooks, and have a certain outflow so that they are fresh and drinkable. On the contrary, the waters of the lakes San Cristobal and Xaltocan, and in a more eminent degree those of Lake

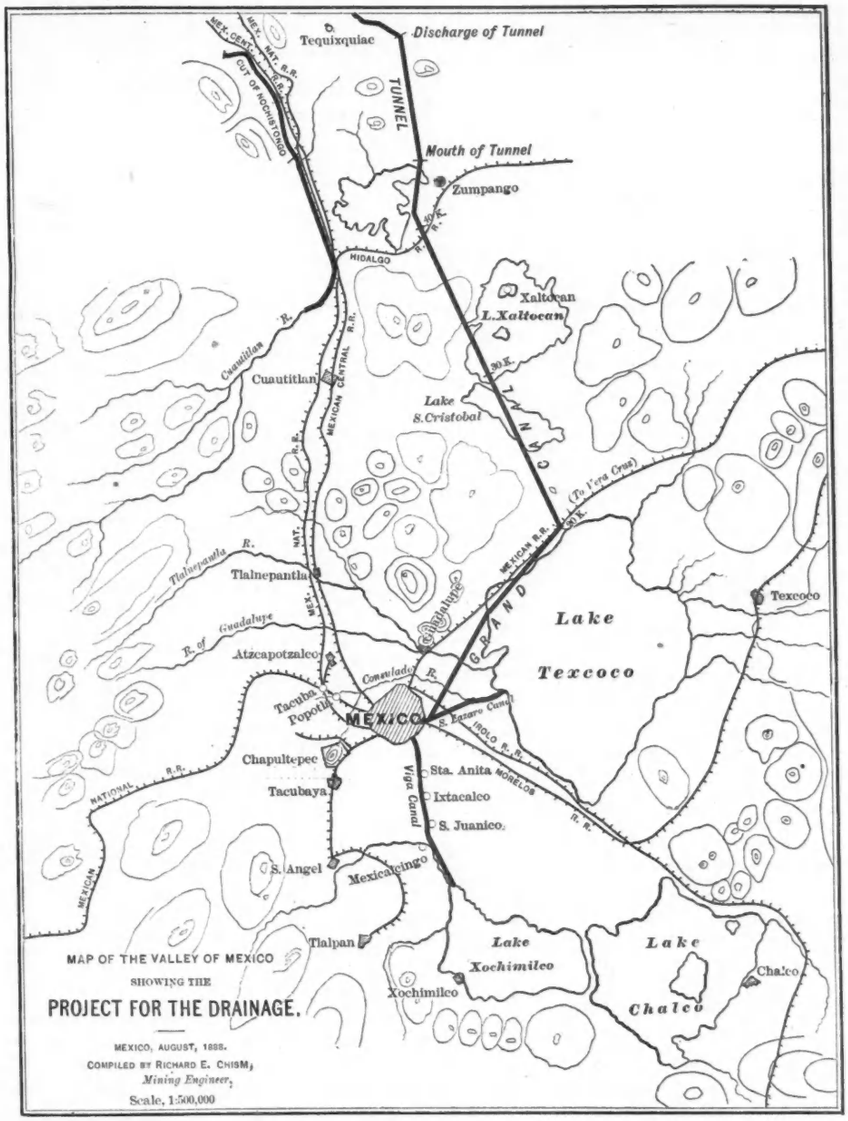
Texcoco, are salty and bitter to such an extent as to be fatal to vegetation.

GEOLOGY OF THE VALLEY.

The rocks that compose the mountain walls of the valley are of the three groups, igneous, metamorphic and sedimentary.

The igneous rocks predominate in the whole extension of the chain, but especially on the eastern, southern and western sides. In the Sierra Nevada the rocks are principally dolorites and scoriaceous lavas. The peak of Ajusco is made up of compact basalt and its western slope of trachyte porphyry. These same rocks, basalts, trachytes and spongy lavas also compose the hills that at various points interrupt the plains of the valley.

Metamorphic rocks are found in the shape of compact limestone on the northern side of the valley and sedimentary formations in the level ground of the center. All over the floor of the valley we have a succession of varying thickness of beds of clay, marls, sand and gravel, products of the decomposition and degradation of the older rocks, while



the beds of decomposed igneous rocks are in place as the foundation of all.

An eminent Mexican geologist classifies the metamorphic limestones of the valley as Mesozoic, the porphyries and basalts he calls, in general, tertiary, although he believes that some of the latter and all the lavas belong to the present epoch. Some of the sedimentary formations are referred to the Post-Tertiary period and the rest to present geologic time.

Without entering into the question as to the mode of formation of this curious valley, whether it is a vast filled-up crater or the result of a subsidence, we may review some of the latter phases of its history that have a more immediate relation with our subject.

When the Aztecs, on their mysterious march to the southward, arrived at the present site of this city, the vast lake that at one time had covered the whole valley had diminished considerably in size and the present bodies of water were represented by two lakes, a northern and a southern one. At the western part of the southern lake a ridge of harder and unaltered rock emerged through the sedimentary rocks and the lacustrine deposits. The pinnacles of rock, part of this ridge, came to or near the surface of the lake, and around these an island of marsh was developing into the future site of the City of Mexico. One of these pinnacles of rock is stated to have been where the plaza of Santo Domingo now is, and on this one the mystic eagle that had been the guide of the wandering Aztecs is said to have rested to make a snake lunch, an event that signified the end of the long journey. Upon the other pinnacle the Aztecs erected the temple of the sanguinary Huitzilipotchztli, later on replaced by the present grand cathedral.

The ridge of rock referred to extends in a southwesterly direction through the center of the city between the hill of Guadalupe on the north and that of Chapultepec on the southwest and has been a prime cause of the formation of the land on which the city stands, becoming at first a swamp and afterward dry land, leaving the bulk of the lake to recede to the eastward. At the time of the Spanish Conquest this process had gone on so far that there was a shallow arm of the lake to the north and south of the city, where there were depressions in the chain of rocks, and shallow pools or marshy ground to the westward where the filling up had progressed farther but was not yet complete. The lake came close up to the city on the eastern side, but was gradually receding. At the present time the western shore of Lake Texcoco is at a distance of 3·5 kiloms., 2·17 miles, from the eastern side of the city.

RAINFALL AND EVAPORATION.

From the observations made at the Meteorological Observatory in this city and extending over many years, it has been demonstrated that the annual rainfall in the center of the valley is about 0·61 meters (20 inches). Taking this as the figure for the whole valley, we have the total quantity of water received during the year to be, on an average 4,286,884,000 cubic meters. Of this quantity about one third, or, say, 1,500,000,000, is drained away through the Cuautitlan River and the Tajo or cut of Nochistongo; about 2,000,000 cubic meters more are used in irrigation or evaporated in transit, so that the lakes finally receive some 786,884,000 cubic meters in the course of an average year. Of course, there will be some years in which the influx will be less, as well as others during which it will be greater. The average daily influx to the lakes during the average year will be 2,160,000 cubic meters. As we have seen, the surface area of the lakes is very considerable, and the evaporation therefrom at the rate of from three to five millimeters daily is just about sufficient to dispose of the average daily supply. In fact, as the lakes are slowly diminish-

ing in size, it is evident that the evaporation during any given long series of years must be greater than the inflow from the rains.

The bulk of the yearly rainfall takes place during the last five months of June, July, August, September, and October, in which months the rainfall is about five times that of all the rest of the year. At this time, known as the rainy season, the evaporation diminishes and is quite unable to cope with the large quantity of water suddenly received in the lakes, and we have the periodical inundations to which the valley is subject.

During the rainy season the water is only kept from flooding the city by means of the dykes which restrain the rivers and the upper lakes and also exclude the water from Lake Texcoco. The city itself at such times is a closed area surrounded to a greater or less extent by water at a higher level than the ground inside the city defenses. However, at the present level of Lake Texcoco, it would take about five weeks continuous rainfall to fill it up to the city level, even at the rate at which the, water pours down during the rainy season, so that the danger of an overflow is not so imminent as in former years.

[TO BE CONTINUED.]

REPORT OF THE DIRECTOR OF THE MINT.

Dr. James P. Kimball, the Director of the Mint, has submitted to the Secretary of the Treasury his report on the operations of the mint service for the fiscal year ended June 30th, 1888.

The value of the deposits of gold was $80,894,456.67, including $8,668,-959.11 of re-deposits.

The deposits and purchases of silver were 35,941,507·92 standard ounces of the value, at coining rate, of $41,822,846.45. This included re-deposits of the value of $491,831.79.

Of the gold deposited, $32.406,306.59 was classified as of domestic production, against $32,973,027.41 in the preceding year. These figures tend to indicate a reduction of half a million dollars in the production of gold in the United States.

The foreign gold bullion deposited aggregated $21,741,042.44; foreign gold coin, $14,596,885.03; a total of $36,337,927.47, against $32,467,840.98 in the year preceding.

The value of United States light gold coin, deposited for re-coinage, was $492.512.60. Old material was deposited in the form of jewelry, bars, plate, etc., containing gold of the value of $2,988,750.90.

Of the silver bullion deposited and purchased $37,393,648.34 (32,135,-165.79 standard ounces) was classified as of domestic production, $1,668,-384.25 as foreign silver bullion, and $87.336 as foreign silver coin.

United States silver coin, consisting almost entirely of transfers from the Treasury of worn and uncurrent subsidiary silver coin, was melted during the year of the value of $194,155.64. Trade dollars were received and melted of the value of $1,060,174.11.

Old material was deposited containing silver of the value of $627,316.32.

Recoinages thus far communicated to this Bureau, amounted during the calendar year 1887 to: Gold, $29,786,783; silver, $30,174,980.

INDUSTRIAL EMPLOYMENT OF GOLD AND SILVER.

The value of the gold bars furnished for industrial use during the calendar year 1887 was $11,672,606.40; silver bars, $5,241,998.19; total, $16,914,604.59.

On the basis of the last direct reports of the use of coin, the industrial employment of the precious metals for the calendar year 1887 is estimated as follows: Gold, $14,600,000; silver, $5,280,000.

STOCK OF COIN IN THE UNITED STATES.

The stock of gold and silver coin in the United States July 1, 1888, is estimated to have been: Gold coin, $595,349,837; silver dollars, $299,708,-790; subsidiary silver coins, $76,406,376.

At the same date there was gold bullion awaiting coinage in the mints of the value of $110,469,018; silver bullion, $3,950,388; melted trade dollars, $6,545,554; making a total metallic stock of $1,092,429,963. Of this there was in the Treasury of the United States $594,533,172; in national banks, $105,435,492, and in other banks and in general circulation $392,461,299.

The estimate for the 1st November, 1888, was: Gold coin, $603,225,837; silver dollars, $309.750,890; subsidiary silver, $76,660,481; gold bullion in the mints, $108,479,213; silver bullion, $10,559,113; total, $1,108,675,534.

COINAGE.

The coinage is exhibited in the following table:

Description.	Pieces.	Value.
Gold	2,350,534	$28,364,170.50
Silver dollars	32,718,673	32,718,673.00
Subsidiary silver coin	12,983,521	2,417,428.25
Minor coins	60,977,819	1,218,976.57
Total	109,030,547	$63,719,242.32

The subsidiary coinage consisted of 5673 half dollars, 778,673 quarter dollars, and 12,199,175 dimes.

The minor coinage of the mint at Philadelphia was the largest in the history of the mint service, being occasioned by the demand for 5-cent nickles and 1-cent bronze pieces.

Gold bars were exchanged for full-weight United States gold coin, as authorized by the act of May 26, 1882, of the value of $15,846,986.25, against $7,604,059.89 in the preceding year, indicating an increased demand for gold bars for export.

Gold and silver bars were manufactured as follows: Gold, $51,-765,436.95; silver, $7,547,578.27; total, $59,313,015.22.

Medals were manufactured at the mint at Philadelphia as follows: Gold, 124; silver, 531; bronze, 742; total, 1397.

SILVER PURCHASES.

27,235,601·06 standard ounces of silver bullion, costing $23.398 466·06, were delivered on semi-weelky purchases on telegraphic offers. The average cost was $0.95·45 per ounce fine. The average London rate at the par of exchange was $0·95·741 per ounce fine. Silver purchased at the mints increased the total purchases of silver for the silver dollar coinage to 28,206,805·91 standard ounces, costing $24,237,553·20. The average cost per fine ounce of all the silver purchased for the silver dollar coinage was $0·95·47.

The silver for subsidiary coinage was obtained from melting worn and uncurrent coins of the value of $535,355.99 and 745,690 trade dollars.

The seignorage on the coinage of silver dollars during the year was $8,407,922.32 and on the subsidiary coinage $71,191.80. The seignorage on the coinage of silver from July 1, 1878, to June 30, 1888, has amounted to $47,536,681.02.

The following table exhibits the number of silver dollars coined, the number held by the Treasury and the number outstanding July 1st, 1887, and October 1st, 1888:

PERIOD.	Total coinage of silver dollars.	In the Treasury.		In circulation.
		Held for payment of certificates outstanding.	Held in excess of certificates outstanding.	
July 1st, 1887	266,990,117	142,118,017	69,365,953	55,506,147
October 1st, 1888	306,750,890	218,561,601	30,229,933	57,959,356

The number of silver dollars distributed by the mints during the year was 12,054,104, exclusive of transfers to the treasury.

PRICE OF SILVER.

On July 1st, 1887, the London price of silver was 44 pence. The highest price was reached August 26th, 1888, namely 45 3-16 pence; the lowest, May 19th, namely 41⅛ pence. At the close of the fiscal year, June 30th, 1888, the price was 42¼ pence.

APPROPRIATIONS AND EXPENDITURES.

The amount appropriated for the support of the mints and assay offices was $1,096,390. In addition, the unexpended balance of the appropriation for the renewal of the steam power plant at the mint at Philadelphia, amounting to $43,174.93, was available. There was expended from regular appropriations $1,039,492.35 and from the permanent appropriation for the coinage of the silver dollar $234,480.84. A total of $1,273,-973.19.

The net expenditures of refineries were $155,903.16, against receipts amounting to $157,727.45.

The earnings of mints and assay offices from all sources amounted to $9,788 592.80, and the expenditures and operative losses to $1,534,209.91.

IMPORTS AND EXPORTS OF GOLD AND SILVER.

Gold imports:		Gold exports:	
Bullion	$17,180,332	Domestic bullion	$9,348,685
Foreign coin	21,572,472	Foreign coin	5,816,150
United States coin	5,181,513	United States coin	3,211,399
Total bullion and coin	$43,934,317	Total bullion and coin	$18,376,234
Gain in gold, $25,558,083.			
Silver imports:		Silver exports:	
Foreign bullion	$5,619,006	Domestic bullion	$20,563,956
Foreign ores	4,506,655	Domestic ores	107,878
Foreign coin	9,478,084	Foreign bullion re-exported	31,980
United States coin (including trade dollars)	306,579	Foreign coin re-exported	7,370,549
		Foreign ores re-exported	683
		United States coin	71,464
Total	$19,910,324	Total exports	$28,146,510
Net loss by export, $8,236,186.			

PRODUCTION OF GOLD AND SILVER.

The production of gold and silver in the United States for the calendar year 1887 is estimated to have been:

	Fine ounces.	Coining value.
Gold	1,596,375	$33,000,000
Silver	41,268,305	53,357,000

The production of gold and silver in the world for the last four years is exhibited in the following table:

Calendar years.	Gold.		Silver.	
	Kilograms.	Value.	Kilograms.	Coinage value.
1884	153,017	$101,694,000	2,665,386	$110,773,000
1885	156,103	103,744,000	2,954,766	122,799,800
1886	149,355	99,250,877	3,027,632	125,828,400
1887	149,048	99,056,850	3,259,144	135,449,410

The production of gold has remained nearly constant, while the production of silver has increased in the last four years about $25,000,000.

WORLD'S COINAGE.

The aggregate coinage of the world, including recoinage, was as follows:

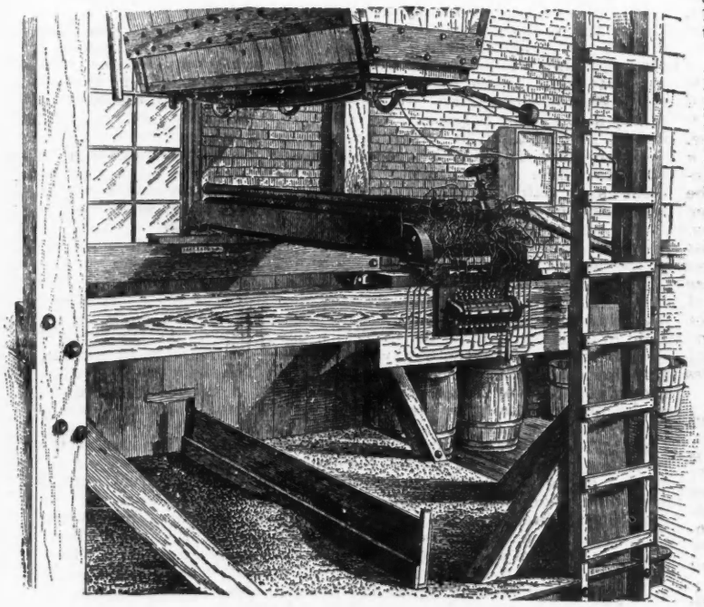
Calendar years.	Gold.	Silver.
1884	$99,432,795	$95,832,084
1885	95,757,582	126,764,574
1886	94,642,070	124,854,101
1887	124,992,465	160,984,877

The director's report contains the usual tables, exhibiting the business of the mints and assay offices in detail, and the statistics of the coinage, production, and movement of the precious metals in the principal countries of the world.

Owing to the delay of authority from Congress to print the report of the director of the mint on production of the precious metals for the calendar year 1887, the two reports will be issued about the same time.

THE EDISON MAGNETIC SEPARATOR.

The principle upon which this separator is based is the deflecting by a powerful magnet of those particles in a mixture of ore and gangue which are magnetic, in their fall by its field. The quartz or other gangue falling by the magnet are not affected by its attraction. The particles of magnetite or of magnetic oxide are diverted from the vertical sufficiently to reach the floor at a point considerably removed from that which they would attain in a free fall. Given, then, a thin sheet of ore dropping by a broad magnet, the gangue accumulates immediately below the orifice from which the sheet fell, while the magnetic particles of the ore will be found separated from it. The accompanying engraving, from a photograph of the machine now in place at Edison's laboratory, at Llewellyn Park, N. J., and which, with the description, we reproduce from the *Iron Age*, will show how this principle has been carried out. We may state, however, that since the photograph was taken a number of minor changes have been made without affecting a general design. The crushed, dried and screened ore is delivered into the hopper, shown in our engraving. In the bottom of this hopper is a long slit, which can be closed by a sharp-edged casting, balanced by a counter weight. Below the hopper is mounted the magnet, a casting weighing 3 tons in this case, around which are wrapped a series of coils of wire. To regulate the power of the magnet, the arrangement provided is shown, by which any desired number of the coils can be arranged in multiple arc or in series. In the apparatus as now modified, this arrangement is put out of the way, being mounted on the top of the magnet instead of at the side. A dynamo furnishes a current of 25 to 30 ampères and 110 volts. A hand-wheel and screw have been recently



Edison's Magnetic Separator.

added to move the magnet forward or backward, as needed, scales being provided to record its exact position. In order to separate more sharply the gangue from the ore as it accumulates on either side of the projection to the floor of the line of the slot in the hopper, a slender movable partition is placed in position on the floor. There exists a narrow zone within which those particles collect which are only very slightly deflected particles of gangue, to which a minute speck of magnetite may adhere. In order to collect this material separately the partition is made in the form of a narrow box, which has been facetiously termed the "mugwump." Lately a scale has been attached to the floor and to the wall in order to facilitate the recording of the exact position of the "mugwump." Immediately above the magnet is a pipe with a series of perforations, through which jets of air, supplied by a fan, can be projected against the sheet of material to be concentrated should it be considered desirable to remove the dust from the ore.

Experiments have been made on various ores with the Edison separator.

Some of the results obtained are given as follows:

SEPARATION OF NEW BED LEAN ORE, PORT HENRY.

		Crude ore.	Concentrates.	Trailings.
Crushed to 26 mesh	Iron	53·20	69·90	7·67
	Phos.	0·03	0·01	0·08
Crushed to 10 mesh	Iron	51·60	70·00	7·80
	Phos.	0·025	0·018	0·41
Above 10 mesh.	Iron	32·20	66·80	18·70
	Phos.	0·032	0·013	0·085

The Old Bed ore is also high in phosphorus, and the experiments were made to determine to what extent this can be removed by magnetic separation, that element being present in the ore in the form of crystals of apatite.

SEPARATION OF OLD BED ORE, PORT HENRY.

	Crude ore.	Concentrates.	Tailings.
Iron	59·5	69·15	7·10
Phosphorus	1·77	0·41	11·06
Iron	62·0	70·90	9·25
Phosphorus	1·46	0·18	10·54
Iron	64·20	71·20	9·00
Phosphorus	1·39	0·31	11·57

SEPARATION OF CROTON ORE.

	Crude ore.	Concentrates.	Tailings.
Iron	37·97	64·72	11·04
Phosphorus	0·38	0·10	0·97

Mr. Edison has not confined himself to magnetites. He has experimented with roasting non-magnetic ores, in order to first convert its oxide into the magnetic oxide, and then putting it through his machine. The possibilities of handling titaniferous ores have also been taken into consideration. One of his machines is now being put up in Michigan, and others have been ordered.

The Last of the "Great Eastern."—A three days' sale by auction of the entire vessel and her fittings has taken place at Liverpool. The catalogue contained 893 lots, and as a rule satisfactory prices were obtained. The hull and fittings realized over £43,000, the copper bringing £2,960; the gun-metal, etc., £4,480; brass, £3,980; lead, £4,185; outer iron plates, £12,500; inner iron plates, beams and rivets, £12,230, and anchors, about £300. The engines and engine fittings sold for about £10,000 in addition, bringing up the total to more than £50,000. The breaking up of the steamer will commence on January 1st, will occupy a year, and will, it is estimated, cost in labor from 10s. to 15s. per ton of material.

Mineral Statistics of Italy.—The following is a summary of the report for 1886 of the Italian Inspector-General of Mines: "The metal and mineral works in activity in 1886 numbered 272, with 15,100 workmen. Of these there were: 11 blast-furnaces, with 248 hands; 233 iron and steel works, with 10,560 hands; 4 argentiferous gold works, with 79 hands; 1 lead and silver works, with 800 hands; 4 copper and alloys works, with 575 hands; 2 mercury works, with 393 hands; 2 antimony works, with 60 hands; 6 alum works, with 130 hands; 2 rock-salt works, with 215 hands; and 7 sea-salt works, with 2000 hands. The entire production during the year was valued at £2,483,200, of which iron and steel account for over 60 per cent (185,390 tons, valued at £1,578,100), of lead 19,500 tons, silver 33,800 kilogrammes, copper 2200 tons, sea-salt 354,000 tons, etc. The eleven blast-furnaces produced altogether 12,290 tons."

The Movements of the Earth's Crust.—A long series of observations has been carried out all over France since the year 1884 for the purpose of detecting any variations of level of the land. These observations have been carried out by men belonging to the Génie corps under specially selected officers. The result of this series of observations is most important. It would appear that a depression from south to north is in progress. While on the coast of the Gulf of Lyons no alteration of level has been noted on the line between Marseilles and Lille, a stretch of 820 kilometers, the ground is sinking towards the north at the various rate of 3 centimeters yearly. It is noteworthy that the direction of the sinking is complicated; it is about three times greater towards the northeast than in the direct line from south to north. The rate along the line of the meridian is about 1 millimeter yearly on every 27 kilometers; whereas it is 1 millimeter on every 10 kilometers in a northeasterly direction. Should this rate of depression continue, northeastern France would, in the course of a few centuries, encounter a calamity similar to that which, at the end of the thirteenth century, befel the Netherlands.

Tests of Burning Oils in Philadelphia.—We recently called attention to the necessity for more careful regulation of the test requirements in illuminating oils permitted to be sold. We learn from the *Oil, Paint and Drug Reporter* that a public test of burning oils was made in Philadelphia last week under the supervision of the Retail Grocers' Association; which body had ordered it in view of the increasing number of explosions. Six barrels of oil were purchased, each from a different person and covered with paper so that the inspector could not see the brand on the head. About 2 o'clock a select party had gathered in the yard, and upon the arrival of E. W. Strain, the inspector, the test began. All the oil had been marked 150 degrees fire test. The first experiment made flashed at 128 degrees and ignited at 143; the gravity was 46½. The next flashed at 130 degrees and ignited at 150; gravity, 46. The third flashed at 120 degrees and ignited at 145; gravity, 46. The fourth flashed at 95 degrees and took fire at 105; gravity, 46. The fifth oil ignited at 120 degrees and began to burn at 125; gravity, 47. The sixth flashed at 130 degrees and took fire at 150; gravity, 46. Another oil purchased from a tank wagon flashed at 125 degrees, and took fire at 140; gravity, 46; same company's oil, but of 120 degrees fire test, found to be as represented.

New Method of Making Chrome-Manganese Iron.—A proposition has been made to utilize Bessemer slag, which consists in grinding it fine, adding chrome ore, and mixing these with tar, so as to form the mass into blocks, and then smelting them down in the blast-furnace. The product is chrome-manganese iron, the manganese emanating from the acid cinder. For instance, if Bessemer slag containing SiO_2 = 45 p.c., FeO = 10 p.c., MnO 45 p.c., is intimately incorporated with chrome ore of the following contents: Cr_2O_3 = 50 p.c., Fe_2O_3 = 12 p.c., Al_2O_3 = 11 p.c., MgO 18 p.c., SiO_2 = 9 p.c., and the necessary carbon, and the mixture be reduced by melting, the following alloy will, approximately, be obtained: 20 p.c. Mn, 50 p.c. Cr, 26 p.c. Fe, together with a slag which contains, say, up to 50 p.c. SiO_2, 1 to 2 p.c. FeO, 14 p.c. Al_2O_3, 18 p.c. MnO, 16 MgO, and only traces of Cr_2O_3. The separation of the metal from the slag is perfect, because the Bessemer cinder forms an excellent solvent for the otherwise almost infusible earths accompanying the chrome ores, and again because the manganese in the chrome alloy—which, of course, will depend on the quality of the Bessemer slag employed—makes this metal quite fluid. The exact quantity of manganese in the alloy can, of course, be obtained by adding manganese ores as required.

Gas Fuel for Coke-Ovens.—The experiment of heating coke-ovens by natural gas has been tried in the Connellsville region with success says the *Pittsburg Times*. The Central Connellsville Coke Company supplied by the Southwest Natural Gas Company, has used it for some time and is satisfied with the results, as is the Walston Company, in Jefferson County, which has also tried it. The theory of the experiment is that by using wood to start the fire, time for warming up a cold oven is much longer and the first drawing of coke is of an inferior quality.

From the first results of the natural gas experiment, which gives first-class coke on the primary drawing, the idea has gained ground that the natural gas as a kindling will be universally adopted. A number of coke men expressed opinions on the subject yesterday, and the feeling was that the expense of the fixtures would be more than could be repaid by

the improved quality of the first drawing. A representative of the H. C. Frick Company said that he knew the first drawing of the ovens lit with wood or coal was of an inferior grade, but that it could be used in blast-furnaces. If any one who understood the practical working of ovens would think for a moment, they would see that they might run for two years continually, then perhaps lay off for anywhere from one to six months.

Now, a gas fixture that can only be used once in two and a half years would be rather an encumbrance. Some temporary provision might be made in the shape of a rubber pipe and burner, with fixtures which might be a good thing for ovens which did not work regularly. For a set of, say 100, ovens which were kept in constant fire no lighting apparatus was needed, and, as far as the first drawing is concerned, the 3½ tons per oven which are fit for blast-furnaces would not entail any serious loss.

The Severac and Goupillon Steel Railway Sleepers.—The sleeper designed by M. Sévérac consists of two wrought-iron plates riveted to the top and bottom of an upright double T piece, making a sort of box-sleeper, divided centrally by the T piece, and open at the sides, into which ballast can be packed. This sleeper is 7½ feet long, 8 inches wide, and 5 inches deep, thus resembling a wooden sleeper in size, but weighing, with the ballast, 330 pounds, instead of 154 pounds. A saddle of soft homogeneous and very strong metal, bolted or riveted on to the sleeper, receives the flat-bottomed rail, having a sloping surface to give the required cant to the rail, and formed with two projecting pieces which are hammered down to clip the rail on each side. In the sleepers tried on the Northern Railway of France, and with very satisfactory results on the North Belgian Railway, the projections on the saddle have been replaced by apertures, into which wedges are inserted for fixing the rail. The metal sleepers designed by Goupillon Brothers have a flat top, with flanges on each side dipping down into the ballast, forming a sort of bottomless box, 8 feet 10 inches long, 9 inches wide, and 4 inches deep. The saddle in this case is formed in the sleeper itself by a groove in a thickened portion of the top under each rail, which both receives the rail, gives it the requisite cant, and maintains the two rails at their proper gauge. The rails are fastened on to the sleeper by screw bolts. The sleeper for a 60-pound rail would weigh about 150 pounds. The details of the fastenings adopted by M. Sthévenot, for connecting the rails firmly to the sleepers, while admitting of their rapid laying and removal, are then described. The Sthévenot steel sleeper, 7 feet long and 2 inches deep, would not only last longer than wood sleepers, but would actually cost less, if allowance is made for the reduction in ballast due to the smaller length and depth of the steel sleeper. As, however, these sleepers are smaller than the types described above, and as there is a difference of opinion with regard to the cost of steel sleepers, the longer life of the metal sleepers, which may be reckoned at double that of wood sleepers, the smaller cost of maintenance, and the increasing cost of wood must be regarded as the main advantages in favor of metal sleepers.—*Annales des Travaux Publics, through Proc. Inst. Civ. Eng.*

The Miners of Scotland.—In Scotland there are three distinct types of men among the miners. There is the Scottish miner pure and simple, then there is the Scotch-Irish miner, and last, the miner who is altogether an Irishman. The first of these is unquestionably not only the best miner, but also the best man of the three. He has in most cases an education quite equal to that of a skilled artisan; he reads much, he thinks much, and has opinions of his own concerning himself and other people, which he is in no way slow to give expression to. The colliers of this stamp are or the most part sober, steady and thrifty; not infrequently they own the houses they live in, and they never put any more of their sons than they can help to their own calling. The eldest boy, as a rule, must go down the pit, and it is an even chance with the second that he shall do so, too; but after that the lads are almost sure to be sent to work that is "above ground," as it is phrased. It frequently happens that lads of this class work in the pits till they are young men, and then take measures to give up the calling of a collier. I know clergymen and doctors of medicine who when young men were colliers, and found the means for their education by working in the pits during the summer months, while they attended the University of Edinburgh or Glasgow in the winter ones. This, of course, meant the cultivation of learning on a little oat meal, but young fellows such as I am referring to did not think much of that. From their boyhood up they had been accustomed to do a big darg on a spare diet, and cheerfully toiled away alternately with the pen and the pick until they achieved that on which they had set their hearts. Many a pinch, too, the old folks at home made to give "the laddies" a help in their time of struggle, and felt far more than repaid for all their self-denial when they saw John "wag his pow in a pu'pit," or found Sandy with a brass plate on his door with the letters M. D. after his name. Those, however, who aim at divinity and medicine are necessarily a small minority; the bulk of the youngsters who do not go into the pits, or go into them and afterwards leave them, take to the ordinary callings of a country district and become blacksmiths, carpenters, tailors and shoemakers, or join the ranks of the various shopkeeping occupations. Most of the officers about the colliery come from the same class, the overseers and roadsmen under ground, the engine keepers and the pit-head staff above ground, being almost to a man Scotch colliers or the sons of such.—*Nineteenth Century.*

Working Model of the Nicaragua Canal.—At the American Institute Fair, in this city, there is on exhibition a working model of the projected Nicaragua Interoceanic Canal, showing vividly the entire canal route, and the topography of the section of country through which it passes. It is a bird's-eye view of a part of Nicaragua and Costa Rica. A striking presentation is afforded of the Lake of Nicaragua, the mountains and hills on the east and west of it, the San Juan river and valley, the basins of the Tola and the San Francisco, and the general course of the canal from ocean to ocean.

Between the two mountain ranges lies a great interior basin, about three hundred miles long by one hundred wide, in the center of which are the broad and beautiful lakes of Nicaragua and Managua, the characteristic and most important physical features of the country. These lakes receive the waters which flow down from the mountains on either hand, and discharge them through a single outlet, the San Juan River, flowing through a narrow break in the Cordilleras into the Caribbean Sea.

The Lake of Nicaragua is represented on the model by a basin six inches deep, the surface being two inches above the level of the oceans, which stands for 110 feet, the height above mean tides of the summit level of the proposed canal. Into this basin water is introduced by a supply pipe under the side of one of the islands, and flows into the eastern and western sections of the canal over dams and through locks, falling into the sea at either end, where it is received in drains prepared for the purpose. Drains are provided also to carry off the overflow corresponding with the system of natural drainage along the route.

Tiny models of vessels pass through the canal, and are locked up and down by three locks each in the eastern and western sections. The size of the vessels and locks greatly exceeds the scale of the model, such exaggeration being unavoidable in this case.

There are numerous beautiful islands and peaks in the lake, of which the most conspicuous are shown on the model. Ometepec and Zapatero are more than 5000 feet above the surface, and are visible far out in the Pacific Ocean. On the principal islands, sector lights will mark, at night, the sailing line between the lake termini of the canal, and beacon lights dot the ends of piers and breakwaters.

This ingenious work is 20 feet long by 6 feet wide, and was designed and executed by Mr. Vaulx Carter, of Brooklyn, who is at the head of the Department of Mechanical Drawing and Mechanics of the Hebrew Technical Institute of New York. Mr. Carter was educated at Swarthmore College and at the U. S. Naval Academy.

Colliery Explosion at Dour, Belgium.—Mr. Geo. C. Andre, writing to the *Colliery Guardian*, says: The peculiarly dangerous character of the period including the early weeks of November has been again exemplified by a disastrous colliery explosion. Scarcely had the forty-eight bodies been removed from the exploded pit at Crousac, in France, when thirty-two miners were struck down by the same agency at Dour, in Belgium. The mines in this locality are very fiery. The St. Frederick pit, in which the accident happened, gives employment to some 400 hands. Of these about a fourth work in the night shift, in which the shot-firing is done. Dynamite is the explosive agent used. Safety-lamps were used exclusively. Most of the Belgian mines, but more particularly those of the Mons district, are subject to sudden outbursts of gas, and it seems that one of these outbursts occurred on the occasion under consideration. Thus the primary cause of the disaster is the same in both cases, at Dour as at Crousac.

The explosion occurred during the night in the upper workings, 1840 feet from surface and about 600 yards distant from the shaft. It is said that 80 hands, men, boys, and girls, were at work in this level on the night in question, 31 being occupied in a lower level. At the faces of work at or near which the explosion occurred, there were 35 persons, only three of whom escaped with their lives. The accident was made known at surface by a loud report, followed by a column of dust and smoke, projected from the shaft. Here, as in France, the explosion was very violent, the dead bodies being fearfully mutilated as well as burned. Among the dead are two girls of eighteen years of age. The men in the lower level neither heard nor felt the explosion. The result of the inspection of the workings has not yet been made publicly known, but the common opinion seems to be that the gas was ignited by a shot.

As bearing directly on the question of colliery explosions, Herr Stern, of Dortmund, read a paper before the German Mining Engineers' Association at Bochum on the necessity for some breathing apparatus which will enable a man to enter workings filled with after-damp. He points out the failure of all such apparatus hitherto devised. They are, he says, designed upon one of two principles. In one there is a purification or regeneration of the vitiated air; in the other pure air is conveyed to the nostrils through tubing from the outside. The former, which make use of the hydrate or the carbonate of lime, fail in consequence of the injurious action of those substances on the lungs. It is impossible to use them a sufficient length of time to do much good with them. Those of the latter class yet devised have been too complicated—only specially instructed men can employ them. The most successful of this class is that which is known in Germany as the "Löbsche apparatus. The writer had two years' experience with this apparatus, and feels no hesitation in declaring it to be the best yet experimented with. It is always ready for use, and needs no special training in the men who are called upon in an emergency to use it.

BOOKS RECEIVED.

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

The Lake Superior Copper Properties. By Henry M. Pinkham, Boston. Pages, 102. Price 25 cents.

PATENTS GRANTED BY THE UNITED STATES PATENT-OFFICE.

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

PATENTS GRANTED DECEMBER 4TH, 1888.

393,794. Horse-Power. Charles E. Sutton, Richmond, Ohio.
393,805. Rolling-Mill. Franklin H. Wright, Lake View, Ill.
393,808. Device for Drawing Wire Rods. Aaron P. Baldwin and Reuben Hadfield, Akron, Ohio.
393,832. Process of Manufacturing Zinc. Henry A. Hunicke, St. Louis, Mo.
393,850. Hydrocarbon-Furnace for Steam-Boilers. Frank W. Ofeldt, Newark, N. J.
393,856. Blowing-Engine. Edwin Reynolds, Milwaukee, Wis.
393,879. Leveling-Instrument. Aaron T. Binkerd, Allegheny, Pa.
393,897. Water-Motor. Samuel B. Goff, Camden, N. J.
393,905. Pulverizing-Machine. James W. Hilton, Brooklyn, N. Y.
393,943. Steam Pumping Engine. John H. Vaile, Dayton, Ohio.
394,091. Method of Making Aluminum Alloys. William A. Baldwin, Chicago, Ill.
394,112. Gold-Separating Apparatus. John S. George, Newport, Ore.
394,127. Apparatus for Cooling Coke. Daniel R. Murphy, Greensburg, Pa.
394,136. Feed-Water Heater. Philip Rohan, St. Louis, Mo.
394,137. Feed-Water Heater. Philip Rohan, St. Louis, Mo.

THE METALLURGY OF STEEL.*

By Henry M. Howe.

(*Continued from page* 418.)

Osmond recognizes three chief irregularities in these curves. Those which occur during heating he terms a_c, those during cooling a_r: those which occur at the lowest temperature he names a_{c1} and a_{r1}: those at the intermediate and highest temperatures he names a_{c2}, a_{c3}, a_{r2} and a_{r3} respectively. When he thinks that two or all of these irregularities coalesce, he gives them such names as $a_{c2\text{-}1}$ and $a_{r3\text{-}2\text{-}1}$.

CURVE OF TEMPERING HARDENED STEEL. OSMOND.

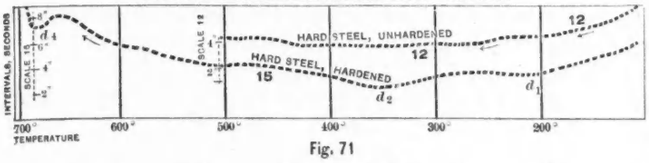


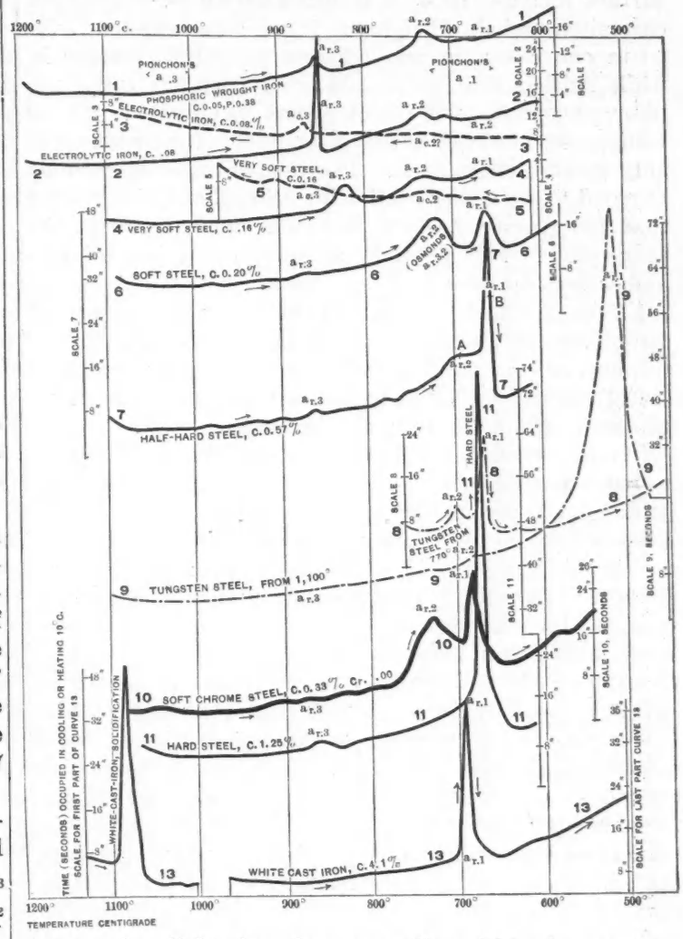
Fig. 71

Under favorable conditions H. Tomlinson detects as many as seven recalescences during the cooling of iron from whiteness: two decided ones are generally noticed, one between 500° and 1,000° C., the other below 500°.[a]

In the series of irons experimented on by Osmond, detailed in Table 87 A, we find that the position of two of these elevations, a_{r1} and a_{r3}, is tolerably constant for given conditions of heating and cooling, and nearly independent of chemical composition. a_{r1} is raised only 14° C. by increase of carbon from 0·05 to 1·25%; but it is lowered about 40° by an increase of manganese from 0·27 to 1·08%. The higher the temperature which precedes cooling and the more rapid the cooling, the lower is a_{r1} for steels with 0·57 and 1·25% of carbon.

The statement that the position of a_{r3} is nearly independent of composition is on my own authority, and directly opposed Osmond's view. According to him a_{r3} descends rapidly with increasing carbon, merging in a_{r2} when the carbon reaches 0·20%. Here, however, he appears to strain the facts to fit his theory. The reader can verify from Figure 71 the existence, in 8 out of the 9 cooling curves, of a slight rise whose crest lies within the narrow limits 815° and 872° C.

Fig. 71. CURVES OF COOLING AND HEATING. OSMOND.



* Copyright by the Scientific Publishing Company, 1887.

[a] Jour. Iron and Steel Inst., 1888, I., p. 355, from Trans. Proc. Phys. Soc., London, IX., pp. 107–122.

TABLE 87 A.—RETARDATIONS IN THE HEATING AND COOLING CURVES OF IRON. OSMOND AND PIONCHON (FIG. 71).

Number.	Description of metal.	No. of curve in fig. 71.		Composition, per cent. C.	Si.	Mn.	P.	S.	a_3. Limit.	Max.	Limit.	Size.	a_2. Limit.	Max.	Limit.	Size.	a_1. Limit.	Max.	Limit.	Size.
	Unhardened metal.								°C	°C	°C		°C	°C	°C		°C	°C	°C	
A.	Iron by hydrogen, Pionchon.	....	*Heating*	.....	.....	.....	.....	.....	**1,050**	.....	**1,000**	.....	.....	.....	.....	.....	**720**	.....	**660**	.....
C.	Phosphoric iron	1	Cooling..	·05	·08	tr.	·38	·02	.....	855	.....	Small	.....	727	.....	Small.	.....	660	.....	Very slight.
D.	Electrolytic iron	2	Cooling..	·08	.....	.....	.....	.....	855	855	855	Sudden, high, brief.	750	733	720	.....	.....	663	.....	Very slight.
E.	" "	3	*Heating*	.....	.....	.....	.....	.....	**900**	**867**	**840**	*Slight*	**730**	**720**	**710**	*Slight, very flat*	.....	.....	.....	*Missing.*
F.	Extra soft steel, basic open-hearth	4	Cooling..	·16	·01	·11	·03	·02	845	822	800	Moderate	755	730	710	Small	680	658	645	Small.
G.	The same	5	*Heating*	.....	.....	.....	.....	.....	**920**	**900**	**835**	*Slight*	**755**	**725**	.....	*Slight*	.....	**690?**	.....	*Very obscure.*
H.	Soft steel, basic Bessemer	6	Cooling..	·29	·06	·27	·05	·06	.....	865	.....	Very slight	780	721	690	Strong	680	660	640	Of good size.
I.	Half-hard steel, acid open-hearth	7	Cooling..	·57	·08	·23	·05	·02	.....	863	.....	Very slight	750	695	.....	.....	.....	661	645	Very strong.
J.	The same	....	*Heating*	*Not examined.*													**720**	**705**	**690**	.....
K.	Hard steel, crucible	11	Cooling .	1·25	·19	·10	·02	·02	.....	853	.....		.....	.....	.....	Absent	720	674	645	Extremely strong.
L.	The same	15	*Heating*	.....	.....	.....	.....	.....	.....	.....	.....		.....	.....	.....	.....	**720a**	**705a**	**698a**	*Hardened steel.*
M.	White cast iron, Swedish	13	Cooling..	4·10	·22	·12	·02	·04	.....	.....	.....	Probably absent	.....	.....	.....	.....	710	695	660	Very strong.
N.	Basic Bessemer steel,	....	"	·32	·05	·50	·05	·02	.....	855	.....	Very slight	740	705	660	Moderate	660	640	620	Strong.
O.	% of manganese	....	"	·42	·03	1·00	·09	·03	.....	865	.....	" "	.....	665	.....	Slight	.....	625	600	Very strong.
P.	varying.	....	"	·46	·07	1·08	·07	·03	.....	860	.....	Extremely slight	.....	658	.....	.....	.....	620	595	" "
Q.	Tungsten steel, tungsten 3·47%	8–9	Cooling..	·71	·11	·73	·01	·04	.....	.....	.....	Probably absent	.....	700 / 680	.....	Small / Extremely slight	.....	670 / 515	.....	Strong. / Enormous.
R.	Chrome steel	10	"	·33	.....	.....	.....	Cr. 1·00	.....	872	.....	Extremely slight	770	727	.....	Strong	.....	680	.....	Moderate.
S.	" "	....	"	·5@·6	.....	.....	.....	2·00	.....	.....	.....	.....	.....	.....	.....	.....	.....	676	....	Temperature rises to 690° and 716°.
T.	" "	....	"	2·00	.....	.....	.....	10.@12·	.....	.....	.....	.....	.....	.....	.....	.....	.....	694	....	
U.	Redshort (sulphurous) basic Bessemer steel	....	Cooling..	·48	·08	·51	·16	S. ·28	.....	810	.....	Very slight	760	735	.....	Moderate	.....	671	645	Strong.
	Accelerations in heating (tempering) curves of hardened steel.								d_4.				d_2.				d_1.			
V.	Half-hard steel (same as number I.)	....	*Heating*	.....	.....	.....	.....	.....	.....	.....	.....	.....	**345**	.....	*Slight*	.....	.....	.....	.....	.....
W.	Hard steel (same as number K)	15	"	.....	.....	.....	.....	.....	.....	**680**	.....	*Moderate*	**353**	.....	*Strong*	.....	.....	**210**	.....	*Slight*

a Hardened steel.
Italics and heavy-faced type refer to heating, *i. e.* to rising temperature: the others to falling temperature.

The height of a_{r1} and perhaps also that of a_{r3} varies greatly with the composition. a_{r1}, insignificant in iron with ·05 or ·08% of carbon, increases constantly and very greatly with rising carbon till this reaches 1·25%: with further increase to 4·.% it again decreases. Increasing chromium probably heightens it, as does tungsten (3·5%, ±) in one case: in another case tungsten shortens it, while neither manganese (changing from 0 to 1·08%) sulphur, phosphorus nor silicon seems to affect it. 20% of manganese, however, effaces it, and 6·3% of tungsten probably greatly shortens it. The temperature assigned by Osmond to a_{r1} agrees well with Pionchon's observation that the specific heat of iron was much higher in the range 660° to 720° C. than at lower or at immediately higher temperatures.

I trace no simple relation between the percentage of carbon and the height of a_{r3}. Neither chromium, silicon, sulphur, silicon, nor phosphorus nor a little manganese (1·08%) seems to affect it, but it is missing in ferro-manganese, in white cast-iron, and in tungsten steel.

In one case only, that of electrolytic iron, curve 2, does a_{r3} reach a considerable height, and here its height may be due not to the relative freedom from carbon, but to some individual peculiarity of the specimen tested, for a_{c3} in this same specimen is very short: further, a_{r3} is short in phosphoric iron, number 1, which has still less carbon. Pionchon noticed no absorption of heat in this range, but he found one at a much higher temperature, about 1050° C., both in very pure commercial iron and in iron reduced by pure hydrogen from pure ferric oxide.

While a_{r1} and a_{r3} seem to be distinct entities, as much cannot be said confidently of a_{r2}. Those retardations which are called a_{r2} vary so much in position and height in different steels as to suggest that they are not due to the same cause. Grouping them provisionally as a_{r2}, we note that, with rising carbon, the temperature of this retardation falls continuously, from 727° with 0·05% of carbon to 695° with carbon 0·57%, now nearly merging in a_{r1}, which seems to swallow it completely when 1·25 or 4·1% of carbon is present. As manganese rises from 0·27 to 1·08%, a_{r2} falls some 63° C., of which 35° may be due to the simultaneous rise of carbon. With 20% of manganese it is no longer visible. Rising tungsten in one case raises, in another almost effaces it: sulphur perhaps raises it: but neither chromium, phosphorus nor silicon changes its position.

Its height seems on the whole to increase with rising carbon, but not constantly, and perhaps with rising chromium; but it is lessened by tungsten, while rising manganese lessens and finally effaces it. Silicon, sulphur and phosphorus do not seem to affect its height.

a_c has been studied much less than a_r. Only two elevations can in general be traced, and these seem much less marked than those with falling temperature. The upper one is slightly above a_{r3}, and probably corresponds to it: and hence may be called a_{c3} provisionally. The second lies between a_{r1} and a_{r2}: Osmond calls it a_{c1} in some cases, a_{c2} in others, implying that it corresponds to a_{r1} in the former and to a_{r2} in the latter: but this correspondence seems to be very doubtful except in the case of steel with 1·25% of carbon, with which a very strongly marked elevation occurs at 705° C., 31° higher than a_{r1}: this may well be called a_{c1}.

When hardened steel is reheated, three if not four depressions occur between the common temperature and 680° C. (V). We may name the lowest of these d_1, the others d_2, d_3, etc.

§ 258. DISCUSSION. Of these flexures, two only, a_{r3} and a_{r1}, seem to have definite positions. a_{r2} indeed seems to vary with some regularity: but beyond these we find two three or even more flexures. In the cooling-curve of electrolytic iron eight distinct flexures exist. Osmond often classes two distinct elevations as one, *e. g.* that marked a_{r2} and the one at its right in the cooling curve of electrolytic iron (3): in other cases he asssumes that one elevation really consists of two or even three, *e. g.* the great elevation in the cooling-curve (11) of steel with 1·25% of carbon, which he terms a_{r123}. For the assumptions, apparently deemed essential to his theory, I see little warrant.

a_{r1} is probably a phenomenon of the after-glow, of the rapid change from hardening to cement carbon (this Osmond admits) and from hard to soft steel. This is indicated by its absolute position, 700° C., (1,300° F., a dull red), and by the fact that its height is roughly proportional to the intensity of these changes. Let H = the ratio of the hardness in the quenched to that of the slowly cooled state, or the intensity of the hardness-change, I = the intensity of the after-glow, and J = the height of a_{r1}.

As carbon increases from 0·05% to 1·25%, H, I and J increase apparently continuously and roughly proportionally, from insignificant to most striking phenomena: before the carbon rises high enough to form white cast-iron, however, both H and J have diminished somewhat. A moderate quantity, say 1% of manganese apparently affects neither H, I nor J seriously, and the same may be true of a little chromium:[b] a large proportion of manganese, as in ferro-manganese and Hadfield's steel, greatly diminishes or effaces all three.[a] In regard to tungsten alone have we even an apparent anomaly. A large proportion, say 6%, of tungsten greatly diminishes if it does not efface H and I: while in curves 8 and 9 3·47% in one case lessens, in another enormously increases a_{r1}. Our data are too scanty for analysis: but it may be doubted whether this small proportion of tungsten would greatly diminish H and I; and, further, the great retardation in curve 9 lies so much below the temperature of a_{r1} in all the other curves, that we may reasonably doubt whether it really is a_{r1}: it may well represent some other change within the metal.

As sudden cooling prevents the heat-yielding change from hardening to cement carbon, it is natural that when hardened steel is reheated, and while its carbon is gradually changing to cement, heat should be evolved, causing the depressions d_1, etc., in the heating-curve number 15 of Figure 71.

d_1 seems to occur at the same temperature as the temporary weakening of hardened steel noted in § 255. It will be interesting to see whether a second weakening occurs at 353°, corresponding to d_2.

(TO BE CONTINUED.)

NOTE.—The publishers of the ENGINEERING AND MINING JOURNAL will thank the readers of this article if they will promptly call attention to any inaccuracies they may observe in it.

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[a] "Manganese," R. A. Hadfield, p. 77: Excerpt Min. Proc. Inst. Civ. Eng., XCIII., 1887-8.

[b] I find a surprising if accidental correspondence between my observations and Osmond's. When I first tried chrome steels I failed to note the after-glow: on repeating the experiment I found to my surprise a very marked after-glow. I attributed my failure to notice it the first time to malobservation: but I now find from Osmond's experiments that, if the initial temperature is low, say 800° C., chrome steel shows but an arrest of cooling at a_{r1}: while, if slowly cooled from 1100° C., a very marked rise of temperature occurs at a_{r1}: thus my failure was probably due to not heating high enough initially.

PERSONAL.

Mr. James F. Wilson, of Harney Peak fame, according to Dakota papers, is expected there this month.

Mr. Samuel T. Ross, Secretary and Treasurer of the Maryland Coal Company, died very suddenly on Thanksgiving Day.

Mr. H. J. Allen, of Bellevue, Idaho, is in New York endeavoring to obtain capital to work a copper property situated in Nevada.

Mr Sylvester Bowman, a well known Boston merchant and president of the Magee Furnace Company, died in that city on the 2d inst.

Mr. Thomas Cosgrove, an experienced Montana millwright, will start for China shortly to erect a quartz mill there for Messrs. Fraser & Chalmers, of Chicago.

Mr. O. B. Morris, General Manager of the St. Helens Smelting Company, Trinidad, Colorado, is actively engaged preparing for the construction of the company's plant.

Mr. Samuel A. Beckett, President of the Beckett Foundry and Machine Company, will be at the company's branch office in New York Tuesdays and Fridays, 12 to 2:30 P. M.

Prof. J. F. Elsom, chemist, of New Albany, Indiana, delivered an address on Brick Efflorescence; its Cause and Cure, before the annual meeting of the National Brick Association, which convened at Memphis, Tenn., last month.

Mr. A. H. Danforth has resigned from the position of general manager of the Colorado Coal and Iron Company, of Colorado. He had been vice-president and general manager nine years. Mr. J. Depuy, of New York, has been appointed his successor.

The collection of rocks and minerals belonging to the state geological office has recently been removed to Houghton by Dr. M. E. Wadsworth, state geologist of Michigan. It has been kept heretofore in Marquette, the home of the late Prof. Charles E. Wright, Dr. Wadsworth's predecessor in office.

Messrs. John Charlton M. P., William Coe and Archibald Blue, members of the Canadian Mining Commission, have left Toronto for Washington, where they will spend some time investigating the mining laws of the different States. Their information will be incorporated in suggestions they are expected to make in their report to the government.

The Central Trust Company, of New York, began proceedings in the Circuit Court at Chicago, on the 1st inst., to foreclose mortgages aggregating $330,000 given by John E. Burton and his wife, Lucretia D. Burton, to the Trust Company and the Burton Manufacturing Company to John E. Burton. All of the mortgages were executed last year. The New York & Gogebic Investment Company is made a party to the suit.

The project of a trip of the American engineering societies for a joint visit to Europe is beginning to take tangible form. E. N. Carbutt, President of the Institution of Mechanical Engineers, of London, has tendered an invitation to the American Society of Mechanical Engineers, and the latter have now issued a preliminary circular, asking members of the three societies, the Civil, Mechanical and Mining Engineers, to inform the committee, W. R. Hutton and W. R. Wiley, whether they can attend.

General Thomas J. Powers, one of the oldest civil engineers in this country, died in Rochester, Pa., on the 1st inst., aged 81 years. He built the Erie Canal and the famous Portage Railroad over the Allegheny Mountains, which gave the first rail communication between Philadelphia and Pittsburgh. He built the Rome & Oswego Railroad in New York State, the Chesapeake & Ohio Railroad, and the great locks on the Kanawha River, in West Virginia. During the rebellion he had charge of the military routes in and about the District of Columbia. He was President of the old Pittsburgh & Lake Erie Railroad.

The trustees of Columbia College, New York, at a meeting held this week decided that hereafter all architects in the third and fourth year classes of the School of Mines will be obliged to study plumbing and masonry at the New York trade schools, and money to defray the expenses of such instruction was appropriated. The course in chemistry for the graduate department was changed from analytical to medical. In the mining engineering course, quantitative analysis was made obligatory in the second term of the fourth year. Another change is that seniors in the School of Arts will be permitted to take drawing as an optional, and a tutorial fellow will be appointed in physics, in place of the prize fellows, who have heretofore occupied the position.

The third annual convention of the American Federation of Labor, to be held at St. Louis, commencing on next Tuesday, promises to be one of the most important labor meetings held this year. Especial interest attaches to the convention, as the Federation has made such wonderful strides within a comparatively recent time. A couple of years ago, with but a few members, it was alluded to as the infant rival of the Knights of Labor. To-day it has 625,000 members, and it is thought nearly 100,000 will be added at the coming convention by the admission of all the organized miners. It has been learned that an important resolution regarding assessments is likely to be passed. This will provide that each member be assessed 5 cents per week, which would in a short time amount to a large fund. It is proposed that a law be passed that if a trades union is in trouble and needs assistance that the general head of the Federation be appealed to and this fund be drawn upon to help such trades.

On Tuesday evening, a number of gentlemen interested in the formation of a social club to be called the Engineers' Club, whose object is to draw more closely together those engaged in the kindred pursuits, met at the rooms of the American Society of Civil Engineers, in this city. The organization was perfected, the incorporators being: James A. Burden, H. R. Towne, J. C. Bayles, A. C. Rand, David Williams, B. S. Church, Edward Copper, Thes. Egleston, W. G. Hamilton, J. F. Holloway, W. A. Perry, J. C. Pratt, R W. Raymond, and F. S. Witherbee. Its present officers are: James A. Burden, President; H. R. Towne and James C. Bayles, Vice-Presidents; A. C. Rand, Treasurer, and David Williams, Secretary. The responses received at an earlier stage of the movement encourage the belief that the new club will start with a large and representative membership. A circular is soon to be issued to members of the three great engineering societies, inviting their co-operation and placing before them the details. We may state that engineers residing within 150 miles of New York are eligible for membership, the initiation fee being $50 and the annual dues $35. For non-resident members the admission fee is $50 and the annual dues $20.

INDUSTRIAL NOTES.

The Keystone Rolling Mill, of Reading, Pa., shut down on the 4th inst. for a month.

Seyfert's Rolling Mill at Naomi, Pa., will resume in all departments on the 10 inst., after four weeks' lock out, resulting from the objection of the puddlers to their foreman. The foreman to whom they objected remains.

Furnace No. 2 of the Ensley plant at Ensley City, Ala., went into blast last week. Each of the three furnaces now in active operation produces 150 tons daily. Furnace No. 1, the last of the plant, will go into operation not later than February 1st, 1889.

An engine on the Tolodo, Columbus & Southern Railroad drew a passenger train from Toledo to Findlay, Ohio, on the 5th inst. on a fuel furnished by crude petroleum. The trial is said to be a success, and according to reports all engines will be arranged for the use of oil.

It is reported that English shipbuilding firms have offered to build for the Canadian Government three express steamers of 7500 tons apiece, to steam not less than 20 knots an hour, and make the passage between Halifax and Plymouth in five days and to Rimouski in five or six hours longer.

The Standard Oil Company is projecting the construction of a pipe line from Lima, Ohio, to St. Louis, for the transportation of oil for distribution over Southern and Southwestern States. The St. Louis line is to be built like the one already in use between Lima and Chicago. Work will be commenced in the spring.

It is reported that Mr. H. C. Thurber, of Marquette, Mich., has organized a company and bought the Sarnia oil refinery. As soon as the necessary stills, etc., have been placed, he will begin the refining of petroleum in Canada. The object is to demonstrate the utility of the new process invented by a Buffalo scientist, to which we referred in a previous issue.

Thomas G. Boyle & Co., iron brokers, of Pittsburg, Pa., on the 3d inst., it is reported, purchased 20,000 kegs of nails from a number of Western factories. This, with the 35,000 kegs purchased by this firm last month, makes the largest purchase ever recorded in Pittsburg, and, the firm claims, will exhaust the stock on the market, and the production until next April, thus giving them a corner in nails.

The Henderson Steel and Manufacturing Company, at Birmingham, Ala., has been in successful operation since November 26th. On the 2d inst., the company shipped to Chattanooga two car loads of medium hard steel to be used by the Lookout Rolling Mill Company. The steel will be made into car springs, locomotive springs, etc. There is said to be a big demand for this steel from all quarters.

Upon application of citizens of Maple Grove, a village in the eastern end of Berks County, Pa., the Eureka Dynamite Company has been restrained from manufacturing dynamite and other high explosives. The report of ex-Judge Sassaman, Master in Chancery, has just been filed. He takes the ground that dynamite is too dangerous an article to be made near dwelling houses, and the works should be more isolated.

The Boughton Acid Works, located at Boughton Switch, three miles from Titusville, Pa., were burned on November 30th, the property of the American Chemical and Manufacturing Company, of Cleveland, entailing a loss to Marsh, Harwood & Co. of $70,000. The fire was caused by stray acid eating the natural gas pipe that furnished the fuel. The works have furnished all the refining interests of this section with the acid used in the manufacture of refined oil.

We learn that Messrs. Eugene Kelly, of New York, and Patricio Milmo, of Monterey, Mexico, have somewhat changed their iron and steel project for northern Mexico, to which we referred in our issue of September 8th. It appears that they are now to have no English partners in the scheme and that in place of investing $2,000,000 in the enterprise they will now be content with an outlay of $1,000,000, and it is stated that the Bessemer steel plant will be given up for the present.

The furnace at Trussville, built by the Birmingham Mining and Manufacturing Company, of Alabama, went into blast last week. The plant has a capacity of 100 tons per day. The new furnace was christened as the "Janie Hogssett." The officers of the company are: Robert Hogssett, President; Judge Ewing, Treasurer; R. D Smith, of Birmingham, Secretary, and Mr. Fuller Hogssett, General Manager. The probabilities are that work on furnace No. 2 will be begun as soon as operations have fairly begun in the one already built.

Apparently the electric railways or some of them are going to stand the ordeal of snow-storms well, and the system that has first been tested is the Sprague. On November 9th, St. Joseph, Mo., was visited by a very severe snow-storm, interrupting business and communication with the rest of the country, but according to the *Daily Gazette*, neither inconvenience nor delay resulted to the service of the electric street railway—with the use of two-fifths the capacity of the plant the usual number of cars were operated, and made the usual time. Not a wire was broken down or post strained, while telegraph and telephone wires were down in all directions.

BURSTING OF THE BESSEMER STEEL GUN.—At the second test of the Bessemer cast steel gun at the proving grounds at the Naval Academy this week, the gun burst into about twenty pieces, breaking the heavy-timbered platform it was on into fragments. The first charge was thirty-six pounds, the second forty-eight—the regulation charge. The gun, made of Bessemer cast steel by the Pittsburg Steel Casting Company, was 16 feet 1 inch in length, and weighed 10,000 pounds. It was charged with forty-eight pounds of powder and shot a concave ball of 100 pounds. Ensign Robert Dashiell, one of the officers who made the test, said the experiment proves that Bessemer cast steel will not do for great guns; it has not the elasticity nor the tensile strength. The gun exploded under a pressure of 14·1 tons to the square inch.

CONTRACTING NOTES.

Our list of machinery and supplies wanted will be found on page xi. Manufacturers of machinery, engineers and contractors should also consult our directory of "Contracts Open" on page xii. This week, proposals are invited for the following new contracts: No. 1204, Constructing Reservoir; No. 1205, Construction of Water-Works System; No. 1206, Completion of Water-Works; No. 1207, Dredging; No. 1208, Harbor Improvement; No. 1209, Metal Work; No. 1210, Building Wrought Iron Bridge and Construction of Private Railway Line.

It is announced that the Dutch government is ready to receive tenders for the construction of nine metal bridges, to cross the State railways in the Island of Sumatra. Application must be made to the Colonial Office (Technical Department), at The Hague, Holland.

GENERAL MINING NEWS.

Important conventions of the Federation of Miners and Mine Laborers and District Assembly No. 135 of the Knights of Labor, which were this week in session at Columbus, O., on the 6th inst. decided that the name of the new organization shall be the National Progressive Union of Miners and Mine Laborers, and the organization is to be open. The officers are to be president and treasurer and general executive board of seven members. The vice-presidents are to be organizers, and all the officers are to be salaried with the exception of the executive board. The president will receive $1200, and the others a less sum.

Shipments of iron ore from the mines of the districts mentioned below for the season up to and including November 28th, as reported by the Marquette *Mining Journal*, were as follows:

	Tons. 1888.	Tons. 1887.
Marquette, Marquette District	844,694	803,411
St. Ignace, " "	107,399	91,544
Escanaba, " "	863,309	869,296
" Menominee District	1,111,220	1,151,711
" Gogebic District	206,923	51,701
Ashland, " "	1,016,414	1,040,727
Two Harbors, Vermillion District	450,475	390,467
Total tons	4,600,434	4,398,857

TENNESSEE COAL, IRON AND RAILROAD COMPANY.—The official report for November shows that there were received directly from the mines 14,721 tons of coal and 13,155 tons of coke. For the eleven months of 1888 a total of 158,672 tons of coal and 138,007 tons of coke.

[Special report by Mr. H. M. Johnson, Chicago.]

It has been many months since there was a much activity in mining matters on the Gogebic Iron Range as at present. Mines and options which have been idle many months have resumed work, and there is every indication that the production of 1889 will surpass that of this year by nearly one fourth. The output this year from the Gogebic Range now foots up nearly 1,400,000 tons, and of this amount the "Norrie" mines have produced about 400,000, Colby over 300,000, and several of the mines have shipped 100,000 and over.

Several of the mines west of Hurley, which have

been idle this season, are preparing for active work next year. More ore will be shipped to Milwaukee, Chicago, Joliet and other furnaces this winter than ever before, and with the opening of navigation next spring, it is said, a mild boom of a healthy character will be noticed all along the range.

The following table shows Lake shipments from the Gogebic mines for the season up to and including November 21st, 1888.

	Tons.		Tons.
Aurora	172,947	Nimikon	1,313
Anvil	19,366	Norries	372,871
Ashland	161,022	Odanah	3,912
Brotherton	40,639	Pence	26,484
Colby	203,576	Palms	9,725
F. Hennepin	16,549	Pabst	44,436
Germania	23,504	Ruby	2,635
Iron Belt	28,291	Trimble	2,048
Iron King	62,234		
Kakagon	1,228	Total	1,213,431
Montreal	20,631		

The shipments by rail to inland furnaces amounts to about 175,000 tons, which added to the above gives the total production, viz., 1,388,431 tons.

ALABAMA.

The Birmingham Mineral Railroad Company has commenced work on a branch to extend from near Connellsville to the Aldrich coal-fields, about 8 miles. It will be completed at once.

CALIFORNIA.

NEVADA COUNTY.

COE MINING COMPANY.—The final papers in the bonding of the Coe mine, to which we referred in our issue of November 17th, were signed on the 26th of that month. It is stipulated that work must be commenced by January 1st, 1889. It is stated that Captain White will be the superintendent of the property, and that operations will be begun without delay.

COLORADO.

CLEAR CREEK COUNTY.

It is understood that Jo Reynolds will do extensive work on the Red Elephant mines this winter.

COPPER GANGUE MINING AND MILLING COMPANY.—This company has been incorporated by William S. Wilson, of Kansas City; Felix Leavick and Herbert W. Wolcott, of Denver. The object of the company is to operate mining properties in Clear Creek County with the principal office at Dumont. There will also be a branch office at Kansas City. The capital stock is $300,000, shares $10 each.

NEW DUNDERBERG MINING COMPANY.—Stephen B. Elkins and others, the purchasers of the Dunderberg mines for the stockholders, have deeded the property to the new company, the New Dunderberg Mining Company, of West Virginia. The organization of the new company is not yet completed.

ORIENTAL.—This lode on the Red Elephant Mountain has been sold for $6000.

EAGLE COUNTY.

[From our Special Correspondent at Gilman.]

BATTLE MOUNTAIN.—The great Apex question, as affecting the rights of those lodes in the lime versus those in the quartzite, and which has been pending for several months, is about to be brought to a crisis. Surveyors and experts are numerous, and a stir of great activity is taking place within the vicinity of the Champion Battle Mountain and Ground Hog lines.

A recent survey shows the Champion workings to be under the end lines of the Battle Mountain, and they have been enjoined from driving further. Meanwhile, the Battle Mountain's shaft is going down rapidly, but in all probability when they tap the quartzite contract the Champion people will obtain an injunction from the court restraining them from doing further work until the decision is given. It is understood that the first hearing comes off in the United States Court at Topeka, Kan., next June. Prominent lawyers give as their opinion that the suit will exceed that of Aspen Mountain, because it is of such a far-reaching character, involving, as it will, the interest of every noteworthy mine upon Battle Mountain. Four or five years are likely to pass before a decision is rendered, as matters of equity as well as law necessarily enter into the case. The carbonate owners are apparently going to endeavor to substantiate the theory that the entire mountain is a mineralized mass, while the quartzite owners claim a continuous vein existing, entirely separate and independent of the overlying lime. The ores are undoubtedly of a distinct and foreign nature. Meantime I shall endeavor to keep you posted regarding the progress in the above important question. Shortly I will explain, after a thorough investigation, the similarities and differences as occurring between the lime and quartzite formations

TAYLOR HILL MINING DISTRICT.—This mining district is located about twelve miles from Red Cliff, to the east, a region heretofore little developed. The altitude corresponds with that of Leadville. The stratification as far as seen resembles that in Battle Mountain, the quartzite and granite, however, being entirely covered by the lime. The majority of the ore-bodies uncovered to date are imbedded in the crystallized lime and trending strongly into the underlying dolomite. The contact between the crystallized and dolomite limes is mineralized, but not in paying quantities. From appearances the greater bodies are yet to be found in the dolomite, should the formation afterward exposed prove identical with that of Battle Mountain; and taking as a basis the fact that the Dawson, the only mine having penetrated the dolamite exhibits more extensive ore channels, we can safely argue in its favor. The ore is termed free-milling. The similarity between the Holy Cross District and Taylor Hill ores is striking, one occurring in lime, the other in granite, one partaking of the nature of a porphyritic granite while the other is a decomposed quartz, and both are slimy ores. Both run heavily in gold, with no lead. As an instance of high assays 1739 ounces silver and 19 ounces gold can be cited. All that is required at this point is sufficient capital to thoroughly prospect the territory. Most of the lodes are owned by professional miners who do not possess the funds for such an undertaking, and hence the lack of systematic work thus far.

THE NEW ERA.—This property, operated by an Eastern company, has resumed work. They are preparing to sink to the dolomite.

LAKE COUNTY.

PRESIDENT MINING COMPANY.—Nearly all the floating debts have now been paid. It is said, too, that in view of the very favorable outlook in the mine, arrangements are to be immediately made by the shareholders in the company, whereby the debts which are secured by trust deeds on the company's property are to be paid at once.

LAS ANIMAS COUNTY.

ST. HELENS SMELTING COMPANY.—This company, to which we referred in our last issue, is pushing work vigorously at its plant at Trinidad. It is the first smelting company to take advantage of the cheap fuel afforded by Trinidad and will be ultimately a complete reduction works for copper ores.

SUMMIT COUNTY.

JUMBO MINING AND MILLING COMPANY.—This company has not yet found a contractor to remove the Eureka mill, and rumor says the company is considering the propriety of discarding stamps and substituting Huntingdon mills therefor, inasmuch as the latter used at the Ware mill, the Ryan & Ford mill, the Wire Patch and the Victoria mills are successful in treating the ore of this section.

CONNECTICUT.

Reports state that some New Haven, New York and Albany capitalists have put up $400,000, so it is claimed, to fit up with all modern appliances an old copper mine near New Haven. It has not been worked for 30 years, but the parties evidently mean business, and claim that they can begin to get out rock in three months.

DAKOTA.

The present visit of Captain David Cock to the Black Hills, according to the Rapid City *Journal*, is for the purpose of purchasing tin property for a company composed of new men (presumably Englishmen), and that the property of the Stephens Tin Company has already, in whole or in part, been sold to this new corporation. The terms upon which it is said the property has thus far been purchased for the company are similar to those offered by Captain Cock to owners of tin claims since his arrival—a considerable percentage of the agreed price down, to secure an option of ninety days, when, if developments upon the property make satisfactory disclosures of ore, the balance is to be paid. In our last issue our correspondent "More Anon," in his letter on Dakota mining interests, gives some information about Captain Cock.

Mr. Webster, of the Glendale, Dak., Tin Mining Company of Chicago, in a recent interview said: "I consider that the Black Hills tin mines are an assured fact. We will run our tin into bars, and stamp it to indicate where it comes from, and we will show some of the Eastern skeptics whether the Black Hills country has tin in it or not."

We would respectfully suggest that Mr. Webster should also let the "Eastern skeptics" know what the bars cost. That is the information they are after.

IDAHO.

Coal is again scarce in this territory says the Wood River *Times*. At Nampa and other towns along the Oregon Short Line the people are compelled to burn sagewood for fuel, and the locomotive running on the Idaho Central from Nampa to Boise is compelled to go to Caldwell to coal up.

In Hailey the supply is short between one hundred and fifty and two hundred and fifty tons, and many persons having coal stoves are compelled to burn wood. In Bellevue and Ketchum pretty much the same state of affairs prevails. If the supply of coal continues short much longer many persons who have heretofore used coal will use wood altogether. In explanation of the famine the general agent of the Union Pacific coal mines at Salt Lake states that on account of the fire at their Olney mines all orders are badly delayed, and that enough cars to supply the Rock Springs mines cannot be obtained. Smelters and company orders have to be filled first, and commercial orders have to take their turn, and are often 1000 tons behind.

ALTURAS COUNTY.

IDAHOAN.—It is reported that this mine has been sold to Montana capitalists by Judge Turner, of Hailey.

MICHIGAN.

After one year's work of development and exploration at the Washburn gold and silver mines, four miles east of Wakefield, the works recently built have started up The company has fifty men at work in the shafts and plant. It is expected that the first bullion from Washburn will be molded on Jan. 1st.

BARAGO GRAPHITE MINING COMPANY.—Work has been commenced on this company's plant, which is located about eight miles south of L'Anse, on section 16-49 33. A road is now being built from L'Anse to the location. Mr. R. R. Williams has been employed as superintendent, and a force of men will be put on immediately to get out graphite for shipment by rail to Detroit.

COPPER MINES.

CALUMET & HECLA.—The latest news with reference to the fire is that it is still burning fiercely and that several small slides of ground have taken place near Shaft No. 3, but have been filled. The fire is now showing at the surface, as was to be expected from the plan adopted by those in authority, viz., leaving two shafts open to allow the fire to burn itself out, in place of trying to choke it as on the last occasion.

The Michigan *Copper Journal* says: Work is of course suspended in other sections of the mine, and from sixteen to eighteen hundred men, who are regularly employed underground, will be for a time without work.

The shaft, or more properly speaking, shafts, in which the flames are located are sunk at the customary angle of forty-five degrees. They are two in number, being the hoisting and the man engine shafts, and are thirty feet apart. The hoisting shaft is covered by a wooden building of comparatively small value; the man engine shaft is roofed over by a stone building, containing the surface machinery of the engine, and which under ordinary circumstances probably would be fire-proof. If the shaft is allowed to burn out according to the now expressed intention, both these buildings will probably be destroyed.

The company has a source of copper supply left which will undoubtedly very nearly supply the amount of the metal called for by the syndicate. Reference is made to the Black Hills mine. It will be remembered that soon after the fire broke out, November 23d of last year in No. 1 shaft, that the only level—the seventh—which connected this mine, so-called, with the Calumet & Hecla system proper, was sealed up with stone. Being entirely separated as it now is, it will probably be worked to its fullest capacity, and many of the miners who are thrown out of work by the present fire will undoubtedly be given employment.

CENTENNIAL COPPER COMPANY.—In August, 1885, judgment was rendered Messrs. William Bingham, John E. Greene, Chas. W. Bingham and Henry S. Blossom against Centennial Copper Company in the sum of $4887.27 damages, and costs $22.50. In consideration of the payment of the judgment, the plaintiff discharges of record the levy of execution in this cause on S. ½ of sec 12, town 56, north range 33 west. Such discharge was filed on November 22d with the Register of Deeds of Houghton County.

TAMARACK MINING COMPANY.—The directors of the Tamarack will offer to stockholders of record, December 20th, the right to subscribe to the 10,000 shares treasury stock at $100, payable in installments of $20, February 1st, June 1st and October 1st, 1889, and February 1st and June 1st, 1890, no stock to be issued until date of last payment. The money will be spent in the work of sinking two shafts on Section 11, which will be begun at once. The company has just declared a dividend of $5 per share.

IRON MINES.

AURORA MINING COMPANY.—The company is now free from debts, and has a surplus of about $50,000 in the treasury. Its production for 1889 is estimated at 200,000 tons, for which proposals are now being considered at prices far in advance of those received this year.

BROTHERTON.—This mine on the extreme east end of the range will ship ore all winter. Its earnings for the season amount to $40,000.

IRON KING.—This mine, one of the Bessemer Consolidated properties, is now temporarily closed for general repairs.

MONTANA.

DEER LODGE COUNTY.

HOPE MINING COMPANY.—Official advices show that the production for the ten months of 1888 amounted to 151,313·80 ounces of fine silver. A strike has been made in the Porter Lode on Hope Hill. The Silver Chief tunnel is in 970 feet, and it is expected to strike the ledge every day. From the raise in this tunnel, No. 1 and 2 west, rich ore is extracted; average assay, 95 to 125 oz. silver, produce, say, 65 to 85 tons per month. This ore is in granite formation and is a fissure vein and the company expects to have a mine in this lode. The company has a reserve fund of $50,000 in St. Louis city bonds and cash in bank.

LEWIS & CLARKE COUNTY.

BOSTON & MONTANA GOLD MINING COMPANY.—An Eastern syndicate, represented by A. J. Seligman, has filed attachments in the District Court of Lewis & Clarke County against this company for $83,000 in money and the "Gloster" lode, the company's richest mine. The mine is operated by a company, of which H. W. Child was manager. The improvements consist of a sixty stamp gold mill and one of the finest hoists in the country, while the other buildings are of the best. Little except development work has been done in the mine for the past eight months. Manager Child withdrew from the company some time ago, and since then nothing to amount to anything has been done, which has evidently dissatisfied the Eastern syndicate, and they attached. It is not likely that any legal difficulty will grow out of the affair, as the property is very valuable, and the syndicate is amply secured by the mill, hoist, and other surface improvements, not taking into consideration the gold-bearing quartz the mine contains. It is thought at Helena the attachments were made merely to force a reorganization of the company.

SILVER BOW COUNTY.

BOSTON & MONTANA CONSOLIDATED COPPER AND SILVER MINING COMPANY.—It is probable that the mine may have to close down for two or three weeks for repairs, owing to the recent boiler explosion. It

reported that the company is now bid $200,000 for its tunnel property recently purchased for $150,000. On the 1st inst. three samples were taken from the ore at the Lloyd tunnel, and the average of all the dump gave 25·4 per cent copper, 27·75 ounces silver.

It is said this vein runs through the Butte & Boston to the east.

BUTTE & BOSTON MINING COMPANY.—A letter from Superintendent Palmer says: We have about located our new shaft on the east ground near the Silver Bow mill. We have just run out lines of vein from the Harris-Lloyd tunnel. The extent of the vein opened in the tunnel at present is only 130 feet, making a very short line as extended with that of the vein worked on in the tunnel which passes just south of the mill, consequently it is believed that the veins passing north of the mill are those of the Anaconda and St. Lawrence. Our shaft, however, will be located at the tunnel vein, and about 1200 feet east of the tunnel shaft. At the 300-foot level with this location we may have to cross-cut north to intersect the Anaconda-St. Lawrence vein. We ought to cut the tunnel vein in the bottom of the shaft. This vein to-day, as seen at the bottom of the tunnel workings, is one of the best ever opened in this section, carrying clean ore of about 15 to 20 per cent copper, and some copper glance pieces which I brought out, assaying 98 ounces silver and 69 per cent copper per ton. In driving this drift they have taken out about 250 tons of the lower grade of ore, 15 to 20 per cent, the better grade being found as they go west.

NEVADA.

ELKO COUNTY.

[From our Special Correspondent.]

The Water Company has at last got its thirteen-mile ditch finished and pipe laid, the water running into town last Monday. The Navajo mill is doing good work, ore pulping $308 per ton. The new concentrator starts to-morrow on Nevada Queen ore. Fuel has been laid in at the Navajo mill and mine to run both over one year from now.

Work on the new twenty-stamp Union mill is being pushed rapidly ahead, and it is expected to be in running order in forty days. North Belle Isle, Commonwealth and Nevada Queen are all looking well, and the Navajo stopes are yielding abundance of very high-grade ore.

The water in the Grand Prize is being lowered and they will soon be able to get to work on the four hundred foot level, when a drill will be run off to cut the rich body of ore found in the West ledge 300-foot level, which was followed down in a winze about thirty feet, the winze being in very rich ore at the bottom.

STOREY COUNTY—COMSTOCK LODE.

From Comstock comes the encouraging reports of the bullion product for the current month, which is estimated to reach $750,000, distributed about as follows: Con. Cal. & Va., $340,000; Hale & Norcross, $160,000; Confidence & Challenge, $150,000; Chollar & Potosn, $25,000; Alta, $25,000; Savage, $25,000; Occidental, $10,000; Yellow Jacket, $10,000; Overman, $7,500.

For some two or three years past Comstock mine owners have been endeavoring to find some cheap method of reducing the low-grade ores, of which there is an enormous quantity developed in the mines. The scarcity of water has always been a difficulty, and wood for fuel purposes is scarce and expensive. Recently experiments were made with electricity as a motive power, as described in the ENGINEERING AND MINING JOURNAL. The water from the Sutro Tunnel is used by means of turbine wheels to run dynamos, and the electricity is carried to the mills and used to run the stamps etc. This method of obtaining power is proving eminently successful and one of the mills started its plant last week. The rise and fall of the Carson River will soon cease to be looked upon as affecting the output of the Comstock. It is stated that all the water necessary to run the mills of the Comstock flows from the Sutro Tunnel and the cost of treatment of ores will not exceed $5 per ton.

NEW MEXICO.

[From an Occasional Correspondent at Silver City.]

There is very little doing here outside of several small gold mills at Pinos Altos, eight miles north of Silver City, which are running upon auriferous pyritic quartz from numerous veins in the syenite formation of Pinos Altos Mountains. The Flagler Reduction Works is the only ore reducing works in operation at Silver City, and is at present occupied in smelting about 30 tons daily in a small (36 inch) cupola, of oxidized copper ores from Hanover, 18 miles northeast of Silver City, turning out a car load per week of pig copper. The Russell process plant, belonging to these works, is not at present in operation. Small quantities of very rich gold and silver ores are shipped from this point to various smelting works, principally to Denver, notably from the Alhambra mine (formerly Blue Bell) at Black Hawk, and from the Copper King, at Cooney. The Alhambra ore, in common with the ore from the Black Hawk and Rose mines in the same district, is composed principally of native silver, often in solid masses, occasionally a terarsenide of nickel cobalt, and silver is found containing 69 per cent, as 12 per cent Co, 6 per cent Ni and 3 per cent Ag. These ores occur in quartz veins in syenite. But as a general rule the ores of this and surrounding districts which occur in large veins are not sufficiently rich to pay for shipping to distant smelting works, and as they consist largely of sulphides of iron, copper, lead, etc., they do not generally afford much profit by stamping.

The Santa Rita copper mine has been unwatered and is being retimbered.

GRANT COUNTY.

SANTA FE COPPER COMPANY.—An official telegram to us from Los Cerillos states: "The Titles of Santa Fe Copper Company have been examined. San Pedro all correct; no lawsuit at Los Cerillos. There are eleven full locations indicating large ore-bodies, one mine is working, hoisting daily one hundred tons twelve per cent ore; one water jacket is running. The second one will run next week; the capacity will be tripled next summer.

PENNSYLVANIA.

The Pittsburg & Lake Erie Railroad Co. will build a short branch road to open up the clay and coal fields along Brady's Run. The new road will extend from Fallston Station, on the Pittsburg & Lake Erie Railroad, to the rich deposits of fire-clay about one mile distant, where the extensive fire-brick works and potteries will be located by capitalists of New Brighton. The brick will be a specialty, and will be burned black. The company has a big gas well on the premises from which the supply of fuel will be obtained. The railroad company expects to have the new branch completed soon after the opening of next year, and as the country in that vicinity develops, the road will be extended to afford transportation facilities.

The case of Lawrence Lewis, Robert M. Lewis, Francis Lewis, and several others, all residents of Philadelphia, and heirs of Lawrence Lewis, of that city, against the Boyertown Mining Company, one of the most important suits tried in Reading for years, was called up in court on the 3d inst. for trial, and after a discussion between counsel was postponed until next term of court. The contest is for the possession of iron ore mines covering over 19 acres within the limits of Boyertown, from which hundreds of thousands of tons of iron ore have been taken out. The defendants claim possession from a lease executed by Thomas Rutter and Samuel Potts, early iron masters of Berks County, and their wives, on November 2d, 1786, to Jonathan Rhoads. His son, John Rhoads, operated them for many years. In 1852 they were leased to Robert S. Buck, who operated them for 30 years and paid a royalty to the Rhoads heirs. The latter operated them for some time after the expiration of the lease, and then leased the mines to the present defendants. Many thousands of tons of ore have been taken out, and some of the shafts are nearly 300 feet deep. The Lewis heirs claim the mines under a deed also executed to them by Messrs. Rutter and Potts.

COAL.

The report issued by the Schuylkill Coal Exchange, dated Pottsville, December 3d, states that the following collieries drawn to return prices of coal sold in November, 1888, to determine the rate of wages to be paid, make the following returns: Bast Colliery, $2 69²; Boston Run Colliery, $2.62⁹; Preston No. 3 Colliery, $2.62²; Turkey Run Colliery, all of the P. & R. C. & I. Co., $2.67⁹; William Penn Colliery (Wm. Penn Coal Co.), $2.54. The average of these rates is $2.63⁷⁄₁₀, and the rate of wages to be paid is four per cent above $2.50 basis.

PHILADELPHIA & READING COAL AND IRON COMPANY.—The Bast Colliery, operated by this company, suspended operations on November 30th for an indefinite period. At Shenandoah, the Knickerbocker Colliery closed down for the winter on the 1st inst. In our last issue we referred to the closing of a number of the company's collieries. The company has purchased at Allentown the property of the Allentown Iron Company, on which will be located the terminal which the company will build as a connection between the East Penn and Jersey Central roads through Allentown. The property purchased contains three blast-furnaces, two of which are in operation. As soon as the transfer was made George F. Baer, of this city, a Philadelphia & Reading director, was elected president, and Albert Broden, superintendent of the Coal and Iron Company's furnace, was chosen general manager of the Allentown Iron Company.

ROCKHILL COMPANY.—The Rockhill Company's mines near Huntington were flooded on the 1st inst., shortly after 150 men had begun work. The men were driven to the extreme end of the mine and were imprisoned there 10 hours, it is said, the water reaching their chins. By excavations outside the water was withdrawn and the men rescued. The flood was caused by the breaking of a dam.

NATURAL GAS.

JEFFERSON GAS COMPANY.—Messrs. Jones & Laughlins, of Pittsburg, are about to apply for a charter for this company, with a capital of $200,000. The firm has secured a quantity of natural gas territory in Jefferson township, Washington County, and will drill wells there and pipe the fuel a distance of over fifteen miles to Pittsburg to supply the American Works and Eliza furnaces. They will not probably have have any gas in Pittsburg before next summer.

PHILADELPHIA NATURAL GAS COMPANY.—The company voted at its meeting held this week to issue $2,500,000 ten-year 6 per cent bonds to pay for floating debt. The dividend will have to be reduced in consequence of having to meet interest charges and provide a sinking fund.

OIL.

Exports of refined, crude, and naphtha from the following ports, from January 1st to December 1st:

	1888. Gallons.	1887. Gallons.
From Boston	4,301,956	3,760,422
Philadelphia	125,468,432	152,573,661
Baltimore	6,835,545	8,193,251
Perth Amboy	20,050,068	15,796,136
New York	342,060,478	351,494,273
Total exports	498,716,479	531,817,743

TEXAS.

EL PASO COUNTY.

SIERRA BLANCA MINING AND SMELTING COMPANY.—This company will, it is said, play an important part in the development of the mineral riches of El Paso County, more particularly the eastern portion of it. The officers are: John T. Lytle, President; J. H. Pressnall, Vice-President; Jos. W. Maddox, Secretary, and W. W. Tobey, Treasurer. The most promising property of the company at present is the King mine.

UTAH.

MYERS & DICKERT SULPHUR COMPANY.—We are officially informed that the suit, to which we referred in our issue of November 17th, brought in Salt Lake City for possession of the company's ground has been decided in favor of Fred. Dickert.

JUAB COUNTY.

BULLION-BECK.—It is reported that a rich deposit of ore has been encountered in the 400-foot level of the Bullion-Beck & Eureka Hill mine at Eureka. Twelve cars of ore sold in Salt Lake City for over $25,000.

VIRGINIA.

ROANOKE COUNTY.

WASHINGTON ZINC MINING COMPANY.—Efforts are being made to have located at Roanoke the zinc works referred to in our issue of November 10th, to be built at Bonsack's next spring.

WASHINGTON TERRITORY.

The report of Mr. H. C. Page, Inspector of the First District of Mines, shows that there are five mines in the first district, being located at South Prairie, Wilkeson, and Carbonado, in Pierce County, and Bucoda, in Thurson County. The Bucoda mine is operated by the Northwest Coal Transportation Company, and is located on the line of the Northern Pacific Railroad, about twenty miles distant from Olympia. The character of the coal in this mine is a good quality of lignite. The principal output is shipped to San Francisco, the same being 49,160 tons for the year ending September 30th, 1888. The present daily output is 250 tons, mined by seventy men and eight boys. The narrow gauge railroad from Olympia to Tenino is to be extended to Bucoda, which will give that place two outlets by rail to Puget Sound, namely, Olympia and Tacoma.

WISCONSIN.

MINNEWAWA.—It is reported the Minnewawa mine has struck a vein of clean ore 35 feet wide and the mine will be developed this winter. This property is located between the Ashland and Germania mines and on the Wisconsin side of the Montreal River.

PENCE.—The Pence is selling its product at the mine on the cars and will continue active work all winter. The ore is the highest grade on the Range and in demand at advanced prices. Its earnings for the season will be close to $50,000.

FOREIGN MINING NEWS.

CANADA.

PROVINCE OF NEW BRUNSWICK.

BRUNSWICK ANTIMONY COMPANY.—The company's mines at Frederickton have been cloeed, and for the present operations have been suspended at the company's works at Glenwood, Mass.

MEXICO.

BATOPILAS MINING COMPANY.—General Manager Shephard of this company writes under date of the 17th ult. to President Quintard that the condition of the property is very satisfactory, and the yield of mineral will be largely increased. The 30-stamp mill has started. In the week in which the letter was written 7000 pounds of first-class ore was produced, the largest output for many weeks. From 5000 to 10,000 tons of low-grade ore are awaiting treatment. Boilers, compressors, engines and dynamos are putting in place, and the plant is expected to go into operation by Jan. 1. The various properties and lodes are producing silver in good quantities. With the compressors at work, the manager writes that within a year sufficient known silver-bearing veins should be cut to give enough ore for the present plant, if not more. The year's operations will show net earnings of over $100,000 for the first year of consolidation. A great number of improvements have been made and are making.

[From our Special Correspondent.]

LOWER CALIFORNIA.—There has been a great change in the affairs of the French Copper Company of the Boleo mines at Santa Rosalia. A new superintendent assumed charge a short time ago and has made some radical changes at the mines and works. A large number of workmen are to be imported from France so as to introduce more economical methods than has been practicable with the former force. A large consignment of machinery from France has also commenced to arrive, having come through the United States by rail in bond. It will be sent by steamer from San Diego, Cal., to the point of destination.

The San Fernando copper mine was denounced some time ago by Señor J. M. Ibarra, of Ensenada, and has just been taken possession of by him with all its belongings.

SONORA.—The old St. Louis mine, situated in Ures District, was taken up a number of years ago by a company in St. Louis, Missouri. The company had great faith in the property and expended large sums in its development. The neighborhood was, however, scarce of water, and the ore could never be worked to advantage on that account. Rather than go to the expense of piping water to the mill the property was allowed to lie idle until it was denounced for abandonment by some Mexicans. The new owners are profiting by the work done by the St. Louis parties,

and are making money, although they are working in the old primitive way. They reduce the ore in arrastras with the loss of all the silver, but are sensible enough to remark that even this is better than to lose the whole mine as the Americans did.

The Santa Ana mine is situated about twenty miles to the northwest of the town of Oposura, and is one of the famous San Juan Bautista group which were worked by the Spaniards about two centuries ago. The tradition is that they yielded immense wealth, although these old workers left untouched the dry silver ores which they had no quicksilver to treat, and used only the ores that were rich enough to be smelted either by themselves or with litharge. Tradition also says that when the Spaniards were obliged to abandon the Santa Ana mine from water coming in they left off in a vein of pure silver, one third of a yard in breadth. A company, of which Mr. George D. Capen is president, has been investing St. Louis capital in the Santa Ana for some time past, and a late report from the superintendent states that he has evidently reached the bottom of the old workings. He found some ore which assayed from 250 to 2800 ounces in veins about an inch wide. The stockholders of the company have agreed to raise $10,000 for further development, each subscriber to receive $10 from the first product of the mine for each dollar so loaned.

CHIHUAHUA.—The Carizo District is about sixty miles northeast of the city of Chihuahua, from which there is an excellent wagon road direct to the mouth of the mines. The formation of the country rock is limestone intersected by veins filled with oxide of iron or ferruginous clays carrying silver chlorides; the gangue is heavy spar and calcite.

The ore is, as might be supposed, entirely free milling, but it is expected will change somewhat in character after water is met with. At present the deepest working in the camp is not over eighty feet and no water has as yet been encountered. The producing properties of the camp are the Purissima, the San Antonio, the Dolores, the Carmen and the Santa Rita, which have already shipped several car load of ore to the El Paso smelters. In addition to the above work there is some prospecting being done. The greater part of the district is covered by a mineral zone concession made by the Mexican Government, and most of the work is being carried by permission from the owner of the concession.

At Sabinal the La Libertad Company is erecting an additional desulphurizing furnace, which will enable the mill to give a greater output. The same company will probably soon erect a smelting plant. The Plancha de Plata mine is practically idle, awaiting the action of the owners in Chicago, and the Florenzia mine has closed down indefinitely. The strike in the Santo Domingo mine is about the only thing that keeps up the courage of the camp, and as this mine is in the hands of individual owners who are moreover practical miners, it is to be hoped that it will escape the fate of the mines just mentioned. The Santa Juliana mine is about to start up again.

Mr. John Darroch has organized a company in Chicago to work the Santa Margarita mine near Rosario. The ore is free milling, and some samples have yielded as high as $5000 per ton. The company has purchased machinery for a stamp-mill to be run by a fine water-power not far from the mine.

NUEVO LEON.—The concentrators belonging to the Yguana and the Guadelupe companies of Villaldama and located in Laredo, Texas, commenced operations some time ago and are steadily receiving shipments from the mines. These have, for the present, entirely discontinued the sale of their low-grade ores to outside smelting and refining companies. The Volcan and Gloria mines, near Villaldama, have sent several samples to the International Exposition now being held at San Antonio, Texas. These mines, being new ones, have none of the gopher work which often impairs the value of mines in this republic. They are said to have thirteen headings in ore which is well up in both lead and silver. Development-work on this property is still being pushed and the ore is being piled up on the dump. Many new and promising claims have been discovered in this State lately, and numerous prospectors are at work.

The San Antonio de Yguana Company is working near Lampazos doing development work and running a tunnel which it will take six months to complete, for the purpose of opening up the vein in their most promising mine.

SAN LUIS POTOSI.—The San Salvador mines known as the Restanradora, near the station of the above name on the Mexican National Railroad, are now being worked by a Texas company and some ore is being shipped to Laredo. Work on the Vaneges branch of the Mexican National Railway, which is to tap the rich mining district of Catorce, is progressing finely, the grading is nearly completed for more than two-thirds of the entire length and tracklaying will begin in a few days. The Concepcion mine in Catorce has paid two dividends within the last six weeks, with more coming. The La Paz mine near Matehuala is also reported to be doing very well, and will probably declare a dividend within two months.

It is expected among mining men, both natives and foreigners, that the year 1889 will see a big boom in mining matters all through this region.

A concession for the exploration and exploitation of mines of all metals has been made to Blas Diaz Gutierrez and Gaspar S. Butcher, in the Sierra of Minas Viejas, within a parallellogram of 20×15 kilometers. Another concession has been made of the same size to Gaspar S. Butcher & Co., in the Sierra de Montanas, and a third concession of the same size to Gaspar S. Butcher in the Sierra of the Yguana. All of these concessions are in the district of Villaldama.

GUANAJUATO.—A rich strike is announced in the La Union mine, owned by St. Louis parties. The mine has been barren for some time, but within a few weeks numerous bunches of ore were encountered, which were followed up with the result of getting into a fine ore-body in the main vein.

The hacienda or silver mill on Las Luces is owned by a St. Louis syndicate, which has purchased a number of old dumps around the city of Guanajuato, from which they expect large returns. At present the mill is shut down pending the arrival of some more machinery which has been ordered to remedy some defects in the refinery. Up to the time that the mill was shut down 150 tons of ore had been milled, yielding about $48 per ton.

The Santa Ana Mining Company was formed in St. Louis, Mo., about a year ago to work a famous old mine of that name in Guanajuato, but after spending some thousands of dollars in development they were forced to await the settlement of certain legal difficulties respecting the ownership of the property, and have since been at work on the Rico mine, in the same district. On the latter claim the company has sunk a shaft 200 feet deep to drain the mine. After the completion of the shaft it took some weeks work to get the water out of the mine. This part of the work has just been finished, resulting in the discovery of a vein of horn silver, running $75 to $300 per ton. The company will now put in all the machinery needed and begin to work the mine on a large scale.

SINALOA.—Bismuth ore of good quality is reported to have been recently discovered in this State not far from Culiacan. An expert was sent out recently by some California parties to examine the mine, and it is stated that he found the ore to be quite rich, but not so much so as that from the mines in Sorato, Bolivia. The latter mines yield native bismuth associated with silver ores. The uses of bismuth in the arts are very limited; it would not take many tons to glut the market.

MICHOACAN.—The Concepcion mine in Tlalpujuhua is now running its 20-stamp mill only about two thirds of the time on account of a deficiency in pan capacity. The work of exploration is still going on in the mine, as the rich ores lie deep in this camp. Although the main shaft has been connected with some of the upper workings, it will be necessary to sink it some 90 feet farther and to run a long cross-cut before it can be connected with the lowest levels. This will take some months labor, but will enable the whole mine to be drained by a single set of pumps, and do away with the expensive partial drainage that is now necessary. At present also a large portion of the ore product has to be packed some distance on men's backs, an expense that will cease when all the connections that are now projected are once made.

The Seis Senores is reported as doing better than ever before, and as producing enough ore to keep the mill running full time.

The Nacicnal mine, owned principally by employés and contractors of the Mexican National Railroad, will finish in a few weeks a tunnel about 2500 feet long on which the company has been spending money for nearly five years.

GUERRERO.—The San Cristobal mine is situated in the State of Guerrero, on or near the road from Chilpancingo to Acapulco and about sixty miles to east of the latter place. The mine is owned by a New Orleans company, for which Mr. E. R. Bush is the superintendent. The mine has been doing very well since Mr. Bush took hold of it, and has recently made a small shipment to Mexico of ore which assayed over 300 ounces of silver per ton.

Governor Francisco Arce of this State owns a mine near Chilpancingo from which some rich specimens have been brought to this city recently.

HIDALGO.—From Pachuca I hear that the vein which I recently reported as having been struck in the courtyard of the Guadelupe hacienda, where some men were diging a well, is turning out to be a find which is expected to rival some of the richest mines in the camp within a short time.

In the Cueva Santa mine the main drift has cut the vein and opened up a fine pay streak which is being developed as rapidly as possible.

SOUTH AMERICA.

REPUBLIC OF COLOMBIA.

SANTIAGO GOLD MINING COMPANY.—To a representative of the ENGINEERING AND MINING JOURNAL Mr. John Grodhaus, the superintendent of this company, who is now in the city, said, in reference to the condition of the property: "Work has now commenced in earnest, and a shipment of bullion is probably on its way here now. When I left we had 3000 or 4000 tons of ore on the dump ready for milling. The mill started with twenty stamps on the 21st of October. During the week ending November 7th 180 tons of quartz were crushed and 270 ounces of amalgam taken from the plates. About 20 tons of ore are sent to the mill daily. We are producing about 10 tons of first-class and 30 tons of second-class ore per day. The old La Guaca vein, which is of blanket formation, has been opened up for over 500 feet, the ore averaging about $31 per ton. Work has also been commenced on the Harper vein. We are employing 20 miners and 16 cargadores, and considering that the mill is run by inexperienced men, good progress has been made. The surrounding country is wonderfully fertile. The climate does not differ much from that of the Southern States, Alabama or Mississippi. There are comparatively few white men there, and the natives, of course, are not skilled miners. Our property is very extensive, but on all sides locations have been staked. No actual work will be done upon them until our success is assured."

SOUTH AUSTRALIA.

PROPOSED AMALGAMATION OF SOUTH AUSTRALIAN COPPER COMPANIES.—Advices from Adelaide state that it is proposed to amalgamate the Wallaroo, Moonta, and Hamley copper-mining companies. Nothing definite, however, has yet been done.

SPAIN.

There is considerable movement in mines, so far as application for new concessions may be taken as an indication. The well known mining company, La Cruz, trading under the firm of Neuville & Co., who have good mines and lead smelting works at Linares, have asked for concessions for more than thirty mines near Fuente del Arco, including lead and iron ore, and also some coal mines, the latter in the province of Badajoz. In the same province a well known party has demanded the concession of an extremely large mine of silver-lead deposits, known to contain about twelve or fourteen very rich lodes. The samples taken show such a percentage in silver as to make the mines werkable even if the lead had no value at all. The ground covered by the new concession is larger in itself than the whole of the Linares and Mazarron districts put together, and the district is in the vicinty of the village of Zalamea de la Serena.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Dec. 7.

Statistics.

Production of Anthracite Coal for week ended December 1st and year from January 1st:

	1888.		1887.
Tons of 2240 lbs.	Week.	Year.	Year.
P. & Read. R.R. Co.	165,000	6,731,117	7,026,087
Cent. R.R. of N. J.	111,956	5,347,358	4,513,583
L. V. R.R. Co.	210,706	6,321,793	5,484,333
D., L. & W. RR. Co.	115,708	6,445,732	5,576,711
D. & H. Canal Co.	105,714	4,181,579	3,682,386
Penna. R.R.	39,514	4,196,071	3,489,264
Penna Coal Co.	21,127	1,555,280	1,473,182
N. Y., L. E. & W.	20,000	878,210	702,487
Total	789,785	35,657,140	31,948,033
Increase		3,709,107	

The above table does not include the amount of coal consumed and sold at the mines, which is about six per cent of the whole production.

Production for corresponding period:

1883	30,146,547	1885	29,021,111
1884	29,388,609	1886	30,032,139

Production of Bituminous Coal for week ended December 1st, and year from January 1st:

EASTERN AND NORTHERN SHIPMENTS.

	1888.		1887.
Tons of 2240 lbs.	Week.	Year.	Year
Phila. & Erie R.R.	1,554	60,648	18,310
Cumberland, Md.	64,358	3,327,600	3,032,984
Barclay, Pa.	*3,480	144,397	165,950
Broad Top, Pa.	9,534	341,971	321,911
Clearfield, Pa.	73,029	3,101,510	2,842,965
Alleghany, Pa.	18,925	737,660	771,905
Pocahontas Flat Top.	28,831	1,269,408	943,004
Kanawha, W. Va.	35,000	1,494,295	1,313,684
Total	234,711	10,477,489	9,410,713

*Week ending November 28th.

WESTERN SHIPMENTS.

Pittsburg, Pa.	12,922	673,111	519,625
Westmoreland, Pa.	28,914	1,437,332	1,315,014
Monongahela, Pa.	4,073	362,179	354,262
Total	45,909	2,472,622	2,188,901
Grand total	280,620	12,950,111	11,599,614

Production of Coke on line of Pennsylvania R.R. for week ending December 1st and year from January 1st, in tons of 2000 lbs.: Week, 96,955 tons; year, 3,752,407 tons; to corresponding date in 1887, 3,396,170 tons.

Anthracite.

NEW YORK, Fridav Evening, Dec. 7.

The coal trade is very quiet and dull, and as a consequence outside operators, particularly those producing hard coals, are cutting prices pretty freely. The companies still hold up to their quotations and at the meeting of the sales agents early this week the question was discussed, and nothing beyond a reduction in the output was suggested. This reduction in the output has actually commenced by some of the companies. The Reading, Lackawanna and Jersey Central have shut down from 30 to 60 per cent. The other companies are doing less in this way, but much is hoped from them in the near future. The Delaware & Hudson Company is stocking coal at Honesdale. The Pennsylvania Coal Company is reducing its output. The Pennsylvania Railroad, of course, is not taken into account. It has always declined to be controlled in any way by the other companies, and it will continue its output just as long as it can find a market for the coal. The New York and Lehigh Coal Exchange have made the following prices for their coal for December shipments at Perth Amboy, South Amboy, Elizabeth and Port Johnson: Lump, $4.10; Broken, $4.10; Egg, $4.10; Stove, 4.40; Chestnut, $4.30. The present average market prices of Lehigh coals outside of the companies are about as follows: Broken and Egg, $3.75; Stove and Chestnut, $4.25; Pea Coal, $2. The circular prices for free-burning coals remain as heretofore f.o.b. at New York shipping ports: Broken, $3.95; Egg, $4.30; Stove, $4.65; Chestnut, $4.65; Pea, $2@$2.25.

Since the Lake ports have closed the coal is coming very freely to tide-water, and stocks are expected to show considerable increase this month, even under the reduction in output referred to above. From now until the spring prices are made we cannot expect any lively market, unless the weather should become very severe or that some unexpected accident should prevent the arrival of coal at the shipping ports. Consumers appear to have laid in heavier supplies of coal this year than they have done for the previous two or three years, but the yards are not heavily supplied,

and a period of very cold weather would promptly create a good demand from the dealers.

Bituminous.

There is little new to report in this market, though the trade is rather more active than usual at this season of the year. There are many vessels taking on coal. The very severe weather that we have had recently has delayed many steamers, and has obliged them to purchase much heavier amounts of coal here than they usually do. Some of the companies find it difficult to supply this pressing demand, but most of them report the supply of coal more abundant than a week or so ago. Cars are also a little more abundant. The different railroads have commenced to send their own cars to the mines for supplies, where during the summer most of the coal business was done in the Pennsylvania and Baltimore and Ohio cars. We continue our quotations as heretofore $2.60 f.o.b. at Baltimore and Georgetown, $3.25 for New York Harbor shipping ports, $3 50 alongside New York.

Buffalo. Dec. 6.

[From our Special Correspondent.]

The year's transportation trade in coal and iron ore has been of marked magnitude to and from the port of Buffalo. The shipments by lake of the former exceeded 2,500,000 net tons, while the receipts of the latter aggregated about 250,000 gross tons, a gain in coal of about 700,000 net tons, and in ore of about 220,000 gross tons, as compared with 1887. The increase in the ore trade is due to the fact of this being the great distributing point for coal—anthracite especially—assuring, as a rule, return cargoes for vessels. Vessel owners have no cause for complaint, as they received good returns, financially, from their investments. The contracts for gas for our city's use were made on Monday at $1.30 per 1000 feet, and for electric lights 45c. per light per night. Quotations for coal unchanged. Business light but up to a fair average. Transportation facilities by rail improved.

The following Buffalo statistics are of interest: Receipts of coal by lake at Buffalo this year, none; the shipments westward by lake for the month of November, 303,820 net tons, as compared with 244,730 in 1887 and 311,560 in 1886; for the season to December 1st, 2,548,620 net tons, 1,902,580 tons in 1887 and 1,588,900 tons in 1886; the receipts by canal for November, 24,894 net tons, as compared with 3462 tons in 1887; the shipments, 457 net tons, as compared with 565 tons in 1887; the season's receipts to December 1st, 148,857 net tons, as compared with 59,539 tons in 1887 and 81,445 tons in 1886; the season's shipments to December 1st, 4374 net tons, as compared with 8706 tons in 1887 and 19,670 tons in 1886. The railroad receipts and shipments not reported, as the companies decline to give the information.

This year the closing rate of lake freight on coal to Chicago per net ton was $1, as compared with $1.50 in 1887 and 1886.

The distribution of coal from this port by lake this year since opening of navigation to December 1st was as follows, to points named:

To	Net tons.	To	Net tons.
Chicago	1,004,949	Marquette	20,580
Milwaukee	567,097	Romney	317
Duluth	227,840	Manitowoc	8,230
Sandusky	7,930	Escanaba	1,700
Racine	31,380	Alpena	1,620
Toledo	83,542	Marine City	2,250
Bay City	9,210	Hancock	1,570
Pt. Colborne	950	Michigan City	600
Windsor	2,320	Bay Mills	300
Cleveland	1,030	Put-in-Bay	350
Detroit	33,250	Muskegon	1,470
Ludington	1,530	Port Dover	357
Gladstone	35,240	N. Baltimore	50
Washburn	29,170	Danville	150
Perry Sound	174	Chippawa	68
Houghton	630	Sault Ste. Marie	3,150
Lake Linden	5,660	Sheboygan	11,120
Ashland	34,560	Kenosha	4,800
Green Bay	29,770	Pt. Arthur	5,216
Saginaw	16,315	Wallaceburg	280
Superior	119,150	St. Clair	1,000
Marinette	3,730	Portage	620
Tawas	250	Pt. Clinton	970
Cheboygan	1,040	Kincardine	3,290
Kelly Island	870	Pt. Huron	4,620
Oscoda	350	Miscell. points per Tonawanda vessels, about	175,000
Menominee	2,640		
St. Ignace	1,250		
Manistee	600		

(Subject to correction.)

The only shipment by lake for the week past was 9450 tons to Chicago, at a cost of $1 per ton freight. Navigation is closed for the season.

The receipts by canal of coal for fourth week in November 7455 net tons; shipments none.

The canal was not closed until December 3d at midnight, to allow the boats thereon to reach destination, they having been detained by snow and ice.

Boston. Dec. 6.

[From our Special Correspondent.]

The market at this port is in less satisfactory shape than when I last wrote. The demand for anthracite continues light, and the inclination of the market is toward further weakness on all sizes. Even stove coal is easier, and can be had at a concession of 15 cents from individual operators, if not from outsiders. Broken and egg are in over-supply, and close buyers can do well. It is very evident that restriction on a greater scale is absolutely necessary if prices are to be kept from a further material decline. The weather is mild and coal-dealers are very well fixed in regard to stocks.

The demand for bituminous coal is not large, but the market possesses more interest than usual because coal is hard to get, and the demand is in excess of the supply. F.o.b. prices are well held at $2.45@2.65, with very little coal under the old pool price of $2.60, if quick shipment is wanted.

The freight situation is not quite so firm, but rates are still in vessel owners' favor. The great storm has reduced tonnage still more, and there must now be several thousand tons less coal tonnage on this coast than there were two years ago. The barges were lucky in the storm, and escaped with very little loss.

We quote vessel rates, exclusive of discharging: New York, $1@$1.20; Philadelphia, $1.50@$1.60; Baltimore, $1.55@$1.60; Newport News and Norfolk, $1.50@$1.60; Richmond, $1.75; Provincial, $1.90@$2.

There is but a slight movement at retail, comparatively speaking. The market here needs the tonic of a cold snap.

Delivered prices are: Stove and Nut, $6.50; Egg, $6.25; Broken, $6; Franklin, all sizes, $7.75; Lehigh Egg, $6.50; Broken, $6.25. Wharf prices 50 cents less than the above. Bituminous coal, $4.25 on the wharf.

Pittsburg. Dec. 6.

[From our Special Correspondent.]

Coal.—The shut-down that was to be inaugurated on December 1st was pretty general. There are a few empty barges being loaded which will occupy some days, when the suspension of mining may become general. Although there is a difference of opinion on the subject, some think otherwise. The coal shipment by river for the past 11 months amounts to 105,000,000 bushels—largest ever known.

Prices in the pools are:

PRICE OF COAL PER 100 BUSHELS = 7600 LBS.			
First pool	$4.75	Fourth pool	$3.25
Second pool	4.25	Railroad coal	5.00
Third pool	3.75		

Connellsville Coke.—The trade is in a very flourishing condition. The cry about the famine in cars is heard no more. The coke men for the first time in four months have about all the cars they want, hence the shipments are large and steadily increasing. It has been decided that coke will be $1.50 January 1st. The outlook for the coke trade is very rosy; a large number of new ovens will soon be in full blast.

The new rates are: Blast-Furnace, $1.25 per ton; to dealers, $1.35; foundries, $1.50; crushed, $2.20.

Freight rates to Pittsburg, 70c. per ton; to the Mahanoy and Shenango valleys, $1.35; East St. Louis, $3.20; to Cleveland, $2.80; to Chicago, $2.75; to all other points the same proportions.

FREIGHTS.

Freights on Oil.—The independent oil refiners of Titusville, Pa., have induced the Central Traffic Association to adopt a uniform rate for oil shipped by tank and barrel to eastern points and expect a like concession on oil shipped West.

The latest coal charters to per ton of 2240 lbs.

From Baltimore to:—Bangor, Me., 1.60; Bath, 1.60; Boston, 1.75; Bridgeport, Conn., 1.35@1.40; Bristol, 1.25@1.30; Brooklyn, 1.15@1.20; Charleston, 1.00; Fall River, 1.50; Galveston, 3.00; Gardner, Me., 1.75; New Bedford, 1.45; Newburyport, 2.00; New Haven, 1.45; New London, 1.45; New York, 1.25; Portland, 1.75; Portsmouth, N. H., 1.75@1.85; Providence, 1.45@1.50; Quincy Point, 1.50; Richmond, Va., .80; Roxbury, 1.50 3c.; Salem, Mass., 1.75; Savannah, 1.25@1.30; Somerset, 1.35; Williamsburgh, N. Y., 1.25@1.35; Wilmington, 1.25.

From Philadelphia to:—Bangor, 2.00*; Boston, 1.60@1.70*; Charleston, .90; Chelsea, 1.55@1.60*; Com. Point, Mass., 1.60*; E. Boston, 1.70*; East Cambridge, 1.50*; Fall River, 1.15@1.25*; Galveston, 2.90*; Gardner, Me., 1.60*‡; Georgetown, D. C., .85; Lynn, 1.75@1.85*; New Bedford, 1.15@1.25*; Newburyport, 1.75*; New York, .90†; Norfolk, .70; Portland, 1.50@1.60*; Portsmouth, N. H., 1.60*; Portsmouth, Va., .65; Providence, 1.15@1.25*; Richmond, Va., .80; Rockport, 1.22½*; Saco, Me., 1.75*; Salem, Mass., .90*; Savannah, 1.00; Washington, .85; Weymouth, 1.15*; Wilmington, N. C., .60.

* And discharging. 3c. per bridge extra. † Alongside. ‡ And towing.

METAL MARKETS.

NEW YORK, Friday Evening, Dec. 7, 1888.

Prices of silver per ounce troy.

Dec.	Sterling Exch'ge.	Lond'n Pence.	N. Y. Cts.	Dec.	Sterling Exch'ge.	Lond'n Pence.	N. Y. Cts.
1	4.87½	42⅞	93⅝	5	4.87½	42¾	93¼
3	4.87½	42⅞	93⅝	6	4.87½	42¾	93
4	4.87½	42⅞	93⅝	7	4.87½	42⅞	92½

Silver showed a sharp decline this week, due to the absence of demand for India, coupled with dearer money market in London and on the Continent. Tendency still weak.

Foreign Bank Statements.—The governors of the Bank of England at their weekly meeting made no change in its rate for discount, and it remains at 5 per cent. During the week the bank lost £176,000 bullion, and the proportion of its reserve to its liabilities was reduced from 41·27 to 40·35 per cent, against a reduction from 48·04 to 46·93 per cent in the same week of last year, when its rate for discount was 4 per cent. Thursday the bank lost £150,000 on balance. The weekly statement of the Bank of France shows a gain of 300,000 francs gold and a loss of 1,575,000 francs silver.

Copper.—The pool sale of Lake copper mentioned in our last issue has now been actually consummated, and the price is the same as on the last occasion, namely, 16¼c. per pound, but it is said that the total quantity contracted for by the consumers in the present instance is much larger than ever before since the great rise in prices took place, and some reports place it at 20,000,000 pounds.

No doubt the consumption of copper in this country has lately been very good, and as the parties requiring the metal have no stocks to fall back on and practically nothing now remains in second hands, no course is open but to pay the prices demanded by the syndicate.

The fire which unfortunately has again broken out in the Calumet & Hecla Company's mine must reduce the production of that brand of copper to some extent, but it is too early too arrive at any definite idea on this point, as everything, of course, depends on the time it will take to extinguish the fire and resume regular operations. Whatever reduction in the output may result from this disaster can only be beneficial to the French syndicate, however, as they alone are interested in preventing further accumulation of stocks, and therefore the less turned out at the C. & H. mine, the better for them. For home consumption the production of lake copper will still be ample, and as large quantities of lake and other American descriptions of copper are stored in warehouses in Havre, Liverpool, London, and other places, the foreign markets are not in a position to absorb further supplies. Consequently a diminution of the output at the Calumet & Hecla mine will simply relieve the syndicate of the necessity of disposing of so much stock. In the open market no business has been transacted in Lake copper during the past week, but casting brands remain very firm at 16⅛@16¼. In London the copper market has been rather dull during the week, and but little business has been done. Speculators are not doing anything and consumers having made large purchases before the last nominal (and some think tricky) advance of quotations on the part of the syndicate, they are now out of the market. We quote: Tough Copper, £81; Best Selected, $82 10s. to £83; G. M. B., £77 10s. to £78; Chili Bars, £77 10s. to £78 12s. 6d. spot, and £78 to £78 2s. 6d. 3 months.

Tin has been very irregular during the week, and a sharp decline in prices has taken place. We are informed that certain parties have been hammering the market in London, and whilst the principal operators have continued to buy they naturally wanted to get in as cheaply as possible, and thus allowed prices to give way. The lowest figure touched during the week in London was on Thursday, when spot tin gave way to £97 15s., and 3 months tin to £98 10s., but this (Friday) morning a much firmer tone was reported, and the closing quotations are: Spot, £98 17s. 6d.; 3 months, £99.

Our market on this side gave way long before the break in London, and the tone has been flat and prices have ruled considerably under the parity of Eastern and European markets. This feeling was more conspicuous as regards futures than for spot lots, as most of the spot tin has gone into strong hands. The lowest figure touched here for spot was 21·90, whilst February was sold down to 21·65. Only a few transactions took place at these figures, however, and in sympathy with London, we close higher: Spot, 22; December, 22; January, 22·10, February, 22·25; March, 22·35.

Lead.—A very quiet week has again to be reported in the lead market, and the total transactions would not exceed 400 to 500 tons, principally in small lots. For the business done higher prices have, however, been obtained. It is true the bulk of the sales were made at 3·75, but up to 3·82½ has since been paid. Large quantities known to be held by second hands are still hanging over the market, but have not yet been offered, and after the recent heavy sales made by smelters they are holding off for the moment. Still the market is not in a position to bear any great pressure of sales, and large quantities could not be placed without depressing prices. As we have previously stated, the lower prices now obtainable for lead are not likely to bring about any reduction of production, as whilst it may curtail the output in some quarters, this will be more than made up in other directions, and regarded from this point of view it could hardly be looked upon as an advantage to the trade if prices advanced above the present level, as such an advance could not be sustained for any length of time, and it would certainly be much better to have a steady market than to be again subjected to the rapid fluctuations of the past 12 months. Our closing quotations to-day are: Spot 3·75@3·80; December, 3·75@3·80; January, 3·77½@3·82½; February, 3·80@3·85.

The European markets have been very flat throughout the week, and at this season of the year buyers naturally hold back. Quotations in London have again suffered a sharp decline, and Spanish lead is reported to-day £12 17s. 6d. with buyers scarce even at that figure. We quote English lead £13 to £13 2s. 6d.

St. Louis, Mo.—Messrs. John Wahl & Co. telegraph us to-day as follows: Market has been a trifle firmer during the week, owing to the withdrawal of a number of producers from the market. Sales for the week amount to 300 tons at 3·45@3·50 for common and corroding.

Spelter.—This market has improved somewhat from its depressed condition. Some remelted spelter is still offered at low figures in this market but prime Western brands are held very firmly at 5@5½c. A further improvement is noticed in London, and good ordinary is now quoted £18 10s.@£18 12s. 6d. Specials, £18 15s.@£18 17s. 6d.

Antimony is held for higher prices again, and the market here is practically bare of supplies. Cookson's is still obtainable at 14c., but Hallett's is held for 10⅝@11c.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, Dec. 7.

Heavy Chemicals.—The past week has developed no new features of interest in the English chemical trade. The situation, both at home and abroad, is practically the same as last reported. The spot market for the week has been quiet, and transactions have not been of importance. Nothing further worthy of record has been heard from Liverpool concerning the general alkali makers' combination, but as both the caustic soda and bleaching powder combines will continue during 1889, the prices of these articles would probably not be weakened should the scheme to unite all branches of the alkali trade prove a failure. If good prices are secured for caustic soda next year the trade will doubtless receive an impetus, as we learn from the *Newcastle Chronicle* "that the caustic soda extension of the Newcastle Chemical Works Company is now in operation, and that in the early part of December the output of high strength caustic soda will be about 450 tons weekly." It seems that the economical form of high strength caustic is increasingly preferred.

Messrs. S. W. Royce & Co. write from Manchester on the 24th ult. as follows: "There is no good reason for dissatisfaction with the general state of the chemical trade at present. Prices of most articles remain firm, and although in the dyeing and calico printing branches the demand for chemicals is only slow, in others it is satisfactory, and there is a good shipping business all round. Bleaching powder has been throughout the month in strong demand; makers are well sold for next year, and are indifferent about further business for forward delivery, except at very full figures. Saltcake is very firm, though only little business is being done. Caustic soda has receded, and is still easing, supplies being very plentiful. Soda ash has improved, and is in strong request, and makers being well engaged, are asking higher prices for forward delivery."

Messrs. J. P. Brunner & Co. write from Liverpool on the same date as follows: "There is a lack of business in chemicals at present, but caustic soda is the only weak feature in the market. The Caustic Soda Committee decided yesterday to order a restriction of production in December to the extent of one week's make, equal to about 4000 tons, it is stated, and although this is hardly likely to have much effect as long as the present inactivity continues, the committee hope it will cause stocks to be very light at the end of the year, and enable makers to obtain better prices at the commencement of 1889. On the spot, this article is in a very depressed condition, and re-sellers have accepted £7 2s. 6d. for 60 per cent, at which price a fair business is reported. Unless an improved demand sets in, however, prices seem likely to recede, rather than advance, for prompt delivery. Soda ash is scarce, and although values are nominally unchanged, buyers find some difficulty in filling orders, several of the makers being fully booked to the end of the year. Bleaching powder is offering more freely, and at £7 17s. 6d. a fair business has been done. Chlorate of potash is quiet. Bicarbonate of soda is in good request. There are inquiries for chemicals for 1889 delivery, but with the advanced cost of raw materials, makers are not disposed to book orders unless at higher figures than now ruling for spot lots, while buyers are hardly yet prepared to pay the advance asked."

The local market, as above reported, simply reflects the English position. Carbonated soda ash, 48 per cent, is meeting with more favor from buyers, and as spot supplies are light, prices are well sustained. Spot quotations are 1·25@1·35c., according to quantity and brand, with contracts for future delivery to be had at 1·25@1·27½c. Caustic soda ash, 48 per cent, is in better demand; with quotations still in the neighborhood of 1·25c. for round lots on the spot. We hear of lots for future delivery quoted a little above 1·30c.

Caustic soda continues weak on the spot, but dealers profess to hold strong views for 1889. The decrease in the December production, the continuance of the combination, and the increased cost of salt, seem to constitute the principal reasons for this belief. For the higher tests, 70, 74 and 76 per cent, the spot prices vary from 2·27½@2·35c., according to quantity, and large orders could probably be placed at about 2·25c. The usual quotation for 60 per cent is 2·50c. for large lots. Spot supplies are light. Sal soda is maintained at former quotations, ·95@1c. on the spot and ·95c. to arrive. Bleaching powder is scarce, but the old complaint of Boston competition prevents any material advance in prices. The spot prices in this city are 2·12½c.@2·25c., according to brand and quantity. Contracts for 1889 have been placed at a shade under 2c.

Acids.—There is nothing new in this line of the trade. Business is fairly active, with no change in quotations. The Manufacturing Chemists' Association of the United States met in this city on Wednesday for the announced purpose of regulating prices, but, according to current report, the business transacted was almost entirely of a social nature.

Acetic acid is neglected at former quotations, which are nominally 2@2¼c. for prompt delivery.

Muriatic and nitric acids are moving in a small way, at unchanged prices.

Oxalic acid continues to be quoted at 8½@9c. per pound, according to quantity for prime German and English makes, ex store or dock, New York, Philadelphia and Boston.

Sulphuric acid continues in good demand, with prices easily upheld at former figures, which are ·95c. to about 1·25c. for 66 degrees, according to quantity, and ·90@·95c. for 60 degrees. A leading manufacturer informs us that English capitalists are about to erect sulphuric acid works in Virginia with a capital of $500,000 for the purpose of supplying Southern and Western trade.

Fertilizers.—Business continues brisk, and prices seem to be well sustained for all articles. The revised price-list is about as follows: Azotine, $2.55@$2.65 as to quality; dried blood (city), low grade, $2.55 per unit; Western high grade, $2.65@$2.70 per unit for ground material; tankage, high grade, $24@$25 per ton; low grade, $22@$23 per ton, as to quality. Fish scrap, $25 per ton f.o.b. factory. Sulphate of ammonia, $3.40 per cwt.

Refuse bone-black, guaranteed 70 per cent phosphate, is quoted at $19.50 per ton. Dissolved bone-black is 97½c.@$1 per unit for available phosphoric acid, and acid phosphate 75@80c. per unit for available phosphoric acid.

Steamed bones, unground, $19; ground, $25@$26.

Charleston rock, undried, $5 per ton; kiln dried, $6 per ton, both f.o.b. vessels at the mines. Charleston rock, ground, is held at $10@$10.50 ex steamer at New York.

Muriate of Potash.—Arrivals are taken up as fast as received, and with no accumulation of stocks prices are firm at 1·85c. on the spot, and 1 80@1·82½c. to arrive.

Double manure salts are scarce at 1·15@1·20c. on a basis of 48 per cent potash. High grade sulphate of potash, basis 90 per cent, is quoted at $2.30 per cwt.

Kainit.—There is nothing on the spot unsold, and offerings for shipment are light at $9.50@$9.75 per ton.

Brimstone continues in the same position as last reported. The demand is not large, and as freight rates have been reduced, prices are depressed. We quote $22 on the spot for best unmixed seconds; to arrive, $20.25; thirds to arrive, $19.50.

Nitrate of soda is quoted at 2·37½@2·40c. on the spot, and 2 30@2·35c. to arrive. According to the statistics issued by T. F. Edmands & Co., of Boston, on December 1st, the position of this article is as follows:

	Bags.	Bags.
Stocks at Atlantic ports, Dec. 1st, 1888..		75,440
Afloat and due in Atlantic ports, Dec...	50,000	
" " " " Jan...	55,000	
" " " " Feb...	22,000	127,000
Visible supply for U. S. Dec. 1st to March 1st, 1889.		202,440
" " " " 1887-88.		122,500
Deliveries for consumption in U. S. for above time in 1887-88		68,425
Deliveries, for consumption in U. S. for above time in 1886-87		89,471
Deliveries, for consumption in U. S. since Jan. 1st, 1888		432,718
Deliveries, for consumption in U. S. since Jan. 1st, 1887		456,000
Deliveries, for consumption in U. S. since Jan. 1st, 1886		395,000

F. B. Nichols's statistics, issued on the same date, estimate the total visible supply at 285,346 bags, including 74,346 bags in store in New York and 101,500 bags to arrive in this port. The market in Europe continues to advance. At Valparaiso the tone is very firm and tonnage difficult to get. The following are the spot prices at this time for the last four years: 1888, 2·37½@2·40c.; 1887, 2·06¼@2·12½c.; 1886, 1·95@2c.; 1885, 2·30@2·40c. It is evident that although the nitrate industry has been greatly developed recently, the consumption has increased in such a ratio that prices are not affected disadvantageously.

Cream of tartar is sold in a small way at 31@31¾c. for crystals, and 31¾@32½c. for powdered.

Acetate of lime is in moderate demand at 2·12½c. for gray and 1·05@1·10c. for brown.

Minerals.—Concerning the foreign mineral trade, Messrs. S. W. Royce & Co., of Manchester, write us as follows on the 24th ult.: "A good healthy trade is being done in minerals, and prospects are very reassuring. Prices of many articles have advanced, partly of course on account of the generally higher rates of freight, but partly also through an increased demand. The improvement in manganese, mentioned in our last, has been more than maintained; there are no large quantities offering on the spot, and prices are higher, with a probability of further advance shortly. An improvement may also be noted in the demand for chrome ore, and higher figures are now being asked. More French chalk has been coming forward, but it has been quite unnecessary to put any into stock. China clay is also rather more plentiful, but demand continues brisk, and full figures are obtained. Arrivals of brimstone are anything but heavy, the high rates of freight preventing this."

Locally, there is nothing new to report.

Sulphate of barytes is in small demand at $21.50 for special brands of imported; $17 50@$18.50 for best No. 1, and off colored grades at $12@$15.

Chalk is quoted nominally at $3.15.

China clay shows no change in quotations, despite the increase in freight rates. Previous quotations rule.

The corporation of Martin Kalbfleisch's Sons Company has been formed for the purpose of carrying on the chemical business heretofore transacted by the firm of Martin Kalbfleisch's Sons. The company will operate the Bushwick Chemical Works, and have control of the Buffalo Chemical Works and the Bayonne Chemical Works. The President is Mr. Geo. W. Kenyon, Secretary, Mr. L. T. Savage, and General Manager, Mr. Franklin F. Kalbfleisch. The new company has a capital of $650,000 and controls 85 per cent of the claims against the old firm.

Shortly after the failure of W. F. Coleman & Co., the great borax producers of the Pacific coast, it was stated that the firm would pay its creditors 100 cents on the dollar. It is now reported, says the *Oil, Paint and Drug Reporter*, that the most the assignees can offer, after a careful consideration of the assets, seems to be not over 40 cents on the dollar, and a settlement will probably be made on this basis. It is further reported that a large majority of the firm's creditors have signed a conditional agreement, accepting the terms of the compromise. It is also said that the assignees expect to be able to settle the whole indebtedness of the firm on a 40 cent basis.

BUILDING MATERIAL MARKET.

NEW YORK, Friday Evening, Dec. 7.

Although, locally, very little new work is commenced at this season of the year, and the material for that underway has been fully secured, the demand for the leading materials continues very fair, and, as noted in previous reports, the out of-town market has kept dealers very busy for some time past. As the current week draws to a close, a visit to the Building Material Exchange reveals the fact that nearly all lines of stock are well cleaned up, and in some instances have been sold to arrive. Although the number of new buildings projected, according to the official reports of the Building Department, does not indicate greater activity in 1889, the general absorption of materials, as well as the opinions impartially expressed in building circles, seems to give good ground for the belief that a better season is at hand.

Bricks.—The market, if any thing, is a little firmer than last week. Available stock has found a very ready outlet, as a fair demand has existed, but it is doubtful if any thing better than last week's quotations have been obtained. Pales are doing a little better, and good quality cargoes can be placed at about $2.50, and perhaps $2.75 per M. The medium grades, as usual, are meeting with the most favor, but no change in prices can be recorded.

Lime.—Comparatively few cargoes have been offered during the week, and these were quickly taken leaving the market bare, and towards the close sales to arrive are reported.

For prices of building materials and wages of laborers, see our register of current prices.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, Dec. 7

The iron trade is certainly more depressed than it was two months ago, and there is more shading of prices, notwithstanding the sanguine expectations of politicians, nevertheless we do not expect any permanent or serious depression except in the east, which is being cut off from the western and southern trade by the establishment of works nearer those markets and at points where the raw materials are cheap.

The cheap Southern pig-iron is going to cause a permanent recasting of the Eastern iron trade, and the railroads will have to meet the condition by making lower freight rates on coal, ores and pig-iron, and the furnaces will have to seek further economy in ore and in smelting charges by improving the percentage of the ore and, where possible, in using only high grade stock and making a superior iron. In this way only can the Eastern pig-iron business be maintained under the competition it has and will continue to have, and the curtailment of the market its products can reach.

There is no material change in the situation from week to week, but the little "booms" that occasionally come to the West and South have been pretty generally noticeable in the East for some time past by their absence.

In the South "one cent a ton-mile" freight rate on ores and coal is common, and even less than this has sometimes been charged on quite short hauls, while here in the North 2 cents and even 3 cents a ton-mile is charged in some cases on ore and 1½ to 2 cents occasionally on coal on longer hauls than those in the South. Evidently it will not do to let the trade slip away and then only try to recover it. The same remarks apply to the steel interests of the East, that are just now looking on while Western mills have been taking contracts at lower figures than our Eastern cost of production.

Iron Ore—The following telegram from Cleveland, O., December 6th, is of interest: The year 1888 has eclipsed all records of annual production, shipments, sales, and smallness of surplus during the 32 years of iron ore producing in the Lake Superior region. The production exceeded that of 1887, known as the big year, by 5 per cent, the sales nearly 60 per cent, and at the close of navigation only 167,300 tons remain unsold at lower lake ports. The amount on the docks along Lake Erie at the opening of navigation last spring was 704,000 gross tons in round numbers. The receipts at Lake Erie ports during the season were 3,800,000 tons. Of the total, 2,640,000 tons were shipped to furnaces by rail during the season, and all but 167,300 tons of the remainder is already sold. The total sales for lake delivery this year amounted to 4,366,000 tons, which figures are 1,600,000 in excess of last year. The total shipments from Lake Superior ports during 1888 aggregated 5,000,000 gross tons, all of which, except 634,000 tons, was delivered at lower lake ports. Of the whole amount, 1,289,000 tons went to Ashtabula and 972,000 tons came here. Six hundred and eleven thousand went to Fairport, 240,000 each to Erie and Buffalo, 197,000 to Lorain, and 155,000 to Sandusky, 75,000 to Toledo, and a small amount to Huron.

American Pig.—This market is quiet, not to say dull, and little improvement is looked for at present. The market is losing tone. Prices remain as hereto-

fore, $16, $17 and $18 for Forge, No. 2 and No. 1 standard brands of the Lehigh irons, with variations of 50 cents to $1, up or down, from these figures, according to brand and condition of delivery.

The Coke Consumers' Association, including the blast furnace men of the Shenango, Mahoning and Wheeling Valleys, say they will "make a protest" if there shall be an attempt to advance coke to $1.50 the first of the year. One of the members said yesterday in Pittsburgh: "In the Mahoning Valley mill iron is selling at $16 cash. At this figure we could not stand an advance in the price of coke. We all gave our employés a 10 per cent advance in wages on December 1st. Then ore has gone up from 50 to 75 cents, which means an increased cost of from $1 to $1.50 in making a ton of pig-iron. If coke went up from $1.25 to $1.50 it would be an additional cost of from 30 to 40 cents per ton on pig-iron."

Scotch Pig.—This market is perhaps a little weaker than when our last report was made. There is but little iron brought in now and the demand for that is apparently lessening all the time. The outlook is certainly not very good for importers of Scotch iron, even at the present rate of freight, which is down to 3s. 6d. per ton. We continue to quote Coltness at $21, Dalmellington at $19.50@$19.75, Clyde about the same, Langloan about $20.25@$20.50.

Spiegeleisen.—There is nothing worthy of note reported in this article which we continue to quote nominally at $27 for German, 20 per cent, and $53.50 @$54.50 for ferromanganese, 80 per cent.

Structural Iron and Steel remain rather dull and prices are scarcely as firm as they have been. Steel is largely taking the place of iron, and orders for this material are eagerly sought for by the rolling mills as a substitute for rail contracts, which have heretofore been their principal reliance. This is bringing about a competition by the mills which will presently bring the prices down on structural material to a point where the profit will be as low as it now is on rails. In this condition of affairs it is not to be expected that the market will be very brisk or very firm. Our quotations will be found as usual in our table of current prices on another page.

Steel Rails.—Practically no business is being done by the Eastern mills. It is said, however, that the Western mills are stiffening up their prices since the last meeting of the Board of Control, and that we are to see no more of $25 or $26 rails. We hear of a contract for 30,000 tons taken by a Chicago mill at $29, the rails going to the Chicago & Northwestern Railroad. We may quote now $28 at Pittsburg and $29 at Chicago as ruling prices. This, however, leaves very little for our Eastern mills to do, for most of the rails are wanted west of Chicago.

Old Rails.—These continue in fair demand, and in somewhat light stock, though when rails are wanted they can be obtained. We hear of sales of a few thousand tons in small lots at $23@23.25 here for T's. Double heads are still quoted at $25@$26. We continue to quote at $23@$24 for T's, and a fair demand.

Scrap.—We hear of some small sales of scrap iron, No. 1 being worth here $21 on the cars or to lighters from yard, $21.50 at Philadelphia. For quotations of other articles, we refer to our prices current on another page. There have been no changes worthy of note in either the demand or the quotations, and no large orders have been placed during the week.

Louisville. Dec. 4.

[Special report by Messrs. HALL BROTHERS & Co.]

The market during the past week has not been as active as it was sometime since. Although there has been a number of fair sized orders placed, yet none of especial moment. It is not thought that there will be very active buying for some time, as this is about the season when the average consumer is reducing stocks preparatory to taking annual inventory, although during the past few weeks many of the heaviest buyers have anticipated largely on their future requirements On the whole it is thought that the market will not be so active until the first of the year, when the buying movement will be resumed. There has been no material change in the general situation, though it is understood that some furnaces have accepted round orders in the last few days at altered figures.

Philadelphia. Dec. 7.

[From our Special Correspondent.]

The steel rail situation is practically unchanged, although there are rumors that things are getting into better shape. It is only a question of time when an advance of two dollars per ton at least over some of the low selling prices recently announced will be made. Production will be temporarily restricted rather than that rails shall be made at a loss. Nearly one half of the steel rail mills of the country have been for months past making special efforts to expand their business in other than steel rail directions and the occurrences of the past thirty days have caused managements of several companies to put forth renewed efforts to secure a large volume of business that is to be had for steel purposes generally. So far as rails are concerned the situation is rather black. Agents have been scouring the country trying to close contracts from railroad builders for next year's supplies, but they have not done any more than to open negotiations, and there matters stand. The extremely low prices of the past week or ten days will not be heard of again. The disturbing rail makers recognize that with the utmost latitude that is allowed them it is only a question of time when they will be bottled up, and business will return to legitimate terms.

Billets and slabs have suffered somewhat, but the restoration of quotations is near at hand. Quotations for merchant steel have been sharply shaded in this market and there is now an active competition for the winter's business for spring delivery.

Old rails are in active request, but buyers refuse to to pay selling prices excepting for small lots.

The crude iron situation is virtually unchanged. The blowing in of new furnaces is attracting some attention, but the increased production will not be of such magnitude as to affect prices to any extent. Consumers are purchasing still in the hand-to-mouth way, and producers are endeavoring to sell large lots at shadings from current quotations. Everything depends upon the course of demand within the next two months. It is generally regarded that the railroad situation is the keynote to the whole case. No changes in quotations, excepting for choice brands of No. 1 foundry, have been made for the week.

Steel blooms, billets and slabs are in fair request. Muck bars are inclined to droop in quotations in all excepting good qualities.

Merchant iron manufacturers are anticipating a further improvement in business, as several car building contracts are now on the market. It is stated on what seems to be good authority that between 6000 and 7000 tons of iron will be contracted for before the holidays for car purposes.

Nails are dull and only the best selling at quoted rates; a farther cutting is likely to take place, as production is still in excess of the demand. Skelp iron is not so active as a week ago. The prices have been again shaded. Plate and tank orders are for small lots and a heavy business is predicted, but these predictions have been heard for two or three months. It is also asserted that a large amount of business is about to be placed for structural iron, but the truth in regard to this is that unless prices are shaded business will continue in small lots. Business amounting to about 2000 tons has been placed within a week or ten days. Sheet iron is quiet, but little demand will be heard of till after the holidays. The wrought-iron pipe makers report business rather quiet. The iron market in general is only fairly strong; consumers do not propose to anticipate requirements to any great extent. Quotations will be found in our weekly register of prices.

Pittsburg. Dec. 6.

[From our Special Correspondent.]

Raw Iron.—The past week has presented nothing very new or important; demand steady and a fair business transacted. As the new year approaches there is always a disposition to curtail operations so far as possible, in order to carry as little as possible to 1889. Under these circumstances a falling off in transactions will be in order. Consumers who have sufficient stock to tide them over the present month will purchase as little as possible unless inducements are offered in the way of concessions. So far as could be learned, holders are firm in their views at last week's rates all round. The weakness noted last week in gray forge has passed away, and holders refuse to make concessions. On the other hand, dealers generally are disposed to wait; and, in the absence of a large demand, sellers take the same ground, viz., to wait until actual requirements compel consumers to make contracts. Notwithstanding the fact that production is the largest on record and still increasing, the present strength is certainly remarkable; still, stocks do not accumulate, and most of the sales are for future delivery, some extending to March next. The increase in pig last year over the previous one was 821,878 tons; Bessemer steel ingots 776,864 tons; total increase in production in one year, 1,598,742 tons.

The furnaces in and around Pittsburg are in full operation. Several new ones building are expected to be in operation early in the spring. Reports from Shenango and Mahoning valleys report great activity among the furnaces, with orders sufficient on hand to keep them employed for some time. Muck bar steady fair demand for present and future delivery.

Steel Slabs and Billets.	
1500 Tons Billets	28.50 cash.
500 Tons Nail Slabs	28.00 cash.
700 Tons " "	27.75 cash.
1000 Tons Billets	28.50 cash.
500 Tons Billets	28.50 cash.
Muck Bar.	
2000 Tons Neutral, December	29.50 cash.
1500 Tons Neutral, January and February	30.00 cash.
1000 Tons Neutral, December	29.50 cash.
500 Tons Neutral, Spot	29.50 cash.
Old Iron and Steel Rails.	
1000 Tons American T's	25.25 cash.
1500 Tons American T's	25.00 cash.
1000 Tons Old Steel Rails, Short	18.50 cash.
300 Tons American T's	25.25 cash.
Steel Blooms and Crop Ends.	
1000 Tons Bloom Ends	19.50 cash.
500 Tons Steel Scrap	19.25 cash.
600 Tons O. H. Steel	18.50 cash.
Coal and Coke Smelted Lake Ore.	
1000 Tons Bessemer	17.20 cash.
1000 Tons Gray Forge	16.00 cash.
1000 Tons Bessemer	17.25 cash.
1000 Tons Gray Forge	15.75 cash.
1000 Tons Bessemer, Extra	17.95 cash.
500 Tons Gray Forge	16.25 cash.
500 Tons Gray Forge	16.15 cash.
1000 Tons Bessemer	17.25 cash
500 Tons White end Mottled	15.50 cash.
150 Tons No. 1 Foundry, all ore	18.50 cash.
100 Tons No. 2 Foundry	17.00 cash.
Coke, Native Ore.	
600 Tons Gray Forge	16.25 cash.
100 Tons Gray Forge, all ore	16.50 cash.
100 Tons White and Mottled	15.00 cash.
100 Tons Gray Forge	16.25 cash.
100 Tons No. 2 Foundry	17.00 4 mo.
100 Tons Foundry	17.00 cash.
75 Tons Silvery	16.50 cash.
25 Tons Silvery, Extra	19.00 cash.
50 Tons No. 1 Foundry	18.00 cash.

FINANCIAL.

NEW YORK, Friday Evening, Dec. 7.

In reviewing the mining share market of the past week, we find that there is nothing of importance to add to the reports of previous weeks. The market continues to drag along in its usual dull way, with but little changes in the prices of the different stocks.

Adams shows a small business at 50c. Sylvanite, as heretofore, appears on the list only once a week—this time on Saturday, when it sold at from $3.10 to $3.15. Iron Silver was quoted at $3.40. Silver Cord at 80c. Monitor at 5@6c. Denver City at 12c. Plutus at from 77c. to 83c. Little Chief at 20c. to 23c., and Breece at 24c.

An article in the Denver *Tribune-Republican* of November 29th reflected on the Geyser Mining and Milling Company, *alias* Security Mining and Milling Company, *alias* Silver Cliff Mining Company. The *Republican* is informed by prominent citizens of Custer County whose word is worthy of credence that the new company is organized for the purpose of honestly developing the properties under its control and that it is working in a perfectly legitimate way to accomplish that purpose. The management challenges the most thorough investigation of its acts and intentions, and has invited The *Republican* to send a competent man to examine its workings. This will be done as soon as convenient, and the results will be published.

The Security of offensive odor insisted that it was honestly developing this much-prospected and always unsuccessful property. As we so often warned the public against the Security, it seems scarcely necessary to say much about this new shape it has taken.

Colchis was again daily dealt in, but declined from $2.15 to $2. Silver Mining was quiet at from 55 to 60c.

Plymouth Consolidated declined from $10.50 to $9.63.

Brunswick is neglected at 9 and 10c.

Quicksilver continues to be firm at from $36 to $37. Common at from $6.75 to $6.50.

No interest is manifested in Bodie stocks. Bodie Consolidated shows one sale at $1.80. Standard was not dealt in until to-day, when it sold at from $1.25@$1.60.

Amador ruled firm all week at $2.25 but to-day declined to $2.00. Astoria sold at 24@25c. Middle Bar at 38@39c., and Hollywood at 40@41c

Caledonia has just declared a dividend of 8 cents per share; the stock is neglected and sales were made only yesterday at prices ranging from $3.60 to $3.65. Homestake is quiet at from $11.88 to $12. Deadwood-Terra at from $1.75 to $1.90. Iron Hill at 12c.

Calumet & Hecla was dealt in only on Saturday, when it sold at from $270@$275.

Kingston & Pembroke shows a further decline to 88c.

United Copper shows transactions amounting to 2400 shares, at from 55@60c.

El Cristo is weak; a few sales are recorded at from 75@80c

Ontario holds its own at $33 13.

Horn-Silver is quiet, and went from $1 to 80c.

Rappahannock drags along at 10c.

A declining tendency was shown in the price of Buffalo Iron Mining Company, which went from $6.50 to $6, selling to-day at from $6.13 to $6.25.

The stock of Mutual Smelting and Mining Company, a newcomer, opened at $1.75, but later declined to $1.60.

It is reported that the foreclosure sale of the property of the Sutro Tunnel Company to satisfy the holders of the mortgage has been postponed to January 6th.

There was little doing in the Comstock shares, but 300 shares of Consolidated California & Virginia changed hands at from $11.50@$11.75. One sale of Hale & Norcross was reported at $6. Chollar at $3.80. Savage declined from $4.65@$4. Exchequer was quite active at from $1.75@$1.95. Bullion was firm at from $1.95@$2.15.

Sutro Tunnel stock declined from 12 to 9c., and the Trust Certificates from 75 to 66c. Interest at the rate of 4 per cent will be paid on subscriptions to Sutro Tunnel Company bonds from the date thereof to January 1st, 1889, upon presentation of the Trust Company certificates issued thereon at the office of the Union Trust Company, New York city.

Tuscaroras continue to be quiet. Navajo is selling at $2.40. North Belle Isle at from $2.95 to $8. Tornado at 15c. Commonwealth at $3.85.

Barcelona is steady at from 63 to 68c.

SILVER KING MINING COMPANY'S TROUBLES.—The following announcement, which is self-explanatory, appeared in a daily paper this week:

"It having been suggested by a large number of stockholders of the Silver King Mining Company of Arizona, that there should be a transfer office in New York, as in the case of the Standard, Bodie and other companies, and as the Eastern stockholders are the largest owners of the property, there will be a meeting at the offices of Messrs. A. R. Chisolm & Co., 61 Broadway, on Thursday, December 6, at 2:30 P. M., for the purpose of selecting a committee to make nominations for officers at the annual election, which is to be held in January."

Accordingly a number of gentlemen repre-enting, it is said, 52,714 shares of the company, met at the above named offiee on Thursday last, and proceeded to inquire into the company's affairs. Mr. A. R. Chisolm, who had been chosen chairman of the meeting, presented a letter from Mr. H. H. Noble, the president of the company, stating that above the 985-foot level, the mine is exhausted, and that the company had nearly $75,000 in the treasury on December 1st. Reference was then made to the report of the superintendent, Mr. Arthur Macy, on the 1st of last January, in which

it was stated in regard to virgin ground explored on the 250-foot level containing a body of ore of considerable homogeneity 95 feet in its greatest length with a probable extreme width of about 85 feet "that the new development presented a most promising looking ore-body, which when taken together with the column of ore of similar character exposed during the summer on the 119-foot level, offers an ore-body of approximately 193 feet in height which will take some three years more to exhaust with our twenty-stamp and crushing mill."

In addition to this, Mr. Julius Leszynscky stated that in a conversation with Mr. Macy about a month ago he had learned that the mine was in a most excellent condition. A stockholder then referred to the last issue of the ENGINEERING AND MINING JOURNAL, in which Mr. Macy was quoted as saying that the mine was nearly worked out. General Jordan stated that Mr. Macy was reputed to be a mining engineer of high standing as well as a man of integrity. It was unfortunate, however, said a gentleman, that Mr. Macy was not present to explain these discrepancies between his last annual report, together with his statement to Mr. Leszynscky and his published statement, corroborated by President Noble's letter. Mr. Chisolm was asked if Mr. Macy had been asked to attend the meeting. This question seemed to disconcert the representatives of Messrs. A. R. Chisolm & Co., of whom there were four or five, and from a number of explanations that were hurriedly put forward, it was learned that Mr. Macy had not been personally invited, although "he must have seen the advertisement."

A resolution was then proposed by Messrs. A. R. Chisolm & Co. to the effect that a committee be appointed to protect the Eastern stockholders, and that such committee should "demand proper representation in the Board of Trustees;" that a transfer-office be established in this city; and that one of the Eastern members of the Board of Trustees be elected Vice-President, so that certificates could be signed here. A gentleman pertinently remarked that the way to "demand representation" was to carry the stock to the annual meeting and elect satisfactory officers, and that the resolution to make one of the Eastern trustees vice-president was rather premature. But Mr. Chisolm considered this as trifling, and after a series of graceful maneuvers the meeting was brought to an appropriate close by the selection of a committee consisting of Mr. A. R. Chisholm and two others, who were to be chosen by that gentleman. Before closing with a fitting quotation, such as "all's well that ends well," it should be stated that General Jordan intends to announce in this week's *Financial and Mining Record* that Messrs. A. R. Chisolm & Co believe that "there is *virgin* ground in the property of the Silver King Company, likely to produce as good ore as any in the Silver King itself, that should be thoroughly prospected and exploited—for we know of no district, either in the United States, Mexico or South America, in which a single mine so rich as the Silver King has shown itself to be, *has proved to be entirely isolated or without a companion.*"

It has been suggested that the meaning of this is that the principal parties in this movement are directly or indirectly interested in a property adjoining the Silver King, and naturally want at least the shadow of a bonanza on their property, even if this shadow be only in popular belief.

The Present Condition of the Silver King Mine.—Since the Silver King is now attracting much attention, the ENGINEERING AND MINING JOURNAL has obtained from thoroughly well-informed and reliable sources the following full information concerning the past and present of the mine. This data may be relied upon as absolutely correct:

Since Mr. Macy took charge of the property in 1883, he developed the fact by extensive surveying and mapping, that there existed between the surface and the 800 level, two entirely distinct pay shoots lying within the great porphyritic mass constituting the "King ore-body," and enclosed by the well-defined and enveloping syenitic porphyry.

Long before the second pay shoot showed sign of exhaustion, he began opening out and developing the upper or first pay shoot, at the 250 level, as a protective measure. This upper pay shoot had been cross cutted on the 250 and 300 levels in early days, but had never been further developed or operated. The visible indications in the ground as it stood, were not favorable, but with much faith the work was prosecuted, with the result of opening into a fine body of ore on the 250 level sill floor which yielded largely and provided several dividends. The annual report of January 1st, 1888, refers to an obstacle encountered as back-stoping progressed on this level, and the development of a second body of pay ground above.

This latter ground was extracted and milled during the first three months of this year, but came to an abrupt termination in the roof of the fifth floor, which, while of characteristic constituency as a matter or gaugue, was sufficiently devoid of mineralization to be of any profit. As the indications of unfavorable ground appeared, attention was at once turned to the 300, which was quickly made ready for active extraction, and provided the large output of the present summer.

These successful and disappointing circumstances

IMPORTS AND EXPORTS OF METALS AT NEW YORK NOVEMBER 27 TO DECEMBER 3, AND FROM JANUARY 1.

IMPORTS.

Spelter.	Week. Tons.	Year. Tons.
Am. Metal Co..	.....	359
Fr'densvl'eZ.Co.	.....	23
Hendricks & B..	.....	56
Lamarche's S's..	.....	6
Lewisohn Bros.	.....	61
Macy's Sons....	.....	28
Muller, S. & Co.	.....	56
Naylor & Co....	.....	253
Osgood, F.....	.....	83
Perkins, C. L...	.....	725
Pope's S's & Co.	.....	28
Total.....	.....	2,178
Corres. date 1887	.....	2,971
Zinc Sheets.	Tons.	Tons.
G.A.&E.Meyer..	.....	1
Lemanche's S's.	.....	596
Milne & Co.....	.....	1
Naylor & Co....	.....	137
Total.....	.....	735
Pig Lead.	Tons.	Tons.
Am. Metal Co..	.....	22
Caswell, E. A...	.....	46
Corwith & Co...	.....	111
Hendricks Bros.	.....	122
Total.....	.....	301
Corres. date 1887	.....	3,883
Antimony.	Casks.	Casks.
Total.....	50	3,070
Corres. date 1887	.....	3,347
Copper.	Pounds.	Pounds.
Lewisohn Bros. fromLiverpool	.....	161,824
Nickel.	Lbs.	Lbs.
McCoy&Sanders	.....	169,586
Total.....	.....	169,586
Tin.	Tons.	Tons.
Abbott & Co....	.....	3,448
Am. Metal Co..	.....	619
B'dwell&French	.....	201
Bursler, Ira....	.....	29
CrookeS.&R.Co.	.....	469
Crooks & Co....	.....	358
Davol & Sons...	.....	15
Dickerson, VanD	.....	10
Funch, Edye&Co	.....	10
Hendricks Bros.	.....	181
Knauth, W. & K	.....	48
Lehnaier Sons..	.....	50
Lewisohn Bros..	.....	15
Muller, S'll &Co.	224	5,073
Nathan, Trotter	.....	22
Naumann, F....	.....	8
Naylor & Co....	56	2,090
Phelps, Dodge..	56	1,840
Pope, Jas. E.,Jr.	.....	196
Pope's Sons & Co	.....	124
Schwaerer Bros.	.....	7
Thomsen, A. A..	.....	50
Thomson, D.....	.....	248
Total.....	336	15,049
Corres. date 1887	20	13,126
Tin Plates.	Boxes.	Boxes.
Am. Metal Co..	.....	705
Bartlett & Co...	.....	200
Bridge & Beach	.....	339
Bruce & Cook..	1,722	91,526
Byrne, James...	.....	47,683
Carter, G. T....	.....	3,583
Cen. Stam. Co..	.....	34,398
Coddington &Co	2,977	150,763
Corbierre, F.& S.	.....	3,375
Cort & Co., N. L.	236	104,405
C. Fruit Jar Co.	.....	1,470
Crocker Bros...	.....	548
Crooks & Co....	837	64,176
De Mill & Co...	.....	18,023
Dickerson, V. D.	.....	244,725
olly, T. G. F...	.....	112
Fairbanks, N. H.	.....	264
Hamilton & M..	.....	362
Henly & Earle..	.....	38
Iron Clad M. Co.	.....	119
Lalance & Gr'j'n	.....	4,735
Lombard, Ayres	.....	16,965
Merchant & Co.	362	18,750
Mersick & Co...	.....	5,860
Morewood & Co	.....	46,499
Naylor & Co....	.....	8,978
Newall Bros....	.....	208
Phelps, Dodge..	4,659	605,012
Potts, Son & Co.	.....	573
Pratt Mfg. Co..	442	151,601
Saunders Bros..	.....	330
Shepard & Co...	.....	77,204
Smith & L'kw'd.	.....	200
Somers Bros....	.....	768
Stroud & Co....	.....	686
Taylor, N. & G..	.....	540
Thomsen & Co..	.....	147,270
Underhill, A. M.	.....	21
Warren & Co...	.....	1,665
Wheeler & Co..	150	10,097
Whittemore&C.	.....	46,668
Wolff & Reesing	.....	28,792
Wright & Sons.	.....	165
Total.....	11,385	1,940,351
Corres. date 1887	38,415	1,870,674
Pig-Iron.	Tons.	Tons.
Abbott & Co....	.....	600
Austin & Co....	.....	100
Baldwin Bros...	.....	100
Bartlett & Co...	100	5,200
Carter, G. T....	225	1,330
Crocker Bros...	302	14,399
Crooks & Co....	.....	800
Dana & Co.....	.....	1,250
Downing & Co..	250	601
Drum'nd, McC'll	.....	20
Erie Despatch..	.....	250
Foley, E.....	.....	200
Gersenheimer&Co	.....	30
Goodwin & Sons	100	100
Hartf'd Cast.Co.	.....	57
Henderson Bros.	.....	1,895
Holt, H. N.....	.....	50
Irvin & Co.....	.....	50
Knauth, N.& K.	.....	15
Lee & Co.....	.....	375
Milne & Co., A.	.....	2,467
Naylor.....	.....	6,818
Perkins, C. L...	.....	5
Pierson & Co...	.....	15
Page,New'l &Co	.....	13
Pope, J. E., Jr..	.....	150
Pratt Mfg. Co..	.....	10
Sanderson&S'ns	.....	2
Stetson & Co...	100	13,307
Tonsila, M. R...	.....	120
Walbaum, W.H.	.....	400
West. Dispatch.	.....	50
Williamson &Co	200	5,100
Wright & Son..	.....	20
Total.....	1,277	55,889
Corres. date 1887	1,298	137,540
Steel Sheets, Billets, Forgings, etc.	Tons.	Tons.
Abbott & Co....	.....	2,137
Arkell, Jas.....	.....	17
Belcher, H. U...	.....	28
Bowker, C. F...	7	302
Bruce & Cook...	.....	7
Carey & Moen..	.....	24
Carter, G. T....	.....	934
Coe, J. A.....	.....	16
Cohn, M.....	11	197
Cooney, D. J....	.....	20
Crooks & Co....	.....	819
Crousbey, H....	.....	236
Dana & Co.....	.....	1,860
Downing & Co.	67	500
Henderson Bros.	.....	31
Holt, H. N.....	.....	6
Hondolette & D.	.....	136
Hugill, Chas....	4	217
Irwin & Son....	.....	1
Kunhardt & Co.	.....	33
Lalance & G....	.....	308
Lazard Freres..	.....	50
Leng, J. S.....	.....	63
Lebenberg, N...	.....	36
Littlejohn, Jas.	.....	40
Lundberg, G....	.....	381
Mersick & Co...	.....	138
Milne & Co.....	.....	2,055
Montgomery&C	.....	79
Moore's Son&Co	.....	25
MullerSchall&C	.....	5
Manas & Son...	.....	10
Naylor & Co....	349	13,460
Newton&Shipm	.....	83
Oelrich & Co...	58	598
Ogd'n & Wallace	.....	326
PhelpsDodge&C	.....	3
Phœnix Steel Co	.....	20
Pierson & Co...	.....	1,047
Pilditch, F. S...	6	363
Power, C. W....	3	60
PrattWhi'y& Co	.....	33
Prosser, Thos..	.....	3,065
Roebling's Sons.	.....	390
Sanderson& Son	.....	42
Seaburg, C. B..	.....	2
Shotts Iron Co..	.....	15
Steinberg & Co.	.....	4
Strouse & Co....	.....	59
Temple & S.....	.....	23
Union Bridge Co	.....	288
Vulcan S.W.Co.	12	12
Wagner, W. F..	33	1,197
Walbaum, W.H.	.....	2,479
Wallace & Co..	.....	41
Walschid. C. A.	.....	15
Webb, J. B.....	.....	1
Wessel, Aug....	.....	4
Wetherall Bros.	.....	2
Wetherill & Co.	.....	5
Wheeler & Co..	.....	12
Whiting, E. W.	.....	11
Whitney & Co..	.....	51
Williams&Whit	.....	48
Wilson, J. G....	.....	112
Whittemore & C	.....	6
Wolff, R. H	48	512
Wright's S.&Co.	.....	10
Total.....	594	36,076
Corres. date 1887	2,589	83,665
Bar-Iron.	Tons.	Tons.
Abbott & Co....	125	2,887
Abeel Bros.....	.....	3
Bacon & Co.....	.....	160
Hugh Cranshaw	.....	1
Downing & Co..	.....	351
Holt, S. N.....	.....	210
Jacobus, E. Y...	.....	16
Lilienberg, N...	.....	16
Lundberg, Gust	.....	700
Mersick & Co..	.....	29
Milne & Co.....	36	369
Naylor & Co....	.....	515
Ogd'n & Wallace	.....	4
Page Newell &C	.....	122
Philips, C. M...	.....	20
Stroud & Co....	.....	8
Wallace & Co..	.....	19
Wilson, J. G....	.....	11
Totals.....	161	5,438
Corres. date 1887	351	14,146
Steel & Iron Rods.	Tons.	Tons.
Abbott & Co., J..	251	7,472
Amer. Screw Co.	.....	858
Bacon & Co.....	.....	223
Baldwin B. & C.	.....	53
Bowker, C. F...	.....	3
Carey & Moen..	29	919
Cohn, M.....	.....	69
Dana & Co.....	100	6,505
Downing & Co..	51	398
Galpin, S. A....	100	2,842
Heyn, A.....	91	1,999
Hondolette& D.	.....	30
Hugill, Chas....	.....	41
Jacobus, E. Y...	.....	12
Lazard Freres..	.....	695
Leng, J. S.....	.....	850
Lilienberg, N...	.....	450
Lundberg, G....	.....	120
Milne & Co., A.	.....	1,408
Montgomery&C	.....	73
Muller, Schall&C	.....	150
Naylor & Co....	452	19,815
Newton& Ship'n	.....	2
N.Y.Barb W.Co.	.....	20
Page, Newell& C	.....	152
Perry & Ryer...	.....	100
Pierson & Co...	.....	51
Pilditch, F. S...	.....	21
Prosser, Thos...	.....	162
Roebling's Sons.	.....	1,828
Sanderson& Son	.....	67
Sheldon & Co...	.....	11
Walschid, C. A.	.....	15
Washburn M.Co	.....	35
Wheeler & Co..	.....	101
Whittemore & C	.....	1,705
Wilson, J. G....	.....	26
Wolff & Co.....	123	2,321
Total.....	1,097	51,500
Corres. date 1887.	1,888	116,771
Old Rails.	Tons.	Tons.
Baldwin Bros..	.....	100
Bowen'g &Arch.	.....	100
Brown B. & Co.	.....	668
Crossman & Bro	.....	1,005
D., L. & W. R. R.	.....	409
Frankfort, M...	.....	100
Geisenheimer&C	.....	100
Henderson Bros.	.....	537
Neuma'k&Gross	.....	1,912
Stetson & Co....	.....	230
Waltam & Co...	.....	300
Winter &Smil'ie	.....	80
Total.....	.....	5,541
Corres. date 1887.	1,355	152,945
Sheet Iron.	Tons.	Tons.
Bruce & Cook..	.....	53
Coddington& Co	25	1,774
Crooks, R. & Co.	.....	10
Newton & S....	.....	4
Thomsen & Co..	.....	2
Wagner, W. F..	.....	40
Whitney & Co..	.....	15
Wolff & R.....	.....	40
Total.....	25	1,938
Corres. date 1887.	10	1,934
Scrap Iron.	Tons.	Tons.
Abbott, A.....	.....	206
Boothby, J. H...	.....	80
Bowring&Arch.	.....	200
Brown B. & Co..	.....	20
Burgess & Co...	.....	172
Crossman & Co.	.....	47
Froth'hamB.&C	.....	248
Geisenheimer&C	.....	565
Gerhardt, P. T..	.....	8
Johnson & Co...	.....	85
Muller, Schall&C	.....	15
Ne'mark&Gross	.....	321
Purdon & W. ..	.....	75
Salter & L.....	.....	.....
Trowbridge& Co	.....	75
Ward & Co.....	.....	150
Total.....	.....	2,157
Corres. date 1887.	65	17,000
Charcoal Iron.	Tons.	Tons.
Abbott & Co..	.....	3
Bacon & Co...	.....	127
Downing & Co..	.....	25
Lilienberg, N...	.....	15
Lunberg, G.....	.....	16
Mersick & Co...	.....	6
Milne & Co.....	.....	137
Muller, S. & Co.	.....	124
Naylor & Co....	.....	931
Page, N. & Co..	.....	589
Sanderson & S.	.....	1
Total.....	.....	2,027
Spiegeleisen.	Tons.	Tons.
Abbott & Co....	.....	205
Arkell, Jas.....	.....	78
Bartlett & Co...	.....	100
Crocker Bros...	230	6,906
Dana & Co.....	.....	4,123
Geisenheimer&Co.	.....	473
Jansen, J. A....	.....	11,612
Kessler & Co....	.....	120
Naylor & Co....	.....	13,796
Perkins, C. L...	.....	3,644
Pierson & Co...	.....	1,050
Post, M. & Co..	.....	320
Total.....	230	42,427
Corres. date 1887	1,116	111,964
Iron Ore.	Tons.	Tons.
Cormack & Co..	.....	1,022
Danagh & G....	.....	25
De Flores, R....	.....	7,478
Earnshaw, A....	278	7,864
Ennis & Co.....	.....	1,721
Johnston & Co.	.....	300
Naylor & Co...	.....	3,706
Outerbridge&Co	.....	340
Wright & Co...	.....	1,630
Total	278	24,036
Corres. date 1887	217	59,427

EXPORTS.

Copper.	Pounds.	Pounds.
Abbott & Co....	.....	13,265,308
Amer. Metal Co.		6,279,449
Becker & Co....	.....	1,250
Bridgpt.Copper C	.....	112,000
Burgass & Co...	51,840	51,840
Copper Queen..	.....	224,034
Crooks & Co....	.....	1,000
Crossman & Bro	.....	4,000
Herold, E.....	.....	250,000
Ismay, J. B....	.....	115,000
Jones, R. W....	.....	189,984
Ladenburg & Co	.....	229,371
Ledoux & Co...	.....	140,276
Lewisohn Bros.	.....	5,022,754
Lomal, F. A....	.....	2,691,293
Mendel, S.....	.....	560,000
Muller, Schall..	.....	1,105,000
Naylor & Co....	.....	462,709
Neumark & G..	.....	120,143
Orford Co.....	.....	574,881
Parsons & Co...	.....	420,000
Phelps, Dodge..	.....	230,664
Pope's Sons	.....	1,917,780
Todd & Co.....	.....	112,026
Wilms & Trhne	.....	99,320
Total.....	51,840	34,260,086
Corres. date 1887.		11,023,814
Copper Matte.		
Abbott & Co....	.....	643,592
Amer. Metal Co.	149,801	5,942,272
Kunhardt & Co.	.....	41,652
Freidensv'le Zinc Co.....	.....	56,000
Ledoux, Chas...	.....	454,000
Ledoux & Co....	.....	469,720
Lewisohn Bros..	.....	1,126,822
Nichols & Co...	.....	516,783
Wilm's, Terhune	496,370	38,935,927
Total.....	646,171	45,811,124
Corres. date 1887.		51,198,063
Copper Ore.		
Amer. Metal Co.	.....	778,883
Kunhardt & Co.	.....	37,682
Mallory & Co...	.....	167,065
Mann, John H..	.....	28,000
Will s&Terhune	176,960	803,406
Total.....	176,960	1,818,036
Corres. date 1887		681,066

CURRENT PRICES.

CHEMICALS.

Acid—Acetic, ℔ 100 lbs..... 2.00@2.25
Muriatic, 18°, ℔ 100 lbs ... 1.15@1.20
Muriatic, 20°, ℔ 100 lbs..... 1.35@1.50
Nitric, 36°, ℔ 100 lbs ..... 4.00@5.50
Nitric, 42°, ℔ 100 lbs..... 5.50@7.00
Oxalic, ℔ 100 lbs..... 8.50@9.00
Sulphuric, 60°, ℔ 100 lbs..... 90@95
Sulphuric, 66°, ℔ 100 lbs..... 95@1.25
Alkali—36 p. c..... 1.12½@1.15
48 p. c..... 1.25@1.27½
Refined, 58°..... 1.12½@1.15
Alum—Lump, ℔ lb..... 1¾
Ground, ℔ lb..... 1½@2
Lump, ℔ ton, Liverpool..... £4 15
Sulphate of Alumina, ℔ ton..... £3 15
Aqua Ammonia—18°, ℔ lb..... 4¾
20°, ℔ lb..... 6
22°, ℔ lb..... 6@7
26°, ℔ lb..... 10@11
Ammonia—Sul., ℔ 100 lbs... 3.35@3.45
Carb, per lb..... 7½@8
Muriate per lb..... 6½@8
Arsenic—White, powdered, ℔ lb. 3¼@3½
Red, ℔ lb..... 5½@5¾
White, at Plymouth, ℔ ton. ... £11 10
Asbestos—Am., p. ton..... $50@$300
Italian, p. ton, c. i. f. L'pool .. £50@£300
Asphaltum—P. ton 13.00
Prime Cuban, ℔ lb ..... 4½@5½c.
Hard, ℔ ton..... $28.00
Trinidad, refined, ℔ ton..... $30.00
Barytes—Sulph., Am. prime white 17.00
Sulph., foreign, floated, p. ton.... 20.00
Sulph., off color, p. ton 13.00
Carb., lump, f.o.b. L'pool, ton.... £6 0 0
No. 1, casks, Rancorn " " £4 10 10
No 2, bags, Rancorn " " 3 15 0
Bleach—Over 35 p.c., ℔ lb. ....2.00@2.15
Borax—℔ lb..... 9¼
Refined at Liverpool, ℔ ton..... £29
Brimstone—*See Sulphur.*
Bromine—℔ lb..... 37@38
Chalk—℔ ton..... 3.15
Precipitated, ℔ lb..... 5
China Clay—English, ℔ ton..... 18.50
Southern, ℔ ton..... 13.50
Chrome Yellow—℔ lb..... 10@25
Cobalt—Oxide, ℔ lb..... 2.60@2.90
Copper—Sulph. English Wks. ton £21 10s.
Precip., Eng. Wks, unit.. .fluctuating
Copperas—Common, ℔ 100 lbs... 62½
Best, ℔ 100 lbs..... 1.00
Liverpool, ℔ ton, in casks .....£1 10s.
Cream of Tartar—Am. 99%....31@31¾
Powdered, 99 p c..... 31¾@32½
Emery—Grain, ℔ lb..... 4
Flour, ℔ lb..... 2½
Feldspar—Ground, ℔ ton..... 15.00
Fuller's Earth—Lump, ℔ bbl. .90@95
Powdered, ℔ lb..... 2
Gypsum—Calcined, ℔ bbl..... 1.25
Iodine—Resublimed..... 3.50
Kainit—℔ ton..... 9.75@10.50
Kaolin—*See China Clay.*
Lead—Red, ℔ lb..... 6
White, American, in oil, ℔ lb..... 6½
White, English, ℔ lb..... 7½
Acetate, or sugar of..... 13@13½
Lime Acetate—Amer. Brown 1.05@1.10
" Gray 2.10@2.12½
Litharge—Powdered, ℔ lb..... 6@6¼
English flake, ℔ lb..... 9
Magnesite—Greek, ℔ ton..... 10.00
Manganese—lump, c. i. f. L'pool. 5s.
Per unit, up or down..... 1s. 6d.
Ground..... £5 10
Mercuric-Chloride—(*Corrosive Sublimate*) ℔ lb..... 55
Mineral Wool—℔ lb..... 2
Mica—In sheets according to size,
1st quality, ℔ lb..... 25@$6.00
Phosphate Rock—S. Carolina,
per ton, o. b. Charleston. 5.00@6.00
Ground, ex vessel New York. 10.00@10.50
Canadian Apatite, lump, f. o. b. at
shipping port, ℔ unit..... 24
Phosphorus—℔ lb..... 65
Plumbago—Ceylon, ℔ lb..... 4@5
American, ℔ lb..... 5@7
London, ℔ cwt..... £0 15 0
Potassium—Cyanide, ℔ lb.... .39@40
Bromide, ℔ lb..... 33
Chlorate, ℔ lb..... 14½@14¾
Carb. ℔ lb..... 4.70@5.50
Caustic, ℔ lb..... 7½@8
Iodide..... 2.70@2.75
Muriate, ℔ 100 lbs..... 1.80@1.85
Nitrate, refined, ℔ lb..... 6
Bichromate, ℔ lb..... 10½
Sulphate, ℔ 100 lbs..... 2 30
Yellow Prussiate, ℔ lb..... 19
Red Prussiate, ℔ lb..... 42@45
Pumice Stone—Select lumps, lb. 3¼
Original cks., ℔ lb..... 1¾
Powdered, pure, ℔ lb..... 2¼@2½
Pyrites—Non-cupreous, p. unit, s. 5d.
Quartz—Ground, ℔ ton..... 18.00
Rotten Stone—Powdered, ℔ lb. 3¼@3½
Lump, ℔ lb..... 6@10
Eng., powdered, ℔ ton..... £4
Lump, ℔ ton..... £5
Salt—Liverpool, ground ℔ bbl.. 75@80
Turk's Island, ℔ bbl..... 30@33
Salt Cake—℔ 100 lbs..... 50@57
Saltpeter—Crude, ℔ lb..... 5@5½
Refined, ℔ lb..... 6@8
Soda Ash—Carb., 48 % 100 lb... 1.25@1.35
High test..... 1.12½@1.15
Caustic, 48 %..... 1.26¼@1.35
Soda Caustic, 60%..... 2.50@2.75
" " 70%..... 2.25 @2.35
" " 74–5%..... 2.25 @2.35
Sal, English, ℔ 100 lbs.... .95 @1.00
Sal, American, ℔ 100 lbs .... .95 @1.20
Nitrate, ℔ 100 lbs..... 2.37½@2.40
Strontium—Nitrate ℔ lb..... 9@9½
Sulphur—Roll, ℔ lb..... 1¾
Flour, ℔ lb..... 2
Crude Brimstone, 2s., ℔ ton. 20.00@23.00
Crude Brimstone, 3ds, ℔ ton. 19.50@21.00
Talc—Ground French, ℔ lb.. ...1¼@1½
Domestic, ℔ lb..... ¼
Domestic, ℔ ton..... 15 00
c. i. f. Liverpool, ℔ ton..... £4 50
Tannin—Pure, ℔ lb..... 61
Vermillion—American, ℔ lb.. ..
English, ℔ lb..... 82@85
Vitriol—(Blue), Ordinary, ℔ lb.. 5¾@6¼
Extra, ℔ lb..... 6½@6¾
Zinc Oxide—Am., Dry, ℔ lb..... 4½
Antwerp, Red Seal, ℔ lb..... 6@6½
Paris, Red Seal, ℔ lb..... 6½@7
* Spot.

BUILDING MATERIAL.

Bricks—Pale, ℔ 1,000..... 2.50@2.75
Jerseys, ℔ 1,000..... 5.00@5.25
Hackensacks, ℔ 1000..... 5.50@5.75
Up Rivers, ℔ 1000..... 5.50@5.75
Haverstraw seconds, ℔ 1000.. 5.75@6.00
Haverstraw firsts, ℔ 1,000.. 6.12½@6.50
Fronts, nominal.
Croton..... 14.00@16.00
Wilmington..... 20.00@21.00
Philadelphia..... 28.00@29.00
Trenton..... @28.00
Baltimore..... 37.00@41.00
Building Stone—Amherst
freestone, ℔ cu. ft.. ..... 95@1.00
Brownstone, ℔ cu. ft. ..... 1.00@1.35
Belleville, N. J., red and gray
rock, ℔ cu. ft. 1.00
Corncockle red freestone, ℔ cu.
ft..... 1.00
Granite, rough, ℔ cu.ft..... 45@1.25
Granite, Scotch..... 1.00@1.05
Cement—Rosendale, ℔ bbl .90@1.15
Portland, American, ℔ bbl... 2 15@2.45
Portland, foreign, ℔ bbl..... 2.20@3.00
Roman, ℔ bbl..... 2.65@2.85
Keene's coarse, ℔ bbl..... 4.50@5.50
Keene's fine, ℔ bbl..... 7.00@8.25
Slate—Purple and green roofing, ℔ 100 ft..... 5.00@6.00
Red roofing, ℔ 100 sq. ft... .15.00
Black, roofing, ℔ 100 sq. ft... 4.25@5.00
Lime—Rockland, common... 1.00@1.20
Rockland, finishing..... 1.25
St. John, com. and finish..... .90
Labor—Ordinary, ℔ day..... 1.50@2.00
Masons, ℔ day..... 4.00
Plasterers, ℔ day..... 4.00
Carpenters, ℔ day..... 3.50
Plumbers, ℔ day..... 3.50
Painters, ℔ day..... 2.50@3.50
Stonesetters, ℔ day..... .3.50@4.00
Tilelayers, ℔ day..... 3.50@4.50
Bricklayers, ℔ day..... 4 00

THE RARER METALS.

Aluminum—(Metallic), per lb...$6.00
Arsenic—Metallic, per lb..... 32
Barium—(Metallic), per lb..... 975.00
Bismuth—(Metallic), per lb..... 2.40
Cadmium—(Metallic), per lb.... 150@0
Calcium—(Metallic), per oz..... 1.50
Cœsium—(Metallic)..... .....
Cerium—(Metallic). per oz..... .160.00
Chromium—(Metallic), per lb... 200.00
Cobalt—(Metallic), per lb..... 6.00
Didymium—(Metallic), per oz.. 160.00
Erbium—(Metallic), per oz... .140.00
Gallium—(Metallic), per oz 3250.00
Glucinum—(Metallic) per oz.... 250.00
Indium—(Metallic), per oz..... 158.00
Iridium—(Metallic), per lb..... 650.00
Lanthanum—(Metallic), per oz. 175.00
Lithium—(Metallic), per oz..... 160.00
Magnesium—Per lb..... .. 4.00
Manganese—Metallic, per lb... 1.10
Molybdenum—(Metallic), per oz. 6.00
Nickel—(Metallic), per lb..... .65
Niobium—(Metallic), per oz.... 128.00
Osmium—(Metallic), per lb 640.00
Palladium—(Metallic), per lb.. 400.00
Platinum—(Metallic), per lb. .. 128.00
Potassium—Metallic, per oz.... 2.00
Rhodium—(Metallic), per lb.... 512.00
Ruthenium—(Metallic), per oz. 112.00
Rubidium—(Metallic), per oz.. 200.00
Selenium—(Metallic), per oz.... 3.00
Sodium—(Metallic) per lb. .. 4.50
Strontium—(Metallic), per oz.. 128.00
Tantallum—(Metallic) per oz... 144.00
Telurium—(Metallic) per oz.... 9.00
Thallium—(Metallic) per oz..... 3.00
Titanium—(Metallic) per oz.... 32.00
Thorium—(Metallic) per oz..... 272.00
Tungsten—(Metallic) per lb..... 1.25
Vanadium—(Metallic), per oz.. 320.00
Yttrium—(Metallic), per oz 144.00
Zirconium—(Metallic), per oz.. 240.00

METALS.

Aluminum—
Bronze (10 %), ℔ lb..... 46c.
Copper—
Lake Ingot, Spot, ℔ lb..... 17·75c.
Electrolytic, ℔ lb..... 16·50c.
Casting Brands, ℔ lb. ... 16½c.
Chili Bars, London, ℔ ton £78
Sheet Copper (according to
size), ℔ lb..... 25 @38c.
Lead—
Domestic, Common, Spot.. 3·80c.
Foreign..... 4·70c.
Sheet, ℔ lb, net..... 7·00c. net
Pipe, ℔ lb..... 6c. "
Tin lined Pipe, ℔ lb..... 14c. "
Shot, ℔ lb..... 6¼c.
Tin—
Tin Plates..... 13s. 6d.
Tin Spot in London..... £98 17s 6d.
Pig tin, spot in N. Y., ℔ lb.. 21·75c.
Zinc—
Domestic spelter, ℔ lb..... 4·95c.
Foreign spelter, ℔ lb..... 5¾c.
Silesian, ton..... £18 5s.
Sheet, American, ℔ lb..... 6¾c.
Antimony—Hallet's, per lb.. 16½c.
Cookson's, per lb..... 14c
Star Antimony..... £44
Quicksilver—Per lb..... 61@63c.
London, ℔ flask..... £7@£7¼

IRON AND STEEL.

New York Prices.

American Pig-Iron.—At tidewater.
No. 1 X..... $18.00@$19.00
No. 2 X..... 17.00@ 18.00
Forge..... 16.00@ 16.50
Scotch Pig—Coltness... 21.00@.....
Clyde..... 19 75@ 20.00
Dalmellington..... 19.75@ 20.00
Summerlee..... .....
Shotts..... .....
Langloan..... .....
By Cable to-day to the Metal Exchange:
Scotch Warrants..... 41s. 3d.
Coltness, at Glasgow..... 49s.
Langloan, at Glasgow..... 49s.
Summerlee, at Glasgow..... 49s.
Gartsherrie, at Glasgow..... 47s. 3d.
Glengarnock, at Ardrossan..... 47s. 6d.
Dalmellington, at Ardrossan..... 42s. 6d.
Eglinton, at Ardrossan..... 41s. 6d.
Bessemer Pig—
Foreign, nominally..... $19.00@$20.00
Domestic..... 16 60@ 17.00
Spiegeleisen—
German, 20 per cent..... 26.50@ 27.00
English, 20 " " ..... 27.00@ 27.00
" 30 " " ..... 32.00@ 33.00
Ferro Manganese, 80%..... 54.00@ 54.50
Steel Blooms, nominally..... .....
Steel Billets, " 32.00@ 36.00
Steel Nail Slabs, " 29.00@ 29.50
Steel Wire Rods, " 39.75@ 40.00
Steel Rails—
Heavy sections, at mill.... 26.00@ 28.00
Light " " ..... 30.00@ 32.00
Structural Iron and Steel—
Bridge Plate, at mill.. .....2·0 @2·1c.
Angles, at mill ..... 2·00@2·10c.
Tees, at mill..... 2·40@2·60c.
Steel Angles, at mill..... 2¼ @2½c.
Beams and Channels, on wharf, 3·3c. base
Steel Plates—
Tank and Ship, on wharf..... 2 25@2·3
Shell, on wharf..... 2·4 @2·5
Flange, " ..... 2·6 @2¾
Fire-Box, on wharf..... 3½ @4
Iron Plates—
Common tank, on wharf.... 2·1@2·2c.
Refined, on wharf..... 2·3@2·4c.
Shell, " ..... 2·3@2·4c.
Flange, " ..... 3·4@3·5c.
Extra flange, on flange..... 3¾@4
Bar Iron—
Refined..... 1·7 @1·9c.
Common..... 1·65@1 80c.
Merchant Steel—
American tool..... 8½@10c.
Special grades..... 13 @20c.
Crucible machinery..... 5 @6c
" spring..... 4½c.
Bessemer machinery..... 2·2@2·5c.
" spring..... 2·7@2·9c.
Cast-Iron Pipe—At works:
According to size..... $25 00@$31.00
Wrought-Iron Pipe—nominally—
Butt-Welded, Plain and Tarred, 52½% disc; Galv., 42½% disc.
Lap-Welded, Plain and Tarred, 62½% disc; Galv., 52½% disc.
Boiler Tubes—Per cent disc..60@62½%
Rail Fastenings—
Spikes..... 2·2@2·25c. delv'd
Angle Fish-bars..... 1·9 @2c.
Bolts and Sq Nuts..... 2·9 @3c
" Hex. " ..... 3·1 @
Wrought Scrap—
Foreign, *ex store*..... @
No. 1 Yard *to vessel*..... 20.50@ 21.50
Cast Scrap..... 15.50@ 16.50
Old Car Wheels..... 17.00@ 18.00
Old Rails—Tees..... 23.00@ 24.00
—Doubles..... 24.00@ 25 00
Nails—In car-load lots. .. 1 90@ 2·0c.
—From store..... 1·95@ 2.00

Louisville Prices.

Hot Blast Irons—
So. Coke, No. 1..... $16.50@$17.00
" " No. 2..... 15 50@ 16.00
" " No. 2½..... 15.00@ 15.25
Mahoning Valley (Lake Ore Mixture)..... 20.50@ 21.00
So. Charcoal, No. 1..... 18.00@ 18.50
" " No. 2..... 17.00@ 17.50
Missouri Charcoal No. 1.... 19.50@ 20.00
" " No. 2.... 19.00@ 19.50
Forge Irons—
Neutral Coke..... $14.75@$15.25
Cold Short..... 14.25@ 14.75
Mottled..... 12.75@ 13.75
Car Wheel and Malleable Irons—
Southern (standard brands).$22.50@$25.00
" (other brands)..... 18 00@ 18 50
Lake Superior..... 22.50@ 23.50

Pittsburg Prices.

Coke or Bituminous Pig—
Foundry No. 1..... $17.75@18.00
Foundry No. 2..... 16.75@17.00
Gray Forge No. 3..... 16.00@16.25
" " No. 4..... 15.50@15.75
White..... 15.00@15.50
Mottled..... 15.25@15.50
Silvery..... 16.50@18.50
Bessemer..... 17.25@17.50
Low Phos..... 21.00@21.50
Charcoal Pig—
Foundry No. 1..... 23.50@24.50
Foundry No. 2..... 22.00@24.00
Cold-Blast..... 25.00@27.00
Warm-Blast..... 24.00@25.00
20 p. c. Spiegel..... 27.50@28.00
Muck-Bar..... 29.25@30.00
Steel Blooms..... 29.00@29.50
Steel Slabs..... 28.50@28.75
Steel Crop Ends..... 19.50@19.75
Steel Bloom Ends..... .....@19.50
Ferro Manganese, 80%.. .. 54.50@55.00
Steel Billets..... 29.00@29.50
Old Iron Rails..... 25.00@25.20
Old Steel Rails..... 19.00@20.00
No. 1 W. Scrap..... 21.00@21.50
No. 2 W. Scrap..... 18.50@19.50
Steel Rails..... 28.00@28,50
" light sections..... 28.00@31.00
Bar Iron., nominal..... 1.75@ 1.80
Nails..... $1.90 usual discount
Steel Nails..... $1.90
Two per cent off forcash. * At works.

Philadelphia Prices.

Foundry No. 1..... $18.00@19.50
Foundry No. 2..... 17.00@18.00
Gray Forge..... 17.00@16.50
Bessemer Pig..... 19.50@20.50
Steel Rail Blooms..... 29.50 nom
Foreign Bessemer..... .....@20.50
Spiegeleisen..... 26.50@27.00
Scrap, Selected..... 22.00@23.00
No. 1..... 21.00@22.00
Cargo Scrap..... 21.00@21.50
Muck-Bars..... 29.00@30.00
Merchant Iron..... 1.75@ 1.95
Plate Iron..... 2.00@ 2.10
Tank Iron..... 2.00@ 2.15
Skelp Iron..... 1.95@ 2.00
Angles..... 2.00@ 2.10
Beams and Channels..... 3.30@.....
Nails..... 1.90@ 2.00
Steel Rails..... 27.50@29.00
Old Rails..... 23.50@24.00

STOCK MARKET QUOTATIONS

Baltimore, Md.

COMPANY.	Bid.	Asked.
Atlantic Coal	1.35	.....
Balt. & N. C.	.25	.30
Conrad Hill	.....	.15
Diamond Tunnel	.35@.41	.42@.45
George's Crk. C.	102½@103¼	110.00
Lake Chrome..	.05	.10
N. State, Balto..	.20	.....
Silver Valley	.....	1.00

Highest and lowest prices bid and asked during the week ending December 4th.

Birmingham, Ala.

COMPANY.	Bid.	Asked.
Ala. Conn. C..	....	27
Bir. Min. & Mfg.	....	160 @170
Bir. Fur. & Mg.	10	16
Broken Arrow C. & M..	....	12¾@ 16
Decat. L. Imp. & Fur	11¼@11¼	11½@ 12
Decatur Min. L.	. .	23 @ 25
Enterprise Mfg. Co	....	50
Jagger-Townley C. & C. Co.	5	9
Mag-Ellen C. & Mg	75	100
No. Bus. Crk., C. & Mg.	3¾	4¼@ 7½
Sloss I. & S..	....	30 @ 31½
* Sloss I. & S..	87¼@88¼	90½@ 91
Sheffield C. & I.	74	81½@ 85
Tenn. C. & I. Co.	33 @35	....
*Williamson Iron Co	99¾	....
Woodstock S. & I	54¼@56	55½@ 57

* Bonds.

Highest and lowest prices bid and asked during the week ending December 4th.

Pittsburg, Pa.

COMPANY.	H.	L.	Closing.
Allegheny Gas Co.	37.00	35.00	37.00
Bridgewater Gas.	75.00	60.00	70.00
Chartiers Val. Gas.	51.00	46.00	51.00
La Noria Mining..	1.88	1.38	1.75
Manufac's Gas Co.	25.00	20.00	25.00
Nat. Gas of W. Va.	56.00	55.00	56.00
Ohio Val. Gas..	40.00	38.00	38.00
Penn Gas Co	20.00	20.00	20.00
Philadelphia Co..	40.00	37.63	38.00
Pittsburg Gas Co..	70.00	70.00	70.00
Silverton Mg.....	1.50	1.50	1.50
Tuna Oil Co.....	62.50	60 50	61.00
Washington Oil...	73.00	70.00	70.00
Westinghouse Air Brake Co....	118.50	118.50	118.50
West'house B. Co.	60.00	60.00	60.00
Westm'land & Cam.	38.00	25.00	35.00
Wheeling Gas	28.25	27.50	28.00
Yankee Girl Mg..	5.00	5.00	5.00

Highest and lowest prices bid and asked during the week ending December 6th.

Foreign Quotations.

London. November 24.

COMPANY.	Highest.	Lowest
Alturas Gold, Idaho...	5s.	4s. 6d.
Arizona Copper, Ariz..	18s. 6d.	18s.
Birdseye Creek, Cal....	6s.	5s.
Carlisle, N. Mex	15s. 6d.	14s. 6d.
Colorado United, Colo..	3s. 6d.	2s. 6d.
Columbian, S. A.....	35s.	33s.
Cons. Esmeralda, Nev..	7s.	6s. 6d.
Denver Gold, Colo.....	2s.	1s. 9d.
Dickens Custer, Idaho.	4s. 9d.	4s. 3d.
Eberhardt, Nev	1s. 9d.	1s. 3d.
El Callao, Venezuela....	£3	£2¼
Empire, Mont	£1½	£1
Flagstaff, Utah.....	3s. 6d.	3s.
Garfield, Nev.....	14s.	13s.
Gold Hill, N. C.....	1s. 6d.	1s.
Ilex, Cal.....	£¼	£¼
Josephine, Cal	6s.	4s.
Kohinoor, Colo.....	2s. 6d.	2s. 3d.
Mason & Barry, Portugal	£11¼	£11
Montana Lt., Mont	38s.	36s.
New California, Colo...	7s. 6d.	7s.
New Emma, S., Utah...	3s. 6d.	3s.
New Hoover Hill, N. C.	2s.	1s. 6d.
New La Plata, Colo...	2s. 3d.	1s. 9d.
Pittsburg Cons., Nev...	£1½	£1
Quebrada, Venezuela,..	£6½	£6¼
Richmond Con., Nev...	£3¼	£2¾
Ruby & Dunderberg, Nev	1s. 9d.	1s. 3d.
Russell Gold, N. C.....	4s.	3s.
Sierra Buttes, Cal.....	£⅜	8½s.
Stanly, N. C.....	£⅜	£⅛
U. S. Placer, Colo.....	7s. 6d.	6s. 6
Viola Lt., Idaho	10s.	9s.

*Paris.** November 22.

El Callao.....	74.50	74.50
Golden River.....	405.00	405.00
Lexington.....	102.50	102.50
" parts.....	4.25	4.25
Rio Tinto.....	648.75	648.75
" obligations.....	.....	.....
" " 2d.....	.....	.....
Tharsis	163.50	163.50

* Francs.

DIVIDEND-PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares. No.	Par	Assessments. Total levied.	Date and amount of last.			Dividends. Total paid.	Date and amount of last.		
1	Adams, S. L.	Colo.	$1,500,000	150,000	$10	*				$555,000	Jan.	1887	.15
2	Alice, S. C	Mont	10,000,000	400,000	25	*				775,000	Dec.	1888	.06¼
3	Alturas, G	Idah.	1,500,000	300,000	5					95,000	Sept	1886	50
4	Amy & Silversmith, S.	Mon.		341,419						247,530	Aug.	1887	12½
5	Atlantic, C.	Mich	1,000,000	40,000	25	$280,000	Apl.	1875	$1.00	480,000	Aug.	1888	1.50
6	Argenta, S	Nev.	10,000,000	100,000	100	325,000	July	1885	.10	40,000	Feb.	1880	.20
7	Aspen Mg. & S., S. L.	Colo.	2,000,000	200,000	10	*				40,000	Nov.	1888	.20
8	Aurora, I.	Mich	2,000,000	100,000	20					155,000	Oct.	1887	1.87½
9	Bassick, G. S.	Colo.	10,000,000	100,000	100	*				400,000	Mar.	1884	1.00
10	Belle Isle, S.	Nev.	10,000,000	100,000	100	145,000	Feb	1887	20	300,00	[illegible]	[illegible]	95
11	Belcher, G. S.	Nev.	10,400,000	104,000	100	2,770,000	Sept	1888	.50	15,397,200	Apl	1876	1.00
12	Bellevue Idaho, S. L.	Idah.	1,250,000	125,000	10	57,500	Nov.	1887	25	187,500	Jan	1887	10
13	Black Bear, G.	Cal.	3,000,000	30,000	100	22,500	Dec.	1884	.25	895,000	May	1883	.20
14	Bodie Con., G. S.	Cal.	10,000,000	100,000	100	500,000	Sept	1888	.50	1,295,000	Apl.	1885	.50
15	Bonanza Developm't	C&M	3,000,000	300,000	10					135,000	Oct.	1882	.15
16	Bonanza K'g, Cons. S.	Cal.	1,000,000	100,000	10	*				185,000	Feb.	[illegible]	.10
17	Boston & Mont., G.	Mon	2,500,000	250,000	10	*				520,000	Jun.	1886	.15
18	Boston & Mont., C. S	Mon	2,500,000	100,000	25	*				400,000	Nov.	1888	2.00
19	Breece, S.	Colo	,000,000	200,000	25	*				2,000	Feb.	1880	.01
20	Brooklyn Lead, L. S.	Utah	500,000	50,000	10					127,000	July	1887	.05
21	Bulwer, G.	Cal.	10,000,000	100,000	10	80,000	May	1888	.20	175,006	Jan.	1884	.10
22	Caledonia, G.	Dak.	10,000,000	100,000	100	505,000	May	1885	.15	56,000	Dec.	1888	.08
23	Calumet & Hecla, C.	Mich	2,500,000	100,000	25	1,200,000				31,350,000	Dec	1888	5.00
24	Carbonate Hill, S. L.	Colo.	1,500,000	200,000	10	*				80,000	Apl.	1884	.05
25	Castle Creek, G.	Idah.	100,000	100,000	1					51,000	Oct.	1883	.03
26	Catalpa, S. L	Colo.	3,000,000	300,000	10	*				270,000	May.	1884	.10
27	Central, C.	Mich	500,000	20,000	25	100,000	Sept	1861	.06	1,890,000	Aug.	1888	1.50
28	Chrysolite, S. L.	Colo.	10,000,000	200,000	50	*				1,650,000	Dec.	1884	.25
29	Colorado Central, S. L	Colo.	2,750,000	275,000	10	*				351,000	Dec.	1888	.05
30	Confidence, S. L.	Nev.		24,960		287,440	Apl.	1887	.50	174,720	Aug.	1888	1.00
31	Cons. Cal. & Va., G. S.	Nev.	21,600,000	216,000	100	108,000	Jan.	1885	.20	2,440,800	Nov.	1888	.50
32	Contention, S.	Ariz.	12,500,000	250,000	50					†2,587,000	Dec.	1884	.25
33	**Cop. Queen Cons, C.	Ariz.	1,400,000	140,000	10					140,000	Oct.	1888	.50
34	Crescent, S. L. G.	Utah	15,000,000	600,000	25	*				228,000	Oct.	1888	.18
35	Crown Point, G. S.	Nev.	10,000,000	100,000	100	2,825,000	Oct.	1888	.50	11,588,000	Jan.	1875	2.00
36	Daly, S. L.	Utah	3,000,000	150,000	20					825,500	Nov.	1888	.25
37	Deer Creek, S. G.	Idah.	1,000,000	200,000	5	*				10,000	Oct.	1888	.05
38	Deadwood-Terra, G.	Dak.	5,000,000	200,000	25	*				$1,000,000	Nov.	1887	.10
39	Derbec B. Grav., G. S.	Cal.	10,000,000	100,000	100	90,000	Dec.	1881	.10	180,000	May	1887	.10
40	Dunkin, S. L.	Colo.	5,000,000	200,000	25	*				345,000	Oct.	1888	.05
41	Eclipse	Colo.	100,000	100,000	1					20,000	Nov.	1887	.10
42	Elkhorn, G. S.	Mont	1,000,000	100,000	10	50,000	July	1883	.50	170,000	July	1887	.05
43	Empire Lt., G.	Mont	500,000	100,000	5					70,500	Oct.	1887	.37½
44	Eureka Con., G. S. L.	Nev.	5,000,000	50,000	100	500,000	July	1886	1.00	4,918,500	July	1888	.25
45	Evening Star, S. L.	Colo.	500,000	30,000	10	*				1,400,000	Nov.	1883	.50
46	Excelsior, G.	Cal.	10,000,000	100,000	100	560,000	Sept	1885	1.00	875,000	Oct.	1880	.25
47	Father de Smet, G.	Dak.	10,000,000	100,000	100	200,000	Nov	1878	1.00	1,125,000	Dec.	1885	.20
48	Franklin, C.	Mich	1,000,000	40,000	25	220,000	Jun.	1871		720,000	July	1888	2.00
49	Freeland, G. S. C.	Colo.	5,000,000	200,000	25	*				190,000	July	1886	.10
50	Fresno Enterprise, G	Cal.	5,000,000	100,000	50		Mch	1883	.10	110,000	July	1882	.10
51	Garfield Lt., G. S.	Nev.	500,000	100,000	5					85,000	Apl.	1888	.12½
52	Golconda, G. S.	Idah.	1,000,000	100,000	10					120,000	May	1888	.60
53	Gould & Curry, G. S.	Nev.	10,800,000	108,000	100	5,355,000	Oct.	1888	.50	3,826,800	Oct.	1870	10.00
54	Grand Central, S.	Ariz.	1,000,000	100,000	10					625,000	Dec	1882	.25
55	Grand Prize, S.	Nev.	10,000,000	100,000	100	595,000	Oct.	1888	.25	495,000	Mar.	1884	.25
56	Granite, S.	Colo.	125,000	125,000	1					6,250	May	1883	.01
57	Granite Mountain, S.	Mont	10,000,000	400,000	25					5,200,000	Oct.	1888	.50
58	Green Mountain, G.	Cal.	1,250,000	125,000	10	*				212,000	Nov.	1881	.07½
59	Hale & Norcross, G. S	Nev.	11,200,000	112,000	100	5,086,000	July	1887	.50	1,822,000	Aug.	1888	.50
60	Hecla Con., S. G. L. C.	Mont	1,500,000	30,000	50					1,197,500	Aug.	1888	.50
61	Hel'a Mg & Red, G.S.L	Mont	3,315,000	663,000	5	*				197,970	July	1886	.06
62	Holmes, S.	Nev.	10,000,000	100,000	[illegible]	300,000	Sept	[illegible]	10	75,000	Apl	1886	.25
63	Holyoke, G.	Idah.	200,000	200,000	1					27,000	Feb.	1883	.10
64	Homestake, G.	Dak.	12,500,000	125,000	100	200,000	July	1878	1.00	4,268,750	Nov.	1888	.20
65	Honorine, S. L.	Utah	500,000	250,000	2	25,000	Jun.	1883		125,000	Sept	1887	.05
66	Hope, S.	Mont	1,000,000	100,000	10	*				233,252	Apl.	1888	.25
67	Horn-Silver, S. L.	Utah	10,000,000	400,000	25	*				4,000,000	Nov.	1884	.50
68	Hubert, G.	Colo.	500,000	50,000	10	*				239,500	Oct.	1888	.11
69	Idaho, G.	Cal.	310,000	3,100	100					4,966,750	Sept	1888	7.50
70	Ideal, S. L.	Colo.	1,500,000	50,000	10					15,000	Oct.	1886	.05
71	Illinois, S.	N.M.	100,000	100,000	1	*				25,000	Jan.	1887	.25
72	Independence, S.	Nev.	10,000,000	100,000	100	340,000	Oct.	1886	.20	225,000	Sept	1879	.25
73	Indian Queen, S.	Nev.	250,000	125,000	2					368,750	July	1883	.03
74	Iron Hill, S.	Dak.	2,500,000	250,000	10	118,750	Sept	1888	.03	156,250	Nov.	1887	.07½
75	Iron-Silver, S. L	Colo.	10,000,000	500,000	20	*				2,400,000	Dec.	1888	.20
76	Jackson, G. S.	Nev.	5,000,000	50,000	100	10,000	Nov	1880	.20	45,000	Oct.	1886	.10
77	Jay Gould	Mont	2,000,000	4[illegible]	5	*				267,000	Jun.	1888	.09
78	Jocuistita, S.	Mex.	2,500,000	250,000	10					1,200,000	Feb.	1885	.50
79	Jumbo, G.	Colo.	2,000,000	200,000	10					35,000	Oct.	1887	.02½
80	Kentuck	Nev.	3,000,000	30,000	100	342,000	Nov	1881	.30	1,350,000	Dec.	1886	.10
81	La Plata, S. L.	Colo.	2,000,000	200,000	10	*				610,000	Sept	1882	.30
82	Leadville Cons., S.L.I.	Colo.	4,000,000	400,000	10	*				423,000	Apl.	1887	.05
83	Lexington, G. S.	Mont	4,000,000	40,000	100	*				565,000	Jan.	1885	2.00
84	Little Chief, S. L.	Colo.	10,000,000	200,000	50	*				800,000	July	1888	.10
85	Little Pittsburg, S. L	Colo.	20,000,000	200,000	100	*				1,050,000	Mch.	1880	50
86	Manhattan, S.	Nev	5,000,000	50,000	100	250,000	Dec.	1887	1.00	437,500	Feb	1886	.25
87	Marion Bullion, G	N.C.	500,000							15,000	Jan.	1886	
88	Martin White, S.	Nev.	10,000,000	100,000	100	1,150,000	Mar.	1886	25	140,000	Dec.	1886	.25
89	Mary Murphy, G. S.	Colo.	350,000	3,500	100	*				122,500	Feb.	1888	5.00
90	Minnesota, C	Mich	1,000,000	40,000	25	420,000	Apl.	1886	1.00	1,820,000	Mar.	1876	
91	Mono, G.	Cal.	5,000,000	50,000	100	641,000	Sept	1888	.50	12,500	Mar.	1886	.25
92	Montana, Lt., G. S.	Mont	3,300,000	660,000	5	*				2,149,035	Oct.	1888	.06¼
93	Morning Star, S. L.	Colo.	1,000,000	100,000	10					775,000	Mar.	1888	.25
94	Moulton, S. G.	Mont	2,000,000	400,000	5	*				380,000	Dec.	1887	.07½
95	Mount Pleasant, G.	Cal.	150,000	150,000	1	*				150,000	Feb.	1887	.30
96	Mt. Diablo, S.	Nev.	5,000,000	50,000	100	137,500	Jun.	1880	2.00	120,000	Aug.	1888	.20
97	Napa, Q	Cal.	700,000	100,000	7					290,000	Jan.	1883	.10
98	Navajo, G. S.	Nev.	10,000,000	100,000	100	485,000	Apl.	1888	.30	325,000	Feb.	1885	.25
99	N. Hoover Hill, G. S.	N. C.	300,000	120,000	2½	*				30,000	Dec.	1885	.06¼
100	Northern Belle, S.	Nev.	5,000,000	50,000	100	425,000	Jan.	1884	8.00	2,400,000	Apl.	1883	.50
101	North Belle Isle, S.	Nev.	10,000,000	100,000	100	300,000	Oct	1888	.50	230,000	May	1888	.50
102	North Star, G	Cal.	1,000,000	100,000	10					100,000	Oct.	1888	.50
103	Ontario, S. L.	Utah	15,000,000	150,000	100					9,650,000	Nov.	1888	.50
104	Ophir, G. S.	Nev.	10,000,000	100,000	100	4,109,440	Sept	1888	.50	1,595,800	July	1882	1.00
105	Original, S. C.	Mont	1,500,000	60,000	25	*				120,000	Apl.	1888	.05
106	Osceola, C.	Mich	1,250,000	50,000	25	480,000	Apl.	1876	1.60	1,172,500	Sept	1888	1.00
107	Oxford, G.	N. S.	125,000	125,000	1	*				33,500	Oct.	1885	.02
108	Paradise Valley, G. S	Nev.	10,000,000	100,000	100	62,000	Apl.	1888	.15	150,000	Apl.	1887	.10
109	Parrott, C.	Mont	1,800,000	180,000	10					282,000	Nov.	1888	.20
110	Peacock, S. G. C.	N.M.	2,000,000	200,000	10	*				60,000	Nov.	1886	
111	Pleasant Valley, G. S.	Cal.	10,000,000	100,000	100	10,000	Mar.	1884	.10	30,000	Dec.	1882	.05
112	Plutus, G. S. C. L.	Colo.	2,000,000	200,000	10	*				20,000	Feb.	1886	.10
113	Plymouth Con., G.	Cal.	5,000,000	100,000	50	*				2,280,000	Feb.	1888	.40
114	Prussian, S. L.	Colo.	1,500,000	150,000	10					132,000	Jan.	1883	.10
115	Quicksilver, pref., Q.	Cal.	4,300,000	43,000	100					1,471,442	Oct.	1888	1.25
116	" com., Q.	Cal.	5,700,000	57,000	100					151,000	July	1882	.40
117	Quincy, C.	Mich	1,000,000	40,000	25	200,000	Dec.	1862		4,970,000	Aug.	1888	5.00
118	Richmond, S. L.	Nev.	1,350,000	54,000	25	*				4,312,587	Jun.	1887	1.25
119	Ridge, C.	Mich.	500,000	20,000	25	219,939	Mar	1886	.50	99,785	Feb.	1880	.50
120	Rising Sun, S.	Dak.	750,000	150,000	5	*				52,000	May	1881	.07½
121	Robinson Con., S. L.	Colo.	10,000,000	200,000	50	*				585,000	Mar.	1886	.05
122	Robert E. Lee, S. L.	Colo	10,000,000	500,000	20					100,000	Dec.	1882	.50
123	Rooks, G.	Vt.	500,000	50,000	10	*				61,000	Apr	1885	.30
124	Savage, S.	Nev.	11,200,000	112,000	100	6,436,000	Oct	1888	.50	4,460,000	July	1869	3.00
125	Security L. Mg., Mfg.	Colo.	1,000,000	100,000	10	*				50,000	July	1884	
126	Shoshone, G.	Idah.	150,000	150,000	1					7,500	Apl.	1883	.01
127	Sierra Buttes, G.	Cal.	2,225,000	122,500	10					1,492,557	Apl.	1888	.12½
128	Sierra Nevada, G. S.	Nev.	10,000,000	100,000	100	6,150,000	Nov	1888	.25	102,000	Jan.	1871	1.00
129	Sierra Nevada, S. L.	Idaho	1,000,000	¶	1	*				20,000	June	1888	.01
130	Silver Cord, G. S. L.	Colo.	5,000,000	500,000	10					225,000	Nov.	1883	.25
131	Silver King, S.	Ariz.	10,000,000	100,000	100	50,000	Jun.	1888	.50	1,950,000	July	1887	.25
132	Silver Mg. of L. V.	N. M.	500,000	500,000	1					25,000	June	1888	.05
133	Silverton, G. S. L.	Colo.	2,000,000	200,000	10	*				80,000	Nov.	1886	.02
134	Small Hopes Cons., S.	Colo.	5,000,000	250,000	20	*				3,112,500	Dec.	1887	.20
135	Smuggler, S. L.	Colo.	600,000	60,000	10					66,700	Aug.	1883	.25
136	Spring Valley, G.	Cal.	200,000	200,000	1	50,000	Oct.	1886	.25	50,000	Jan	1881	25
137	Standard, G. S.	Cal.	10,000,000	100,000	100	25,000	Oct.	1884	.25	3,595,000	Jun.	1888	.05
138	Stormont, S	Utah	500,000	500,000	1	*				155,000	Nov.	1881	.05
139	St. Joseph, L	Mo.	1,500,000	150,000	10	*				844,000	Dec.	1887	.20
140	Surinam, G.	D. G.	3,000,000	300,000	5					105,000	Nov.	1887	.05
141	Swansea, G.	Colo.	600,000	60,000	10	*				9,000	Apl.	1885	.02½
142	Syndicate, G.	Cal.	10,000,000	100,000	100	38,729	July	1882	.15	48,308	Sept	1885	.10
143	Tamarack, C.	Mich.	1,000,000	40,000	25	520,000	Apl.	1885	3.00	640,000	Dec.	1888	5.00
144	Tip Top, S	Ariz.	10,000,000	100,000	100	250,000	Sept	1883	.25	100,000	Nov	1881	.20
145	Tombstone, G. S. L.	Ariz.	12,500,000	500,000	25	*				1,250,000	Apl.	1882	.10
146	United Verde, C.	Ariz.	3,000,000	300,000	10	*				97,500	Feb.	1884	.20
147	Valencia, G.	N. H.	150,000	1,500	100	*				37,500	Apl	1886	2.50
148	Viola Lt., S. L.	Idah.	750,000	150,000	5	*				272,500	Oct.	1888	.37½
149	Yankee Girl	Colo.	2,500,000	250,000	10					1,275,000	July	1887	.10
150	Yellow Jacket, G. S.	Nev.	12,00000	120,000	100	5,448,000	Dec	1885	.75	2,184,000	Aug	1871	1.50

NON-DIVIDEND-PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shares. No.	Par Value.	Assessments. Total levied.	Date & am't of last.		
1	Agassiz Cons., S. L.	Colo.	$2,500,000	50,000	$50	*			
2	Allouez, C.	Mich	2,000,000	80,000	25	$657,000	Jun	1888	1.00
3	Alpha Con., G. S.	Nev.	3,000,000	30,000	100	562,500	Nov.	1888	87½
4	Alta, S.	Nev.	10,080,000	100,800	100	2,241,600	Sept	1888	.50
5	Amador, G.	Cal.	400,000	200,000	2	*			
6	American Flag, S.	Colo.	1,250,000	125,000	10	300,000	Jun	1877	.50
7	Anglo-Montana, Lt.	Mon.	600,000	120,000	5				
8	Appalachian, Lt., G.	N. C.	1,500,000	300,000	5				
9	Barcelona, G.	Nev.	5,000,000	200,000	25	*			
10	Bechtel Con., G.	Cal.	10,000,000	100,000	100	173,500	Jan.	1883	.10
11	Belmont, S.	Nev.	5,000,000	50,000	100	735,000	Apl.	1886	.10
12	Best & Belcher, G. S.	Nev.	10,080,000	100,800	100	2,054,590	Oct.	1888	.25
13	Big Pittsburg, S. L.	Colo.	20,000,000	200,000	100	*			
14	Bi-Metallic, S.	Mon.	5,000,000	200,000	25	*			
15	Black Oak, G.	Cal.	3,000,000	300,000	10	*			
16	Boston Con., G.	Cal.	10,000,000	100,000	100	170,000	Nov	1883	
17	Bremen, S.	N. M.	5,000,000	500,000	10	*			
18	Brunswick, G.	Cal.	2,000,000	400,000	5	*			
19	Bullion, G. S.	Nev.	10,000,000	100,000	100	4,007,000	Aug.	1888	
20	Bye and Bye	Ariz.	1,000,000	100,000	10	*			.25
21	Calaveras, G.	Cal.	500,000	500,000	1	*			
22	Carisa, G	Wy.	500,000	100,000	5	*			
23	Carupano, G. S. L. C.	Ven.	200,000	100,000	2	*			.50
24	Cashier, G. S.	Colo.	500,000	250,000	2	*			
25	Cen. Contin'l, G.S.L.	C.&A	2,000,000	200,000	10	*			
26	[illegible]arles Dickens, G.S.	Idah.	1,250,000	250,000	5	*			
27	Cherokee, G.	Cal.	1,500,000	150,000	10				
28	Chollar, S.	Nev.	11,200,000	112,000	100	1,320,000	Oct.	1888	
29	Cinnamon Mt., G.S.	Colo	750,000	150,000	5				
30	Cleveland, T.	Dak.	1,000,000	500,000	2	*			
31	Colchis	N.M.	500,060	50,000	1				
32	Comstock, G. S.	Nev.	10,000,000	100,000	100	30,000	Mar.	1887	.50
33	Con. Imperial, G. S.	Nev.	5,000,000	50,000	100	1,175,600	Sept	1887	
34	Con. Pacific, G.	Cal.	6,000,000	60,000	100	177,000	Sept	1887	
35	Cons. Silver, S.	Mo.	2,500,000	250,000	10				
36	Courtlandt	Colo.	500,000	50,000	10				.15
37	Crescent, S. L.	Colo.	3,000,000	300,000	10	*			.25
38	Crocker, S.	Ariz.	10,000,000	100,000	100	105,000	Feb.	1888	.10
39	Crowell, G.	N. C.	500,000	500,000	1				
40	Dahlonega, G.	Ga.	250,000	250,000	1	*			
41	Dandy, S.	Colo.	5,000,000	500,000	10				
42	Dardanelles, G.	Cal.	1,000,000	100,000	10				.20
43	Decatur, S.	Colo.	1,500,000	300,000	5	*			
44	Denver City, S. L	Colo.	5,000,000	500,000	10	*			
45	Denver Gold, G.	Colo.	300,000	60,000	5				
46	Durango, G.	Colo.	500,000	500,000	1	*			
47	Eastern Dev. Co., Lt.	N. S.	1,500,000	150,000	10	990,000	Mar.	1886	
48	El Cristo, G. S.	U.S.C	1,000,000	500,000	2				
49	El Dorado, G	Cal.	1,000,000	250,000	4	*			
50	El Talento, G.	U.S.C	1,000,000	500,000	2				
51	Empire, S.	Utah	10,000,000	100,000	100				1.00
52	Eureka Tunnel, S. L.	Nev.	10,000,000	100,000	100	*			
53	Exchequer	Nev.	10,000,000	100,000	100	790,000	Sept	1888	
54	Found Treasure, G.S.	Nev.	10,000,000	100,000	100	18,030	July	1882	
55	Gogebic I. Syn., I	Wis.	5,600,000	200,000	25				
56	Gold Cup, S.	Colo.	500,000	500,000	1	*			
57	Golden Era, S.	Mon.	2,000,000	200,000	10	*			.90
58	Gold Placer, G.	Colo.	5,000,000	200,000	25	229,314	Dec.	1885	.06
59	Gold Rock, G.	Cal.	1,000,000	500,000	2	*			
60	Goodshaw, G.	Cal.	10,000,000	100,000	100	*			
61	Grand Belt, C.	Tex.	12,000,000	120,000	100				
62	Grand Duke	Colo.	800,000	80,000	10				.25
63	Great Remance, G.	U.S.C	1,000,000	500,000	2	*			
64	Gregory-Bobtail, G.	Colo.	550,000	550,000	1	*			
65	Gregory Con., G.	Mon.	3,000,000	300,000	10				
66	Harlem M.& M.Co., G.	Cal.	1,000,000	200,000	5				
67	Head Cent. & Tr., S. G	Ariz.	10,000,000	100,000	100				
68	Hector, G.	Cal.	1,500,000	300,000	5				
69	Highland, C	Mich	500,000	25,000	25				
70	Hollywood	Cal.	200,000	100,000	2				
71	Hortense, S.	Colo.	2,000,000	200,000	10				
72	Huron, C	Mich	1,000,000	40,000	25	280,000	May	1887	3.00
73	Iron Gold & Silver, S	N. M.	2,000,000	200,000	10	*			
74	Ironton, I.	Wis.	1,000,000	40,000	25				
75	Iroquois, C	Mich	1,250,000	50,000	25				
76	J. D. Reymert	Ariz.	10,000,000	100,000	100	*			
77	Julia Cons., G. S.	Nev.	11,000,000	110,000	100	1,650,000	Apl.	1887	.10
78	Kearsarge, C.	Mich	1,250,000	50,000	25	190,000	Oct.	1887	1.00
79	Lacrosse, G.	Colo.	1,000,000	100,000	10	*			
80	Lee Basin, S. L.	Colo.	5,000,000	500,000	10	*			
81	Lucerne, S.	Colo.	5,000,000	500,000	10	*			
82	Mammoth Bar., G.	Cal.	10,000,000	100,000	100	50,000	Dec.	1881	
83	May Belle, G.	Cal.	10,000,000	100,000	100	84,000	Mar.	1884	.15
84	Mayflower Gravel	Cal.	1,000,000	100,000	10	425,000	July	1888	1.50
85	Medora, G.	Dak.	250,000	250,000	1				
86	Mexican, G. S	Nev.	10,000,000	100,000	100	2,725,760	Aug.	1888	.25
87	Middle Bar G.	Cal.	400,000	200,000	2	*			
88	Mize & Starr, S. L.	Colo.	1,000,000	200,000	5	*			
89	Monitor, G.	Colo.	100,000	100,000	1	*			
90	Moose Silver, S.	Colo.	3,000,000	300,000	10				
91	Native, C.	Mich	1,000,000	40,000	25				
92	Neath, G.	Colo.	1,000,000	100,000	10				
93	Nevada Queen, S.	Nev	10,000,000	100,000	100	130,000	Dec.	1887	.50
94	New Germany, G	N. S.	100,000	100,000	1	*			
95	New Pittsburg, S L	Colo.	2,000,000	200,000	10	*			
96	North Standard, G.	Cal.	10,000,000	100,000	100	20,000	Nov		
97	Noonday	Cal.	600,000	60,000	10	203,000	Dec.	1881	.10
98	Oneida Chief, G.	Cal.	500,000	125,000	4	*			
99	Oriental & Miller, S.	Nev.	10,000,000	400,000	10				
100	Osceola, G.	Nev.	5,000,000	50,000	25	*			
101	Overman, G. S.	Nev.	11,520,000	115,200	100	3,737,180	Aug.	1887	.25
102	Park, S.	Utah	2,000,000	200,000	100				
103	Peer, S.	Ariz.	10,000,000	100,000	10	125,000	Nov.	1886	.10
104	Peerless, S.	Ariz.	10,000,000	100,000	100	345,000	Apl.	1888	.25
105	Phœnix	Ariz.	500,000	500,000	100				
106	Phœnix, G. S.	Ark.	5,000,000	200,000	1	*			
107	Phœnix Lead, S. L.	Colo.	100,000	100,000	25	*			
108	Pilgrim, G.	Cal.	600,000	300,000	1	*			
109	Potosi, S.	Nev.	11,200,000	112,000	2	1,349,600	July	1885	.50
110	Proustite, S.	Idah	250,000	250,000	100	*			
111	Puritan S. G.	Colo.	1,500,000	150,000	1	*			
112	Quincy	Colo.	3,000,000	300,000	10				
113	Rappahannock, G.S.	Va.	250,000	250,000	10	*			
114	Red Elephant, S.	Colo.	500,000	500,000	1	*			
115	Ropes, G. S.	Mich	2,000,000	80,000	1	103,200	July	1887	.50
116	Russell, G	N. C.	1,500,000	300,000	25				
117	Sampson, G. S. L.	Utah	10,000,000	100,000	5	288,157	July	1888	1.00
118	San Sebastian, G.	San.S	1,600,000	320,000	5	*			
119	Santiago, G.	U.S.C	400,000	1,200,000	2	*			
120	Security, S.	Colo.	10,000,000	1,000,000	10				
121	Sheridan	N. M.	2,000,000	200,000	10				
122	Silver Queen, C.	Ariz.	5,000,000	200,000	25	*			
123	South Bulwer, G	Cal.	10,000,000	100,000	100	100,000	May	1881	.25
124	South Hite	Cal.	10,000,000	100,000	100	195,000	Jan.	1883	.05
125	South Pacific	Cal.	500,000	100,000	5				
126	Stanislaus, G.	Cal.	2,000,000	200,000	10				
127	State Line, S.	Nev.	250,000	250,000	1				
128	St. Kevin, G. S.	Colo.	100,000	100,000	1	*			
129	St. Louis & Mex., S.	Mex.	5,000,000	500,000	10	*			
130	St. Louis & St. Elmo	Colo.	2,000,000	200,000	10				
131	St. L. & St. Felipe, G. S.	Mex.	1,500,000	150,000	10				
132	St. L. & Sonora, G.S.	Mex.	1,500,000	150,000	10				
133	St. Louis-Yavapai	Ariz.	3,000,000	300,000	10	*			
134	Sunday Lake, I.	Mich	1,250,000	50,000	25				
135	Sullivan, G. S. L.	Me.	500,000	100,000	5	125,000	Dec.	1882	.25
136	Sutro Tunnel	Nev.	20,000,000	2,000,000	10				
137	Sylvanite, S	Colo.	5,000,000	500,000	10	*			
138	Taylor-Plumas, G.	Cal.	1,000,000	200,000	5	10,000	Feb.	1888	.03
139	Tioga Cons., G.	Cal.	10,000,000	100,000	10	295,0 0	May	1888	.10
140	Tornado Cons. G S.	Nev.	100,000	100,000	1	*			
141	Tortilita, G. S.	Ariz.	1,000,000	100,000	2	*			
142	Tuscarora, S.	Nev.	10,000,000	500,000	100	110,00	Oct.	1881	.1[illegible]
143	Union Con., G S.	Nev.	10,000,000	100,000	100	2,185,000	Nov	1887	.50
144	Utah, S.	Nev.	10,000,000	100,000	100	120,000	Oct.	1888	.20
145	Washington, C.	Mich	1,000,000	40,000	25				
146	West Granite Mt., S.	Mon.	5,000,000	500,000	10	*			
147	Zelaya, G. S	C. A.	600,000	300,000	2	*			
148									
149									

G. Gold. S. Silver. L. Lead. C. Copper. * Non-assessable. † This company, as the Western, up to Dec. 10th, 1881, paid $1,400,000. ‡ Non-assessable for three years. § The Deadwood previously paid $275,000 in eleven dividends, and the Terra $75,000. Previous to the consolidation in Aug., 1884, the California had paid $31,320,000 in dividends, and the Con. Virginia, $24,390,000. ** Previous to the consolidation of the Copper Queen witt the Atlanta, Aug., 1885, the Copper Queen had paid $1,350,000 in dividends. ¶ 1,000,000.

NEW YORK MINING STOCKS QUOTATIONS.

DIVIDEND-PAYING MINES

NAME AND LOCATION OF COMPANY.	Dec. 1. H.	Dec. 1. L.	Dec. 3. H.	Dec. 3. L.	Dec. 4. H.	Dec. 4. L.	Dec. 5. H.	Dec. 5. L.	Dec. 6. H.	Dec. 6. L.	Dec. 7. H.	Dec. 7. L.	SALES.
Adams, Colo.	.50		.50										1,500
Alice, Mont													
Argenta, Nev													
Bassick, Colo													
Belcher, Nev													
Bodie Cons., Cal									1.80				100
Breece, Colo									.24				100
Bulwer, Cal													
Caledonia, Dak									3.65	3.60			200
Calumet & Hecla	275	270											15
Challar, Nev			3.80										15
Chrysolite, Colo													
Colorado Cent'l, Colo.													
Cons. Cal. & Va., Nev.			11.50								11.75	11.63	300
Crown Point, Nev													
Deadwood, Dak									1.90	1.75			400
Dunkin, Colo.													
Eureka Cons., Nev													
Father de Smet, Dak													
Freeland, Colo.													
Gould & Curry, Nev.													
Grand Prize, Nev.													
Hale & Norcross, Nev									6.00				10
Holyoke, Idaho						.06			.07				300
Homestake, Dak					12.00	11.88							225
Horn Silver, Ut.			1.00		.80				.88		.80		3,050
Iron Hill, Dak.			.12										500
Iron Silver, Colo.	3.40												100
Leadville C., Colo.													
Little Chief, Colo.	.22		.23	.20	.21	.20	.20						2,500
Little Pittsburg, Colo													
Martin White, Nev.													
Mono, Cal													
Mount Diablo, Nev.													
Navajo, Nev			2.40										100
North Belle Isle, Nev.									3.00		3.60	2.90	400
North Star, Cal.													
Ontario, Ut.											33.13		50
Ophir, Nev			8.00										200
Plutus, Colo.	.83	.77	.85		.80		.80		.80		.78	.77	2,900
Plymouth, Cal.			10.75	10.00	10.38	9.63							314
Quicksilver Pref., Cal							36.00		37.00				200
" Com., Cal					6.75		6.50						200
Robinson Cons. Colo.													
Savage, Nev					4.65				4.00				125
Sierra Nevada, Nev.													
Silver King, Ariz.	1.15	1.10	1.15		1.25	1.05	1.25	1.05	1.15		1.20	1.05	4,840
Silver Mg. of L. V.	.30		.28		.29	.28							3,000
Small Hopes, Colo.													
Standard, Cal											1.60	1.25	700
Stormont, Utah													
Yellow Jacket													

NON-DIVIDEND-PAYING MINES

NAME AND LOCATION OF COMPANY.	Dec. 1. H.	Dec. 1. L.	Dec. 3. H.	Dec. 3. L.	Dec. 4. H.	Dec. 4. L.	Dec. 5. H.	Dec. 5. L.	Dec. 6. H.	Dec. 6. L.	Dec. 7. H.	Dec. 7. L.	SALES.
Allouez, Mich.													
Amador, Cal.	2.25		2.25		2.25		2.25		2.25		2.25	2.00	2,600
Am'can Flag, Colo.													
Astoria, Cal.	.24		.24		.24		.25	.24	.25	.24	.25	.24	6,000
Barcelona, Nev.			.65	.63			.68	.67	.66	.65			5,700
Bechtel, Cal.					.10								100
Best & Belcher, Nev.													
Brunswick, Cal.					.10		.10	.09			.09		2,100
Buffalo Iron Min'g.	6.50	6.13	6.38	6.13	6.38	6.00	6.25	6.13	6.25	6.13	6.25	6.13	3,000
Bullion, Nev.	1.95		2.00				2.05		2.15		1.95		600
Cashier, Colo													
Castle Creek, Id.													
Central Arizona													
Cleveland, Dak.													
Colchis, N. M.	2.15	2.10	2.10	2.05	2.10		2.05		2.05	2.00	2.05	2.00	1,120
Commonwalth, Nev											3.85		200
Con. Imperial, Nev													
Con. Pacific													
Denver City, Colo.	.12												500
Eastern Oregon													
El Cristo, U. S. Col.							.78		.80		.80	.75	700
Excelsior, Cal													
Exchequer, Nev.	1.85		1.80		1.95				1.85		1.75		700
Hollywood, Cal.	.41	.40	.40		.40		.41	.40	.41	.40	.41	.40	6,600
Huron, Mich.													
Julia, Nev.	.50		.50		.35		55		.55				900
Kingst'n & Pemb'ke					.88								200
Kossuth, Nev.													
Lacrosse, Colo													
Lee Basin, Colo													
Mexican Nev.													
Middle Bar, Cal.					.38		.38		.38		.39		1,900
Monitor, Colo.				.06	.05								1,200
Mutual Sm. & M. Co.			1.75		1.75	1.70	1.70		1.60		1.60		1,100
Oriental & Miller													
Phœnix Lead, Colo.													
Phœnix of Ark.													
Rappahannock, Va.	.10		.10		.10		.10		.10		.10		4,200
San Sebastian, S'nS													
Santiago, U. S. Col.													
Shoshone, Idaho	.09		.09				.10	.09	.10	.09	.09		5,200
Silver Cliff, Colo													
Silver Cord, Colo.	.80												300
Silver Hill							.11						200
State Line I. & A., Nev													
" 2d S. "													
Sutro Tunnel, Nev.	.12	.11	.11		.10		.11	.09	.09				10,2 0
" Trust Cert	.70								.75		.66		1,015
Sutter Creek, Cal.													
SylvaniteM. & M. Col	3.15	3.10											
Tornado, Nev.													
Union Con., Nev.											.15		500
United Copper	.56		.55		.60	.57	.58		.59		.56		2,400

Ex. dividend. †Dealt in at the New York Stock Ex. Unlisted Securities ‡Assessment unpaid. Dividend shares sold, 22,179. Non-dividend shares sold, 59,735 Total New York, 81,914

BOSTON MINING STOCK QUOTATIONS.

NAME OF COMPANY	Nov. 30.	Dec. 1.	Dec. 3.	Dec. 4.	Dec. 5	Dec. 6.	SALES.
Atlantic, Mich.	18.00	18.00	18.00 17.75			18.00 17.63	455
Bodie, Cal.							
Bonanza Developm't	1.50	1.50	1.50	1.50		1.69 1.50	2,000
Bost. & Mont., Copper	74.50 73.00	73.00 72.50	73.00 72.00	71.00 69.75	70.00 69.00	71.00 70.00	2,987
Breece, Colo.	.27						1,000
Calumet & Hecla	300 295	270 258	280 270	285 281	285 283	300 295	1,795
Catalpa, Colo.	.19	.18	.18	.18		.18	1,000
Central, Mich.							
Chrysolite, Colo							
Con. Cal & Va., Nev.							
Dunkin, Colo.	.95	.92½	.97½ .95	.95		.95	2,000
Enterprise							
Franklin, Mich.	17.38 17.25	17.00	17.25	17.25	17.00	17.00	1,155
Hale & Norcross, Nev.							
Honorine, Utah							
Little Chief, Colo.							
Little Pittsburg, Colo.							
Martin White, Nev.							
Mono, Cal.							
Napa, Cal.		2.25	2.00	2.13		2.13	850
Ontario							
Osceola, Mich.		21.00 20.50		20.00		20.00	405
Pewabic, Mich.	6.00	6.00	6.00	5.75	6.00	6.00	1,250
Quincy, Mich.	84.00	84.00 83.00	88.00 82.50			81.00 79.00	220
Ridge, Mich.		2.13 2.00	2.00			2.00	700
Sierra Nev., Nev.							
Silver King, Ariz.						1.15	100
Standard, Cal.							
Tamarack, Mich.	173 170	172 171		173¼ 173	174¼ 174	175 174¾	259

NAME OF COMPANY.	Nov 30.	Dec. 1.	Dec. 3.	Dec. 4.	Dec. 5.	Dec 6.	SALES
Allouez, Mich.	4.13	4.50 4.25	4.50 4.25	4.38 4.00	4.13 3.75	4.13 4.00	2,270
Arnold, Mich.							
Aztec, Mich.							
Brunswick, Cal.							
Butte & Boston			28.00	28.00 27.50			1,000
Canada							120
Crescent, Colo.							
Cusi, N. Mex.							
Denver City, Colo.							
Everett							
Hanover, Mich.							
Humboldt, Mich.		.15					200
Hungarian							
Huron, Mich.	5.50 5.50			6.00			400
Kearsarge, Mich.	12.75 12.13	12.50	12 25 12 00	12.00	11.50 11.00	12.00 10.50	1,475
Mesnard, Mich.		.60					150
National, Mich.	8.75 8.50	8.50	9.00 8.50	8.63	8.00	8.50 7.75	1,240
Native, Mich.							
Pontiac		.40	.40			.35	350
Rappahannock, Va.							
Rockland							
Security, Colo							
Shoshone Idaho							
South Side, Mich.							
St. Louis Cop.							
St. Mary's						.25	100
Sutro Tunnel		.25	.25	.10		.25	400
Washington				.25			400
Winthrop, Mich.							

Boston: Dividend shares sold, 16,176. Non-dividend shares sold, 7,105. Total Boston, 23,281.

COAL STOCKS.

NAME OF COMPANY.	Par val. of sh'rs.	Dec. 1. H.	Dec. 1. L.	Dec. 3. H.	Dec. 3. L.	Dec. 4. H.	Dec. 4. L.	Dec. 5. H.	Dec. 5. L.	Dec. 6. H.	Dec. 6. L.	Dec. 7. H.	Dec. 7. L.	Sales.
American Coal														
Barclay Coal														
Cameron Coal & Iron Co		22	21½			21¾	21½	21	20½			21¾	21½	1,000
Ches. & O. RR.	100													
Chic. & Ind. Coal RR.	100													
Do. pref.	100													
Col. & Hocking Coal	100											20¼		100
Col., C. & I	100	32½	32½	31½	31	31¼	30¼	30	29½	30½	29¾	30¾	30	371
Consol. Coal	100			26⅝				26⅝						
Del. & H. C.	100	118⅝	118¼	119	118¼	119	118¾	118¾	118¼	119	118¼	120⅛	119¼	10,581
D., L. & W. RR.	50	137½	136⅝	136¼	135⅝	136¼	135¼	135½	134	134⅞	133¾	136¼	134¾	152.010
Hocking Valley	100	24½	24¼	25	23	24	23	23½	23	24	23¾	24½		2,200
Hunt. & Broad Top														
Do. pref		46½												100
Lehigh C. & N.	50			51½		51½	51¼	51½	51⅜	51¼				625
Lehigh & W. B. Coal														
Lehigh Valley RR.	50	54¾		54¾	54¼	54⅜	54¼	54¼	54⅛	54⅛				1,473
Mahoning Coal RR.	100													
Do. pref.														
Marshall Con. Coal	100					15	14⅞							300
Maryland Coal	100													
Montauk Coal	50													
Morris & Essex	100			145½	145									34
New Central Coal	100			101¼	9¾							103⅜		310
N. J. C. RR.	50	89½		89⅝	88⅞	89¾	89½	89⅜	87½	89¼	88¾	90¼	89¼	7,760
N. Y. & S. Coal	100													
N. Y., Susq. & Western	100	8¼		8¼				8½	8					1,000
Do. pref.	100	31½		31	30½	30½	30¾	30		30		30¼	30½	1,650
N. Y. & Perry C. & I.	100													
Norfolk & Western R.R.	100	16⅝		16½		16½		16¼				16¾		500
Do. pref.	50	48⅞	48¼	48½	47½	48¼	48	48	47⅞	49	48⅛	49⅛	48⅝	11,512
Penn. Coal	50													
Penn. RR.	50	53⅜	53⅜	53¼	53	53¼	53⅛	53¼	53	53⅜	53⅛			3,309
Ph. & R. RR.**	50	47¼	46⅞	46¾	45¼	46¼	45¼	46	44⅝	45⅛	44⅛	46	45⅝	369,236
Tennessee C. & I. Co.	100	34¼		33¾	33	33¾	33⅛	33⅛	32¾	34	33⅛	34⅛	34¼	3,533
Do. Pref.						95½				95¼		94		135
Westmoreland Coal	100									*67				
Wyoming Valley Coal														

*Bid. †Asked.
**Of the sales of this stock, 75,941 were in Philadelphia, and 293,236 in New York. Total sales, 568,739.

San Francisco Mining Stock Quotations.

COMPANY	CLOSING QUOTATIONS. Nov. 30.	Dec. 1.	Dec. 3.	Dec. 4.	Dec. 5.	Dec. 6.
Alpha						
Alta	3.00	3.00	3.15	3.10	3.10	2.80
Belcher						
Belle Isle						
Best & Bel.	7.38	7.50	7.13	7.38	7.25	6.75
Bodie	1.85	1.85	1.80	1.70	1.75	1.55
Bulwer	.60		.60	.60	.55	.50
Challar	4.05		4.25	4.00	4.00	3.65
C'm'weal'h	3.85	3.75		3.75		3.75
Con. C. & V	11.38	11.50	11.88	11.38	11.50	10 50
Con. Pac.						
Crown Pt.	5.50	5.63	6.00	6.00	6.00	5.25
Eureka C.						
Gould & C.	4.50		4.70	4.55	4.55	4.00
Grd. Prize.						
Hale & N.	6.13	6.13	6.38	6.13	6.25	5.75
Mexican	4.90	4.95	5.25	5.00	5.25	4.80
Mono	1.36		1.40	1 35		1.35
Mt. Diablo						
Navajo	2.55	2.50	2.50	2.50	2.50	
Nev. Queen	3.50		3.50			3.05
N. Belle I.	3.20		3.10	3 50	3.00	2.95
Ophir	7.63		8.50	8.13	8.15	7.75
Potosi	3.70	3.75	3 85	3.60	3.55	3.30
Savage	4.50	4.25	4 65	4.50	4.35	3.90
Scorpion						
Sierra Nev	3.85	3.80	4.10	3.95	3.90	3.55
Sutro Tun.						
Tip Top						
Union Con.	3.85	3.90	4 20	4.00	4.05	3.75
Utah	1.50		1.70	1.65	1.65	1.50
Yellow Jkt.	5.25	5.25	5.38	5.25	5.13	4.85

have both occurred since the last annual report, and when that was written there was neither indication or reason for conjecture for any failure of the upper portion of the 250 level to provide a handsome revenue.

At the writing of the last report tunnels were being rapidly driven to place the entire ground from the 143 level to the bottom of the old surface workings under command, and to provide for economical handling. This work was prosecuted upon the results of the lower 250 development, and the appearances of a cross-cut at the 119 level, which latter was correctly referred to in the report mentioned. Almost an entire sill floor has been taken out on the 143 level since established, with most disappointing results. Winzes have been sunk, one being from the surface through this upper ground, and the systematic and considerable work of prospecting and development have clearly shown that where there was a large block of ground nearly 200 feet high that there was every possible reason to pronounce as good and available a year ago, has, while containing small sections that carried silver bearing minerals, proven "en masse" entirely unavailable.

The 119 cross-cut was laid out from a study of careful surveys and mapping, and as is now shown, traversed by happy accident one of the latter mentioned sections. Where such a princely output was made from the old open pit at the surface, and the lower portion of the 250 level had proven so good, none but a confirmed skeptic could have conjectured a year ago otherwise than that there were two or three years successful work in hand.

The upper pay shoot stands to-day entirely worked out, except the comparatively barren ground recently proven.

The second pay shoot had only a small volume of ore left in it, on the 800 level, in October. There now remains to go below the 900 and prospect for a third pay shoot, the existence of which seems entirely possible with the knowledge of all the conditions of the vast volume of ground above.

The assessment was levied June 23d (or 22d), as a protective measure, and the large summer's output was made afterwards in somewhat uncertain ground, but believed to be good. The stock declined from $1.25 to $1.05.

Electric Stock Quotations.

The following are the latest quotations, prepared for the ENGINEERING AND MINING JOURNAL by Messrs. Crosman & Quick, brokers, New York city: Edison, $120@$125; Edison Illuminating, $83@$86; Brush, $35@$45; Brush Illuminating, $80@$110; United States, $20@$30; United States Illuminating, $45@$55; Daft, $40@$60; Consolidated, $50.

Meetings.

American Contracting and Dredging Company, No. 47 Exchange Place, Rooms 29-32, New York city, December 11th, at three o'clock P.M.

Dividends.

The following dividends have been declared:

Caledonia Gold Mining Company, of Dakota, dividend No. 6, eight cents per share, or $8000, payable December 26th.

Mammoth Mining Company, of Utah, dividend No. 7, $10,000, payable December 15th, in Salt Lake City,

New York & Honduras Rosario Mining Company, dividend No. 6, ten cents per share, or $15,000, and an extra dividend, No. 7, fifteen cents per share, or $22,500, both payable December 20th at No. 347-349 Produce Exchange, N. Y. City.

Tamarack Mining Company, of Michigan, dividend No. 4, five dollars per share, or $200,000, payable January 1st to stockholders of record December 20th.

Assessments.

COMPANY.	No.	When levied.	D'l'nq't in office.	Day of Sale.	Amn't per share.
Alpha, Nev.	24	Nov. 3	Dec. 8	Dec. 28	.87½
Alpha Cons., Nev.	2	Nov. 3	Dec. 8	Dec. 28	.25
Bear Butte, Dak.	3	Oct. 22	Nov. 30	Dec. 17	.002½
Bellevue, Idaho	—	Nov. 10	Dec. 20	Jan. 20	.15
Benton Cons., Nev.	18	Oct. 29	Dec. 3	Dec. 24	1.00
Best & Belcher, Nev.	41	Oct. 16	Nov. 21	Dec. 11	.25
Blue Bird, Dak.	3	Oct. 25	Nov. 26	Dec. 17	.001
Caledonia, Nev.	43	Oct. 19	Nov. 21	Dec. 12	.15
Concordia, Nev.	2	Nov. 12	Dec. 13	Dec. 29	.50
Cons. Imperial, Nev.	25	Oct. 16	Nov. 21	Dec. 12	.05
Cora, Dak	3	Nov. 10	Dec. 15	Jan. 10	.01
Del. Monte, Nev.	1	Oct. 15	Nov. 20	Dec. 12	.25
Found Treasure, Nv.	4	Oct. 25	Nov. 30	Dec. 21	.06
Garden City, Dak.	2	Nov. 3	Dec. 3	Dec. 18	.001
General Crook, Dak.	5	Oct. 12	Dec. 1	Dec. 20	.002
Gray Eagle, Cal.	10	Nov. 13	Dec. 18	Jan. 8	.05
Huron Mt. L. & M., Mich.	....	Nov. 5	Dec. 5	.....	.02½
John Duncan, Mich.	....	Nov. 14	Dec. 15	.....	.25
Keyes, Nev.	3	Oct. 22	Nov. 24	Dec. 15	.25
Last Chance, Cal.	13	Nov. 9	Dec. 11	Jan. 5	.10
Live Oak Drift, Cal.	11	Nov. 19	Dec. 21	Jan. 16	.05
Monarch, Dak.	7	Nov. 20	Dec. 22	Jan. 6	.01
Montrose, Colo.	1	Oct. 3	Dec. 26	*Jan. 28	.01½
Mayflower, Nev.	45	Oct. 16	Nov. 16	Dec. 10	.50
North Belle Isle, Nv.	13	Oct. 23	Nov. 27	Dec. 19	.50
N. Commonw'th, Nv.	1	Oct. 15	Nov. 19	Dec. 11	.30
Overland, Idaho	..	Nov. 1	Dec. 10	Dec. 31	.30
Potosi	31	Oct. 1	Nov. 6	Nov. 27	.50
Russell, Cal.	3	Oct. 18	Nov. 26	Dec. 17	.10
Seabury Calkins, Dak.	10	Oct. 15	Nov. 20	Dec. 10	.06½
Sierra Nevada, Nev.	93	Nov. 9	Dec. 13	Jan. 2	.25
Silver King, Dak.	1	Nov. 2	Dec. 3	Dec. 18	.001
Trent, Dak	1	Nov. 9	Dec. 11	Dec. 28	.001
Troy, Dak.	2	Nov. 1	Dec. 6	Dec. 22	.002
Wall St., Dak.	1	Sept. 20	*No. 13	*Dec. 10	.001½

*Delinquent day and day of sale postponed to dates given above.

uction Sale of Stocks.

At the Real Estate Exchange on the 5th inst., the following securities were sold at auction:

200 shares Quicksilver Mining Co., preferred, $100 each, $34; 280 shares Ashburton Coal Co., $4; 20 shares Central Iron Works, of Harrisburg, Pa., $500 each, $150; 21 shares Delaware & Hudson Canal Co, $100 each, $118; 20 shares Consumers' Coal Co., $5 each, $17; 200 shares Rocker Silver Mining Co., $5 each, $1; 100 shares Maryland Coal Co., $100 each, $11½; 20 shares Pennsylvania Coal Co., $50 each, $300; 80 shares Standard Oil Trust, $100 each, $165; 185 shares Standard Oil Trust, $100 each, $165; 1000 shares Kentucky Petroleum & Mining Association, 138 shares Kentucky Oil Co., 120 shares Red River Oil Co., $1 for lot; 200 shares Independence Mining Co., 2000 shares Decatur Silver Mining Co., 100 shares Lilybegrud Oil & Mining Co., 200 shares Excelsior Petroleum Co., 200 shares Idaho Gold Mining Co., 1000 shares Findley Gold Mining Co., $5 for lot; 300 shares Central Arizona Mining Co., $7 for lot.

Pipe Line Certificates.

Messrs. Watson & Gibson, brokers, report as follows for the week:

The crude oil market this week got an extreme advance of nearly five cents, without any corresponding advance in the price of refined. The reduction of stocks goes on, and if statistics and a strong commercial situation will insure high prices we may expect a higher range of prices.

NEW YORK STOCK EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
Dec. 1	86½	87⅛	86¼	86⅝	285,000
3	86⅝	86¾	84¾	86⅝	1,348,000
4	87	87⅛	86⅝	86⅝	519,000
5	86⅛	86¾	86	86¼	552,000
6	85⅞	89⅝	85⅞	89⅛	2,177,000
7	89⅛	90⅞	88⅞	88⅞	1,587,000
Total sales in barrels					6,468,000

CONSOLIDATED STOCK AND PETROLEUM EXCHANGE.

	Opening.	Highest.	Lowest.	Closing.	Sales.
Dec. 1	86⅞	87	86⅝	86⅝	587,000
3	86½	86⅞	84½	86⅝	1,778,000
4	86¾	87⅛	86⅝	86⅝	739,000
5	86½	86½	86	86⅛	472,000
6	86	89½	86	89½	2,892,000
7	89¼	91⅛	88⅞	88⅞	2,055,000
Total sales in barrels					8,523,000

St. Louis Mining Stocks. Dec. 5.

[From our Special Correspondent.]

The trading on our new Mining Exchange during the past three days has dwindled down to the most insignificant proportions; it is the quiet succeeding the storm, for last week was an active one and transactions were unusually large. The aggregate sales for the week fell but little short of 375,000 shares. West Granite, the "birdie," was the feature of the week. Its proximity to the Granite and the fact that if a strike is ever made it would be a rich one, has given the stock a speculative value it does not possess intrinsically. Besides this, vague rumors have been in circulation for some time past that a rich strike has been made, and this, together with steady and continued buying by good parties, advanced the stock to the present price, 70c., from 12c. It has always been hard to get any reliable information in regard to the property, as its office is in Montana, and St. Louis holders have had to depend almost entirely upon their friends and correspondents in Montana for news. Opinions and statements there are as conflicting as they are here in St. Louis, and it is just as easy to find people who think there is a strike, and others who think there is not one, as it is to find bulls and bears on the stock market. To put the matter squarely, the stock is a gamble pure and simple, with the chances in its favor diminishing every day, just in proportion as their cross-cut tunnels are advanced without developing a good ore-body. The stock holds firm now, at 70 to 72½, and may see higher figures, but will, ultimately, I think, seek a much lower level. Frisco is another Montana property here that keeps the boys guessing. Situated about a mile from the Granite, it has many of the speculative features of the West Granite. In April last a strike was made of high-grade ore, but unfortunately it was not found in paying quantities. A cross-cut is now being driven at a depth of 500 feet, with a view of developing the fact whether or not the seam encountered in the higher workings leads to an ore-body of any size. If struck, the stock will go skyward, but if not ——. During the past week it has ranged from 35 to 41¼, until today, when it broke sharply, and closed at 30 sellers.

A good inquiry prevails for Small Hopes at 72½@75, owing to the rumor in circulation that a dividend will soon be declared. Adams is quiet and weak at 50c. sellers. The annual statement just submitted has had a rather depressing influence on the market. It shows their

ASSETS AND LIABILITIES.

Real estate, mining property		$1,500,000.00
Buildings, machinery and surface improvements		48,850.00
Cash balance		1,712.00
		$1,548,867.12

LIABILITIES.

Capital stock	$1,500,000.00	
Bonds sold	16,000.00	
Bills payable ($34,000 bonds hypothecated)	27,390.43	
Open accounts due	14,015.03	
		1,557,405.46
Liabilities over assets		$8,538.34

Face of bonds hypothecated over liability thereon, $6609.57. Stockholders are urged to subscribe to the remaining bonds unsold, in which event they are assured the mine and mill can be started up on a paying basis at once. The showing is not as bad as it appears on its face. Of the $14,015.03 due on open account, there is $5000 that will not be pressed; the whole thing depends upon how many bonds are sold. I am told there is little doubt but that they will all be taken, in which event the stock would be a good purchase at present figures.

The following is a table of the listed stocks traded in on the Mining Exchange and their close at 1 o'clock Wednesday.

	Bid.	Asked.
Adams, silver, Colorado	40	50
Dinero, silver, Colorado	8	10
Eclipse, silver, Colorado	....	....
Gold King, gold, Colorado	....	35
Gold Run, gold, Colorado	8	10
I. X. L., gold, Colorado	9½	10
Jumbo, gold, Colorado	30	32½
Lady Murphy, silver, Colorado	....	....
Mary Murphy, silver, Colorado	....	....
Mary Foster, silver, Colorado	7	8
Neath, gold, Colorado	....	20
Pat Murphy, silver, Colorado	15	16¼
Phillipps, gold, Colorado	....	20
Ruby Trust, silver, Colorado	40	50
Small Hopes, silver, Colorado	72½	80
Silver Age, silver, Colorado	77½	80
Silver Bell, silver, Colorado	22½	25
Wire Patch, gold, Colorado	37½	40
Anderson, silver, Montana	15	20
Bi-Metallic, silver, Montana	35	36
Golden Era, gold, Montana	7½	8
Granite, silver, Montana	47½	48
Hope, silver, Montana	4.50	4.75
Major Budd, silver, Montana	47½	50
San Francisco, silver, Montana	27½	30
Rena, silver, Montana	3	4
Sidney, silver, Montana	....	....
West Granite, silver, Montana	70	72½
Aztec, gold, New Mexico	....	50
Deep Down, silver, New Mexico	....	....
Mountain Key, gold, New Mexico	1.50	1.55
Iron Clad, silver, New Mexico	....	....
Black Oak, gold, California	35	40
Buckskin, silver, Idaho	....	....
Bariboo, silver, Idaho	....	....
Pine Grove, gold, Idaho	....	....
Central Silver, silver, Arizona	....	40
Golden West, gold, Arizono	80	85
San Pedro, silver, Arizona	5	6
Conception, silver, Mexico	17½	20
Mexican Imp., silver, Mexico	12½	13¾

"THE SCALPER."

Boston Mining Stocks. Dec. 6.

[From our Special Correspondent.]

The fire in the Calumet & Hecla mine on the 29th ult., and the decline in the market value of the stock, has been the feature of the market the past week. At the opening on the 30th there was a rush to sell the stock, and prices rapidly wilted until $255 was reached, a decline of $50 per share from the last sale on the 28th ult. At this point sustaining orders were met and good buying by those who were supposed to know just how matters were at the mine, caused an upward movement to $270, followed by a reaction to $258, but the market quickly recovered, and has steadily advanced ever since, and to day, on reports that the fire was under control and not so serious as had been feared, the stock reached the $300 point again, with but slight reaction. About 2000 shares have changed hands during the week, and those who were scared into selling have been eager purchasers at the higher prices. The rest of the market declined more or less in sympathy with C. & H., but not to any extent, and the feeling is general that the market is a purchase on all declines. Boston & Montana advanced to $74½, but in the general stampede to sell C. & H. and the reports that the mine would shut down for a few weeks on account of the accident it declined to $69, recovering to $71 in the later dealings.

Tamarack advanced to $175 on the announcement of a $5 dividend and the offer to the stockholders of the right to take 10,000 shares of new stock at par.

Quincy was heavy, and on small sales declined from $85@$80.

Franklin continues to rule dull and heavy, declining to $17.

Atlantic steady at $17¾@$18.

Osceola declined to $20, and is rather weak at that.

Kearsarge declined to $11. The mine is not panning out as well as it was expected, and there is a disposition to sell the stock at present rates.

Butte & Boston sold in a small way at $27½@$28. There is not much enthusiasm over this stock, but it may be developed later on.

Allouez was further depressed to $3¾, but the reports from the mine indicate that it is doing a good paying business, and may be in a position to pay a dividend in 1889. The stock was strong to-day at $4@$4⅛.

National declined to $8. Pewabic steady at $5. Huron sold at $5½ and $6. Ridge at $2. Bonanza at $1½@$1⅝.

Silver stocks are dull, with sales of Dunkin at 9½@95c.

A Western paper says the Dunkin mine employs about 45 men, and is shipping 75 tons daily of argentiferous iron ore and a few tons of carbonates. The shipments last month amounted to 2000 tons of iron and 100 tons of carbonates. The former averaged 12 ounces in silver per ton and 45 per cent excess in iron, and the latter 45 ounces silver per ton and 18 per cent lead. It further says the mine is well timbered and equipped, and is increasing facilities, which will call for an additional working force.